ISSN 1484-9402
ISBN 978-1-4249-3583-3

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:

Sangster, P.J., Steele, K.G., LeBaron, P.S., Laidlaw, D.A., Lee, C.R., Carter, T.R. and Lazorek, M.R. 2007. Report of Activities 2006, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report: Southeastern Ontario and Southwestern Ontario Districts, Mines and Minerals Information Centre, and Petroleum Resources Centre; Ontario Geological Survey, Open File Report 6206, 68p.

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 the EIP or Content	MNDM Publication Services	Local: (705) 670-5691 Toll Free: 1-888-415-9845, ext. 5691 (inside Canada, United States)	Pubsales.ndm@ontario.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@ontario.ca
Crown Copyright	Queen's Printer	Local: (416) 326-2678 Toll Free: 1-800-668-9938 (inside Canada, United States)	Copyright@gov.on.ca

Ontario

Ontario Geological Survey
Open File Report 6206

Report of Activities, 2006 Resident Geologist Program

Southern Ontario Regional Resident Geologist Report: Southeastern and Southwestern Ontario Districts, Mines and Minerals Information Centre, and Petroleum Resources Centre

2007

Ontario

ONTARIO GEOLOGICAL SURVEY

Open File Report 6206

Report of Activities, 2006
Resident Geologist Program

Southern Ontario Regional Resident Geologist Report:
Southeastern and Southwestern Ontario Districts,
Mines and Minerals Information Centre, and
Petroleum Resources Centre

by

P.J. Sangster, K.G. Steele, P.S. LeBaron, D.A. Laidlaw, C.R. Lee, T.R. Carter and M.R. Lazorek

2007

Sangster, P.J., Steele, K.G., LeBaron, P.S., Laidlaw, D.A., Lee, C.R., Carter, T.R. and Lazorek, M.R. 2007. Report of Activities 2006, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report: Southeastern Ontario and Southwestern Ontario Districts, Mines and Minerals Information Centre, and Petroleum Resources Centre; Ontario Geological Survey, Open File Report 6206, 68p.

Open File Reports of the Ontario Geological Survey are available for viewing at the John B. Gammon Geoscience Library in Sudbury, at the Mines and Minerals Information Centre in Toronto, and at the regional Mines and Minerals office whose district includes the area covered by the report (see below).

Copies can be purchased at Publication Sales and the office whose district includes the area covered by the report. Although a particular report may not be in stock at locations other than the Publication Sales office in Sudbury, they can generally be obtained within 3 working days. All telephone, fax, mail and e-mail orders should be directed to the Publication Sales office in Sudbury. Use of VISA or MasterCard ensures the fastest possible service. Cheques or money orders should be made payable to the *Minister of Finance.*

Mines and Minerals Information Centre (MMIC) Macdonald Block, Room M2-17 900 Bay St. Toronto, Ontario M7A 1C3	Tel:	(416) 314-3800
John B. Gammon Geoscience Library 933 Ramsey Lake Road, Level A3 Sudbury, Ontario P3E 6B5	Tel:	(705) 670-5615
Publication Sales 933 Ramsey Lake Rd., Level A3 Sudbury, Ontario P3E 6B5	Tel: Fax: E-mail:	(705) 670-5691(local) 1-888-415-9845(toll-free) (705) 670-5770 pubsales.ndm@ontario.ca

Regional Mines and Minerals Offices:

Kenora - Suite 104, 810 Robertson St., Kenora P9N 4J2

Kirkland Lake - 10 Government Rd. E., Kirkland Lake P2N 1A8

Red Lake - Box 324, Ontario Government Building, Red Lake P0V 2M0

Sault Ste. Marie - 70 Foster Dr., Ste. 200, Sault Ste. Marie P6A 6V8

Southern Ontario - P.O. Bag Service 43, Old Troy Rd., Tweed K0K 3J0

Sudbury - Level A3, 933 Ramsey Lake Rd., Sudbury P3E 6B5

Thunder Bay - Suite B002, 435 James St. S., Thunder Bay P7E 6S7

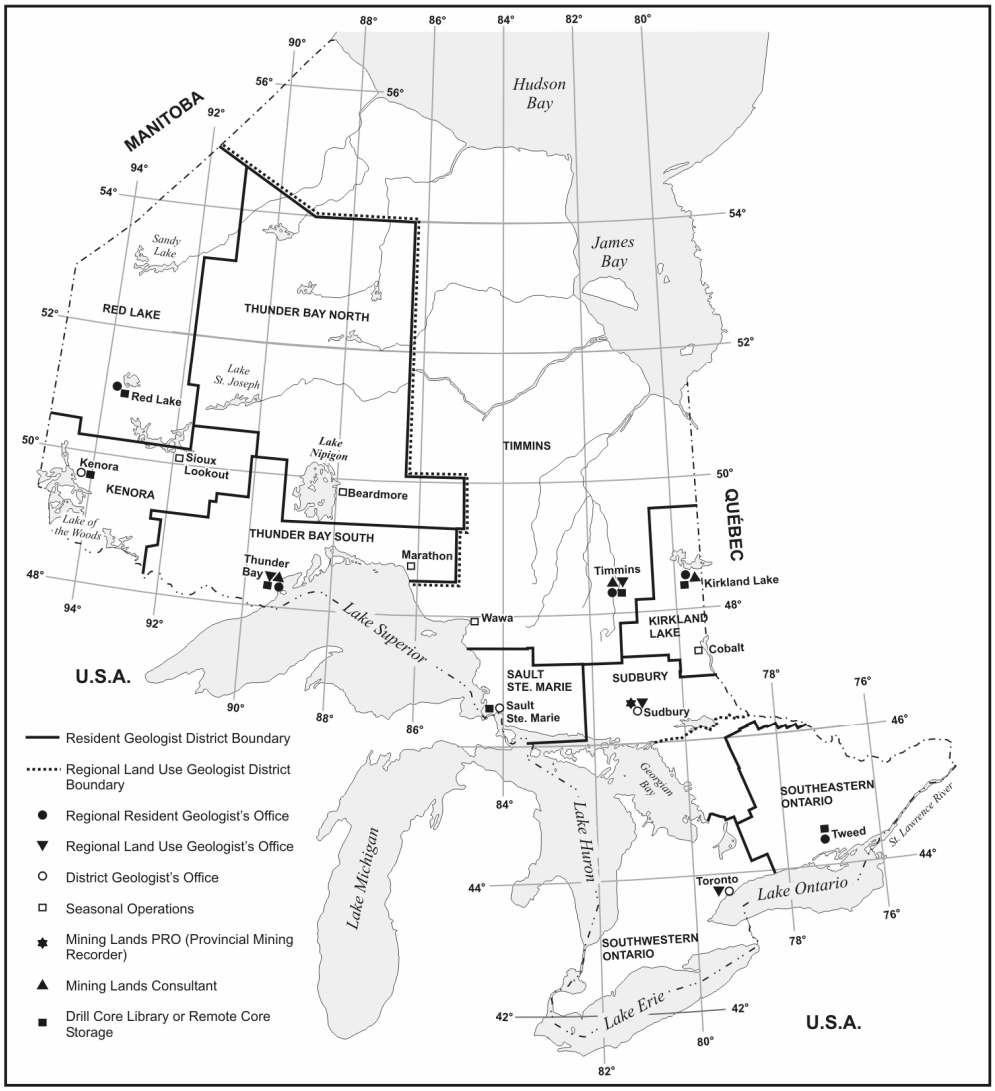
Timmins - Ontario Government Complex, P.O. Bag 3060, Hwy. 101 East, South Porcupine P0N 1H0

Toronto - MMIC, Macdonald Block, Room M2-17, 900 Bay St., Toronto M7A 1C3

Cette publication est disponible en anglais seulement.

Parts of this report may be quoted if credit is given. It is recommended that reference be made in the following form:

Sangster, P.J., Steele, K.G., LeBaron, P.S., Laidlaw, D.A., Lee, C.R., Carter, T.R. and Lazorek, M.R. 2007. Report of Activities 2006, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report: Southeastern Ontario and Southwestern Ontario Districts, Mines and Minerals Information Centre, and Petroleum Resources Centre; Ontario Geological Survey, Open File Report 6206, 68p.



Mines and Minerals Division Regional and District Offices

CITY	ADDRESS	OFFICE(S)	TELEPHONE	FAX
Kenora	Suite 104, 810 Robertson St., Kenora P9N 4J2	○ ■	(807) 468-2819	(807) 468-2930
Red Lake	Box 324, Ontario Government Building, 227 Howey Street, Red Lake P0V 2M0 Temporary Office: 51A Hwy 105	● ■	(807) 727-3272	(807) 727-3553
Thunder Bay – North	Suite B002, 435 James St. S., Thunder Bay P7E 6S7	● ■ ▼ ▲	(807) 475-1331 (807) 475-1368 (807) 475-1311	(807) 475-1112 (807) 475-1112 (807) 475-1124
Thunder Bay – South	Suite B002, 435 James St. S., Thunder Bay P7E 6S7	● ■ ▼ ▲	(807) 475-1331 (807) 475-1368 (807) 475-1311	(807) 475-1112 (807) 475-1112 (807) 475-1124
Sault Ste. Marie	Suite 200, 70 Foster Dr., Sault Ste. Marie P6A 6V8	○ ■	(705) 945-6931	(705) 945-6935
Timmins	Ontario Government Bldg., P.O. Bag 3060, 1270 Hwy 101 East, South Porcupine P0N 1H0	● ■ ▼ ▲	(705) 235-1619 (705) 235-1622 (705) 235-1600	(705) 235-1620 (705) 235-1620 (705) 235-1610
Kirkland Lake	10 Government Rd. E., P.O. Box 100, Kirkland Lake P2N 3M6	● ■ ▲	(705) 568-4516 (705) 568-4521	(705) 568-4515 (705) 568-4515
Sudbury	Willet Green Miller Centre, Level A3, 933 Ramsey Lake Rd., Sudbury P3E 6B5	○ ✱ ▼	(705) 670-5735 (705) 670-5887	(705) 670-5681 (705) 670-5818
Southern Ontario (Tweed)	P.O. Bag Service 43, 126 Old Troy Rd., Tweed K0K 3J0	● ■	(613) 478-3161	(613) 478-2873
Toronto	Mines and Minerals Information Centre, Room M2-17, MacDonald Block, 900 Bay St., Toronto M7A 1C3	○ ▼	(416) 314-3803 (416) 314-3792	(416) 314-3797 (416) 314-3797

Ontario Geological Survey

Resident Geologist Program

Report of Activities—2006

SOUTHERN ONTARIO
REGIONAL RESIDENT GEOLOGIST REPORT

CONTENTS

Ontario

Ontario Geological Survey
Regional Resident Geologist Program

Southern Ontario Regional Resident Geologist
(Southeastern Ontario and Southwestern Ontario Districts)—2006

by

P.J. Sangster, D.A. Laidlaw, P.S. LeBaron, K.G. Steele and C.R. Lee

2007

CONTENTS

Southeastern Ontario and Southwestern Ontario Districts—2006

FIGURES

TABLES

Southern Ontario Regional Resident Geologist (Southeastern Ontario and Southwestern Ontario Districts)—2006

P.J. Sangster[1], D.A. Laidlaw[2], P.S. LeBaron[3], K.G. Steele[4] and C.R. Lee[5]

[1]Regional Resident Geologist, Southern Ontario Region, Ontario Geological Survey

[2]Regional GIS Specialist, Southern Ontario Region, Ontario Geological Survey

[3]District Geologist, Southeastern Ontario District, Ontario Geological Survey

[4]Regional Land Use Geologist, Southern Ontario Region, Ontario Geological Survey

[5]Regional Client Service Geologist, Southern Ontario Region, Ontario Geological Survey

INTRODUCTION

The Southern Region comprises 2 offices—the Regional Resident Geologist office in Tweed and the Mines and Minerals Information Centre in Toronto, which also houses the office of the Regional Land Use Geologist for Southern Ontario. The area encompasses the most populous part of the province and includes both the provincial and national capitals. The Southern Region stretches over 700 km from the Canada–United States border in the west, through the southern Great Lakes (lakes Huron, Erie and Ontario) and along the St. Lawrence River to the Ontario–Quebec border in the east. The northern boundary of the Region cuts across Georgian Bay striking westward north of Lake Simcoe across the Precambrian Shield, including Algonquin Park and neighbouring townships, ending at the Ottawa River and the Province of Quebec. From Paleozoic sedimentary rocks to the metamorphic terranes of the Central Metasedimentary Belt and Central Gneiss Belt, the Region hosts some of the most diverse and productive geology in the province.

In 2006, production from mines and quarries continued throughout southern Ontario within both the Grenville Province and in the Paleozoic rocks in the southwest and southeast. Exploration for various non-metallic commodities including dimension stone, vermiculite and wollastonite remained strong. The continued exploration for and development of deposits of dimension/landscape stone, high-purity limestone and dolostone, aggregate, shale/brick and other commodities should result in new quarries and/or mines coming into production in the future. Junior mining companies and prospectors showed a renewed interest in exploring for gold, copper-nickel and platinum group metals. Continued high prices for uranium and molybdenum saw exploration companies and prospectors continuing to acquire and explore past producing mine sites and areas of historic exploration activity.

Tables 12 through 19 provide details on currently inactive mineral deposits with identified resources and past producing mineral occurrences.

MINING ACTIVITY

During 2006, there were over 100 mineral extraction operations in southern Ontario, including 14 industrial mineral operations; 2 trap rock producers; 7 cement producer's quarries; 7 brick producer's quarries; 3 gemstone and mineral specimen sites; and 64 dimension stone quarries. All Ontario production of salt, gypsum/wallboard, natural gas and petroleum, shale/brick, lime/dolime, cement, nepheline and the majority of dimension stone, sand and gravel comes from Southern Ontario Region.

For a complete listing of mining activity and locations of operating mines and mills in southern Ontario, please refer to Table 1 and Figures 1a and 1b. Selected industrial mineral production values are presented in Table 2. Production

figures for the 2 underground salt mines and the underground gypsum mine operating in the Southwestern Ontario District in 2006 are shown in Table 3.

An estimated 5000 people were directly employed in mineral extraction and onsite processing plants in southern Ontario during 2006. Preliminary figures for 2006 indicate that southern Ontario mineral production was valued at over $2.4 billion.

All of the province's oil and gas production occurs in the Southwestern Ontario District. For information on oil and gas exploration and development activity in Ontario in 2006, please refer to the report of the Petroleum Resources Centre, in this volume.

Table 1. Mining activity in the Southeastern Ontario District in 2006. Keyed to Figure 1a.

No.	Company/Individual (Mine Name)	Township (Commodity)	Mining Activity
1	Aecon Construction and Materials Ltd.	Gloucester (Dolomitic Sandstone)	Dolomitic sandstone from the Ottawa Quarry is produced from the lower member of the March Formation (11 m thick) for use in pavement aggregate.
2	Allan Franks Construction Ltd.	Madoc (Limestone)	Limestone has been quarried and crushed on a seasonal basis since 1991 for road aggregate.
3	AME Materials Engineering (Aecon)	Marmora (Limestone)	Limestone is quarried from former Marmoraton mine site for aggregate.
4	Amsen Quarries Ltd.	Harvey (Limestone)	Limestone landscaping stone products.
5	Aqua Rose Quarries	Lyndoch (Gemstones, Mineral specimens)	Quarrying operations for rose quartz, beryl, feldspar, lyndochite, amazonite, cleavelandite, peristerite, columbite, fluorite and bertrandite. Two quarries are in operation: the Beryl Pit, which charges a fee for mineral collecting, and the Rose Quartz Quarry, which produces landscape stone.
6	Arriscraft Corporation (Elgin Quarry)	Bastard (Sandstone)	Potsdam sandstone was quarried for the manufacture of reconstituted sandstone. Raw material was shipped to Cambridge for processing. In 1998, a new application was found with blocks being quarried and cut into tiles for lining acid tanks.
7	Bancroft Chamber of Commerce (Bear Lake Diggings)	Monmouth (Mineral Specimens)	Fee for collecting site near Wilberforce. Field trips to this site organized by the Bancroft Chamber of Commerce attract on average 40 to 50 participants.
8	Belmont Rose Granite Corp. (Belmont Rose Granite Quarry)	Belmont (Dimension Stone)	Granite is quarried for dimension stone, curbstone, landscaping stone, crushed decorative stone and exposed aggregate.
9	Canada Brick (Hanson Brick) (Russell Quarry)	Russell, Gloucester (Clay Products)	Clay bricks are produced from red shale. During 2000, 74 883 t of material were extracted. The quarry is located in Russell Twp. The brick plant, in Gloucester Twp. produced 42 million brick units.
10	Canada Talc Division , Dynatec Mineral Products Division (Henderson Mine)	Huntingdon (Talc, Dolomite)	Dynatec acquired the industrial minerals division of Highwood Resources in 2002. Additional access to ore has been attained by the development of a new mining level (underground) at the Madoc Mine which will allow for the planned increase in production to over 20 000 t per year. Similarly, the completed upgrading and expansion of processing lines at the Marmora processing plant has allowed for the increased volume of ground and micronized talc and dolomite products, as well as the processing of other mineral filler products, principally barite. Canada Talc has ISO 9001:2000 certification for design and production of minerals to varying product specifications. The facility now produces all of its high-end barite filler products for high-end industries located in the United States and South America.
11	Central Ontario Natural Stone (Batty Quarry)	Laxton (Limestone)	Grey, buff and black limestone is produced as flagstone.
12	Colonial Brick & Stone Elite Blue Granite	Chandos (Marble)	Stone is split / guillotined for flagging and landscape stone.
13	Cornwall Gravel Company Ltd. (Cornwall Quarry)	Cornwall (Limestone)	Limestone for dimension stone is quarried on demand from the thick upper beds of this construction aggregate quarry.

No.	Company/Individual (Mine Name)	Township (Commodity)	Mining Activity
14	Cruickshank Construction Limited	Kingston (Limestone)	The Elginburg Quarry near Kingston produces 500 000 t of limestone annually. This company has 12 operating quarries throughout eastern Ontario including Green Valley, Kemptville, Brockville, Iroquois, Napanee and Verona. They produce a range of products from fine aggregate to armour stone. Their stone has been used in shoreline protection projects along the St. Lawrence Seaway, including a $3.5 million breakwater and a marina project in Prescott.
15	Danford Construction (Springbrook Road Quarry)	Huntingdon (Limestone)	Limestone is quarried and crushed for road aggregate and specialty concrete (seasonal operation). Annually, they produce 150 000 t of limestone and employ a staff of 24.
16	Danford Construction Ltd.	Elzevir/Hungerford (Granite-Gneiss)	Granite-gneiss from the Tweed quarry is used and approved for use in "Superpave" aggregates.
17	Dibblee Paving & Materials Ltd.	Gloucester (Dolomitic Sandstone)	Dolomitic sandstone from the Boyce Quarry is removed from the lower member of the March Formation.
18	Drain Bros. Excavating Inc.	Dummer (Limestone)	Limestone for use as road aggregate.
19	Drain Bros. Excavating Inc.	Methuen (Granite)	Crushed stone for aggregate.
20	Dufferin Aggregates	Harvey (Limestone)	Grey limestone is extracted for use as armour stone, landscaping stone and crushed stone
21	Essroc Canada Inc. (Picton Quarry)	Sophiasburg (Cement)	A cement plant and on-site limestone quarry with an annual production of slightly less than 1 000 000 tons. This is one of the largest cement plants in North America and employs 160 people. Essroc has contracts to supply cement for the construction of the new Canadian War Museum in Ottawa and a new call centre being built in Kingston.
22	FPL Aggregates (Mountain Lake Quarry)	Cavendish (Granite)	Burgundy coloured granite is quarried for use as crushed stone aggregate and decorative stone. The quarry has an aggregate extraction licence, with no annual extraction limit. Product is shipped to the company's Mount Albert site serving the Richmond Hill, Newmarket and Aurora markets.
23	Haliburton Stone Works	McClintock, Minden (Granite, dolomite and limestone)	A variety of granite and limestone dimensional and landscape stone are produced from 2 quarries.
24	I.K.O. Industries Ltd. (I.K.O. Quarry)	Madoc (Trap Rock)	Since 1991, I.K.O. Industries Ltd. has operated a traprock quarry east of Madoc on the south side of Hwy 7. The quarry is located within a ridge of grey to black, fine-grained, agglomeratic, metavolcanic rock. The rock is durable and exhibits no undesirable weathering effects. An on-site mill and colouring plant produce roofing granules, which are trucked to the company's asphalt shingle manufacturing plant in Brampton. In addition to roofing granules, stone from the quarry is crushed to produce HL-1 aggregate (asphalt road surfacing mix). The quarry is licensed under the *Aggregate Resources Act* to produce up to 1 Mt per year. A total of 70 people are currently employed at the quarry, mill and colouring plant. (OGS MP 161; I.K.O. Industries Ltd., February 2002)
25	International Quartz Ltd.	McClintock (Quartz)	Crushed white quartz is produced on demand for local market.
26	Jeff Parnell Contracting Limited	Galway (Limestone, Granite)	Natural and dimension cut armour stone, rockery stone, garden stone, natural surface steps and natural and dimensional flagstone. Burgundy coloured granite from the site is being tested for decorative stone, landscaping and dimension stone applications.
27	John Bacher Construction Limited	McClintock (Granite Gneiss)	Building stone, flagging stone, and landscaping stone.
28	Johnston Quarry	Galway (Limestone)	Gull River formation limestone is removed for use as landscaping stone, flagstone and building stone.
29	Karson Kartage & Konstruction Ltd. (Clarke Quarry)	Huntley (Limestone)	The quarry produces limestone for use as road aggregate.
30	Keystone Granite	Minden (Granite)	Granite is quarried for use as armour, flags, steps and dimension stone.

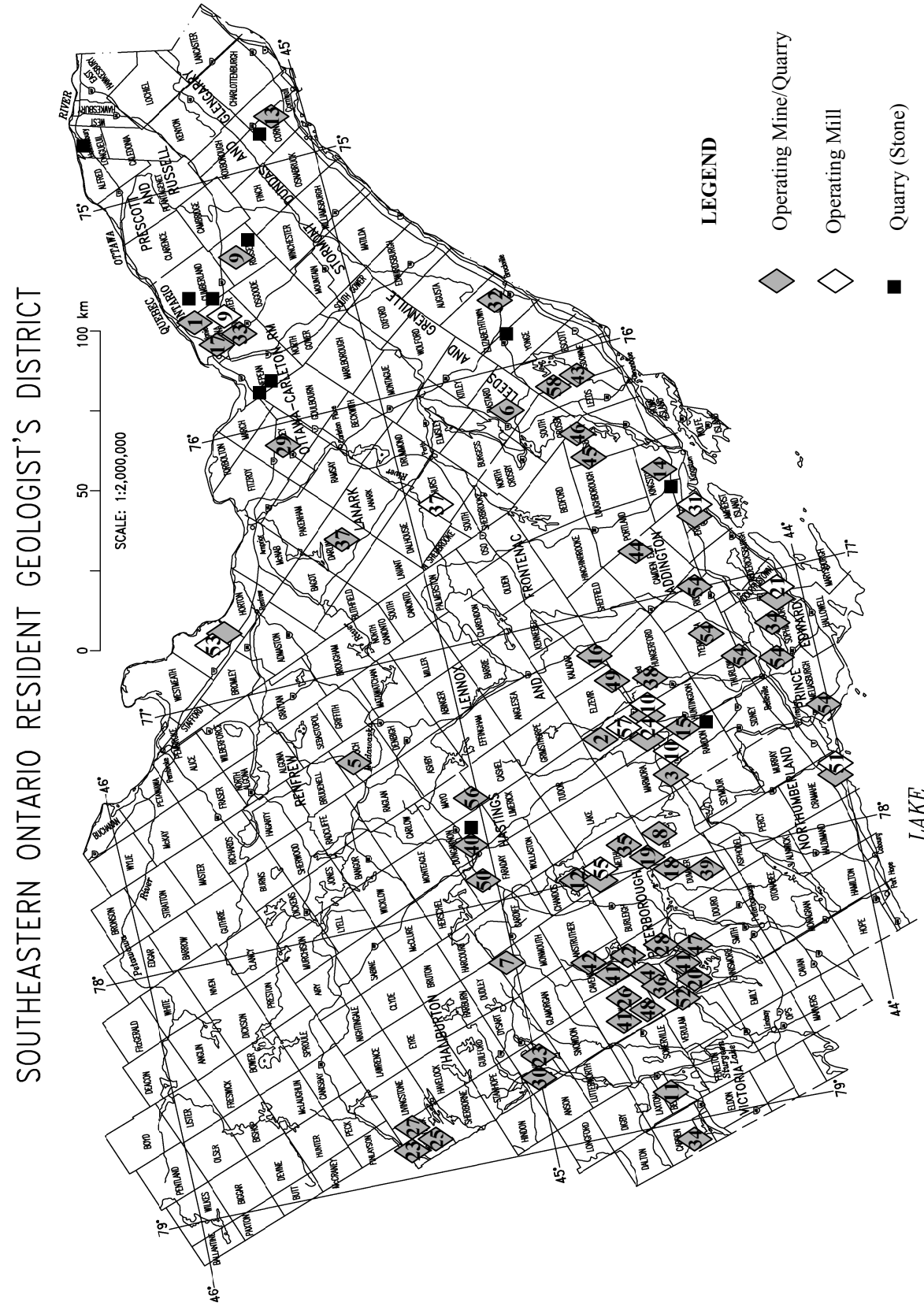


Figure 1a. Mining and/or quarrying activity in the Southeastern Ontario District in 2006. Keyed to Table 1.

Table 1. continued

No.	Company/Individual (Mine Name)	Township (Commodity)	Mining Activity
31	LaFarge Canada Inc. (Bath Quarry)	Ernestown (Cement)	A cement plant and on-site limestone quarry with a capacity to produce 1 Mt of cement. Silica used in the production of cement is extracted from the company's Potsdam sandstone quarry in Pittsburgh Twp. as well as from recycled foundry sands.
32	Lafarge Canada Inc. – Brockville Quarry	Elizabethtown (Dolomitic Sandstone)	Dolomitic sandstone from the lower member of the March Formation (at least 19 m thick) is used for road aggregate.
33	Lafarge Construction – Hawthorne Quarry	Gloucester (Dolomitic Sandstone)	Material from the lower member of the March Formation (11 m thick) is crushed for use as road aggregate.
34	Miller Paving Ltd. (Carden Quarry)	Carden , Sophiasburg (Limestone)	This quarry east of Brechin produces grey limestone for use as aggregate, architectural stone, landscaping/armor stone, asphalt limestone, crushed limestone and manufactured sand. Product from the quarry supplies a growing market in Markham, 90 km to the south.
35	MRT Aggregate Inc.	Methuen (Aggregate)	Metagabbro is quarried and crushed onsite for use as premium aggregate for HL-1 purposes. Portable crusher is moved on site as required. Production began in December 2002, and in 2003 production totalled 100 000 t. The product is used by Miller Paving and also sold outside the company.
36	Nelson Windover Quarries (Windover, Buckhorn Quarry)	Harvey (Limestone)	Grey limestone is quarried as a seasonal operation for the production of flagstone.
37	OMYA (Canada) Inc. (Tatlock Quarry)	Darling (Calcite)	Calcitic marble is mined to produce high-purity, fine-grind calcite for fillers with terrazzo chips and landscaping stone as secondary products. Annual production is 250 000 tons and quarry reserves currently stand at over 5 000 000 tons. In 2000, a 5-year expansion program was completed at their quarry and plant located in Perth.
38	Ontario Marble (Tweed Marble Quarry)	Hungerford (Marble)	White-grey green marble is removed for dimension stone blocks.
39	Payne, E.W. (Payne Quarry)	Dummer (Limestone)	Flagstone is produced seasonally from this quarry.
40	Princess Sodalite Mine	Dungannon (Sodalite)	Decorative stone, landscaping stone, mineral specimens including fee for collecting.
41	Redstone Quarries	Galway, Harvey, Cavendish (Limestone, Sandstone)	Beige limestone and red sandstone are quarried for weathered landscaping stone and armour stone blocks.
42	Regis Resources, Inc.	Cavendish (Vermiculite)	Regis Resources began producing vermiculite in June 2004. Proven and probable reserves are 890 000 t at 21.4% vermiculite as well as measured and indicated resources of 380 000 t at 21.4% vermiculite. The mine produces fine, super fine, and micron grades of vermiculite, destined for markets in North America.
43	Rideauview Contracts Ltd. (Ellisville Quarry)	Rear Leeds & Lansdowne, (Sandstone)	Sandstone produced for flagstone, granite blocks and masonry stone.
44	Rideauview Contracts Ltd. (Pettworth & Renaud Quarries)	Camden (Limestone)	Limestone was quarried for building restoration work in Kingston.
45	Rideauview Contracts Ltd. (Rideauview Quarry)	Storrington (Sandstone)	Red sandstone is produced for ashlar and flagstone.
46	Rideauview Contracts Ltd. (Sloan Quarry, Battersea Quarry)	Storrington (Sandstone, Granite)	Cream and red sandstone are quarried for the production of ashlar, flagstone and landscaping stone at the Sloan Quarry. Red granite is quarried at the Battersea Quarry.
47	Rigbe's Quarry	Harvey (Limestone)	Buff limestone is removed for use as weathered armoury and rockery, crushed aggregates and landscape stone.
48	Royel Paving	Galway (Granite)	Granite is quarried and crushed on site for road aggregate.
49	Senator Stone	Elzevir (Marble)	The quarry began production in 2001. White calcitic marble is quarried seasonally and crushed on site.

No.	Company/Individual (Mine Name)	Township (Commodity)	Mining Activity
50	Senator Stone	Faraday (Marble)	The quarry site was brought to mining lease in 2002. (Temagami Pink marble breccia.)
51	St. Lawrence Cement Inc. (Ogden Point Quarry)	Cramahe (Limestone, Cement)	The quarry has been in production since 1959. It produces between 1.9 and 2.1 Mt of limestone per year. Crushed stone from the quarry is shipped by lake to the company's cement plant in Mississauga. The quarry employs 20 people.
52	Stone Cottage Inn Ltd. (Attia Quarries)	Harvey (Limestone)	Grey limestone is quarried for dimension stone.
53	Timminco Ltd. (Timminco Metals Quarry)	Ross (Magnesium, Strontium & Calcium metal)	Magnesium is produced from high-purity dolomite mined at this location. Calcium and strontium are produced from purchased limestone. Production rate is 1000 tons of dolomite weekly. The annual production is 6000 tons of magnesium metal and alloys; 400 tons of calcium metal and alloys and 135 tons of strontium metal. The operation employs 240 people and there are reserves for 50 years at the current rates of production.
54	TRT Aggregates Ltd.	Ameliasburgh, Hilliard, Tyendinaga, Thurlow & Richmond (Limestone)	Rough dimension stone blocks, armour stone, flagstone and crushed limestone are produced. Most of the quarries are operated on an as-needed basis.
55	Unimin Canada Ltd. (Blue Mountain Quarry)	Methuen (Nepheline Syenite)	Nepheline syenite is mined from a quarry and processed in 2 mills. Magnetite is produced as a by-product. Production rate is 2500 tons per day. The mine opened in 1955 and employs 152 people.
56	Upper Canada Stone Co. Ltd. (Mephisto Lake quarry)	Cashel , Mayo (Calcitic Marble)	White marble is quarried and sold as crushed marble, landscaping stone, decorative stone and in pre-cast architectural concrete and panels.
57	Upper Canada Stone Co. Ltd. Upper Canada Minerals Inc.	Madoc and Huntingdon (Marble)	Red, pink, white, green, buff, black, blue, chocolate, light buff and light green marble are mined from 8 quarries in the Madoc area. Marble chips (terrazzo), exposed aggregate and landscape stone are produced at the mill. In 2001, Upper Canada Stone acquired operations of Specialty Aggregate - Madoc plant and quarries.

Table 2. Value and volume of selected industrial mineral production in the Southern Ontario Region, 2003–2006.

	2006 p Quantity ($\times 10^6$ tonnes)	2006 p Value ($ million)	2005 Quantity ($\times 10^6$ tonnes)	2005 Value ($ million)	2004 Quantity ($\times 10^6$ tonnes)	2004 Value ($ million)	2003 Quantity ($\times 10^6$ tonnes)	2003 Value ($ million)
Non-metals								
Gypsum (1)	N/A	N/A	0.7	N/A	0.7	14	0.9	19
Salt (1)	8.3	260	8 .7	254	8.6	258	8.7	253
Nepheline syenite (1)	0.7	66	0.8	67	0.7	62	0.7	63
Structural Materials								
Clay products (1)	N/A	185	N/A	187	N/A	192	N/A	193
Cement (1)	6.0	667	6.6	660	6.8	658	6.4	622
Lime (1)	1.0	120	1.0	120	1.3	132	1.0	105
Sand and Gravel (2)	94.3	432	99.4	463	102.2	456	98.7	438
Stone* (2)	59.4	627	57.9	552	57.1	562	54.6	512
Total, Industrial Minerals (Non-metals)		**$2.49 billion**		**$2.44 billion**		**$2.45 billion**		**$2.30 billion**

(1) all production from Southern Ontario
(2) >75% production from Southwestern Ontario District
p preliminary data; N/A data not available
* production represents quarry shipments of crude or undressed stone, crushed stone and dressed stone, if the latter is prepared by the quarry operators, at values as reported by operators – this category includes crushed rock aggregate, trap rock, specialty aggregate, dimension stone and calcium carbonate

after MNDM, Ontario Mineral Production Facts, March 2006; Natural Resources Canada, Mineral Yearbook 2005, Preliminary Statistics 2006.

PRODUCERS AND RECENT DEVELOPMENTS

Salt

In 2006, Sifto Canada Inc. continued to operate an underground rock salt mine and brine well field in Goderich and The Canadian Salt Company Limited, continued to operate an underground rock salt mine and brine well field in Windsor.

Compass Minerals Group Inc., the parent company of Sifto Canada Inc., is one of the largest producers of rock, or highway de-icing, salt in North America and the United Kingdom. The Goderich Mine is the largest rock salt mine in the world. The company sells highway salt primarily to state, provincial, county and municipal highway departments for de-icing applications.

Rohm and Haas Co., the parent company of The Canadian Salt Company Limited, is the largest producer of salt in North America.

Ontario rock salt production in 2006 was 8.4 Mt (*see* Table 2). Production was reduced this year by a strike mid-year at the Goderich Mine. The Ojibway Mine achieved near-record annual production (J. Vincent, The Canadian Salt Company Ltd., personal communications, February 2007; K. Cassidy, Sifto Canada Inc., personal communications, February 2007).

In August 2006, Compass Minerals announced a plan to increase its rock salt production capacity at the Goderich Mine. Starting in late 2006 and continuing into 2007, a new mining panel will be opened. This will increase the annual capacity of the mine by approximately 750 000 tons, resulting in a total mine capacity of 7.25 million tons by 2008. The expansion will cost US$11 million (*The Goderich Signal-Star*, August 28, 2006; Blendon Information Services, August 2006).

In August 2005, Compass Minerals announced plans to install a new, $7 million, high-capacity mill at the Goderich Mine. The new, state-of-the-art equipment is expected to reduce the cost of production, maintenance and energy at the mine and will allow the facility greater flexibility to manage production processes. The installation of this underground mill started in 2006, and is expected to be completed and fully-operational by summer 2007 (K. Cassidy, Sifto Canada Inc., personal communication, February 2007).

INDUSTRY NEWS

In addition to the expansion of the Goderich Mine, in August 2006, Compass Minerals announced it expects to add an additional 1 Mt of capacity in the Great Lakes region as market conditions warrant. The company is continuing to evaluate several strategies for this expansion (*The Goderich Signal-Star*, August 28, 2006; Blendon Information Services, August 2006).

In the first quarter of 2006, Compass Minerals reported salt sales at US$190.2 million compared with US$229.2 million from the same facilities in 2005. The company notes that the weather in the quarter was much milder than normal in the markets it serves, particularly in the United States, resulting in a sharp decline in de-icing salt sales. U.S. de-icing salt sales decreased by US$45-50 million compared to a year earlier. The declines in highway and consumer salt de-icing sales volumes, however, were partially offset by higher prices (Blendon Information Services, May 2006).

Compass' rock salt production and sales were hampered during the second quarter by a strike at the company's mine in Goderich Mine. The production interruption contributed to a 13% reduction in highway de-icing product sales volumes (Blendon Information Services, August 2006).

Compass Minerals' third quarter salt segment product sales grew 17% to US$67.3 million, reflecting stronger pricing in the company's highway de-icing and general trade product lines. The company's average selling price of highway de-icing salt was up 13%, to US$31.42/ton, and sales volume increased 3%. The average selling price of general trade products rose 13%, to US$110.57/ton, and sales volumes were up marginally at 554 000 tons (Blendon Information Services, November 2006).

Figure 1b. Producing mines and quarries in the Southwestern Ontario District in 2006.

LEGEND

△ **Producing Mines – Salt and Gypsum**

1.	Sifto Canada Inc., Goderich Mine, Goderich	rock salt
2.	The Canadian Salt Company Ltd., Ojibway Mine, Windsor	rock salt
3.	CGC Inc., Hagersville Mine, Hagersville	gypsum

◇ **Producing Quarries – Cement**

4.	Lafarge Canada Inc., Woodstock Quarry, Zorra Tp.	limestone
5.	St. Marys Cement Inc., St. Marys Quarry, Blanshard Tp.	limestone
6.	St. Marys Cement Inc., Bowmanville Quarry, Darlington Tp.	limestone
7.	St. Lawrence Cement Inc. Mississauga Quarry, Mississauga	shale

⬠ **Producing Quarries – Brick Products**

8.	Brampton Brick Ltd., Cheltenham Quarry, Chinguacousy Tp.	shale
9.	Brampton Brick Ltd., Hungry Hollow North Quarry, Williams Tp.	shale
10.	Century Brick, Georgetown Quarry, Esquesing Tp.	shale
11.	Hanson Brick Ltd., Niagara-on-the-Lake Quarry, Niagara Tp.	shale
12.	Hanson Brick Ltd., Burlington Quarry, Burlington	shale
13.	Hanson Brick Ltd., Aldershot Quarry, Burlington	shale
14.	JADE Hardwoods Inc., Thedford Quarry, Bosanquet Tp.	shale

□ **Producing Quarries – Chemical, Metallurgical, Environmental and Filler Stone Products**

15.	E.C. King Contracting Ltd., Sydenham Quarry, Sydenham Tp.	dolostone
16.	Lafarge Canada Inc., Dundas Quarry, West Flamborough Tp.	dolostone
17.	Carmeuse Lime Canada, Beachville Quarry, Zorra Tp.	limestone

○ **Producing Quarries – Dimension, Building, Landscape Stone and Specialty Aggregate Products**

18.	A & A Natural Stone Ltd., A & A Quarry, Keppel Tp.	dolostone
19.	Amsen Quarries Ltd., Mar Quarry, Albemarle Tp.	dolostone
20.	Amsen Quarries Ltd., Wiarton Quarry, Amabel Tp.	dolostone
21.	Arriscraft International Inc., Adair Marble Quarries, Albemarle Tp.	dolostone
22.	Bruce Peninsula Stone Ltd., Lindsay Quarry, Lindsay Tp.	dolostone
23.	Bruce Peninsula Stone Ltd., Wiarton Quarry, Amabel Tp.	dolostone
24.	Cut Above Natural Stone, Cut Above Natural Stone Quarry, Rama Tp.	limestone
25.	Deforest Brothers Quarry Ltd., Deforest Brothers Quarry, Caledon Tp.	sandstone
26.	Dufferin Aggregates, Flamborough Quarry, West Flamborough Tp.	dolostone
27.	Ebel Quarries Inc., Ebel Quarry, Amabel Tp.	dolostone
28.	Ebel Quarries Inc., Arnold Property Quarry, Amabel Tp.	dolostone
29.	The Wiarton Buckskin Quarry Co. Ltd., Amabel Tp.	dolostone
30.	Georgian Bay Marble and Stone, Cook Quarry, Amabel Tp.	dolostone
31.	Hilltop Stone and Supply Inc., Hilltop Quarry, Esquesing Tp.	sandstone
32.	1590361 Ontario Ltd., Amabel Tp. (operated by Amsen Quarries Ltd.)	dolostone
33.	James Lamb, Rama Tp.	dolostone
34.	Limberlost Stone Inc., Limberlost Quarry, Albemarle Tp.	dolostone
35.	MAQ Aggregates, Hewitt Property Quarry, Orillia Tp. (operated by Gott Natural Stone ’99 Inc.)	limestone
36.	Owen Sound Ledgerock Ltd., Senesun Quarry, Amabel Tp.	dolostone
37.	Owen Sound Ledgerock Ltd., Wiarton Quarry, Amabel Tp.	dolostone
38.	Owen Sound Ledgerock Ltd., Owen Sound Quarry, Keppel Tp.	dolostone
39.	Owen Sound Ledgerock Ltd., Hope Bay Quarry, Albemarle Tp.	dolostone
40.	Rama Stone Quarries Ltd., Fleming Quarry, Rama Tp. (operated by Fowler Construction)	gneiss
41.	Rice and McHarg Ltd., Rice and McHarg Quarry, Esquesing Tp.	sandstone
42.	Rockleith Quarry Ltd., Rockleith Quarry, Orillia Tp.	limestone
43.	Speiran Quarries Ltd., Speiran Quarry, Rama Tp. (operated by Gott Natural Stone ’99 Inc.)	limestone
44.	Stone Cottage Inn Ltd., Attia/Rama Quarry, Rama Tp.	dolostone
45.	Wiarton Stone Quarry Inc., Wiarton Stone Quarry, Amabel Tp.	dolostone
46.	Volarock Inc., Volarock/Ted Young Quarry, Keppel Tp.	dolostone

Producing Brine Well Fields – Salt

47.	Sifto Canada Inc., Goderich Brine Field, Goderich	salt in brine
48.	The Canadian Salt Company Ltd., Windsor Brine Field, Windsor	salt in brine

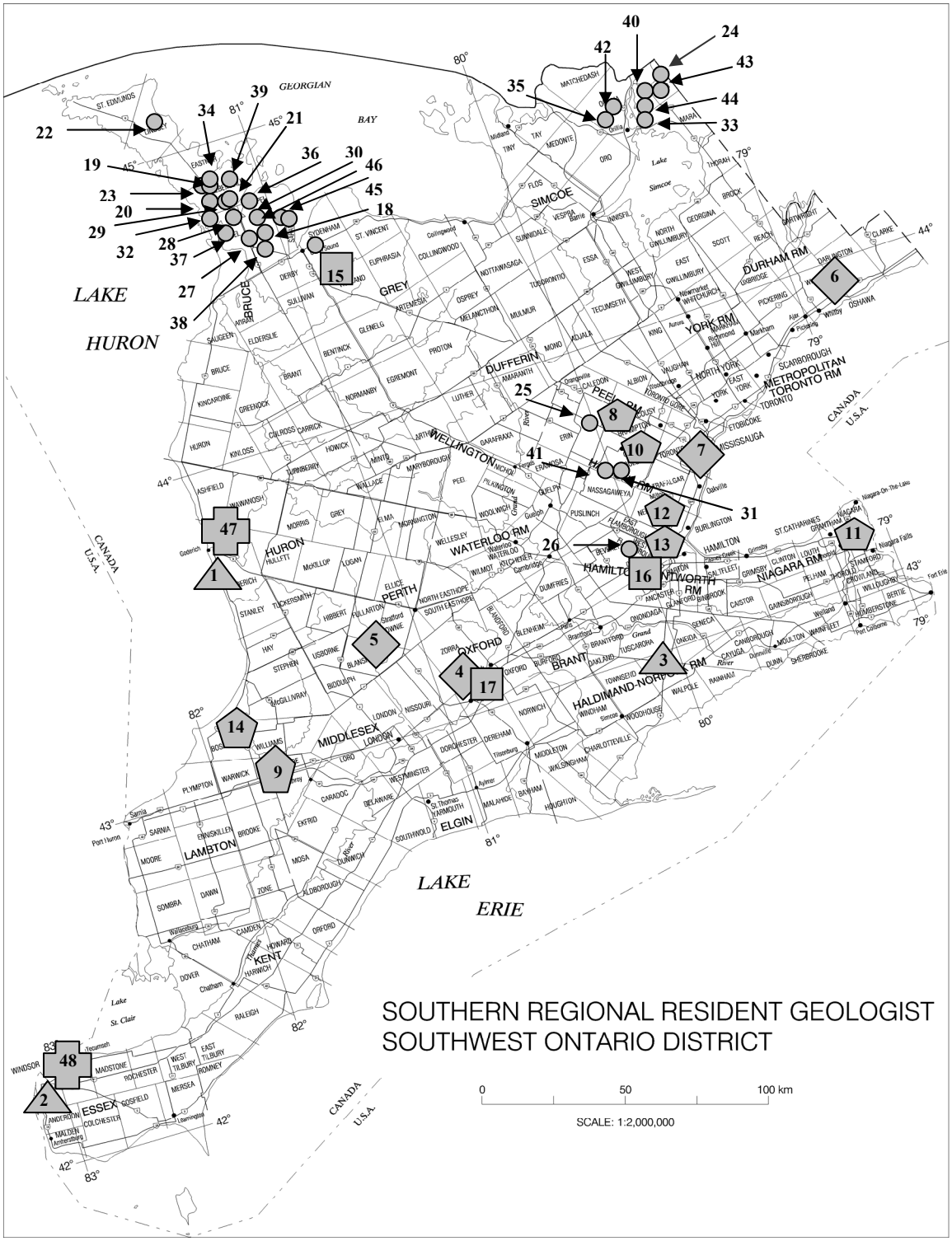


Figure 1b. Producing mines and quarries in the Southwestern Ontario District in 2006.

Rohm and Haas Co. reported a 17% decline in first quarter salt segment sales to US$263 million. The decline is attributed to weak demand for ice control products as a result of unusually warm weather in the mid-west and northeast of the United States (Blendon Information Services, May 2006).

In the second quarter, the company reported that its salt division recorded earnings of US$1 million compared with a loss of US$2 million in the same period of 2005. The division's sales were 6% higher at US$160 million. The company attributes the improvement to higher selling prices as demand was down slightly overall (Blendon Information Services, August 2006).

Rohm and Haas Co. reported third quarter salt sales of US$174 million, a 7% increase over the same period of 2005. The improvement was attributed to product mix management and favourable exchange rates, which more than offset a slight decline in demand associated with decreased shipments of ice control salt (Blendon Information Services, October 2006).

Gypsum

In 2006, gypsum was mined at Hagersville by CGC Inc. where the company has extensive wallboard manufacturing facilities. A small mining issue, which required remediation, resulted in the mine operating below capacity in 2006; approximately 620 000 t of gypsum were extracted (*see* Table 3). During the year, the company purchased additional property adjacent to the mine site resulting in an increase in gypsum reserves. The mined natural gypsum is mixed with flue gas desulphurization (FGD) gypsum as feedstock for the wallboard plant (B. Chisholm, CGC Inc., personal communication, February 2007).

The Canadian market for wallboard and associated products remained strong in 2006; however, the US market showed some signs of weakening during the year. This impacted production at the Hagersville mine and wallboard plant as a significant portion of production is shipped south of the border (B. Chisholm, CGC Inc., personal communication, February 2007).

Georgia-Pacific Canada Inc. operates a wallboard facility in Caledonia using gypsum imported from Nova Scotia. BPB Canada Inc. operates a wallboard facility in Mississauga, using FGD gypsum supplied by Ontario Power.

In June 2006, the Government of Ontario announced a delay in the closure of the province's coal-fired power stations. Previously, Ontario Power Generation announced plans to close the Lambton station by the end of 2007 and the Nanticoke station by early 2009. The Lambton station is equipped with a FGD system that supplies by-product gypsum to BPB Canada's wallboard plant in Mississauga (Blendon Information Services, June 2006).

The gypsum division of CGC Inc., a wholly-owned USG Corp. subsidiary, reported a first-quarter operating profit of US$12 million on sales of US$86 million compared with US$12 million on sales of US$75 million in the same period of 2005. Higher shipments of wallboard and favourable exchange rates were offset by higher manufacturing costs (Blendon Information Services, May 2006).

Table 3. Salt and gypsum mine production and reserves in the Southern Ontario Region, 2002–2006.

Mine	2006 Production Tonnage @ Grade	2005 Production Tonnage @ Grade	2004 Production Tonnage @ Grade	2003 Production Tonnage @ Grade	2002 Production Tonnage @ Grade	Reserves at end of 2006 Tonnage @ Grade
Caledonia No. 3 Mine *			64 135 t @ <75% gypsum	271 376 t @ 75-80% gypsum	274 264 t @ 75-80% gypsum	
Hagersville Mine	620 000 t @ 72% gypsum	700 000 t @ 85% gypsum	700 000 t @ 85% gypsum	700 000 t @ 85% gypsum	690 000 t @ 85% gypsum	11 000 000 t @ 72% gypsum
Goderich Mine	5 710 000 t @ 97% NaCl	6 580 000 t @ 97% NaCl	6 270 000 t @ 97% NaCl	6 008 000 t @ 97% NaCl	5 082 000 t @ 97% NaCl	325 000 000 t @ 97% NaCl
Ojibway Mine	2 705 000 t @ 97% NaCl	2 410 000 t @ 97% NaCl	2 680 000 t @ 97% NaCl	2 712 000 t @ 97% NaCl	2 302 000 t @ 97% NaCl	73 800 000 t @ 97% NaCl

** Mine closed May 2004. Plant operates with gypsum from alternate sources*

For the second quarter of 2006, USG Corp. reported that its North American gypsum business generated an operating profit of US$267 million on net sales of US$977 million, increases of 80% and 22%, respectively, from the same quarter of 2005. CGC Inc.'s gypsum division reported an 11% increase in second quarter net sales, to US$91 million, while operating profit was unchanged at US$14 million (Blendon Information Services, August 2006).

Cement

There are 6 quarries and 7 modern processing plants in southern Ontario between Kingston and St. Marys. Preliminary figures for 2006 show cement production in Ontario was valued at more than $670 million, representing more than 40% of the total value of cement production in Canada.

St. Marys Cement (Canada) Inc. operates limestone quarry and cement plant complexes at Bowmanville and St. Marys. Lafarge Canada Inc., a subsidiary of Lafarge North America, operates limestone quarry and cement plant complexes at Bath near Kingston and near Woodstock. St. Lawrence Cement Inc. operates a cement plant and adjacent shale quarry in Mississauga. Limestone is shipped to this cement plant from the company's Ogden Point quarry located on Lake Ontario at Colborne. ESSROC Canada Inc., operates a quarry and cement plant at Picton. Federal White Cement Ltd. operates a specialized white architectural cement plant near Woodstock using limestone purchased from local quarries.

With the exception of Federal White Cement, each company has port facilities for Great Lakes shipping. The Bath, Picton, Bowmanville and Mississauga plants export significant production to the United States.

Combined, the companies have 11 cement kilns with a total clinker production capacity of over 8.1 Mt per year. Primary stage clinker production is more indicative of ultimate cement production capacity because this is the most capital and energy-intensive stage and clinker can be stockpiled for later use or sale. (Natural Resources Canada, Canadian Minerals Yearbook, 2005)

In December 2006, the Province of Ontario approved Lafarge Canada's request to test burning alternative fuels, including tires and bone meal, at its cement plant in Bath. The approval will allow the company to import and burn up to 100 tonnes of municipal waste per day, including tires, meat and bone meal, and pelletized garbage. The Ministry of the Environment established monitoring requirements to detect toxins that might be released into the environment. (Canadian Press, December 22, 2006)

In North America, cement producers want to increase capacity in the wake of record cement demand. All major producers are planning expansion programs in North America. In 2006, most producers improved plant efficiency and expanded capacity. Increased manufacturing capacity will come in the form of grass-root plants, modernizations and the replacement of kiln lines with new technologies. (www.industrialinfo.com/outlook_2007)

Clay/Shale Products

Preliminary figures indicate that in 2006, Southern Ontario saw brick production valued at over $185 million.

Four companies extract shale from 8 quarries in southern Ontario for heavy clay products, supplying 6 brick and tile manufacturing operations. The 2 largest operators, Hanson Brick and Brampton Brick, have both quarrying and manufacturing facilities. One smaller operator, Century Brick, also has both quarrying and manufacturing facilities. All 3 companies extract Queenston shale in the area between Brampton and Niagara-on-the-Lake. In addition, Hanson Brick extracts Queenston shale from the Russell quarry near Ottawa. Two small quarries owned by JADE Hardwoods Inc. at Thedford and Brampton Brick Ltd. at Arkona, supplied shale to Paisley Brick and Tile Co. Arkona Formation shale forms the resource rock at these quarries.

Hanson Brick quarried Queenston shale at their Burlington, Aldershot , Niagara-on-the-Lake and Russell quarries, and operated 3 large brick plants, a plant at Aldershot and 2 adjacent to their Burlington Quarry.

Brampton Brick Ltd. trucked Queenston shale from their Cheltenham Quarry a distance of 10 km to their brick plant in northwest Brampton. The Brampton plant has a capacity of approximately 300 million modular brick equivalent units per year. In 2006, company operations and production were similar to those achieved in the previous year.

Century Brick operated a quarry near Georgetown that supplied a brick plant in Hamilton.

Paisley Brick and Tile Co. operated a small, speciality brick plant 150 km northwest of Toronto. The company acquired shale resources from small quarries in southwestern Ontario and from construction sites west of Toronto.

The brick products industry in Ontario currently extracts almost all of its resource materials from the Queenston Formation shale. Queenston Formation occupies a narrow, wedge-shaped area located immediately east of the Niagara Escarpment and extends from Georgian Bay to the Toronto and Hamilton areas. Queenston shale also underlies lands along the Niagara Peninsula, which are below the Niagara Escarpment. The only other identified resource occurs near Ottawa in southeastern Ontario. Much of the area underlain by the Queenston Formation is already highly urbanized and/or on the Niagara Peninsula developed into vineyards and wineries. In these areas, urban expansion, Provincial Plans such as the Greenbelt, municipal land use planning initiatives to preserve prime agricultural and natural heritage lands, and infrastructure corridors are major threats to the long-term continuity and development of the brick industry in Ontario.

In November, Brampton Brick Ltd. announced the acquisition of property in west Brampton for future shale reserves. The company also announced a plan to build a manufacturing facility in western Indiana. Construction of the modular brick plant is scheduled to begin in the spring of 2007 at an aggregate cost of about US$45 million. (*Brampton Guardian,* November 10, 2006).

Chemical, Metallurgical and Filler Limestone and Dolostone

Ontario's lime industry is situated in southwestern Ontario. In 2006, 3 operations extracted limestone or dolostone for use in the lime, chemical, metallurgical environmental and filler products industries. Carmeuse Lime Canada Ltd. – Beachville Operations produces high-calcium lime from Lucas Formation limestone. Carmeuse Lime Canada Ltd. – Dundas Operations produces dolomitic lime or "dolime" from Guelph Formation rock purchased from the adjacent Dundas Quarry of Lafarge Canada Inc. E.C. King Contracting extracts glass-grade dolostone from the Amabel Formation at the Sydenham Quarry near Owen Sound.

Lime, dolime, and high-purity limestone and dolostone markets are dominated by the demand for product from the steel making industry. After a number of poor years in the steel industry, from 2004 through 2006, lime producers have benefited from strong steel production and lime demand. Though the steel industry is the dominant market, sales into other markets are gaining ground, including float glass, filler and environmental uses. Limestone is also sold for aglime, aggregate, landscaping and engineering uses.

Dimension/Building Stone

In 2006, a variety of rock types were quarried for use as dimension, building and landscape stone from 64 quarries in southern Ontario (*see* Figures 1a and 1b). A number of these quarries also extracted stone that was crushed and used as aggregate. The primary market for stone is southern Ontario and the Great Lakes region of the United States.

Quarries extracting limestone, dolostone, sandstone and gneiss for dimension, building and landscape stone use, and associated on-site processing plants, employed approximately 700 people in southern Ontario, including more than 400 employees in the Wiarton–Owen Sound area.

WIARTON AREA QUARRIES

The largest concentration of dimension stone producers in Ontario is in the Wiarton area where 15 operations extract Eramosa Member dolostone for dimension, building, landscaping and flag stone markets, 2 operations quarried Amabel Formation dolostone for dimension and building stone and 1 quarry produces Guelph Formation dolostone for building and landscaping applications. Volarock Inc., opened a new quarry in 2006 in Keppel Township.

Owen Sound Ledgerock, a Wiarton area producer, won a prestigious international award in 2006: the Building Stone Institute of America's Tucker Design Award for residential projects. The award winning project was the Art Collector's Residence, Toronto. (*Stone World*, July 2006)

In 2006, the Town of South Bruce Peninsula expressed an interest in developing a more collaborative approach with the quarry sector in the municipality and surrounding area. The Town's Economic Development Officer was given a mandate to construct a report "Economic Impact of the Quarry Sector in the Town of South Bruce Peninsula". MNDM's Regional Land Use Geologist collaborated on the project by providing references, suggestions on survey for quarry operators, contacts at quarries, and toured the Economic Development Officer to a limited number of quarry and stone processing sites. There will be on-going consultation on the project in 2007. The initiative is supported by a significant number of the quarry owners/operators within the area.

SANDSTONE QUARRIES

In the Georgetown–Inglewood area, white and maroon Whirlpool Formation "Credit Valley" sandstone was extracted at the Deforest Brothers Quarry, Rice & McHarg Quarry, and Hilltop Stone and Supply Quarry for the production of squared and irregularly shaped dimension and landscaping stone. The combined output from these 3 small-scale quarries is less than 10 000 t of stone annually.

ORILLIA AREA QUARRIES

In the Orillia area, Gull River Formation limestone was extracted for sale as building and landscape stone by 6 companies: Rockleith Quarry Ltd., Speiran Quarries Ltd., Cut Above Natural Stone, Stone Cottage Inn Ltd., MAQ Aggregates and James Lamb. At the Rama Stone Quarries Ltd. property, Fowler Construction quarried gneiss for landscape stone, and crushed stone for premium-quality and specialty aggregate.

Aggregate

Crushed stone aggregate is a major mineral commodity produced in southern Ontario. The buoyant economy of southern Ontario is producing strong demand for both crushed stone and sand and gravel aggregate products.

In 2006, *Aggregates & Roadbuilding* magazine published the annual listing of Canada's top 25 aggregate operations. For 2005, 10 of Canada's top 25 operations were located in Ontario (Table 4). The largest crushed stone quarry in the province is the Lafarge Canada quarry on Manitoulin Island. The other 9 top quarries are in located in southern Ontario. With the exception of the Beachville Quarry, which supplies high-purity limestone for the chemical industry, all are primarily aggregate quarries and pits.

The main rock formations quarried for crushed stone aggregate are Gull River, Bobcaygeon, Lockport, Amabel, Guelph, Bois Blanc, Dundee, and Lucas. The major crushed stone resource areas are along the Niagara Escarpment and east of Lake Simcoe. The major sand and gravel source areas include along the Oak Ridges Moraine, and outwash deposits within Caledon and Puslinch townships, and between Cambridge and Brantford. Most of the material is trucked to local major urban centres.

Table 4. Top 10 aggregate quarries in Ontario in 2005.

National Ranking	Quarry Name	Operator	2005 Production (million tonnes)	Material Type	Primary Shipment
3	Manitoulin Quarry	Lafarge Canada	5.00	Limestone	Water
4	Dundas Quarry	Dufferin Aggregates	4.24	Limestone	Truck
6	Milton Quarry	Dufferin Aggregate	3.92	Limestone	Truck
8	Acton Quarry	Dufferin Aggregates	3.23	Limestone	Truck
13	Brechin Quarry	Lafarge Canada	2.07	Limestone	Truck
15	Beachville Quarry	Carmeuse Lime (Canada)	1.90	Limestone	Truck
16	Burlington Quarry	Nelson Aggregate	1.89	Limestone	Truck
17	Mosport Pit	Lafarge Canada	1.80	Sand & gravel	Truck
19	Caledon Pit	James Dick Construction	1.73	Sand & gravel	Truck
21	Aberfoyle Pit	CBM Aggregates	1.50	Sand & gravel	Truck

Source: *Aggregates & Roadbuilding*, May/June 2006

INDUSTRY NEWS

In November 2006, the Ontario Cabinet signed an Order-in-Council giving clearance to the Dufferin Aggregates Milton Quarry expansion after the request had passed all other levels of approvals.

The company plans to extract up to 60 Mt of stone on nearly 70 ha northwest of Highway 401 and Regional Road 25, which is expected to extend the quarry's life by 15 years. The quarry has been in operation since 1962. (*The Toronto Star*, December 8, 2006; *Hamilton Spectator*, December 8, 2006)

A rapidly growing trend in the Canadian aggregates industry is towards water-based transportation. In 2005, 4 of Canada's 5 largest operations are on deep-water ports, with 2 located on the Pacific coast, 1 on the Great Lakes and 1 on the Atlantic coast. The only operation in the top 5 relying exclusively on trucks to deliver products is Lafarge Canada's Dundas quarry near Hamilton, with 2005 reported annual production of 4.24 Mt. Water-based operations have, with the exception of Dundas, taken the lead from truck-delivery quarries serving Ontario and Quebec. Based on these trends, it seems likely that water-based operations will occupy most of the top spots 10 years from now, as Canadian producers at existing and new water-based operations develop additional export and domestic markets. (*Aggregates & Roadbuilding*, May/June 2006)

The Region of Halton council has approved a $100 000 fee that will help cover regional staff costs associated with processing pit and quarry applications. A staff report that went before the region's planning and public works committee explained that the current application fees paid for new or expanding pits or quarries only totalled about $12 000. This covers Official Plan and zoning bylaw amendments. "Data collected regarding the amount of time spent by regional employees processing these applications has shown that pits' and quarries' applications are far more complex and time consuming than reflected in the fee for typical planning applications," the report notes. It goes on to provide examples, such as the 814 hours spent in one year working on Nelson Aggregates' quarry application and 259 hours on Hanson Brick's expansion proposal. Staff also estimated that, in the end, a total of 1036 hours will be required to finish processing Hanson's application at a cost of $87 821, whereas processing of Nelson's application is expected to take 3256 hours for $276 011.

Currently, the Town of Milton is the only municipality in the Greater Toronto Area that has a separate fee of $59 529 for processing pit and quarry applications (*Burlington Post*, September 20, 2006).

The Ministry of Natural Resources announced additional land designations and increased industry fees on October 30, 2006. Effective January 1, 2007, the annual licence fee will increase from 6 cents per tonne to 11.5 cents per tonne. With this increase upper tier municipalities will receive 1.5 cents per tonne; lower tier municipalities will receive 6 cents per tonne; and the Crown (Ontario Government) will receive 3.5 cents per tonne. The Management of Abandoned Aggregate Properties Program remains at 0.5 cents per tonne.

Also effective January 1, 2007, the *Aggregate Resources Act* will cover additional private land in southern Ontario and parts of central and northern Ontario not currently covered by the Act, to include all of Muskoka and Parry Sound districts and Haliburton County; parts of Algoma, Nipissing, Sudbury, Manitoulin and Thunder Bay districts, as well as parts of Renfrew, Peterborough, Hastings, Frontenac and Lennox and Addington counties. The OSSGA Board "supports the additional land designations announced by the Ministry and looks forward to full designation at some future point to ensure a level playing field among all aggregate producers" (*Aggregates & Roadbuilding,* December 2006).

ADVANCED EXPLORATION AND DEVELOPMENT

Southeastern Ontario Industrial Mineral Evaluation Projects

In 2006, evaluation of a number of industrial mineral prospects continued with bulk sample permits issued for nepheline, vermiculite and dimension stone. Market testing is being conducted on soapstone prospect in Elzevir Township. The new owners of the past-producing Granimar granite quarry near Kingston have made an agreement with an Asian company that will see blocks of Rideau Red granite shipped offshore for market testing. The quarry has been inactive for several years and the blocks will be selected from an on-site inventory of previously quarried stone. The company is also testing waste rock for use as high-quality crushed stone aggregate.

Canadian Wollastonite–St. Lawrence Deposit

In 2006, Canadian Wollastonite continued development work on its mineral deposit just north of Kingston Ontario. The company successfully tested a revised flow sheet that produced high-grade wollastonite and diopside products. The company plans to construct an on-site pilot plant in 2007 to test and refine its beneficiation process, and to produce commercial scale samples for customer acceptance.

Several local customers have shown interest in a natural, low-iron source of diopside. Currently, only synthetic diopside is available outside of China. Canadian Wollastonite is poised to become the only Canadian producer of wollastonite and one of only a handful of producers worldwide. (B. Vasily, Canadian Wollastonite, personal communication, January 2007)

Hanson Brick Ltd.

Hanson Brick Ltd. has applied for a licence to open a new quarry in Queenston Formation shale immediately north of Highway 407, within the City of Burlington. This location is approximately 4 km by road from the company's two Burlington Brick Plants and has an estimated 13 to 14.5 Mt of accessible resource.

St. Marys Cement Group

St. Marys Cement is one of two companies on the western edge of the Greater Toronto Area that have started applications for new zoning, and then licences, to extract Amabel Formation dolostone for high-quality aggregate products. Both are "greenfield" sites.

In June 2006, St. Marys Cement Group announced the purchase of Lowndes Holding Corp., which owned the site of a proposed 3 Mt per year quarry in the northeast corner of the City of Hamilton. St Marys plans to extract dolostone, a high-quality construction aggregate, from the 158 ha site. The previous owner filed land-use planning applications with the City of Hamilton in September 2004. After the announcement, company environmental and hydrogeology experts have reviewed the existing applications and reports and initiated additional studies. The company has proposed that extraction would occur on only 67 ha of the site and important environmental features on the other 91 hectares would be preserved and remain untouched. (St. Marys Cement Group, press release, June 20, 2006)

The approval of this proposed quarry will not be easy or quick as highlighted in this excerpt from a press report

> "Citizens gear up to meet Goliath in quarry battle"
> - "Richard Olsen, president of St. Marys CBM, which will oversee the quarry project, said St. Marys is aware of opposition from FORCE (Friends of Rural Communities and the Environment) and the Ward 15 Councillor Margaret McCarthy, but he believed it can resolve concerns and build a positive relationship with the community. But McCarthy and FORCE chair Graham Flint warn St. Marys it will not win over the community to the project. Flint said concerns over water supply, loss of wetlands, quarry trucks traveling on country roads, noise, dust and vibrations won't go away no matter who is behind the proposal. Flint agreed the opposition landscape has altered significantly for FORCE, but said his group counts 400 donors who have raised $250,000 to wage war against the quarry proposal". (*The Hamilton Spectator*, June 24, 2006)

James Dick Construction Ltd.

James Dick Construction Ltd. proposes to extract 2 Mt per year from its Town of Caledon location. The approvals process for planning and licencing this proposed quarry continued through 2006. James Dick Construction is preparing a Comprehensive Broader Scale Environmental Study related to the site and surrounding lands as required by the Town of Caledon. As of January 2007, the Town of Caledon, Region of Peel, Credit Valley Conservation Authority and James Dick Construction have held public meetings on the progress of this study. This proposed quarry application has been appealed to the Ontario Municipal Board. The final Board hearing is scheduled for September 2008.

Other applications for new or expanded quarries in central and southwestern Ontario include:

- Nelson Aggregate Co., a partnership between Lafarge Canada Inc. and Steed and Evans Holdings Inc., has applied for a licence for an 82 ha expansion of its Burlington Quarry.
- Georgian Aggregates and Construction Ltd. has applied to amend the Niagara Escarpment Plan and for a licence under the *Aggregate Resources Act* for a proposed quarry in Clearview Township, Simcoe County, which would extract up to 3 Mt per year. The 69 ha quarry would be across the road from the company's Duntroon Quarry.
- Harold Sutherland Construction Ltd. submitted an application seeking an amendment to the Niagara Escarpment Plan in Keppel Township. This would potentially allow an 89 ha, 600 000 t per year quarry adjacent to the company's existing quarry on County Road 17.

Fortune Minerals Limited/Formosa Environmental Aggregates Ltd. – High-Calcium Limestone

Fortune Minerals Limited/Formosa Environmental Aggregates Ltd. owns 107 ha in the Municipality of Brockton in South Bruce County. The site is underlain by patch reefs comprising high-purity calcium carbonate within the Amherstburg Formation. Formosa intends to develop the Greenock Quarry on its property to mine a resource grading 99% calcium carbonate. The company has received all of the requisite Official Plan and zoning amendments. As of January 2007, discussions between the Company and the Ministry of Natural Resources continued with regard to the site/mining plan prior to the issuance of an extraction licence. The current mining plan proposal has all extraction above the water table.

Dimension/Landscape Stone

Proponents of several dimension/building stone projects have started the licensing process under the *Aggregate Resources Act.* These are projects propose to extract Gull River Formation limestone, Amabel Formation dolostone/marble, Eramosa Member dolostone/marble and Guelph Formation dolostone. These applications and projects are at varying stages within the licencing process.

Some of the applications, currently within the formal process, include (proponent, location, and commodity):

- Stone Cottage Inn Ltd., Rama Tp., limestone
- Bruce Peninsula Stone Ltd., Albemarle Tp., dolostone
- D. & J. Pruder, Amabel Tp., dolostone
- I. Maitland, Albemarle Tp., dolostone

St. Marys Cement Inc. – Cement Stone

St. Marys Cement Inc. has applied to amend the current site plan at its Bowmanville Quarry. This facility is the largest cement operation in Canada and one of the largest in North America. Opened in 1968; the quarry/plant complex has a challenging site with a nuclear power plant, Class 1 wetland, Lake Ontario, main rail lines, Highway 401, the Town of Bowmanville and cottagers as close neighbours. The plant was expanded in 2000 to process 5800 tonnes per day, and has a stated production capacity of almost 2.0 Mt of clinker per year.

The current quarry is approximately 66 m deep, with 10 m of overburden covering 56 m of Lindsay Formation limestone. The Company is seeking regulatory approval for future extraction to the 188 m depth. If approved, the additional resource would provide approximately 30 additional years of feed for the cement plant.

EXPLORATION ACTIVITY

All exploration activity in the Southwestern Ontario District and a significant portion in the Southeast District occur on private land; hence, there is no requirement for companies or individuals conducting mineral exploration to file assessment reports with the Ministry of Northern Development and Mines or to contact Ministry staff or offices. However, staff of the Resident Geologist Program acquires information on many property acquisition interests or exploration projects for such commodities as high-purity limestone/dolostone, salt, gypsum, sandstone, limestone/dolostone/marble, dimension/building stone, cement, shale and zinc.

Confidentiality and private land issues surrounding the competitive and market-driven nature of the industrial minerals industry impedes disclosing the identities of companies and/or individuals exploring on private lands and/or the locations of their prospects.

Southeastern Ontario District

Assessment files received for the Southeastern Ontario District are listed in Table 5. Exploration activity is listed in Table 6 and locations are shown in Figure 2.

Table 5. Assessment files received in the Southeastern Ontario District in 2006.

Abbreviations

AEM	Airborne electromagnetic survey	Lc	Linecutting
AM	Airborne magnetic survey	Met	Metallurgical testing
ARA	Airborne radiometric survey	OD	Overburden drilling
Beep	Beep Mat survey	ODH	Overburden drill hole(s)
Bulk	Bulk sampling	OMIP	Ontario Mineral Incentive Program
DD	Diamond drilling	OPAP	Ontario Prospectors Assistance Program
DDH	Diamond drill hole(s)	PEM	Pulse electromagnetic survey
DGP	Down-hole geophysics	PGM	Platinum group metals
GC	Geochemical survey	Pr	Prospecting
GEM	Ground electromagnetic survey	RES	Resistivity survey
GL	Geological Survey	Samp	Sampling (other than bulk)
GM	Ground magnetic survey	Seismic	Seismic survey
GRA	Ground radiometric survey	SP	Self-potential survey
Grav	Gravity survey	Str	Stripping
HLEM	Horizontal loop electromagnetic survey	Tr	Trenching
HM	Heavy mineral sampling	UG	Underground exploration/development
IM	Industrial mineral testing and marketing	VLEM	Vertical loop electromagnetic survey
IP	Induced polarization survey	VLFEM	Very low frequency electromagnetic survey

No	Township or Area (Commodity)	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
1	Bedford (Graphite)	Chris R. Christensen	2005	Tr	2.32116	44
2	Bedford (Graphite)	Chris R. Christensen	2004, 2006	Samp, Fill	2.32892	45
3	Belmont (Ca Marble)	Ulrich H. Kretschmar	2006	Pr, Samp	2.32437	22
4	Butt (Graphite)	Robert J. Bassermann	2006	Geol	2.32981	5
5	Cardiff (Mica, Vermiculite)	Rhonda G. Smerchanski	2005	Bulk, Samp	2.31368	233
6	Cardiff (Vermiculite)	Fred T. Archibald	2005	IM	2.31472	235
7	Cavendish (Vermiculite)	Regis Resources Inc.	2005	Samp, Phys	2.30739	137
8	Cavendish (Vermiculite)	Regis Resources Inc.	2006	Samp	2.32590	138
9	Cavendish (Vermiculite)	Regis Resources Inc.	2006	Samp	2.32751	139

No	Township or Area (Commodity)	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
10	Cavendish (Vermiculite)	Regis Resources Inc.	2006	Samp, Tr, Phys	2.32756	140
11	Denbigh, Lyndoch (BM)	Pelangio Mines Inc.	2004	DD, Samp	2.30860	9, 45
12	Effingham (PGM)	Angelo F. Tomasini	2004, 2006	Pr, Samp	2.33212	3
13	Effingham (PGM, Au)	Angelo F. Tomasini	2004, 2006	Pr, Samp	2.33287	4
14	Faraday, Monmouth, Cardiff	El Nino Ventures Inc.	2005	Samp, GRA, Pr, Str	2.31943	88, 162, 234
15	Galway (REE)	David N. Webster	2005	Samp, Str	2.31425	63
16	Galway (REE, Mica)	Earth Resources Limited	2005, 2006	IM, Str	2.33556	64
17	Grimsthorpe (Au)	Robert J. Dillman	2005	GC (MMI)	2.31570	86
18	Harvey (Limestone)	564348 Ontario Limited	2006	Geol, DD, Str	2.33088	23
19	Hindon (BM)	Yvonne C. Fulton-Bell	2005	Pr	2.31306	13
20	Hindon (BM, Granite)	Yvonne C. Fulton-Bell	2006	Pr	2.33182	15
21	Hindon (BM, Granite)	Yvonne C. Gulton-Bell	2006	Pr	2.33183	14
22	Madoc (Basalt)	Alan Reed	2006	Str	2.32584	155
23	Madoc (Limestone)	IKO Industries Ltd.	2005	DD, Samp	2.33026	156
24	McClintock (BM, PGE)	Randsburg International Gold Corp.	2004	DD, Samp	2.31032	64
25	Methuen (Gabbro as Aggregate)	Trigan Resources Inc.	2005	Baseline Environmental Study	2.31015	45
26	Methuen (Gabbro as Aggregate)	Trigan Resources Inc.	2005	Geol	2.31157	46
27	North Burgess (Graphite)	Graphite Mountain Inc.	2005	Str, Tr	2.30528	25
28	Palmerston (Talc, Tremolite)	Peter F. Jorgenson	2006	Pr, Samp	2.33063	55
29	Tudor (Au)	James M. Chard	2005	Samp, Tr	2.31903	125
30	Tudor (Au, BM)	C. James Laidlaw	2005	GC (MMI)	2.31007	124

Table 6. Exploration activity in the Southeastern Ontario District in 2006. Keyed to Figure 2.

Abbreviations

AEM ..... Airborne electromagnetic survey
AM ..... Airborne magnetic survey
ARA ..... Airborne radiometric survey
Beep ..... Beep Mat survey
Bulk ..... Bulk sampling
DD ..... Diamond drilling
DDH ..... Diamond drill hole(s)
DGP ..... Down-hole geophysics
GC ..... Geochemical survey
GEM ..... Ground electromagnetic survey
GL ..... Geological Survey
GM ..... Ground magnetic survey
GRA ..... Ground radiometric survey
Grav ..... Gravity survey
HLEM ..... Horizontal loop electromagnetic survey
HM ..... Heavy mineral sampling
IM ..... Industrial mineral testing and marketing
IP ..... Induced polarization survey
Lc ..... Linecutting
Met ..... Metallurgical testing
OD ..... Overburden drilling
ODH ..... Overburden drill hole(s)
OMIP ..... Ontario Mineral Incentive Program
OPAP ..... Ontario Prospectors Assistance Program
PEM ..... Pulse electromagnetic survey
PGM ..... Platinum group metals
Pr ..... Prospecting
RES ..... Resistivity survey
Samp ..... Sampling (other than bulk)
Seismic ..... Seismic survey
SP ..... Self-potential survey
Str ..... Stripping
Tr ..... Trenching
UG ..... Underground exploration/development
VLEM ..... Vertical loop electromagnetic survey
VLFEM ..... Very low frequency electromagnetic survey

No.	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
1	564348 Ontario Limited	Harvey (Limestone)	Geol, DD, Str
2	Adroit Resources Inc.	Lyndoch/Denbigh (BM)	Lc, GEM
3	Archibald, F.T.	Cardiff (Vermiculite)	IM
4	Axelson, D.	Dungannon (Marble)	Pr
5	Baird, D./Neczkar, E.	Kaladar, Marmora, Madoc (Au)	Pr
6	Bassermann, R.	Butt (Graphite)	Geol
7	Beckett, R.	Eastern Ontario (Mineral Specimens)	Pr
8	Butts, N.	Madoc (Marble)	Pr
9	Byer, J.	Elzevir (Dim. Stone)	Pr
10	Canadian Wollastonite	Pittsburgh, Leeds & Lansdowne (Wollastonite)	Pr, IM
11	Christensen C.	Bedford (Graphite)	Samp, Drill, Fill
12	Creighton, W.	Kennebec (Au)	Pr
13	Dacre Industrial Minerals	Griffith (Marble)	DD
14	Despres, J./ Milligan, D.	Elzevir (Soapstone)	Pr
15	Dillman, R., Chard, J.	Tudor, Grimsthorpe (Au)	Pr
16	Dubblestein, A.	Ashby (Marble)	Pr
17	Earth Resources Ltd.	Galway (REE, Mica)	IM, Str
18	El Nino Ventures Inc.	Monmouth, Faraday, Cardiff (U)	GRA
19	Farmery, D./Patterson, D.	Lyndoch (Min. Spec.)	Pr
20	Floyd Preston Limited	Mayo (Marble)	Pr
21	Forget, M.	Tudor (Au)	Pr, Samp, GRA, Beep, Tr
22	Frontenac Ventures Corp.	Olden, Palmerston, Oso	Pr, GRA, Geol, Samp
23	Fulton-Bell, Y.	Hindon (BM)	Pr
24	Golden Phoenix Minerals	Griffith (Mo)	Pr
25	Hanes, D.	Mayo (Fe)	Pr
26	IKO Industries Ltd.	Madoc (Trap Rock)	DD, Samp
27	Johnston, B.	Madoc (Mineral Specimens)	Pr
28	Jorgenson, P.	Palmerston (Talc, Tremolite)	Pr, Samp
29	Kretschmar, U.	Belmont (Marble)	Pr, Samp
30	Kriens, P.	Tudor, Clarendon	Pr, IM

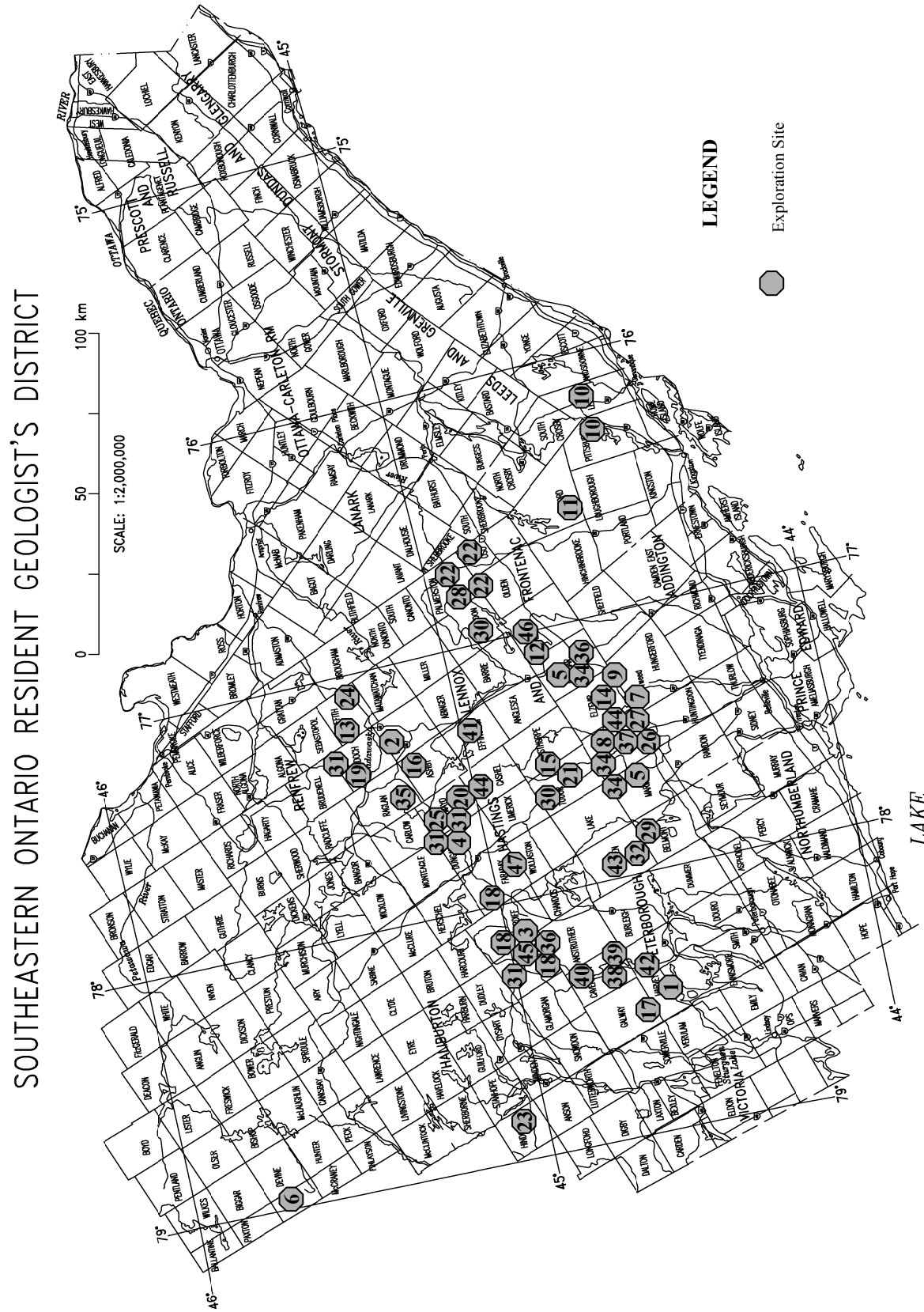


Figure 2. Exploration activity in the Southeastern Ontario District in 2006. Keyed to Table 6.

Table 6. continued

No.	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
31	Laidlaw, R.; Laidlaw, C.J.	Dungannon, Monmouth, Mayo, Lyndoch (Mineral Specimens)	Pr
32	Norway Asphalt Limited	Methuen (Granite)	Pr
33	OMYA (Canada) Inc.	SE Ontario (Marble)	Pr
34	Opawica Explorations Inc.	Marmora, Madoc, Kaladar (Au)	Pr
35	Pacific North West Capital Corp.	Raglan (Ni)	Pr
36	Palu-Corbelli Corporation	Monmouth, Kaladar (Dim. St.)	Pr, Samp
37	Reed, A.	Madoc (Trap)	Str
38	Regis Resources Inc.	Cavendish (Vermiculite)	Pr, Samp, Tr
39	Ross, D., Jones, G.	Cavendish (Min. Spec.)	Pr
40	Smerchanski, R.	Cavendish (Vermiculite, Mica)	Bulk, Samp
41	Tomasini, A.	Effingham (PGM, Au)	Pr, Samp
42	Tomlinson, M.	Peterborough, Haliburton Counties (Limestone, Granite)	Pr
43	Trigan Resources Inc.	Methuen (Gabbro as Aggregate)	Env. Study
44	Upper Canada Stone	Mayo, Cashel, Madoc (Marble)	Pr
45	Varga, P.	Monmouth (Mineral Specimens)	Pr
46	Veeley, H.	Kennebec (Au, BM)	Pr, Samp
47	Whotton, J.	Faraday (Au)	Pr

GOLD

Opawica Explorations Inc. – Mono, Bannockburn, Dingman and Addington Prospects, Southeastern Ontario

In November 2006, Opawica Explorations Inc. announced that the Company had settled the terms of 3 option agreements relating to prospects in southeastern Ontario. The Company may earn a 100% interest in the Mono and Bannockburn gold properties by paying a combination of cash and bond liabilities, shares of the Company and by incurring expenditures on the property all within the next 2 years.

The Mono property has a reported historic geologic reserve of 248 160 tons at 9.15 g/t Au and has had 268 m of ramp development to the 23 m level, 97 m of drifting on 3 veins and 1727 m of underground drilling.

The Bannockburn property is known to host a 3 foot-wide vein system for 700 feet in length and to a depth of 75 feet with values of up to 0.17 opt Au reported by previous operators. The Mono and Bannockburn gold zones are open on strike and at depth.

In addition, Opawica has optioned the Addington gold property from Imperial Metals Corporation. Opawica may earn a 100% interest in the property from surface down to the 300 metre-level and a 50% interest in the property below 300 m by paying cash and shares of Opawica and by incurring $500 000 in exploration expenditures all within the next 4 years. The following information is from the company information:

> "Imperial Metals Corp. will retain a 2% NSR [net smelter return]... In addition, in the event that Opawica earns its interest in Addington, then cash consideration of a further $1,000,000 is also payable by Opawica to Imperial Metals upon commercial production or within the next 5 years, whichever first occurs. An inferred mineral resource of 720,900 tons at 4.5 g/t Au has been reported by past operators (Imperial Metals Corporation 1999). Between 1936 and 1939, the Addington property has been explored to the 220 m level. The exploration development consisted of 221 m of raise development, 2262 m of drifting and 1054 m of crosscutting on 6 developed levels.

> "Opawica has also optioned 162 acres of surface rights covering the eastern half of the Dingman gold property. The Dingman property hosts the Dingman granite, which has a reported Measured and Indicated Resource of 12,600,000 tons of 0.70 g/t Au (Barnes Engineering Services Inc., Dingman Resource Model, Deloro Minerals Ltd., 1998) Opawica has the option to earn 100% of the mineral rights of the Dingman gold property as announced by the Company on September 27, 2006.
>
> "All of the above resources are situated primarily within 150 m of surface and are within 10 km of the main Dingman property, exception for Addington which is about 40 km east of Dingman. The Company is proceeding to acquire further properties in the district." (Opawica Explorations, www.opawica.com, press release, November 6, 2006)

The Dingman Group properties have not been sufficiently drilled by Opawica to have ore reserves calculated. Further drilling is required to upgrade the mineralization to measured and indicated resource status and there is no certainty that the preliminary or historical assessments that were made prior to NI-43-101 requirements will be realized. The company is not presently treating the inferred mineral resource estimates or historical estimates as being NI-43-101-compliant defined resources. (Opawica Explorations Inc., press release, November 6, 2006; T. Keast and P. Antoniazzi, Opawica Explorations Inc., personal communications, 2006)

URANIUM

El Nino Ventures Inc. – Bancroft Area Properties

In 2006, Boulder Creek Explorations Inc. of Nevada optioned El Nino Ventures' 8 Bancroft area uranium projects. Under this agreement, Boulder Creek has committed to spend $1 000 000 on the next phase of exploration. Initial exploration work will focus on the Halo property, which El Nino considers to provide the best opportunity to develop economic tonnage and grade of uranium and rare earths. The 8 properties consist of 34 mineral claims containing 247 claim units. The claims, located in Monmouth, Cardiff and Faraday townships, were staked in 2004 and 2005. In 2005, work initially focussed on the 2 properties with historical reserves (not NI-43-101 compliant); the Halo and the Amalgamated Rare Earth #2 properties. Subsequently, in 2005, the remaining properties were visited and sampled and, by the end of 2005, all 8 properties had been fully evaluated. Three of the properties were chosen for follow-up work in 2006. In 2006, detailed grids, scintillometer surveys and radon-in-soil gas surveys were completed as well as back hoe excavation and rock sampling for U_3O_8 and ThO_2 analysis.

The Halo property comprises the following uranium deposits in Cardiff Township:

Zone	Lot/Concession
Pyroxenite	Lot 6 (north half), Concession XVIII
South	Lots 6,7, Concession XV
Bald Mountain	Lot 5, Concession XVI
Northwest	Lot 4 (north half), Concession XVIII
Lake	Lots 4, 5, Concession XVIII

The Halo property is underlain by a curvilinear belt of amphibolite, and paragneiss with interbedded marble and metamorphic pyroxenite. Uranium mineralization is associated with pegmatite, syenite, metamorphic pyroxenite or calcite-fluorite-apatite veins.

In 1953–1954, the property, originally discovered by prospector E.S. Hogan, was under option to Stratmat Limited from Halo Uranium Mines. Stratmat carried out a radiometric and geological survey and limited diamond drilling. In 1955–1956, extensive exploration was conducted by Halo Uranium Mines, including surface trenching, surface diamond drilling (142 drill holes, totalling 48 736 feet) and 2 adits (in which 89 holes, totalling 9822 feet, were drilled).

Diamond-drill hole intersections from 23 holes, totalling 9491 feet, in the South Zone ranged in value from 0.05 to 0.75% U_3O_8, over intersections of 1.5 to 5.4 feet. Mineralization occurs as uranothorite in granite pegmatite, as uraninite in a syenite dike and as betafite in calcite veins. At the Bald Mountain Zone, 7 diamond-drill holes, totalling 1516 feet, include an intersection grading 0.25% U_3O_8 over 8.4 feet and, at the Pyroxenite Zone, intersections from 1 to 3 feet had grades of 0.15 to 0.20% U_3O_8. In 1957, reserves were estimated at 472 000 tons of ore grading 0.112% U_3O_8.

From early 1956 to July, 1957, extensive mill research was conducted on uranium-bearing samples by Professor T.V. Lord of Queen's University under the auspices of the Atomic Energy Control Board in Ottawa. Numerous laboratory tests on bulk samples of ore proved the feasibility of extracting the uranium and rare earth minerals by flotation concentration, followed by acid leaching the flotation concentrates. Detailed design plans and specifications for mine and mill plants were completed in 1958. In March 1957, Halo Uranium was re-named Consolidated Halo Uranium Mines, Limited and the property was sold to Amalgamated Rare Earth Mines, Limited. Impending cut-backs for purchase commitments of uranium oxide resulted in the inability of Amalgamated Rare Earth Mines to finance the completion of its preproduction development. Operations were suspended in 1957 when all underground and surface plant equipment and buildings were dismantled and sold. Amalgamated Rare Earth completed radiometric surveys in 1968. In 1973, their properties in the Bancroft–Wilberforce area were optioned to Imperial Oil Limited and, in 1979 the name was changed to Rare Earth Resources Limited. Esso Resources Canada Limited dropped the option in 1983. (Information compiled from T.J. Beesley, El Nino Ventures, personal communications, October 2006; Mineral Deposit Inventory; assessment files; El Nino Ventures, press releases, November 2006)

Frontenac Ventures Corporation – Palmerston, Olden and Oso Townships

Frontenac Ventures Corporation holds approximately 53.7 km^2 as unpatented claims, a mining lease and additional land held in agreements with patented mineral rights owners. The property includes one of the more prominent areas of airborne uranium anomalies in southern Ontario.

Exploration conducted by various companies in the 1950s, 1960s and the late 1970s identified numerous uranium showings in the area now controlled by the company. In 2004, the Geological Survey of Canada released compilation maps, in digital format, from various airborne radiometric surveys flown at different times over large areas of the Grenville Province. The new compilation indicates that many of these showings occur within several, far larger zones of anomalous uranium, the full extent of which had never been explored in the past. The overall strike extent of the uranium anomalies is at least 20 km. During the summer of 2006, approximately 8 km were confirmed through ground traverses conducted by the company.

More recent OGS compilation maps of the Grenville Province, at a scale of 1:50 000, indicate that the showings and the radiometric anomalies are associated with a sequence of metasedimentary rocks lying between an older tonalite gneiss unit and a paragneiss unit in areas where the metasedimentary rocks have been altered to a higher metamorphic grade. The geology maps outline a series of isoclinal folds along the contact between the older tonalite gneiss and the metasedimentary rocks as well as within the latter. A large part of the radiometric anomalies lie within the metasedimentary rocks along the limbs of these folds near the contact with the tonalite gneiss, as well as within similar stratigraphy enclosed in the paragneiss in probable inliers of the same units exposed along several shallow plunging domes.

Uranium mineralization, consisting of coarse crystals of uraninite and allanite, occurs in a white quartz-plagioclase-biotite rock with considerable small-scale changes in crystal size and composition, from pegmatoidal to aplitic and from almost pure silica to almost pure feldspar; all hosted within a very mafic pyroxene-biotite-amphibole ± garnet gneiss previously mapped as a mafic volcanic rock. The immediate contacts of the white quartz-plagioclase-biotite rock have previously been described as a conglomerate or pseudo-conglomerate and correlated with coarse clastic metasedimentary rocks of the Flinton Group, the youngest member of the Grenville Supergroup.

The metasedimentary units, as well as the contact with the older tonalite gneiss, all dip at shallow angles, typically less than 20°, so that many of the apparent isoclinal folds are shallow plunging domes and basins, locally exposing the mineralized units over extensive areas of outcrop and subcrop. The white quartz-feldspar-biotite rock appears as a series of "stratabound" or foliation bound units parallel to the enclosing metasedimentary rocks and the contact with the older tonalite gneiss.

Mapping in 2006 by the company has shown that the entire assemblage of mafic gneiss, white quartz-feldspar-biotite rock and the pseudo-conglomerate are all parts of a major blastomylonite unit. The clasts in the "conglomerate" are of the same varied composition and texture as the white quartz-feldspar-biotite rock hosted within the same pyroxene-biotite-hornblende ± garnet mafic gneiss as in adjacent layers, as patches of probable early melt phases during pro-grade regional metamorphism along an area of high strain between the older gneiss and

the metasedimentary units. It appears that the larger, sheets of white quartz-feldspar rock were formed by amalgamation of these original felsic melt patches, leaving as a mafic residuum the unit now seen as the very mafic gneiss either in discrete layers or as the matrix to patches of early felsic melt within the "pseudo-conglomerate".

Major uranium deposits around the world are associated with the basal, unconformable sections of metamorphosed sedimentary sequences enclosing similar rock types to the white quartz-feldspar rocks, usually described as pegmatites or pegmatoids, within similar mafic metamorphic rocks as metavolcanic or metasedimentary phyllites, schists and gneisses. Several uranium deposits in the Northern Territory of Australia have a form that is very similar to the mineralization in the East Bancroft Uranium Project area with characteristic shallow dips to the metamorphosed sedimentary units and the enclosed white quartz-feldspar rocks. In the Rossing deposit in Namibia, the felsic components show the same variability in grain size and fabric as in the project area, from aplites and fine-grained granites through to coarse pegmatites.

Historical sampling of the diamond-drill core from numerous holes in the East Bancroft area, mostly drilled beneath radioactive outcrops, with little or no geological control, was very selective based on the radioactivity of individual core lengths, thus, making the historical average grades not very meaningful. Overall, the mineralized interval appears to have a vertical depth of approximately 25 m in one area, which extends along the bedrock layering for over 1000 m where the mineralization lies either at or just beneath a shallow cover of the very mafic gneiss or thin glacial overburden.

Frontenac Ventures Corporation plans an aggressive exploration program in 2007 consisting of diamond drilling in areas of previously identified mineralisation as well as in the extensive areas along strike corresponding to the airborne radiometric anomalies. (Information compiled from T. Bottrill, Frontenac Ventures Corporation, personal communications, November, 2006; Frontenac Ventures Corporation, press releases, 2006)

MOLYBDENUM

Southeastern Ontario has a history of molybdenum production dating to 1915 with most recent production in the 1940s.

In the Bancroft area, 5 deposits that were in production from 1917 to 1918 produced several thousand pounds of molybdenum from ore grades ranging from 3.85 to 5.8% MoS_2. There are 45 documented molybdenum occurrences in the Renfrew area, including 10 past producers. Reported grades varied from 18 to 0.18% MoS_2. At least 2 of these deposits have known resources. Additional prospects and occurrences have been documented in these areas and in the Madoc–Sharbot Lake area. Deposits have been divided into 3 classifications including stratabound-skarn hosted; unconformable to conformable pegmatite hosted and stratiform paragneiss hosted. In 2005, prospectors and junior mining companies acquired all available deposits in the Bancroft area including properties to the east in Griffith and Lyndoch townships.

Golden Phoenix Minerals Inc. – Northern Champion Project

In 2005, the past-producing Spain molybdenum property in Renfrew County was acquired by staking. Golden Phoenix Minerals Inc. is a publicly traded mining company, based in Sparks, Nevada, and is actively exploring the property now known as the Northern Champion Prospect. In 2006, work included ground geophysical surveys. Results were positive and further exploration is planned for 2007. The company is the majority owner and operator of the Ashdown molybdenum mine in northwest Nevada.

COPPER

Adroit Resources Inc. – Simon Copper Property

The Simon Copper property consists of 12 contiguous claims (92 units) covering 1472 ha in Denbigh and Lyndoch townships. In September 2006, the property was acquired from Pelangio Mines by Adroit Resources Inc.

The company reports the prospect is located within a 175 km northeast-trending belt of metavolcanic rocks known to host a series of deposits. One of the deposits is the past-producing New Calumet Mine, which produced 3.4 million tonnes of ore grading 6.0% Zn, 1.7% Pb, 124 g/t Ag and 0.65 g/t Au.

The Simon Copper prospect consists of multiple surface showings including the South Zone, North Zone, and East Zone. The South Zone has a historical resource of 253 000 tons grading 1.09% Cu; however, this resource estimate does not comply with NI-43-101 standards. The deposit was discovered in the 1960s by Noranda and Young Davidson Mines. No assays were taken for zinc, although grab samples from surface assayed 4 to 6% Zn. Pelangio Mines diamond drill-tested the South Zone in 2000 and 2003 at several widely spaced intervals. The results of the drilling demonstrated the continuation of mineralization down plunge of the main deposit. Adroit Resources has not independently re-sampled this zone. The last round of drilling at the South Zone deposit in 2003 is reported to have intersected a large garnet-bearing alteration halo adjacent to the mineralization. This alteration suggests the possibility of a large mineralizing system.

Approximately 16 km of line cutting has been completed over the South Zone (Simon Copper deposit). A minimum 2500 m diamond-drilling program planned for January 2007 is designed to re-evaluate the deposit in terms of the copper and zinc potential. There is also a plan to drilling the deposit down-dip to the 300 m level.

A further 5.5 km of line cutting has been completed over the B anomaly, and an additional 11.0 km of line cutting is in progress over the D anomaly. The B and D anomalies represent 2 of 5 airborne geophysical features with signatures that resemble the geophysical response over the Simon Copper deposit (South Zone). A time-domain electromagnetic (TDEM) survey has been completed over the South Zone area with plans to also survey the B and D anomalies. Results from the TDEM survey, completed in December, 2006, over the B anomaly, have identified several drill targets for immediate follow-up. Two diamond-drill holes will initially test this anomaly. (Information compiled from K. Filo, Pelangio Mines, personal communications, 2006; Adroit Resources Inc., press releases, September 2006, December 2006, January 2007)

RESIDENT GEOLOGIST STAFF AND ACTIVITIES

During 2006, staff of the Southern Ontario Region, Resident Geologist Program (RGP) offices included P.J. Sangster, Regional Resident Geologist; D.A. Laidlaw, Regional GIS Specialist (Tweed), C.R. Lee, Regional Client Support Geologist, (Toronto). In June, K.G. Steele, District Geologist, Southwest District (Toronto) accepted the position of Regional Land Use Geologist Southern Ontario. P.S. LeBaron joined the program as District Geologist (Tweed) in October. D.A. Laidlaw was Acting District Geologist, Southeast District from January to September 2006. Summer Experience Program student, E. Laidlaw, provided summer field season support to the Tweed RGP office.

In December 2006, the Regional Resident Geologist, District Geologist and Regional Land Use Geologist attended the Ontario Exploration & Geoscience Symposium, an event sponsored by the Ontario Prospectors Association (OPA) in Sudbury. In addition to contributing to and staffing the Resident Geologist Program display, staff attended technical sessions and reviewed all exhibits and posters. The Regional Resident Geologist presented a paper on mineral exploration and development activities in Southern Ontario.

Staff from the Tweed RGP office and Southern Ontario Prospectors Association (SOPA) representatives presented a co-operative booth highlighting Hastings County mineral resources at the 2006 Bancroft Gemboree. The event recorded over 16 000 attendees.

In September, the Southern Ontario Regional Land Use Geologist (RLUG) and the Regional Resident Geologist presented the Ministry of Northern Development and Mines display at the Ontario East Municipal Conference in Kingston. The focus of the display, “Resident Geologist Program – Your Partner in Planning” featured geology and Mineral Deposit Inventory (MDI) information for Hastings County as an example of databases maintained by the RGP that are effective tools in municipal planning.

The RGP was invited by County of Peterborough to participate in the Peterborough Regional Exhibit, at the International Plowing Match in October 2006. The Exhibit highlighted the cultural, heritage, natural and economic development components of the county. Mineral resources continue to play an important role in Peterborough County. At the display, staff and volunteers gave away 370 posters, mostly to teachers and students; 500 geology maps; and 3000 rock and mineral samples. The exhibit was a co-operative effort of the Resident Geologist Program – Southern Ontario, Southern Ontario Prospectors Association and Prospectors and Developers Association of Canada Mining Matters. Despite inclement weather over 100 000 people attended the Match.

Rideau Canal Waterway: History and Geological Setting

In September 2006, the Resident Geologist office was contacted by Parks Canada concerning the potential negative effects of mineral exploration and mining on the Rideau Canal Waterway. Parks Canada had received complaints from an anti-mining group that these activities could have a negative effect on the Waterway and its potential designation as a World Heritage Site.

The year 2007 marks the 175th anniversary of the opening of the Rideau Canal Waterway. Between 1826 and 1832, the canal system, consisting of 47 masonry locks and 52 dams, was constructed, thus creating a 202 km navigable system that links a series of lakes and rivers between Kingston and Ottawa. It is the oldest continuously operated canal system in North America.

Originally intended as a military supply route, the primary use of the canal in the 1800s became one of commerce, transporting goods and people to communities that were growing along the route. With the development of road and rail transportation in the 20th century, the canal became a waterway used primarily for pleasure boating. It has been designated as a National Historic Site (1926) and a Canadian Heritage River (2000) and, in 2005, was nominated as a World Heritage Site.

Construction of the Rideau Canal was directly responsible for the establishment of many settlements along the waterway, including the nation's capital. In 1826, Colonel John By, supervisor of construction, laid out plans for Bytown—now Ottawa—at the confluence of the Ottawa and Rideau rivers, as a headquarters and settlement for canal workers.

The growth in population in the area following completion of the canal led to an increase in local commercial activities, including mining. Sandstone and limestone that were quarried at several locations along the waterway for construction of the locks, dams, and canal buildings, continued to be quarried and used as construction material. Stone masons who arrived from Great Britain and Europe to work on the canal remained in the area and produced the stone bridges, private residences, churches, and public buildings that can be seen in communities along the Rideau system and throughout southeastern Ontario. Other minerals that were discovered and mined in the area in the 1800s to early 1900s include galena, magnetite, hematite, mica, apatite, graphite, barite, celestite, feldspar, quartz crystals, and silica from sandstone. The first iron smelter in Ontario was built in 1801 at Furnace Falls (now Lyndhurst) to process hematitic iron ore from Delta, and the first graphite producer in Ontario was the Globe mine, worked from 1870 to 1875 near Smiths Falls. (www.rideau-info.com)

The Rideau Canal Waterway begins at Kingston in Paleozoic rocks of the Western St. Lawrence Platform, crosses Precambrian rocks of the Frontenac Arch (Axis), and continues to Ottawa through Paleozoic rocks of the Central St. Lawrence Platform.

Precambrian rocks of the Frontenac terrane, a subdivision of the Central Metasedimentary Belt of the Grenville Province, consist of a sequence of marbles, quartzites, and quartzofeldspathic gneisses that were intruded by plutonic rocks and subjected to granulite-facies metamorphism at about 1170 to 1160 Ma. This sequence has been classified as the "Frontenac Supergroup", which differs from the Grenville Supergroup in its lack of volcanic and volcaniclastic rocks and an abundance of quartzites. The oldest paragneiss unit has and age of 1.8 to 1.4 Ga, and the youngest marble/quartzite units have a maximum depositional age of 1.3 Ga. At least 2 major periods of folding have produced a complex interference pattern throughout the terrane, and one major mylonite zone, the Rideau–Canoe Lake fault, trends northeasterly along the route of the Canal.

The quartzofeldspathic gneiss units consist of a variety of mineral assemblages including diopside, pyroxene, amphibole, biotite, cordierite, sillimanite, and garnet. Calcitic marbles may contain accessory graphite, phlogopite, diopside, scapolite, apatite, tourmaline, and pyrite. To the east of the Rideau Canal, the marbles become interlayered with quartzite, commonly on a scale of centimetres, and garnet-sillimanite gneiss.

Small bodies of diorite, gabbro, and anorthosite occur throughout the Frontenac terrane, commonly containing up to 10% ilmenite and titaniferous magnetite. A suite of massive syenitic and granitic rocks, largely unaffected by deformation and recrystallization, has an age of 1180 to 1165 Ma, coincident with the granulite-facies metamorphic event. A younger, monzonitic suite, which occurs along the north shore of Rideau Lake, has an age of 1090 to 1075 Ma.

Unconformably overlying the Precambrian rocks to the east and west of the Frontenac Arch is a series of flat-lying Cambrian to Middle Ordovician strata. The oldest Paleozoic unit is the Covey Hill Formation, a thin succession of feldspathic conglomerates and sandstones that is preserved within depressions in the Precambrian surface.

East of the Frontenac Arch, the Cambrian sandstones are overlain by Lower Ordovician, interbedded sandstones and dolostones (March and Oxford formations), succeeded by Middle Ordovician sandstones and shales with carbonate interbeds (Rockcliffe Formation). Strata of the overlying Nepean Formation, a Cambrian succession of quartz-rich sandstones, are well exposed along the margins of the Frontenac Arch, and were quarried in the Kingston, Perth–Smiths Falls, and Ottawa areas for use in the construction of the Rideau Canal. Originally deposited in a marginal-marine setting, the sandstones show evidence of wind-produced structures such as large, simple cross-beds and wind-ripple laminations, possibly formed in an eolian dune field. Also preserved in these strata, near Kingston, are trackways of large, amphibious arthropods—a recent discovery that has extended the record of the first arthropod landfall back by about 40 million years (MacNaughton et al. 2002).

Middle Ordovician formations of the Ottawa Group overlie the Rockcliffe Formation to the east of the Frontenac Arch, and directly overlie both Nepean sandstone and Precambrian basement to the west of the arch. These formations—the Shadow Lake, Gull River, and Bobcaygeon—have been quarried extensively as aggregate and building stone. In particular, white-weathering microcrystalline beds of the Gull River Formation are well represented in the limestone churches, municipal, and university buildings in Kingston.

The youngest Paleozoic Formation in the Rideau area is the Queenston Formation (Upper Ordovician), a red shale that is exposed in the Russell area near Ottawa, and is quarried there for the production of brick.

The Rideau Canal area has historically produced a wide range of stone and mineral products, and interest in the mineral potential of the area continues.

Current producers include Hanson Brick, which is the operator of a Queenston formation shale quarry and brick manufacturing plant near Ottawa; OMYA Canada Inc., which operates a high-purity, marble processing plant near Perth; Rideauview Contracts, producers of sandstone blocks for building and landscaping purposes from quarries near Kingston; and Upper Canada Stone, which quarries red granite near Seeleys Bay for use as architectural, landscaping, and armour stone.

Canadian Wollastonite is developing the St. Lawrence wollastonite deposit near Seeleys Bay. The company plans to produce high-grade, high-aspect ratio wollastonite and a low-iron diopside by-product.

Three ilmenite-magnetite deposits occur in association with gabbroic or anorthositic bodies. The largest—the Newboro, or Matthews–Chaffey deposit—achieved minor production between 1853 and 1871, and diamond drilling in 1957 outlined open pit reserves of 45 million tons grading 26% Fe and 6.6% TiO_2.

Information for this section compiled from Easton (1992), Wynne-Edwards (1967), MacNaughton et al. (2002), Williams (1991), Sangster, Laidlaw and Papertzian (2006), and www.rideau-info.com.

Southern Ontario Prospector's Association (SOPA)

During 2006, the Southeast Resident Geologist Office continued regular liaison with the Southern Ontario Prospector's Association (SOPA) to provide improved service to the client group. In February, staff of the RGP Tweed office organized a session to provide SOPA members with the opportunity to complete an analysis of available OGS mapping and a survey to contribute to program planning within the Ontario Geological Survey. Staff of the RGP Tweed office provided copies of the Ontario Exploration Corporation grant program applications to interested local clients. In July, a field tour was organized for SOPA members to the H. Veley gold and base metal occurrence in Kennebec Township. Staff of Overburden Services Ltd. provided insight into modern alluvium sampling and interpretation of results.

Table 7 provides a four-year summary of program activity and Table 8 lists new publications added to the RGP office technical library (in Tweed) during 2006.

Table 7. Program activity statistics (four-year summary) for the Southeastern Ontario District.

Activity	2003	2004	2005	2006
Field Investigations/Property Visits	44	58	33	31
Field Trips Given/Field Guide Written	2	1	1	1
MDI Records Revised	470	469	487	183
MMAH Presentations	4	2	2	2
Clients Visits to Tweed RGP Office	470	461	387	455
Drill Core Library Users	26	142	48	56
Client Communications/Interactions (Presentations/Poster Sessions)	2550	>3000	>3000	>3000
Client Inquiries (Telephone/E-mail/Mail)	2461	2498	2247	2500
OGS Publications Sold	62	84	144	129
Prospector's Licenses Sold	20	14	7	10
Claim/Line Tags Sold	27	293	256	86

Table 8. Library acquisitions in 2006 by the Southeastern Ontario District (OGS publications of particular interest to the Southeastern Ontario District are shown in bold).

Title	Author	Type and Year of Publication
An updated guide to the subsurface Paleozoic stratigraphy of southern Ontario	**Armstrong, D.K. and Carter, T.R.**	**Ontario Geological Survey, Open File Report 6191, 214p, 2006, Accompanied by Charts A, B, C**
An updated guide to the subsurface Paleozoic stratigraphy of southern Ontario	**Armstrong, D.K. and Carter, T.R.**	**Ontario Geological Survey, Miscellaneous Release—Data 204, 2 CD-ROM, 2006**
Bedrock topography and overburden thickness mapping, southern Ontario	**Gao, C., Shirota, J., Kelly, R.I., Brunton, F.R. and van Haaften, S.**	**Ontario Geological Survey, Miscellaneous Release—Data 207, 1 CD-ROM, 2006**
Canadian & American Mines Handbook	Giancola, D. (ed.)	Business Information Group, Toronto, 672p, 2006
Firefly Guide to Gems	Oldershaw, C.	Firefly Books Ltd., Richmond Hill, Ontario, 224p, 2004
Index to Maps, bedrock geology, 1991–2005, east-central sheet	Publications Services Section, Ontario Geological Survey	Ontario Geological Survey, scale 1:1 000 000, 2006
Index to Maps, bedrock geology, 1991–2005, northern sheet	Publications Services Section, Ontario Geological Survey	Ontario Geological Survey, scale 1:1 000 000, 2006
Index to Maps, bedrock geology, 1991–2005, southern sheet	**Publications Services Section, Ontario Geological Survey**	**Ontario Geological Survey, scale 1:1 000 000, 2006**
Index to Maps, bedrock geology, 1991–2005, west-central sheet	Publications Services Section, Ontario Geological Survey	Ontario Geological Survey, scale 1:1 000 000, 2006
Index to Maps, surficial geology, 1991–2005, east-central sheet	Publications Services Section, Ontario Geological Survey	Ontario Geological Survey, scale 1:1 000 000, 2006
Index to Maps, surficial geology, 1991–2005, northern sheet	Publications Services Section, Ontario Geological Survey	Ontario Geological Survey, scale 1:1 000 000, 2006
Index to Maps, surficial geology, 1991–2005, southern sheet	**Publications Services Section, Ontario Geological Survey**	**Ontario Geological Survey, scale 1:1 000 000, 2006**
Index to Maps, surficial geology, 1991–2005, west-central sheet	Publications Services Section, Ontario Geological Survey	Ontario Geological Survey, scale 1:1 000 000, 2006
Partners in Progress	Mines & Minerals Division	Ministry of Northern Development and Mines, 1 DVD-Video, 2006
PDAC 2006 International Convention, Trade Show & Investors Exchange March 5-8, 2006, audio of main and open technical sessions synchronized to speaker's PowerPoint presentations.		Content Management Corp., 3 CD-ROM, 2006

Title	Author	Type and Year of Publication
Precambrian geology of the Cloyne–Plevna–Ompah area, Northern Mazinaw Domain, Grenville Province	**Easton, R.M.**	**Ontario Geological Survey, Open File Report 5454, 165p, 2006. Accompanied by Preliminary Map 3443**
Precambrian geology, Cloyne–Plevna–Ompah area	**Easton, R.M.**	**Ontario Geological Survey, Preliminary Map 3443, scale 1:50 000, 2006**
Regional modern alluvium and till sampling survey of the Tweed area, southeastern Ontario	**Felix, V.E., Reid, J.L. and Easton, R.M.**	**Ontario Geological Survey, Open File Report 6178, 134p, 2006**
Modern alluvium and till data release, Tweed area, southeastern Ontario	**Felix, V.E. and Reid, J.L.**	**Ontario Geological Survey, Miscellaneous Release—Data 199, 1 CD-ROM, 2006**
Report of Activities 2005, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Kirkland Lake District	Meyer, G., Grabowski, G.P.B., Guindon, D.L. and Chaloux, E.C.	Ontario Geological Survey, Open File Report 6184, 50p, 2006
Report of Activities 2005, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Sudbury District	Farrow, D., Gaudreau, J.M. and Ireland, J.	Ontario Geological Survey, Open File Report 6185, 41p, 2006
Report of Activities 2005, Resident Geologist Program, Red Lake Regional Resident Geologist Report: Red Lake and Kenora Districts	Lichtblau, A., Ravnaas, C., Storey, C.C., Raoul, A., Gula, R and Saunders, D.	Ontario Geological Survey, Open File Report 6180, 86p, 2006
Report of Activities 2005, Resident Geologist Program, Regional Land Use Geologist Report: Northwestern, Northeastern and Southern Ontario Regions	**Debicki, R.L., Hinz, P., Lichtblau, A.F., and Rowell, D.J.**	**Ontario Geological Survey, Open File Report 6187, 41p, 2006**
Report of Activities 2005, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report: Southeastern and Southwestern Ontario Districts, Mines and Minerals Information Centre, and Petroleum Resources Centre	**Sangster, P.J., Laidlaw, D.A., Papertzian, V.C., Steele, K.G., Lee, C.R., Barua, M. and Carter, T.R.**	**Ontario Geological Survey, Open File Report 6186, 77p, 2006**
Report of Activities 2005, Resident Geologist Program, Thunder Bay North Regional Resident Geologist Report: Thunder Bay North District	Smyk, M., White, G.D., Magee, A., and Komar, C.	Ontario Geological Survey, Open File Report 6181, 44p, 2006
Report of Activities 2005, Resident Geologist Program, Thunder Bay South Regional Resident Geologist Report: Thunder Bay South District	Scott, J.F., Magee, M.A., and Komar, C.	Ontario Geological Survey, Open File Report 6182, 38p, 2006
Report of Activities 2005, Resident Geologist Program, Timmins Regional Resident Geologist Report: Timmins and Sault Ste. Marie Districts	Atkinson, B.T., Hailstone, M., Seim, G.Wm., Wilson, A.C., Draper, D.M., Pace, A. and Woo, H.	Ontario Geological Survey, Open File Report 6183, 88p, 2006
Summary of Field Work and Other Activities 2006	**Baker, C.L., Debicki, E.J., Kelly, R.I., Rowell, D.J., Mason, J.K., Ayer, J.A., Easton, R.M., and Stott, G.M.**	**Ontario Geological Survey, Open File Report 6192, 2006**
The toolbox, providing services in French		Ontario Office of Francophone Services, 1 CD-ROM and kit

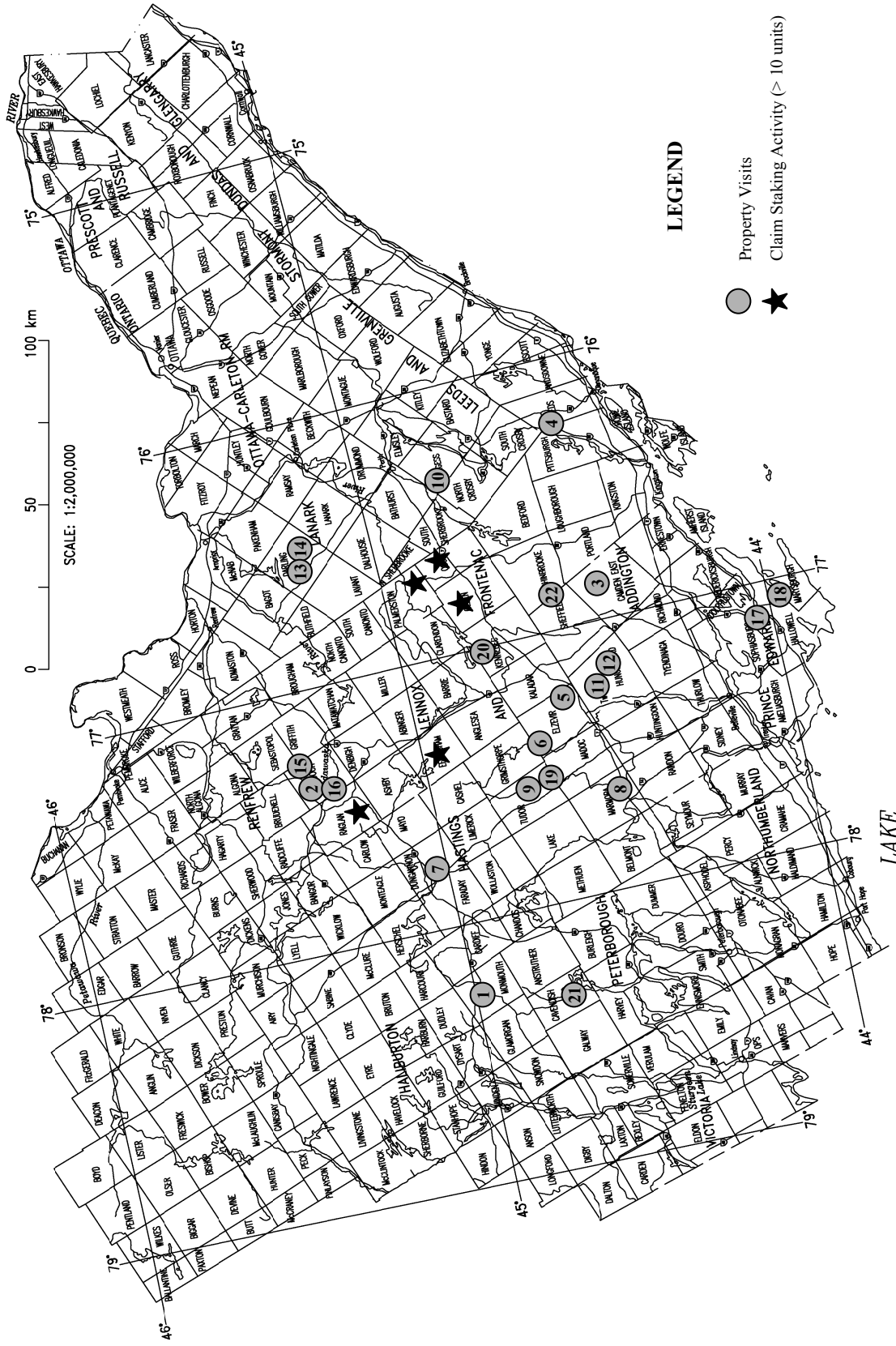


Figure 3. Property visits and claim staking activity in the Southeastern Ontario District in 2006. Keyed to Table 9.

PROPERTY EXAMINATIONS

In 2006, a total of 44 property visits were conducted by staff of the Southeastern Ontario and Southwestern Ontario Districts (Table 9; Figure 3).

Table 9. Property visits conducted by the Southern Ontario Regional Resident Geologist and staff in 2006. Keyed to Figure 3.

No.	Property/Operation	Commodity
1	Bear Lake Diggings, Monmouth Township	Mineral collecting site
2	Beryl Pit, Lyndoch Township	Mineral collecting site
3	Camden east township, Mafic dike investigation	Scientific interest
4	Canadian Wollastonite, Pittsburgh Tp.	Wollastonite
5	Carbroc quarry, Elzevir Tp.	Miller filler - dolomite
6	Champlain Marble, Tweed Marble Quarry, Hungerford Tp.	Dimension stone, marble, pegmatite
7	CN Nepheline Dump, Bancroft	Scientific interest
8	Deloro MOE site tour, Marmora Township	Scientific interest
9	M. Forget Prospect, Tudor Township	Zinc, gold prospect
10	Graphite Mountain prospect / M.Cadieux property visit	Graphite / LUP
11	Lajoie quarry, Hungerford Tp.	Karst, scientific interest with CA
12	Marlbank marl plant, Hungerford Tp.	Portland cement, past producer
13	OMYA Canada Inc., Tatlock Quarry	Calcium carbonate
14	Omega Blue quarry, Darling township	Dimension stone
15	Reported Kimberlite, Lyndoch Township	Scientific interest
16	Rose quartz, Lyndoch Township	Landscape stone, mineral specimens
17	Quinte Conservation Centre, Belleville	Education
18	Quinte Conservation Centre, Picton	Education
19	Tudor Gabbro, Tudor Tp.	Dimension stone
20	H.Veley Prospect, Kennebec Township	Gold
21	Vermiculite Canada, Regis Resources, Cavendish Tp.	Vermiculite
22	Westport Road Traverse	Scientific interest
23	D. Axelson	Marble, dimension stone
24	St. Marys Cement Inc. – Bowmanville quarry & plant, Darlington Tp.	Cement
25	Owen Sound Ledgerock Ltd. – Owen Sound quarry & plant, Keppel Tp.	Marble/dolostone/dimension stone
26	Owen Sound Ledgerock Ltd. – Wiarton Quarry, Amabel Tp.	Marble/dolostone/dimension stone
27	Limberlost Stone Inc. – Limberlost Quarry, Albemarle Tp.	Marble/dolostone/dimension stone
28	Traditional Cut Stone Ltd., Mississauga	Dimensional stone processing
29	University of Ontario Institute of Technology, Oshawa	Borehole thermal energy storage system
30	P.R. Engineering Ltd. Plant, Oshawa	Rock crusher manufacturing
31	T. Young licensed property (now Volarock Quarry), Keppel Tp.	Marble/dolostone/dimension stone
32	The Wiarton Buckskin Quarry Co. Ltd. – Wiarton Quarry, Amabel Tp.	Marble/dolostone/dimension stone
33	Amsen Quarries Ltd. – Wiarton Quarry, Amabel Tp.	Marble/dolostone/dimension stone
34	J. Pruder proposed quarry site – licence application submitted, Amabel Tp.	Marble/dolostone/dimension stone
35	S. Agh property, Orillia	Longford Stone, limestone
36	North Country Slate, Scarborough	Slate/ plant
	Outside Southeastern Ontario and Southwestern Ontario Districts	
	Podolsky Advanced Exploration project, Sudbury	Copper nickel
	Thibault Hill, North Bay	Lamprophyre dike
	Trout Creek	Mafic dike, scientific interest
	Upper Canada Stone, Nipissing Quarry	Crushed decorative stone
	Canada Forces Base, North Bay.	Kimberlite / lamprophyre

Southeastern Ontario District

WESTPORT ROAD MINERAL OCCURRENCES

Along the road between Godfrey and Westport in Hinchinbrooke and Bedford townships, many mineral occurrences have been documented by GSC mineralogist Ann P. Sabina in her guidebook, *Rocks and Minerals for the Collector-Kingston, Ontario to Lac St-Jean, Quebec* (Sabina 1983, p.11, 14-15). In June 2006, the Acting District Geologist and Summer Experience student visited several of the roadcuts to locate documented occurrences for follow-up revision of the Mineral Deposit Inventory (MDI) records. Roadcuts at km 4.5, 10.9 and 16.7, and others in between, on the Westport road were located using a global positioning instrument (GPS) and photographed.

This area lies within the Frontenac terrane of the Central Metasedimentary Belt (Easton 1992). Many of the rocks in the Frontenac terrane are metasedimentary sequences and were deposited in a continental margin setting. Plutonic rocks ranging in age from 1180 to 1070 Ma intrude the metasedimentary sequences. The Frontenac terrane underwent low-pressure granulite-facies metamorphism between 1180 and 1165 Ma resulting in the formation of calc-silicate and marble rock units. The area along the Godfrey–Westport road is underlain by marble, pyroxene gneisses, which are derived from calc-silicate rocks, and granodioritic intrusive rock. Past-producing mines in the area include the Glendower or Howse iron mine, Kingston mica mine and Richardson feldspar mine.

Of particular note, observed at km 10.9, were large crystals of diopside (up to 8 cm long). Large, light brown books of mica, tourmaline and titanite crystals, calcite and pyrite masses, and pervasive disseminated graphite also occur in outcrop along the road side.

M. FORGET – MUD POND PROPERTY

Location and Access

The Mud Pond property consists of 4 claims, staked by Mr. Forget in 2005: Concession IX, Lot 13; and Concession X, lots 12, 13 and 14, Tudor Township. To access the property, from the intersection of highways 7 and 62 in Madoc, go north on Highway 62 for 23 km to the Cleveland Road. Follow the Cleveland Road east for 3 km to Pine Ridge Road; then north along Pine Ridge Road for 2.5 km to a rough bush road that branches northeast and which, after approximately 500 m, leads to the southeast end of Mud Pond. The location of pit A, Zone B, near the shore of Mud Pond, is 295637E 4958703N (Universal Transverse Mercator (UTM) co-ordinates, North American Datum 1983 (NAD83), Zone 18).

Previous Work

There are no previously known mineral occurrences on the property with the exception of a siliceous iron formation, which was shown by Lumbers (1969) on his Tudor Township map. There are no records of previous exploration work on the property.

Current Work

Work to date has focussed on the area east and north of Mud Pond, in the northwest corner of Concession IX, Lot 13. Mr. Forget accompanied the District Geologist to the property on October 26, 2006. In 2006, Mr. Forget established 2 cut line grids: Zone A, directly north of Mud Pond, and Zone B, east of, and including, the pond. He conducted beep mat, very low frequency electromagnetic (VLF-EM) and geological surveys, followed by stripping and trenching of overburden, diamond saw sampling of sulphide-bearing zones, and geochemical analysis of the rock samples.

Geology

The property straddles a contact between metavolcanic and metasedimentary rocks and predominantly carbonate metasedimentary rocks. In the northern part of Tudor Township, mafic metavolcanic rocks of the Tudor Formation are overlain by felsic metavolcanic rocks of the Oak Lake Formation. Within the transitional area are felsic pyroclastic rocks, volcaniclastic rocks, and minor carbonate metasedimentary rocks and iron formation. To the south, carbonate

metasedimentary rocks of the Dungannon Formation overlie and interfinger with the metavolcanic rocks and, locally, directly overlie the Tudor Formation mafic metavolcanic rocks. The contact between the formations has been folded about a major synclinal axis, the Millbridge syncline, which trends northeasterly about 600 m east of Mud Pond. The western limb is truncated by the Tudor Gabbro, and the eastern limb continues southward along the western margin of the Lingham Lake mafic intrusive complex. (summarized from Lumbers 1969)

Several gold occurrences in Tudor Township are located within sheared metavolcanic rocks near the western margin of the Lingham Lake complex, roughly coincident with a major shear and/or carbonate alteration zone along the Moira River. Numerous fissure-vein type lead-zinc-silver occurrences are found within the carbonate metasedimentary rocks. Pyrite-pyrrhotite-bearing metasedimentary rocks, mapped by Lumbers (1969) as "rusty-weathering schist", occur within the metavolcanic sequence near the contact with the Dungannon Formation.

The sulphide occurrences in the Mud Pond area lie within a series of metasedimentary rocks striking northeasterly and dipping steeply westward along the eastern side of the pond, between mafic metavolcanic rocks to the east and felsic metavolcanic rocks to the west. From east to west, the following rock types were observed:

1. Mafic metavolcanic rocks: dark green, medium grained, moderately foliated, amphibole rich with up to 5% disseminated euhedral magnetite; forms northeast-trending outcrop ridges.
2. Felsic tuff: pale grey, buff-weathering; medium, round quartz grains in a fine, albite-rich matrix, laminated texture; contains stockwork of fine, silicified fractures and quartz stringers; interlayered with magnetite-rich mafic metasedimentary rocks containing quartz, chlorite and epidote.
3. Sulphide-bearing metasedimentary rocks: dark grey to black, very fine-grained, pelitic rock containing up to 10% combined pyrite-pyrrhotite, moderately magnetic; interlayered with more siliceous to cherty bands, chlorite-magnetite-rich units, and white, sugary quartzite with minor magnetite. North of Mud Pond (Zone A), the sulphide-bearing rocks are exposed along the east side of a swamp about 50 m wide, which trends north from the pond.
4. Felsic tuff/lapilli tuff: similar to that on the east side of the swamp, coarser fragments, less silicified.

The following samples were taken during the property examination:

1. MF-01. Zone B, pit D: dark green to black, chlorite-amphibole schist with minor epidote, 1 to 5% disseminated magnetite, 1 to 5% pyrrhotite concentrated in fine lenses and fracture fillings.
2. MF-02. Zone B, pit A: similar to MF-01, but more chloritic and higher pyrrhotite content (5 to 10%)
3. MF-03. from outcrop several metres south of MF-02; minor glassy quartz veins in white, iron-stained, sugary quartzite containing 5% magnetite.
4. MF-04. Zone A, pit A: dark grey to black, very fine-grained mafic metasediment containing medium hornblende porphyroblasts and 1 to 3% pyrrhotite as fine lenses and fracture fillings; weakly magnetic.
5. MF-05. Zone A, pit D: dark grey to black, very fine-grained, slaty metasediment; 5 to 10% pyrrhotite as irregular lenses and fracture fillings sub-conformable to foliation.

No geochemical analysis of the above samples has been completed.

Conclusions

The geological setting may suggest a favourable environment for exploration for volcanogenic massive sulphides.

Approximately 3.5 km to the southeast of the Mud Pond property, Lydia Diamond Exploration Company intersected over 24 m of sulphide-rich sedimentary rock in BH83, drilled in 2001 as part of a diamond exploration program. This hole lies 600 m north of a hole drilled in 1998 by Tulonen and King, which intersected sulphide-bearing metasedimentary rocks that had assay values of up to 1.4% Zn over 1.5 m. Recent re-sampling of the Lydia drill core was conducted by R.M. Easton (OGS). Analytical results were not available at the time of writing; however, preliminary geochemical results include values of 664 ppm Pb and 1520 ppm As (Easton 2006). Easton suggests that further exploration of the rusty schist belt is warranted. Both of these sulphide occurrences are situated in a similar stratigraphic position, relative to the Tudor–Dungannon formations contact, to those on the Mud Pond property.

More detailed geological mapping, combined with magnetic and electromagnetic surveys, could prove useful in locating additional areas with potential for sulphide mineralization, and in more accurately defining conductive

zones, particularly in the overburden-covered area west of the known sulphide occurrences. (Easton 2006; Lumbers 1969; Tulonen and King 1998)

H. VELEY – GOLD BASE PROPERTY, KENNEBEC TOWNSHIP

On October 16, 2006, the District Geologist and the owner, Mr. Henry Veley, visited the "Gold Base" property, located in Concession V, Lot 30, Kennebec Township. To access the property, from the intersection of highways 7 and 41 at Kaladar, travel north on Highway 41 for 14.3 km to the Harlowe Road; follow the Harlowe Road east for 8.2 km to the stop sign in Harlowe, and then south for 7.4 km to driveway no. 3031.

In 2006, Mr. Veley cleaned existing stripped areas and stripped a new area in an attempt to locate the western extensions of known gold-bearing zones.

Property History

In 1939, the Gold Base Mining Corporation carried out stripping and trenching on a gold-bearing quartz vein on Concession V, Lot 30, Kennebec Township, under an option agreement with Mr. David Veley. The company reported the presence of visible gold and an assay of 0.38 ounce Au per ton was obtained from a grab sample (Harding 1944).

Henry Veley acquired the property in 1979 and began a program of stripping, trenching and sampling in 1986, exposing the main quartz vein zone at both sides of a beaver pond about 40 m wide.

In 1991, R. Knowles of Rio Algom Exploration Inc. examined the property and collected samples; the best assays returned were 1.17 and 1.44 ounces Au per ton from 12 grab samples taken from the original pit, about 50 m west of the beaver pond.

In 1997–1998, Mr. Veley did considerable stripping, cleaned old trenches, and drained the beaver pond. C. Papertzian (District Geologist, MNDM Tweed) sampled the main pit in 2002, obtaining an assay of 0.967 ounce Au per ton , and assays of 0.16 and 0.12 ounces Au per ton from quartz veins south of the main zone that had been exposed in the 1998 stripping program.

Geology

The property lies within an area of mafic and intermediate metavolcanic rocks and clastic and chemical metasedimentary rocks, which have been tightly folded within the "Flinton Synclinorium" along the northern margin of the Northbrook batholith, shown by Moore and Morton (1986) on their map of the Marble Lake area.

Mafic metavolcanic rocks, basalts of the Tudor Formation, are overlain by intermediate flow and pyroclastic rocks, mafic to silicic clastic metasedimentary rocks, and carbonate metasedimentary rocks. These rocks are unconformably overlain by the Flinton Group, which is a predominantly clastic metasedimentary succession that includes conglomerates, quartzites, pelitic schists and marble. At the base of the Flinton Group is the Ore Chimney Formation: a mafic biotite-hornblende-garnet schist that is considered to be derived from weathering of the underlying volcanic rocks (Harnois 1987). Several gold occurrences in the Flinton–Harlowe area are spatially associated with the Ore Chimney Formation and with other biotite schists and carbonate units near or at the base of the Flinton Group.

Property Geology

Mafic metavolcanic rocks (amphibole ± biotite gneiss) are interlayered with biotite-quartz-chlorite-amphibole schists (possibly interflow sediments) along the northern margin of the Northbrook granodiorite batholith.

The main quartz vein zone lies within a metasedimentary unit consisting of amphibolitic and quartz-biotite schists interlayered with units of very fine-grained, siliceous, dolomitic marble up to 30 cm wide. It consists of irregular quartz lenses and pods from 1 to 15 cm wide within a zone up to 2 m wide that has been traced over a strike length of about 300 m (strike 080, dip 85 N). The zone weathers brown due to iron carbonate within the dolomite, mafic

schist, and quartz vein material. Sulphides in the main vein average less than 1%, but there are local concentrations of up to 5% combined pyrite and chalcopyrite with traces of malachite. Tourmaline is present in the quartz veins as hairline seams and dark grey bands up to 1 cm wide. Both quartz veins and sulphides are more heavily concentrated within the dolomitic units in the main vein zone. Quartz veins within the mafic schist units locally show strong biotite alteration haloes and, rarely, transect the foliation at a low angle.

Additional narrow quartz veins 7 to 15 cm wide, containing rusty seams and traces of pyrite, chalcopyrite and molybdenite have been exposed within 15 m north and south of the main vein. The contact with granodiorite of the Northbrook batholith lies about 80 m south of the main vein zone.

Conclusions

Gold mineralization occurs within a quartz vein zone within interlayered carbonate and mafic (biotite schist) metasedimentary rocks in an area of predominantly mafic metavolcanic rocks near the contact with a granodiorite intrusion. The zone is up to 2 m wide and has been traced for about 300 m along strike. Other than considerable stripping, trenching, and sampling of the main vein zone, there has been very little detailed exploration work on the property.

Detailed geological mapping and magnetic surveys would be useful in further tracing the known mineralized zone and similar, parallel zones that have been exposed to date. The surveys should also be extended southward into the granodiorite to explore for shear or alteration zones and additional lenses of metavolcanic and/or metasedimentary rocks. It has been suggested that the Northbrook batholith may be a series of granodiorite lenses separated by thin layers of metavolcanic rocks (Moore and Morton 1986). The surveys might also help to delineate structures such as cross faults and fold hinges, which may have focussed hydrothermal activity and/or produced local thickening of the favourable, carbonate metasedimentary units.

Sample Descriptions

The following grab samples have not been analyzed for gold content. Locations for these samples, where listed, are provided as UTM co-ordinates using NAD83, Zone 18. Previous sampling by MNDM staff and others have confirmed the presence of gold mineralization, with assays ranging from 0.12 to 1.44 ounces Au per ton. These results and sample locations are available in the MDI file on this property and the samples collected during this property examination are stored at the Resident Geologist's Office in Tweed.

Sample	Location	Description
HV-01	340541E 4961827N	Quartz vein sample collected from a small stripped area about 20 m south of the Harlowe Road and 30 m west of driveway #3031; quartz vein is up to 30 cm wide and occurs in amphibole-bearing mafic metavolcanic rocks that strike 080, dip 80N; vein material contains hairline seams and dark grey bands of fine grained tourmaline 2–10 mm wide; brown iron carbonate stain in fractures; no visible sulphides.
HV-02	340474E 4961711N	Quartz vein material collected from a pit about 140 m east of beaver pond; interlayered fine-grained, siliceous metasedimentary rock (pale brownish grey, very hard, minor biotite) and dark green-grey amphibole-quartz-chlorite schist; few quartz stringers and lenses conformable to foliation, with trace pyrite, concentrated at contact between felsic and mafic layers.
HV-03		Material from a trench in the main quartz vein zone about 20 m east of beaver pond; quartz vein zone is 30–40 cm wide, within siliceous carbonate metasedimentary rocks containing biotite-rich layers; footwall (south) is chlorite–muscovite schist; quartz vein material is vuggy with patches of pyrite up to 5%, and traces of chalcopyrite and malachite.
HV-04		Quartz vein material collected 10 m west of HV-03; quartz vein material is similar to HV-03; pale beige siliceous carbonate interlayered with amphibole-biotite schist and quartz vein material.
HV-05		Quartz vein material collected 10 m west of HV-04; sample material is similar to HV-03
HV-06	340113E 4961620N	Location site only of a trench 70 m west of beaver pond on main vein zone.
HV-07		Quartz vein material collected east end of trench HV-06; 15 cm quartz vein in siliceous carbonate metasedimentary rock between biotite-quartz schist hanging wall and biotite schist footwall; 3 similar quartz veins 2 to 5 cm wide with biotite alteration haloes in the south wall of the trench, one trending northeast, dipping southeast across foliation; main quartz vein contains 1–3% chalcopyrite, trace pyrite and malachite, minor tourmaline.
HV-08		Quartz vein material collected in trench at west side of beaver pond, 10 m south of main vein; 10 cm wide quartz vein in mafic metasedimentary rock; rusty vugs and seams; trace pyrite, chalcopyrite and molybdenum.

Southwestern Ontario District

S. AGH – LONGFORD LIMESTONE QUARRIES

On October 31, 2006, the Regional Resident Geologist and the District Geologist accompanied Mr. S. Agh to his property at the site of the Longford limestone quarries in Rama Township.

A string of abandoned quarries are located on Broken Front Concession, lots 21 to 24, Rama Township, in Simcoe County. Access to this property is by following Highway 12 north from Whitby to Atherton; north on Simcoe Road 44 to Longford Mills; east from the Longford post office for 0.6 km, and then north on a gravel road 0.7 km to the southern boundary of the property. A railway line runs along the western boundary of the property to the west of the access road, and the quarries extend from the east side of the access road to the western shore of Lake St. John. The location of the southeastern corner of the property at the lakeshore is UTM 631767E 4949006 N (NAD83, Zone 17).

Mr. Agh proposes to strip off much of the limestone that remains as high ground between, and west of, the old quarries, to create a series of terraces sloping down toward the lake shore and, subsequently, to develop a seniors' community consisting of approximately 350 homes with a store and recreational facilities. Much of the stone will be used in construction and landscaping on site, and the remainder will be marketed for various purposes such as building stone, armour stone, landscaping stone and aggregate.

Property History

The quarries were opened in the 1880s as a source of building stone and produced a lithographic, white-weathering limestone known as "Longford" stone, which was used in the construction of many important buildings in Toronto, North Bay, Sudbury, Peterborough, and Orillia (Parks 1912).

In the 1930s, the quarries began producing "Rama" stone: a dolomitic limestone extracted from beds underlying the Longford stone. Rama stone was used both as construction stone and as polished "marble" in many buildings (Goudge 1938).

The property was sold in 1936 by the Lake St. John Quarry Company to Longford Quarries Limited, which ceased operations prior to 1960 (Wolf 1993). The quarries are now overgrown with vegetation, and the deeper workings which produced Rama stone, toward the north end of the property, are filled with water.

Geology

The quarries lie within Middle Ordovician limestone and dolostone of the Gull River and Bobcaygeon formations. Liberty (1969) shows Bobcaygeon Formation overlying the Gull River Formation, which is exposed in narrow strips along the shores of Lake St. John to the east and Lake Couchiching to the west. Immediately north of the lakes are undifferentiated Precambrian rocks.

The Longford Quarries strata are exposed in a currently producing aggregate quarry operated by Fowler Construction Co., approximately 300 m north of Mr. Agh's property, and are described by Derry Michener Booth and Wahl and OGS (1989b) as follows :

surface	
Bobcaygeon Formation, lower member (0.3 m)	Limestone: light grey-brown, coarse to very coarse crystalline, thin bedded (5–10 cm), fossiliferous; sharp but irregular lower contact
Gull River Formation, upper member (2.0 m)	Limestone: mottled grey and light brown, microcrystalline to fine grained, medium to thick bedded (10–40 cm), stylolitic contacts, sparsely fossiliferous
Gull River Formation, middle member (3.1 m)	Limestone: white to cream, weathers same; microcrystalline with lithographic texture, medium to thick bedded (20–40 cm), stylolitic, patches of "birds-eye texture" (small calcite crystals), sparsely fossiliferous; lower part with thin interbeds of pale green, shaly limestone
quarry floor	

Parks (1912) described the quarries as "among the most important in the province" as producers of building stone, and identified 3 beds, from 23 to 35 cm in thickness, from which Longford stone was produced. The stone is very light grey to light brown, white-weathering, lithographic, high-calcium limestone of the middle and upper members of the Gull River Formation. Several other beds produced "footing stone" and rubble. The section is well exposed in a 7 m high bluff along the shore of Lake St. John at the southern boundary of the property, and in western quarry walls up to 10 m high toward the northern end of the property. Longford stone was used in the construction of many buildings, including the King and Queen Street subways in Toronto, Catholic churches and post offices in North Bay and Orillia, and the Peterborough Collegiate Institute.

The "Rama" stone was extracted from beds of the lower member of the Gull River Formation, lying from 1 to 4 m below the floors of the original quarries (below lake level). Because Mr. Agh's proposal involves quarrying to a depth above lake level, his source of potential building stone is limited to the Longford stone beds. Jointing in the limestone is sufficiently widely spaced to allow the extraction of blocks up to 2 by 3 by 0.4 m, as were observed in a quarry in the central part of the property. Large piles of rubble within the old quarries suggest that only the thicker and more competent "Longford" stone beds were utilized. However, much of the remaining material is suitable for armour stone, flagstone, landscaping, and aggregate.

In recent years, Southern Ontario stone producers have reported that the demand for building and landscaping stone has outstripped supply (Steele, Lee and Barua 2006); therefore, there appears to be good potential for marketing the Longford stone, particularly in light of its historic importance as a building stone.

RECOMMENDATIONS FOR EXPLORATION

Mafic and Ultramafic Dikes Reconnaissance

In conjunction with the systematic revision of the Mineral Deposit Inventory (MDI) files (OGS 2004), mafic and ultramafic dikes have been identified for follow-up field inspections to investigate their economic potential. In 2005, a dike in Marmora Township, which had been referenced by Derry Michener Booth and Wahl and OGS (1989a, p.160 as a green and black dike of talcose rock cutting buff-coloured brucitic marble, was selected for investigation. The dike intrudes Grenville marble in a quarry located in Concession X, Lot 14 in Marmora Township (MDI31C12SE00113; UTM 292749E 4935193N, NAD83, Zone 18). A sample of the dike was collected and returned assays of 334 ppb Au, 6.52 ppb Pt and 4.81 ppb Pd. The occurrence is located adjacent to the Deloro pluton, which has numerous associated gold prospects and small historic gold mines. Further investigation of the dike is recommended.

Southern Ontario Dimension Stone – New Technologies, New Potential

Southern Ontario has long been a major producer of stone and stone products. Recent trends in the residential construction market toward the use of resin-stone composites and thin stone veneer, which do not require large quarry blocks for production, have increased the economic potential of southern Ontario's wide variety of limestones, dolostones, sandstones, granites, gneisses, and marbles.

Thin stone veneer (known in the industry as "TSV") is natural, split-face stone cut to a thickness of 2 to 4 cm that gives the appearance of rough-cut stone at a much lower cost and weight than standard 10 to 15 cm thick ashlar. It can be applied to an existing wall by using a standard mortar mix over a metal mesh backing, and does not require extra footings and wall ties that are required by conventional, full-thickness veneer products. Thin stone veneer is the fastest-growing sales product of stone suppliers in the United States (Penn 2006), particularly in the residential market where it is used on exterior and interior walls, flooring, fireplaces, driveways, patios, and steps. K2 Stone Quarries Inc., of Nanaimo, BC, expects to triple production in the coming year, having seen sales of TSV grow from 25% of total sales in 2005 to 50% in 2006 (Penn 2006).

The ideal stone for TSV fabrication is 4 to 8 cm thick with 2 split faces. The slab is fed into a veneer saw and sliced into 2 pieces, each 2 to 4 cm thick with a sawn back and split face. Limestone, dolostone, sandstone, slate, and granitic gneiss, all of which have been quarried in southern Ontario, are well suited to the production of TSV.

The following areas are recommended for exploration.

- In southeastern Ontario, sandstone of the Nepean Formation is exposed above the Paleozoic–Precambrian unconformity along the margins of the Frontenac Arch near Gananoque and from Brockville to Ottawa.
- In south-central Ontario, the Whirlpool and Grimsby sandstones outcrop near the base of the Niagara Escarpment from Niagara Falls to Collingwood (Hewitt 1963).

The most productive limestone and dolostone strata, with respect to building stone and flagstone in southeastern Ontario, are the Gull River and Bobcaygeon formations, which are most frequently exposed along the northern margin of the Western St. Lawrence Platform from Kingston to Midland. Several past and current producers are described in LeBaron and Williams (1990). In south-central Ontario, building stone is quarried almost exclusively from dolostones of the Amabel Formation on the Bruce Peninsula. Derry Michener Booth and Wahl and OGS (1989b) describes the geology and quarries of the area.

Gneissic rocks in the Parry Sound–Muskoka area are quarried in several locations for flagstone. Fouts and Marmont (1989) describes the quarries and the potential of the area for flagstone production. Easton and Fyon (1992) suggests that domain and terrane boundaries in the Central Gneiss Belt and the Central Metasedimentary Belt Boundary Zone are primary target areas for flagstone deposits.

Many deposits of limestone, dolostone, sandstone and gneiss that are considered to be unsuitable for dimension stone production, based upon low potential for large quarry block extraction, may be suitable for the production of thin stone veneer. Such deposits, including granites, should also be re-examined as sources of stone for cultured marble and granite, which may contain 80% stone particles in a polyester resin matrix. LeBaron et al. (1990) documents 71 sites in southeastern Ontario that were examined for building stone potential, which were predominantly marbles and granites with a wide range of colours and textures. Polished samples from 51 of the sites can be viewed at the Resident Geologist's Office in Tweed.

Southeastern Ontario – Grenville Province Nickel-Copper (± Cobalt-Platinum Group Elements)

Several nickel-copper prospects that were discovered in southeastern Ontario prior to 1965 have seen little additional exploration work since that time, with the exception of some activity in the 1990s that was directed primarily at exploration for platinum group metals.

Table 10 lists the nickel-copper occurrences in southeastern Ontario that are associated with mafic intrusions. More complete details are available in the Mineral Deposits Inventory database.

Table 10. Southern Ontario nickel-copper occurrences associated with mafic intrusions.

Occurrence	Township	Significant Mineralization
Crowe River	Lake	Zone 53 m long, avg. 2.3% Cu over 2.1 m (DDH in 1958, Alsof Mines)
Macassa	Limerick	3.5 Mt @ 0.8% Ni, 0.25% Cu, 0.05% Co (DDH in 1971, Lac Minerals)
Simon	Lyndoch	S. zone amphibole gneiss, 230 000 t @ 1.09% Cu N. zone gabbro, chalcopyrite, pyrrhotite, magnetite (DDH in 1965, Young-Davidson Mines)
Bonter	Marmora	0.45% Ni, 0.26% Cu over 54.0 m (DDH in 1953, Ontario Nickel)
Ellerington	McClintock	1.36% Ni, 0.2% Cu, 0.0 98% Co over 4.5 m (DDH in 1959, Slocan Van Roi Mines); 1.12 g/t Pt (1997, Orogrande Resources)
Sharbot Lake	Olden	Sulphide zone 228 m long, 46 m wide; 0.3% Ni, 0.3% Cu, 0.14% Co over 5.5 m (DDH in 1957, Sharbot Lake Mines)
Ameranium	Raglan	Surface sampling 0.5% Ni (1957)
Genricks Lake	Raglan	Surface sampling 0.5% Ni (1957)
Landolac	Raglan	Surface sampling 1.9% Cu, 0.85% Ni, 0.07% Co, 2 to 12 ppb Pd (Wilson 1994)
Raglan Hills	Raglan	0.25% Cu, 0.04% Ni over 1.37 m (DDH in 1956, Raglan Nickel Mines); 81 ppb Pt, 133 ppb Pd (1986, McArthur Mills Expl.)
Lingham Lake	Tudor	0.9% Ni, 0.35% Cu (DDH in 1969, Louada Expl.)

One example of a magmatic nickel-copper deposit in the Grenville Province is the former Renzy Mine in Hainaut Township, western Quebec, which produced about 1 million tons grading 1.5% Ni+Cu. The ore consisted of about 50% sulphides in cumulate-textured peridotite, which intruded paragneiss of the Central Gneiss Belt. Recent work has identified a new zone with grades of 0.9% Cu, 0.5% Ni, 0.04% Co, and 0.12 g/t Pt+Pd (Matamec Exploration Inc., www.matamec.com, *see* "Vulcain property").

Easton (1992) has identified 2 suites of gabbroic intrusions within the Central Metasedimentary Belt in Ontario: an older "Killer Creek" suite (older than 1270 Ma) and a younger "Lavant" suite (1250 to 1230 Ma). Although nickel-copper mineralization occurs in both suites, Easton suggests that nickel-copper magmatic sulphide deposits are more abundant in the members of the older suite. Examples of both, and of one occurrence in the Central Gneiss Belt, are described below.

CENTRAL METASEDIMENTARY BELT

Mineralization at the Macassa nickel-copper deposit consists of disseminated pyrrhotite, pentlandite, chalcopyrite, and pyrite in a band of metapyroxenite within the Thanet gabbro of the Lavant suite. The main zone, containing drill-indicated reserves of 3.5 Mt grading 0.8% Ni, 0.25% Cu, and 0.05% Co, is about 320 m long, averages 17 m in width, and has been drilled to a depth of 365 m. A second zone, about 1200 m to the south, contains 1.2 Mt @ 0.3% Ni (Carter 1984). Limerick Mines Ltd. drilled 4 diamond-drill holes to confirm results of previous drilling and did ground magnetic surveys on other parts of the property in 2004.

The Raglan Hills gabbro, which is lithologically similar to the Killer Creek suite (Easton 1992), is predominantly a gabbro-anorthosite intrusion with hornblendite at the margins and pyroxenite to olivine pyroxenite in the central part. The Raglan occurrence consists of a 155 m long, 90 m wide, 6 to 15 m thick lens of disseminated pyrrhotite, chalcopyrite, and pyrite hosted by anorthositic metagabbro (Carter 1984). Work to date has focussed on 4 sulphide occurrences that were discovered in 1956. The presence of nickel-copper mineralization with anomalous platinum group metal values (*see* Table 10) indicates that additional work is warranted in this large intrusive complex.

CENTRAL GNEISS BELT

Metagabbroic anorthosite bodies tens of metres wide and tens of kilometres long occur in the Fishog and McClintock domains of the Algonquin Terrane of the Central Gneiss Belt. Easton (1992) considers these to be layered anorthositic intrusions with a likely emplacement age of 1400 to 1300 Ma. Wilson (1994) describes a layered mafic intrusion in Sri Lanka that has been flattened to 5% of its original thickness and stretched to 20 times its original length during granulite-facies metamorphism, and suggests that the thin, extensive mafic bodies in the Central Gneiss Belt have potential for nickel-copper mineralization.

In McClintock Township, Randsburg International Gold Corporation has intersected several nickel-copper-cobalt-bearing sulphide zones with anomalous PGM values (*see* Table 10, Ellerington occurrence) within a 4 to 5 km wide band of anorthosite, gabbro, diorite, and ultramafic rocks flanked by paragneiss (Tweed RGP office, MDI files). Although the occurrence was originally discovered in 1941, there has been very little exploration work in the surrounding area, and the geology has not been mapped in detail. This occurrence lies within an area shown by Lumbers and Vertolli (2003) as monzogranite, suggesting that the distribution of mafic rocks in the area may be more extensive than is indicated.

POSSIBLE "INDICATOR MINERAL" OCCURRENCES

Most of the southeastern Ontario nickel-copper occurrences are at, or near, the margins of intrusions, indicating that wall-rock assimilation may have induced sulphide saturation in the magma (Easton and Fyon 1992). Eckstrand (1995) suggests that high zinc content in chromite associated with mafic to ultramafic intrusions may indicate assimilation of zinc-bearing sulphidic metasedimentary rocks. Similarly, green spinel, which may be iron rich (hercynite) or zinc rich (gahnite), may also be the product of sulphidic wall-rock assimilation. Green spinel has been reported in marginal phases of the Chenaux Gabbro (Wilson 1994), the Lavant–Oso Gabbro (Wolff 1985) and in pyroxenites in several locations in the McClintock Township area (Adams and Barlow 1910). A stream sediment anomaly consisting of 23 grains of gahnite from a sample taken within 500 m of the Killer Creek gabbro, and a

second anomaly of 17 gahnite grains located about 24 km to the south (Felix, Reid and Easton 2006) may be derived from the Killer Creek intrusion.

SUMMARY

Southeastern Ontario nickel-copper occurrences, in some cases with significant cobalt and anomalous platinum group metal values, are hosted by a variety of mafic to ultramafic intrusive rocks, locations of which are well defined on geological maps within the Central Metasedimentary Belt and less so within the Central Gneiss Belt. In both areas, the intrusions should be examined in more detail for features such as evidence of magma mixing and wall-rock assimilation.

Based upon current high prices and projected continuing high demand for nickel, copper, cobalt and platinum group metals, and upon a relatively low level of previous exploration for magmatic nickel-copper deposits in southeastern Ontario, additional exploration is recommended.

Southeastern Ontario – Central Metasedimentary Belt Non-Sulphide Zinc

In 2006, Ontario produced approximately 108 000 tonnes of zinc worth $380 million. Although the value of zinc produced increased by over 200%, the volume produced decreased by almost 10%. The sole remaining zinc producer in Ontario is the Kidd Creek Mine, which is a volcanogenic massive sulphide (VMS) deposit near Timmins.

The price of zinc has almost tripled in the past few years from $0.35 per pound in 2003 to $1.00 per pound in 2006. The London Metals Exchange reported an average price per tonne of zinc of over $3100 for the period January to November 2006. There is a growing demand for zinc due in part to the increasing industrialization of East Asian nations.

Difficulties in metallurgical beneficiation of non-sulphide zinc ores experienced in the nineteenth and early twentieth centuries led to a lack interest in development of these deposits. Recent new extraction and electrowinning technologies have renewed interest in non-sulphide zinc as a potential major source of zinc metal. It is possible that these new technologies will allow for the production of zinc from non-sulphide deposits at lower costs than production from conventional sulphide ores (Hitzman et al. 2003). Increasing environmental restrictions may also favour the development of non-sulphide zinc deposits relative to sulphide ores.

Prolonged lack of economic interest has contributed to a lack of research into and understanding of these deposits. (Sangster 2003). The world's largest hypogene non-sulphide zinc deposits are Franklin and Sterling Hill in New Jersey. These deposits are hosted by Mesoproterozoic Grenville Province marbles cropping out in Appalachian uplifted terranes.

Gauthier and Larivière (2005) have suggested that the zinc oxide mineral potential of carbonate rocks along the Central Metasedimentary Belt Boundary Zone may be underestimated, as the zinc oxide willmenite will weather to serpentine and, consequently, might be misidentified as altered forsterite or chondrodite. Studies conducted in Quebec using zinc zap have identified several areas of previously unknown zinc oxide mineralization. Grenville Supergroup marbles of the Central Metasedimentary Belt (CMB) present the same characteristics as those in New Jersey.

Non-sulphide zinc occurrences have been located in the (CMB) in the area of Bryson, Quebec, 60 km west of Ottawa. The Cadieux deposit, a SEDEX-type zinc sulphide deposit is hosted in the same marble belt 30 km to the south near Renfrew. Gauthier and Larivière (2005) identify the Bryson–Renfrew region as a transition between conventional sulphide deposits with unconventional non-sulphide zinc deposits in a SEDEX environment.

Marble-rich carbonate units of Renfrew County, are known to host zinc sulphide mineralization. There is potential for previously unrecognized zinc oxide mineralization in this part of the Central Metasedimentary Belt.

Table 11. Past-producing magnetite mines – Southeastern Ontario District.

Deposit/ Township	Mineral Deposit Inventory Number/ Status	Description *[Note: The resource estimates listed in this table are historic figures generated by past workers and do not follow the required disclosure for reserves and resources as outlined in National Instrument 43-101.]*	Reference
Marmoraton Marmora Tp.	MDI31C05NE-00014 (Past Prod. w Reserves)	27 966 762 tons of ore averaging 42.8% Fe produced	OFR 5515, p.322
Glendower Bedford Tp.	MDI31C10SE00022 (Past Prod. w/o Reserves)	Early drilling indicated massive and disseminated ore at a depth of 500 feet	MRC 11, p.135
Tomahawk Lake Tp.	MDI31C12NW00002 (Past Prod. w Reserves)	Lenses and patches of magnetite occur over a strike length of approximately 1000 feet	MRC 11, p.155
Coe Hill Wollaston Tp.	MDI31C13SW00010 (Past Prod. w Reserves)	Reserves estimated in 1914 at 600 000 tons averaging 51.4% Fe	MRC 11, p.177-178
Radenhurst and Caldwell Lavant Tp.	MDI31F02NE00012 (Past Prod. w Reserves)	Main zone with indicated tonnage of 6500 tons of ore per slope foot averaging 32.77% Fe. Three additional zones totalling 1600 feet in length, averaging 17.08%, 16.71% and 25.50% Fe.	MRC 11, p.251
Wilbur Lavant Tp.	MDI31F02SE00009 (Past Prod. w/o Reserves)	Nine workings reported	MRC 11, p.252
Bessemer Mayo Tp.	MDI31F04SE00012 (Past Prod. w Reserves)	Reserves estimated at 2 480 819 tons averaging 28.62% recoverable Fe from 4 deposits	MRC 11, p.167
Childs Mayo Tp.	MDI31F04SE00013 (Past Prod. w Reserves)	Reserves estimated at 6 193 330 tons averaging 19.25% recoverable Fe	MRC 11, p.169
Rankin Mayo Tp	MDI31F04SE00016 (Past Prod. w Reserves)	Reserves estimated at 15 691 599 tons containing 15.3% recoverable Fe	MRC 11, p.170
Calabogie Bagot Tp.	MDI31F07SE00009 (Past Prod. w Reserves)	The deposit contains 27 200 000 tons of ore grading 22.28% Fe proven by diamond drilling, recoverable by open pit	MDC 20, p.67
Bluff Point Bagot Tp.	MDI31F07SE00011 (Past Prod. w/o Reserves)	Two main magnetite-bearing zones, each about 500 feet long and 40 feet wide	MRC 11, p.313
Martel Bagot Tp.	MDI31F07SE00013 (Past Prod. w/o Reserves)	Magnetite body 20 feet thick, dipping 60 SE.	MRC 11, p.317
Williams Bagot Tp.	MDI31F07SW00027 (Past Prod. w/o Reserves)	Two zones of magnetite, approximately 800 and 240 feet long, 20 feet wide	MRC 11, p.318
Blairton Belmont Tp.	MDI31C05NW00026 (Past Prod. w Reserves)	1914 reserves calculated at 1 800 000 tons of 51.8% Fe and 0.5 million tons of 54.9% Fe	MRC 11, p.288
Matthews North Crosby Tp.	MDI31C09NW00009 (Past Prod. w Reserves)	Estimated reserves to depth of 400 to 500 feet are 33 727 000 gross tons averaging 25.08% Fe, which includes 11 861 000 gross tons averaging 31.36% Fe	MRC 11, p.257
Chaffey South Crosby Tp.	MDI31C09NW00011 (Past Prod. w Reserves)	Reserves estimated to a depth of 500 feet are 11 110 000 gross tons averaging 29.76% Fe.	MRC 11, p.258
Belmont (Ledyard) Belmont Tp.	MDI31C12SW00004 (Past Prod. w Reserves)	Drilling from 1906 indicated 200 000 tons of concentrating ore	MRC 11, p.287
Summit Lake (Tomclid) South Canonto Tp.	MDI31F02SW00032 (Past Prod. w Reserves)	Published reserves in 1993 estimated at 3 Mt averaging 40% Fe; reserve estimate has not been adjusted to reflect production from the deposit in late-1990s	MP 161, p.377
Grattan (Radnor) Grattan Tp.	MDI31F06NE00017 (Past Prod. w Reserves)	Proven reserves of 3 639 600 tons to a vein depth of 363 feet and indicated reserves of 9 099 000 tons to a vertical depth of 600 feet, averaging 27.74% Fe	MDC 20, p.98
Black Lake Bedford Tp.	MDI31C10SE00026 (Past Prod. w/o Reserves)	Disseminations and massive magnetite in exposed widths from 10 to 50 feet	MRC 11, p.134
St. Charles Tudor Tp.	MDI31C13SE00014 (Past Prod. w/o Reserves)	Three main deposits within an area of approximately 13 500 square feet	MRC 11, p.176
Robertsville Palmerston Tp.	MDI31C15NE00005 (Past Prod. w/o Reserves)	Two zones, Robertsville Mine is 700 feet long and 50 feet wide and the Mary Mine 900 feet to NW	MRC 11, p.141
Howland Snowdon Tp.	MDI31D15SE00096 (Past Prod. w/o Reserves)	Magnetite in a zone 25 feet in diameter at surface and larger with depth	MRC 11, p.149
Victoria Snowdon Tp.	MDI31D15SE00098 (Past Prod. w/o Reserves)	Deposit was worked from a trench 240 feet long and 16 feet wide	MRC 11, p.150
Yuill Darling Tp.	MDI31F02NE00009 (Past Prod. w/o Reserves)	Lens of high-grade magnetite, 30 m long and 9 m wide, mined to a depth of 21 m	MDC 20, p.92

Table 12. Mineral deposits not currently being mined in the Southeastern Ontario District in 2006. (Note: table does not include nepheline syenite, trap rock, REE and dimension stone deposits.)

Abbreviations

AF ..... Assessment Files
AR ..... Annual Report
CAMH ..... *Canadian and American Mines Handbook*
CMH ..... *Canadian Mines Handbook*
GR ..... Geological Report
MDC ..... Mineral Deposit Circular [No.15–]
[*formerly* Mineral Resources Circular, No.1-14]
MDI ..... Mineral Deposit Inventory
MLS ..... Mining Lands, Sudbury
MP ..... Miscellaneous Paper
NM ..... *The Northern Miner*
OFR ..... Open File Report
PC ..... Personal Communication
Status: A; E; I; M ..... Active; Exploration; Inactive, Mining

Deposit Township	MDI File Number	Status	Commodity	Reserves	Reserve Reference
Ore Chimney Prospect Barrie Township	MDI31C14SE-00142 (SO 1130)	I	Ag, Au, Zn, Pb	11 000 tons above the 500-foot level Averages. 0.2 ounces per ton Au, 5.64 ounces per ton Ag, 2.0% Zn & 1.0% Pb	MDC 12, p.132 MDC 18, p.33
Macassa Nickel Limerick Township	MDI31C13SE-00099 (SO 0595)	I	Ni, Cu	2 000 000 tons @ 1.0% Ni, 0.25% Cu	MDC 12, p1.38
Renfrew Zinc (Renprior) Admaston Township	MDI31F07NE-00063 (SO 0286)	AE	Zn	16 000 tons @ 10.5% Zn to a depth of 30 m; Breakwater Resources optioned the property to Noranda Mining and Exploration in 1996	MDC 12, p.226 MDC 20, p.17
Harvey Simon Prospect Lyndoch Township	MDI31F03NW-00044 (SO 0259)	AE	Cu, Fe, Zn	250 000 tons @ 1.1% Cu to 350 feet	MDC 12, p.226 MDC 20, p.45
Clyde Forks Deposit Lavant Township	MDI31F02SE-00064 (SO 0351)	I	Cu, Sb, Ag, Hg	60 000 tons @ 0.67% Cu, 0.37% Sb, 0.03% Hg & 1.32 ounces per ton Ag	MDC 20, p.36
Twin Lakes Diorite Methuen Township	MDI31C12NW-00114 (SO 3840)	I	Ti	13.2 Mt of 21.7% TiO_2, recoverable from open pit to a depth of 165 m, with rock:ore ratio = 0:54	Kingston, MacKinnon and Caley 1990, p.99
Grattan Deposit Grattan Township	MDI31F06NE-00017 (SO 0270)	I	Fe	Proven: 3 639 600 tons to a vein depth of 363 feet Indicated: 9 099 000 tons to a vertical depth of 600 feet @ average grade of 27.74% Fe	MDC 20, p.98
Radenhurst–Caldwell Deposit Lavant Township	MDI31F02NE-00012 (SO 0349)	I	Fe	Main lens 2000 feet long by 31.3 feet wide; contains 6500 tons per slope foot at a grade of 32.77% Fe; 3 additional zones totalling 1600 feet in length average 17%, 16.7% and 25.5% Fe	MDC 20, p104
Bessemer Deposit Mayo Township	MDI31F04SE-00012 (SO 0235)	I	Fe	No.4 deposit 2 480 819 tons @ 28.62% recoverable Fe	MDC 20, p.110
Childs Deposit Mayo Township	MDI31F04SE-00013 (SO 0236)	I	Fe	6 193 330 tons @ 19.25% recoverable Fe	MDC 20, p.114
Tomclid Magnetite South Canonto Township	MDI31F02SW-00032 (SO0282)	AM	Fe	1993 published reserves estimated at 3 Mt averaging 40% Fe; reserve estimate has not been adjusted to reflect production from the deposit in late-1990s	MP 161, p.377
Calabogie Magnetite Property / Algoma Ore Prop. Ltd. Bagot Township	MDI31F07SE-00009 (SO 0353)	I	Fe	Reserves of 45 million tons @ 25% Fe to 500 feet and 28% Fe to 1000 feet	MDC 11, p.314
Buckhorn Deposit Bagot Township	MDI31F07NE-00069 (SO0362)	I	Mo	Largest of numerous small lenses contains 1500 tons @ 1% MoS_2	MDC 20, p.132
Bannockburn (Madoc Mining Company Ltd.) Madoc Township	MDI31C12NE-00195 (SO 7274)	I	Au	225 000 tons grading 0. 267 ounces per ton Au	MP 161, p.377

Deposit Township	MDI File Number	Status	Commodity	Reserves	Reserve Reference
Cooper Spruce Ridge Resources Ltd. Elzevir Township	MDI31C11SW-00044 (SO 2679)	I	Au, Talc	3 Mt @ 30-33% recoverable talc and 40 000 t @ 8.0 gpt Au	OFR 5945, p.92; OFR 5808, p.79
Dingman Deposit Marmora Township	MDI31C12SE-00040 (SO 3590)	AE	Au	7 Mt @ 1.8 gpt Au	OFR 5958, p.11-13
Hawley Ram Petroleum Limited Olden Township	MDI31C10NW-00117 (SO 4057)	AE	Wollastonite	2.5 Mt @ 32% wollastonite to a vertical depth of 75 m	OFR 5943, p.337
Marmora Gitennes Exploration Inc. Marmora Township	MDI31C12SE-00096 (SO 3729)	I	Wollastonite	450 000 t (open pit) @ 47% wollastonite, plus 680 000 t @ 39% wollastonite in a separate zone	OFR 5715, p.50
Trudeau C. Roger Young Hungerford Township	MDI31C11SW-00049 (SO 1192)	A	Calcite, Dolomite	4 Mt high-purity dolomite; no reserve estimate available for the calcite zone	OFR 5958, p.11-11
Verona-Kirkham Stewart Lake Resources Inc. Bedford Township	MDI31C10SE-00023 (SO 1244)	I	Graphite	1.6 Mt grading 9.5% graphite in 2 separate zones	MDC 33, p.16
Cal Graphite Corp. Butt Township	MDI31E11NE-00004 (N0129)	I	Graphite	Reserves of 60 Mt grading 3% graphitic carbon	MDC 33, p.10
Globe Graphite Mine North Elmsley Township	MDI31C16SE-00016 (SO 1604)	I	Graphite	500 000 t of approximately 7% graphite below mined out portion to the 300-foot level.	MDC 33, p.25
Cordova Mine Belmont Township	MDI31C12SW-00005 (SO 1670)	I	Gold	115 982 tons grading 0.21 ounces per ton Au	OFR 5808, p.43
Newboro Prospect, North and South Crosby Townships	MDI31C09NW00009 (SO1466) MDI31C09NW-00011 (SO1469)	I	Iron, Titanium	45 Mt proven and probable averaging 26.24% Fe, 6.60% TiO_2	OFR 5515, p.316
Madawaska Mine Faraday Township	MDI31F04SW-00037 (SO0223)	I	Uranium	Measured reserve of 385 193 short tons grading 0.143% U_3O_8, 1 098 283 pounds U_3O_8; indicated reserve of 450 988 short tons grading 0.158% U_3O_8, 1 427 195 pounds U_3O_8, total reserves of 836 181 short tons grading 0.151% U_3O_8, 2 525 478 pounds U_3O_8	OFR 5515, p.393
Addington Mine Kaladar Township	MDI31C11NE-00010 (SO0882)	I	Gold	Total measured, indicated and inferred resource in 4 mineralized zones is estimated at 712 449 tonnes grading 4.5 g/t Au	Imperial Metals Corporation, 1999

Note: The resource estimates listed in this table are historic figures generated by past workers and do not follow the required disclosure for reserves and resources as outlined in National Instrument 43-101.

Table 13. Mineral deposits not currently being mined in the Southwestern Ontario District in 2006.

Abbreviations

AF ..... Assessment Files
AR ..... Annual Report
CAMH ..... *Canadian and American Mines Handbook*
CMH ..... *Canadian Mines Handbook*
GR ..... Geological Report
IMR ..... Industrial Mineral Report
MDC ..... Mineral Deposit Circular [No.15–]
[*formerly* Mineral Resources Circular, No.1-14]
MDI ..... Mineral Deposit Inventory
MLS ..... Mining Lands, Sudbury
MR ..... Mining Recorder
NM ..... *The Northern Miner*
OFR ..... Open File Report
PC ..... Personal Communication
PRW ..... Petroleum Resources Well No.

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References*	Status
Amherstburg Quarry silica prospect (40J/03SE)	Silica	20 m thick over 66 ha (20–26 $\times 10^6$ t @ 94% SiO_2)	Amherst Quarries (1969) Ltd.	OFR 5861, p.32 IMR 9, p.29, 31	Inactive
Big Creek 1 (40J/03SE)	Silica	19.5 m thick @ 25 m (10×10^6 t of sandstone)	N/A	IMR 9, p.29	Inactive
Big Creek 1 (40J/03SE)	Silica	14.6 m thick @ 34.4 m (10×10^6 t of sandstone)	N/A	IMR 9, p.29	Inactive
Dow-Moore 2-20-12 (40J/16NW)	Salt	21 m thick @ 698 m 73 m thick @ 582 m 114 m thick @ 410 m	N/A	PRW Dow-Moore 2-20-XII	Inactive
Eastnor–Lindsay prospect (41H/03SW)	Dolomite	60×10^6 t dolomite @ <0.10% impurities (SiO_2+Fe_2O_3+Al_2O_3)	N/A	PRW OGS Lindsay 7-III W	Inactive
Imperial Oil No.560, Sombra 2-12-H, Gormlay No. 1 (40J/090NW)	Salt	32.2 m thick @ 612.6 m 84.1 m thick @ 490.7 m 46.9 m thick @ 388.6 m	N/A	PRW Sombra 2-12-H	Inactive
Imperial Oil No.597, Logierait No.1-Y-R, R.C. Fleck No. 2B (40J/16NW)	Salt	29.6 m thick @ 680 m 87.8 m thick @ 544 m	N/A	PRW Imperial Oil No. 597B	Inactive
Lindsay prospect (41H/03SW)	Dolomite	>35 $\times 10^6$ t dolomite @ <0.10% impurities (SiO_2+Fe_2O_3+Al_2O_3)	N/A	PRW OGS Lindsay 31-VIII W	Inactive
Patton Farm (40J/03SE)	Silica	5.4 m thick @ 10.1 m	N/A	IMR 9, p.29	Inactive
Sunburst GB #7 McGillivray 41-NB (40P/04NE)	Salt	88.7 m thick @ 363.6 m 5.8 m thick @ 339.5 m	N/A	PRW Sunburst GB #7	Inactive
Tobermory prospect (41H/04NE)	Dolomite	60×10^6 t dolomite @ <0.10% impurities (SiO_2+Fe_2O_3+Al_2O_3)	N/A	PRW OGS St. Edmunds 47-III W	Inactive
Union Gas-Enniskillen No. 29, D.V.L.A. No. 1 (40J/16SW)	Salt	25.6 m thick @ 610.8 m 78.6 m thick @ 485.5 m	N/A	PRW Union Gas-Enniskillen No. 29	Inactive
Union Gas-Moore No. 12 P&I Williams No. 1 (40J/16SW)	Salt	26.2 m thick @ 577.3 m 70.7 m thick @ 456.6 m	N/A	PRW Union Gas-Moore No. 12- P&I Williams No. 1	Inactive
Union–Moore No. 22 (40J/16SW)	Salt	36 m thick @ 580 m 32 m thick @ 437 m	N/A	PRW Union Moore No. 22	Inactive

Note: The resource estimates listed in this table are historic figures generated by past workers and do not follow the required disclosure for reserves and resources as outlined in National Instrument 43-101.

Table 14. Titanium, tantalum and REE occurrences compiled from MDI-2 database – Southeastern Ontario District.

Name	Township	MDI File #	Commodity	Deposit Status
Harrington, Marsh Ore Bed	Marmora	MDI31C05NE00135	Au, Fe, Ti	Occurrence
Green Island Rutile	Huntingdon	MDI31C06NW00088	Ti	Occurrence
Matthews, Newboro Lake	North Crosby	MDI31C09NW00009	Fe, Ti	Past Producer with Reserves
Chaffey	South Crosby	MDI31C09NW00011	Fe, Ti	Past Producer with Reserves
Tommy Lake	North Crosby	MDI31C09NW00131	Ti	Occurrence
Ricketts	Lake	MDI31C12NE00109	Fe, Ti	Occurrence
Orton	Tudor	MDI31C12NE00122	Fe, Ti	Past Producer w/o Reserves
Hastings Road Magnetite	Tudor	MDI31C12NE00185	Fe, Ti	Occurrence
Harold White, Twin Lake	Methuen	MDI31C12NW00114	Fe, Ti	Occurrence
Horse Lake, Tripp	Methuen	MDI31C12NW00127	Fe, Ti	Occurrence
Maloney	Marmora	MDI31C12SW00002	Cr, Cu, Fe, Ni, Ti	Past Producer w/o Reserves
Canadian Nickel	Methuen	MDI31C12SW00121	Ti	Occurrence
Ridgway	Marmora	MDI31C12SW00122	Cu, Fe, Ti	Occurrence
Jocko Lake	Limerick	MDI31C13NE00107	Fe, Ti	Occurrence
Umfraville	Wollaston	MDI31C13NW00057	Co, Fe, phosphate, Ti	Occurrence
Canning Lake	Minden	MDI31D15NE00052	Fe, Ti	Occurrence
Pine Lake	Glamorgan	MDI31D16NW00215	Fe, Ni, Ti, V	Occurrence
Basin, Silver Crater (Basin)	Faraday	MDI31E01SE00054	Mica, Mo, Nb, Th, U, Ti	Past Producer w/o Reserves
Allen Lake	Harcourt	MDI31E01SE00306	Fe, Ti	Occurrence
Gal-Wood	Sabine	MDI31E08NE00010	Gd, Nb, Ta, Ti, U	Occurrence
Woodcox	Monteagle	MDI31F04NW00020	Ce, feldspar, Nb, U, Ta, Th, Ti, zircon	Past Producer w/o Reserves
Macdonald Mine	Monteagle	MDI31F04NW00023	Cu, feldspar, Mo, Nb, REE, Th, Ti, U, zircon	Past Producer w/o Reserves
Opeongo	Sebastopol	MDI31F06NE00093	Ag, Ce, Nb, Ta, Th, Ti, U, Y, zircon	Occurrence
East Rockingham	Brudenell	MDI31F06NW00085	Au, Ti	Occurrence
South Lamberts	Griffith	MDI31F06SE00161	Ti	Occurrence
Horton Twp, Ottawa River	Horton	MDI31F10SE00019	Fe, Ti	Occurrence
Mahoney and Morin	Sabine	MDI31E08SE00002	Feldspar, Nb, REE, Ta, U	Past Producer w/o Reserves
Genesee No. 2 South	Monteagle	MDI31F04NW00018	Feldspar, Nb, Si, Ta, Th, U	Past Producer with Reserves
Plunkett, Plunkett South	Monteagle	MDI31F04NW00019	Ce, feldspar, amethyst, Mo, Nb, Th, Ta, U	Past Producer w/o Reserves
Dubblestein	Bangor	MDI31F05SW00010	Nb, Ta, Th, U	Occurrence
Tooeys Lake, Tooley Lake	Brougham	MDI31F06SE00090	Nb, Ta, Th, U	Occurrence
Renfrew Minerals, Wal-Gem West Quarry	Lyndoch	MDI31F06SW00013	Be, feldspar, fluorite, Mo, Nb, REE, Si, Ta, Th, U, zircon	Producing Mine
Barr Feldspar Quarry, Woermke	Fraser	MDI31F14SW00003	Ce, feldspar, Nb, Ta, Th, U	Past Producer w/o Reserves
Quinn	Olden	MDI31C10NW00366	Cu, Ni, REE	Occurrence
Orser-Kraft	South Sherbrooke	MDI31C15SE00027	Feldspar, Nb, REE, Th, U	Past Producer w/o Reserves
Nobles Bay, Rogers, J.	North Burgess	MDI31C16SE00004	Mica, REE	Past Producer w/o Reserves
Maclaren, Willaim L.	North Burgess	MDI31C16SW00017	Mica, phosphate, REE	Past Producer w/o Reserves
Christie Lake	South Sherbrooke	MDI31C16SW00142	Magnetite, Nb, REE	Occurrence
Drude South	Cavendish	MDI31D09NW00079	REE, Th, U	Occurrence
Copper Anomaly	Lutterworth	MDI31D15SE00151	Cu, REE, Sr, zircon	Occurrence

Name	Township	MDI File #	Commodity	Deposit Status
Rare Earth Anomaly	Lutterworth	MDI31D15SE00152	Cu, REE, Sr, zircon	Occurrence
North Rare Earth Anomaly	Lutterworth	MDI31D15SE00153	Cu, REE, Sr, zircon	Occurrence
Laurencin, Milhol	Cardiff	MDI31D16NE00160	Mo, REE, Th, U	Occurrence
Mclennan, J.G.	Peck	MDI31E07NE00006	Nb, REE	Occurrence
Malcovitch, P.	Clyde	MDI31E08NW00003	Ce, REE, U	Occurrence
Gole, J.G.	Murchison	MDI31E09SE00004	Feldspar, Nb, REE, Si, U, zircon	Past Producer w/o Reserves
Cameron and Aleck	Murchison	MDI31E09SE00005	Feldspar, Nb, REE	Past Producer w/o Reserves
D'Eldona, Yankee Dam	Butt	MDI31E11NE00070	Nb, REE, U	Occurrence
Plunkett North	Monteagle	MDI31F04NW00185	Feldspar, REE, U	Occurrence
Lake Clear	Sebastopol	MDI31F06NE00092	REE, Th, U	Occurrence
Price, E.C., Quadeville	Lyndoch	MDI31F06SW00014	Be, feldspar, fluorite, Nb, phosphate, REE, Si, Th, U, zircon	Producing Mine
Universal Light Metals	Lyndoch	MDI31F06SW00065	Be, Ce, Nb, REE, Th, U	Occurrence
Lake Property, Lake Mine	Dickens	MDI31F12SW00006	Feldspar, REE	Past Producer w/o Reserves

***Note**: MDI-2 database was queried for Ti, Ta and REE occurrences. This listing indicates the presence of the commodities, not necessarily their order of abundance. This list should be used as a preliminary guide only. Hard copies of these complete MDI files are located at RGP office in Tweed.*

Table 15. Historic production of gold – Southeastern Ontario District.

Mine	Township	Operating Years	Tons Milled	Ounces Produced	Grade (oz/ton)
Big Dipper	Barrie	1907–1909	52	17	0.33
Cook	Marmora	1901–1904	1483	289	0.26
Cordova	Belmont	1892	120 670	22 774	0.19
Craig	Tudor	1905–1906	1850	248	0.13
Deloro	Marmora	1897–1902	39 143	10 360	0.26
Gatling 5 Acre	Marmora	1900–1903	6114	2353	0.38
Gilmour	Grimsthorpe	1909–1910	550	172	0.31
Golden Fleece	Kaladar	1919–1922	unknown	480	unknown
Ledyard	Belmont	1893–1994	55	13	0.24
Pearce	Marmora	1893–1908	239	302	1.26
Richardson	Madoc	1866–1868	unknown	75 – 100	0.408
Sophia	Madoc	1900–1941	1800	110	0.06
Sovereign	Marmora	1878 1892–1900	unknown 1962	970 370	unknown 0.19
Star of the East	Barrie	1905–1907	976	134	0.14
		Total	**174 894**	**38 592**	

Table 16. Historic production of copper, lead, zinc – Southeastern Ontario District.

Mine	Township	Operating	Tons Milled	Production
Kingdon	Fitzroy	1884–1885, 1914–1931	905 000	76 821409 lbs Pb concentrate; 857 312 lbs Zn concentrate; 60 074 072 lbs Pb recovered
Long Lake	Olden	1897–1925, 1973–1974	3442, not available	$41 550 ore value, 9467 tons Zn valued at $1 227 000
Eldorado Copper	Madoc	1906	not available	234 000 lbs Cu matte containing 230 ounces Au, 182 ounces Ag, 109 000 lbs Cu
Hollandia Lead	Madoc	1903–1906	not available	2 653 365 lbs Pb

Table 17. Historic production of iron – Southeastern Ontario District.

Mine	Township	Operating Years	Tons Milled	Grade (% Fe)
Calabogie	Bagot	1883–1901	10 000	26
Martel	Bagot	pre-1890	2000	58.71
Williams (Black Bay)	Bagot	1880–1890	25 000	51.89
Black Lake	Bedford	1882–1884	4000	40
Glendower	Bedford	1873–1895	50 000	50 – 60
Belmont (Ledyard)	Belmont	1899–1900, 1911–1913	8433	51.2
Blairton	Belmont	1820–1875	300 000	51.8
Playfair (Dalhousie)	Dalhousie	1866–1871	11 100	57.6
Radnor	Grattan	1901–1907	18 824	47.5
Eagle Lake (Blessington)	Hinchinbrooke	1887–1891	700	65.55
Tomahawk (Mag-Iron)	Lake	1947, 1950–1957	2096	50.9
Wilbur	Lavant	pre-1900, 1907–1908	146 892	56.69
Magnetawan	Lount	1910–1912	6000	59.55
Paxton	Lutterworth	pre-1910	1000	not available
Miller	Madoc	1899	6823	not available
Wallbridge	Madoc	1900–1901, 1919, 1921	3421	not available
Marmoraton	Marmora	1952–1978	28 000 000	40
Bessemer	Mayo	1902–1913	99 613	42.18
Childs	Mayo	1913	9649	38.7
McNab	McNab	1873–1874	15 000	68
Robertsville & Mary	Palmerston	1895, 1900–1901, 1918–1909	13 477	70.5
Fournier	S. Sherbrooke	1873	600	60
Howland	Snowdon	1880–1882	1500	58
Victoria	Snowdon	1882	unknown	58.35
Dog Lake	Storrington	1899	600	51.12
St. Charles	Tudor	1900–1902	5186	57 – 60
Coe Hill	Wollaston	1884–1914	100 000	51.4
		Total	**28 841 914**	

Table 18. Historic production of fluorite – Southeastern Ontario District.

Mine	MDI Number	Township	Operating Years	Total Production (Tons)
Bailey	31C06NW00003	Madoc	1907, 1916, 1917, 1944–1950	25 000
Blakely	31C06NW00019	Huntingdon	1918–1920, 1928, 1941–1947	5026
Coe	31C06NW00008	Huntingdon	1941–1942	114
Dwyer	31E01SE00091	Cardiff	1918–1920, 1943, 1944	97
Herrington South	31C05NE00009	Huntingdon	1917	13
Howard, Fred Hill	31C06NW00014	Huntingdon	1918, 1920, 1929, 1940–1942, 1944	2500
Johnston	31C06NW00013	Huntingdon	1943, 1944–1947, 1949	187
Keene	31C06NW00004	Huntingdon	1918–1919, 1943, 1944, 1950	5000
Kilpatrick	31C06NW00005	Huntingdon	1944, 1953–1959	11 566
Lee Junior	31C05NE00008	Madoc	1917, 1940, 1943–1945	2000
Lee Senior	31C05NE00006	Madoc	1916–1918, 1942, 1943	1600
McIlroy	31C05NE00003	Madoc	1917–1918, 1923, 1944	540
Miller	31C05NE00005	Madoc	1917–1919	460
Noyes	31C06NW00011	Huntingdon	1917–1920, 1941–1943	25 000
Palmateer	31C06NW00016	Huntingdon	1942	44
Perry	31C06NW00009	Huntingdon	1915–1920, 1941–1943	8000
Perry Lake	31C06NW00007	Huntingdon	1910, 1913, 1915, 1917, 1952, 1960	4000
Ponton	31C05NE00004	Madoc	1929–1942	1500
Rogers	31C06NW00018	Huntingdon	1909–1914, 1943-51	45 000
Rooks	31C12SE00003	Madoc	1916–1918	100
South Reynolds	31C06NW00010	Huntingdon	1917–1918, 1943	100
Wallbridge & Herrington	31C05NE00007	Madoc	1920–1922, 1941–1943	6600
William Reynolds	31C12SE00002	Madoc	1941–1942	88

Fluorspar, a commercial fluorite product, is used as a flux in the making of steel and ceramics, as a constituent in the electrolytic process of making aluminum and in the production of hydrofluoric acid (HF). During World War II, a Canadian Government assistance program in the form of loans and drill hole explorations stimulated development of the Madoc deposits (Guillet 1964, p.1).

Table 19. Uranium deposits not currently being mined in the Southwestern Ontario District in 2006.

Deposit Township	MDI Number	Commodity	Reserve	Reserve Reference
Zenmac Burleigh, Anstruther Tps.	MDI31D09NE-00033 (Developed Prospect w Reserves)	U, Th	Indicated and inferred reserves are estimated at 406 000 tons grading 1.77 pounds U_3O_8 per ton	OFR 5311, p461
Pole Star Burleigh, Anstruther Tps.	MDI31D09NE-00042 (Prospect)	U	Estimated size and grade from diamond drilling is 370 000 tonnes averaging 0.8 kg U_3O_8 or double using a lower grade of 0.6 kg/tonne	OFR 5635, p199-200
Canadian Dyno Cardiff Tp.	MDI31D16NE-00032 (Past Prod. w Reserves)	U, Th	Reserves of possible ore were estimated at 500 000 tons grading 0.065% U_3O_8	OFR 5311, p71-72
Bicroft (Centre Lake) Cardiff Tp.	MDI31D16NE-00043 (Past Prod. w Reserves)	U, Th	Estimated reserves above 1200 foot level: 559 000 tons grading 2.0 pounds U_3O_8 per ton before dilution (1960)	OFR 5311, p66-67
Blue Rock Occurrence Monmouth Tp.	MDI31D16NE-00143 (Developed Prospect w Reserves)	U, REE	Reserves estimated at 292 444 tons at 0.095% U_3O_8 within 500 feet of shaft & to a depth of 600 feet; 56 720 tons at 0.120% U_3O_8 to a depth of 200 feet in the Lake Zone	OFR 5311, p132, 133
Empire B Zone Monmouth Tp.	MDI31D16NE-00146 (Developed Prospect w Reserves)	U, Th, F	Drilling has indicated reserves of 2 179 166 tons grading 0.726 pounds U_3O_8 per ton	OFR 5311, p135
Kenmac Chibougamau Cardiff Tp.	MDI31D16NE-00165 (Prospect)	U, Th	Estimated reserves: 200 000 tons averaging 0.20% U_3O_8 (1955)	OFR 5311, p101
Rare Earth #1 Monmouth Tp.	MDI31D16NW-00195 (Developed Prospect w Reserves)	REE, U, Th	Official estimated reserves 541 821 tons indicated averaging 0.116% U_3O_8 (1957)	MRC 4, p26
Farcroft Anstruther Tp.	MDI31D16SE-00059 (Developed Prospect w/o Reserves)	U	not known	
Garland Anstruther	MDI31D16SW-00093 (Prospect)	U, Th	not known	
Cavendish Cavendish Tp.	MDI31D16SW-00099 (Prospect)	U, Th	Estimated reserves: 435 624 tons grading 0.096% U_3O_8 (chemical)	OFR 5311, p476
Bicroft (Croft) Cardiff Tp.	MDI31E01SE-00224 (Prospect)	U	Estimated reserves in 3 zones: 979 810 tons grading 1.20 pounds U_3O_8 per ton	OFR 5311, p84-85
Fission Cardiff Tp.	MDI31E01SE-00235 (Prospect)	U, Th, F	not known	
Baumhour-Campbell Faraday Tp.	MDI31E01SE0-0248 (Prospect)	U, Th	not known	
Mell-Quirke Monteagle Tp.	MDI31F04NE-00067 (Prospect)	U, Th	not known	
Greyhawk Mine Faraday Tp.	MDI31F04SW-00036 (Past Prod. w Reserves)	U, Th	Estimated reserves of 0.2 million tons grading 0.065% U_3O_8	MDC 23, p62
Faraday/Madawaska Mine Faraday Tp.	MDI31F04SW-00037 (Past Prod. w Reserves)	U, Th	Proven and probable reserves of 1 023 086 tons at 0.145% U_3O_8 (1976)	MDC 23, p60

Note: The resource estimates listed in this table are historic figures generated by past workers and do not follow the required disclosure for reserves and resources as outlined in National Instrument 43-101.

OGS ACTIVITIES AND RESEARCH BY OTHERS

Southern Ontario Region

R.M. Easton, Precambrian Geoscience Section, Ontario Geological Survey, spent 2 weeks of the 2006 field season examining, logging and sampling diamond drill core from the western Grimsthorpe domain. The drill core, from holes drilled by Lydia Diamond Exploration of Canada Limited between 2000 and 2002, is stored at the Resident Geologist's office in Tweed. This study is an extension of a project that was initiated in 2004 to assess the potential of the western Grimsthorpe domain to host gold and diamond mineralization. The results of the 2006 program are documented in Easton (2006).

D.K. Armstrong and J.E.P. Dodge, Sedimentary Geoscience Section, Ontario Geological Survey, continued work on the creation of a seamless Paleozoic geology map for southern Ontario. The final product will be based upon a compilation of existing maps, supplemented by field investigations and studies of water and petroleum well records, which will assist in correlating units across map boundaries. Details of field work done in all areas of southern Ontario in 2006 are documented in Armstrong and Dodge (2006).

A number of studies related to groundwater resources in southern Ontario were in progress in 2006. Detailed descriptions of the following projects are included in *Summary of Field Work and Other Activities 2006* (Baker et al. 2006):

- Karst Compilation for Southern Ontario: A Progress Report; by F.R. Brunton, J.E.P. Dodge and J. Shirota
- Three-Dimensional Mapping of Quaternary Deposits in the Brantford–Woodstock Area, Southwestern Ontario; by A.F. Bajc
- Three-Dimensional Geological Modelling of Thick Quaternary Deposits in the Barrie Area, Central Ontario; by A.K. Burt
- Bedrock Topography and Overburden Thickness Mapping, Southern Ontario; by C. Gao, J. Shirota, R.I. Kelly, F.R. Brunton and S. van Haaften
- Characterization of the Vars–Winchester Esker Aquifer, South Nation River Watershed, Eastern Ontario; by A.-M. Chapman, A. Pugin, S.E. Pullan, J.A. Hunter, D. Cummings, D.R. Sharpe and H.A.J. Russell
- Devonian Carbonate Investigation in the Grey–Sauble–Saugeen Area and Quaternary Geology Mapping of the Bruce Peninsula; by B. Luinstra, F.R. Brunton and W.R. Cowan
- City of Guelph Groundwater Resource Assessment Project; by D.W. Belanger, F.R. Brunton, S.M. DiBiase, G. Yungwirth, A. Zandbergs and G.H. Funk
- Groundwater Resource Assessment for Halton Region; by A. Kodippili and R. Wootton

A number of geoscience research projects by faculty members of several universities were in progress in 2006.

PALEOZOIC

Mario Coniglio (University of Waterloo) is studying the diagenesis of Ordovician carbonates of the Lake Simcoe area, and the diagenesis and porosity development of Silurian bedrock aquifers in the Cambridge and Guelph areas.

George Dix (Carleton University) and Mario Coniglio are collaborating on a long-term study of carbonate stratigraphy, sedimentology and diagenesis within the Ottawa–Bonnechere graben, upper Ottawa valley, and related fault systems in the Timiskaming region. Of particular interest are hydrothermal dolomite deposits and their relation to tectonism within the craton interior. Structurally controlled hydrothermal dolomite is a major petroleum reservoir facies within Paleozoic rocks of North America, including the Ordovician strata of Ontario.

PRECAMBRIAN

Fried Schwerdtner (University of Toronto) is examining tectonic implications of deformation in Grenville Province gneisses of the Georgian Bay–Muskoka region. Field data from 2006 suggest that deformation during the 1090 to 1050 Ma Ottawan and 1010 to 990 Ma Rigolet orogenies is the result of repeated episodes of ductile shearing, shortening, and stretching rather than northwest to southeast simple shear events as has been widely believed. The results of similar work done in the Ahmic and Parry Sound domains in previous years have been researched by Werner Klemens and Fried Schwerdtner (i.e., W.P. Klemens and W.M. Schwerdtner, University of Toronto, written communication, 2006, abstract "Structural analysis of Ahmic Subdomain (central Ontario), a hanging-wall segment of the Allochthon Boundary" submitted to *Precambrian Research* for a Grenville Province special issue)

Henry Halls (University of Toronto) is conducting a paleomagnetic study on the western half of the Grenville diabase dike swarm, which will provide information on the plate tectonics of the late Neoproterozoic, as well as on the formation of the French River gorge and other topographic expressions of the Grenville dikes.

James Lee (Queen's University) has initiated a geochronology study ($^{40}Ar/^{39}Ar$) of rocks within the Frontenac terrane, just north of Verona.

Laurent Godin (Queen's University) is conducting 2 graduate research projects on tectonics in southern Ontario. The first will explore the dynamics of intraplate regions in an attempt to determine links between regional geology, stress, and seismicity, focusing on areas of moderate seismicity in southern Ontario and Quebec. The second will document the brittle reactivation history of 2 prominent shear zones in the Grenville—the Robertson Lake mylonite zone (Sharbot Lake terrane), and the Central Metasedimentary Belt Boundary Zone—and will provide insights into the potential for future seismic activity within the 2 zones.

ACKNOWLEDGMENTS

The authors would like to thank all producers, exploration companies, prospectors and developers who provided access to their operations or supplied information throughout 2006. Strong communication links between stakeholder groups and government ministries is essential to effective program delivery and ultimately improves the delivery of government services. The help and co-operation of Ministry of Natural Resources staff across the Southern Region is gratefully acknowledged.

REFERENCES

Adams, F.D. and Barlow, A.E. 1910. Geology of the Haliburton and Bancroft area, Province of Ontario; Geological Survey of Canada, Memoir 6, 419p.

Armstrong, D.K and Dodge, J.E.P. 2006. A seamless Paleozoic map for southern Ontario; *in* Summary of Field Work and Other Activities, 2006, Ontario Geological Survey, Open File Report 6192, p.30-1 to 30-5.

Baker, C.L., Debicki, E.J., Kelly, R.I., Rowell, D.J., Mason, J.K., Ayer, J.A., Easton, R.M. and Stott, G.M. eds. 2006. Summary of Field Work and Other Activities 2006; Ontario Geological Survey, Open File Report 6192, 363p.

Carter, T.R. 1984. Metallogeny of the Grenville Province, southeastern Ontario; Ontario Geological Survey, Open File Report 5515, 422p.

Carter, T.R., Colvine, A.C. and Meyn, H.D. 1980. Geology of base metal, precious metal, iron and molybdenum deposits in the Pembroke–Renfrew area; Ontario Geological Survey, Mineral Deposits Circular 20, 186p. Accompanied by Preliminary Map P.2211, scale 1:126 000.

Derry Michener Booth and Wahl and Ontario Geological Survey 1989a. Limestone industries of Ontario. Volume 2 – Limestone industries and resources of eastern and northern Ontario; Ontario Ministry of Natural Resources, Land Management Branch, 196p.

——— 1989b. Limestone industries of Ontario, Volume 3 – Limestone industries and resources of central and southwestern Ontario; Ontario Ministry of Natural Resources, Land Management Branch, 175p.

Easton, R.M. 1992. The Grenville Province and the Proterozoic history of central and southern Ontario; *in* Geology of Ontario, Ontario Geological Survey, Special Volume 4, Part 2, p.714-904.

——— 2006. Geology and mineral potential of the western Grimsthorpe Domain, Grenville Province: insights from examination of archived diamond drill core; *in* Summary of Field Work and Other Activities 2006, Ontario Geological Survey, Open File Report 6192, p.15-1 to 15-21.

Easton, R.M. and Fyon, J.A. 1992. Metallogeny of the Grenville Province; *in* Geology of Ontario, Ontario Geological Survey, Special Volume 4, Part 2, p.1217–1252.

Eckstrand, O.R. 1995. Magmatic nickel-copper-platinum group elements; *in* Geology of Canadian mineral deposit types, Geological Survey of Canada, Geology of Canada, v.8, p.583-605.

Felix, V.E., Reid, J.L. and Easton, R.M. 2006. Regional modern alluvium and till sampling survey of the Tweed area, southeastern Ontario; Ontario Geological Survey, Open File Report 6178, 134p.

Fouts, C.R. and Marmont, C. 1989. Gneisses of the Parry Sound–Muskoka area: flagstone resources; Ontario Geological Survey, Open File Report 5725, 72p.

Gauthier, M. and Larivière, J-F. 2005. The potential of the Grenville Supergroup for non-sulphide SEDEX zinc deposits; *in* The geology and metallogeny of the Grenville Province, Society of Economic Geology–University of Western Ontario Short Course, March 5, 2005, London, Ontario, Abstracts, p.24-26.

Gordon, J.B., Lovell, H.L., de Grijs, J.W. and Davie, R.F. 1979. Gold deposits of Ontario, part 2, part of District of Cochrane, districts of Muskoka, Nipissing, Parry Sound, Sudbury, Timiskaming, and counties of southern Ontario; Ontario Department of Mines, Mineral Deposit Circular 18, 253p.

Gordon, J.B., Rybak, U.C. and Robertson, J.A. 1981. Uranium and thorium deposits of southern Ontario; Ontario Geological Survey, Open File Report 5311, 665p.

Goudge, M.F. 1938. Limestones of Canada, their occurrence and characteristics, Part IV, Ontario; Canada Department of Mines and Resources, Bureau of Mines, Publication Number 781, 362p.

Guillet, G.R. 1964. Fluorspar in Ontario; Ontario Department of Mines, Industrial Mineral Report 12, 68p.

Harding, W.D. 1944. Geology of Kaladar and Kennebec townships; Ontario Department of Mines, Annual Report, 1942, v.51, pt.4, p.51-74. Accompanied by Map 51d, scale 163 360.

Harnois, L. 1987. Geochemistry of the Ore Chimney Formation and associated metavolcanic rocks and gold deposits in the Flinton–Harlowe area, Grenville Province, southeastern Ontario; unpublished PhD thesis, Carleton University, Ottawa, Ontario, 237p.

Hewitt, D.F. 1963. Silica in Ontario; Ontario Department of Mines, Industrial Mineral Report 9, 36p.

——— 1967. Uranium and thorium deposits of southern Ontario; Ontario Department of Mines, Mineral Resources Circular 4, 76p.

Hitzman, M.W., Reynolds, N.A., Sangster, D.F., Allen, C.R. and Carman, C.E. 2003. Classification, genesis, and exploration guides for non-sulfide zinc deposits; Economic Geology, v.98, p.685-714.

Kingston, P.W., MacKinnon, A. and Caley, W.F. 1990. New industrial mineral opportunities in southeastern Ontario; CIM Bulletin, v.83, no.934, p.92-100.

Kingston, P.W. and Papertzian, V.C. 1997. Southeastern (Tweed) Resident Geologist's District—1996; *in* Report of Activities 1996, Resident Geologists, Ontario Geological Survey, Open File Report 5958, p.11-1 to 11-18.

Kingston, P.W., Papertzian, V.C. and Sangster, P.J. 1996. Southeastern (Tweed) Resident Geologist's District—1995; *in* Report of Activities 1995, Resident Geologists, Ontario Geological Survey, Open File Report 5943, p.332-346.

LeBaron, P.S. 1991. Exploration for gold in southeastern Ontario, 1980–1990; Ontario Geological Survey, Open File Report 5808, 147p.

LeBaron, P.S., Kingston, P.W., Papertzian, V.C., van Haaften, S., Meyn, H.D. and Caley, W.F. 1993. Southeastern Resident Geologist's District—1992; *in* Report of Activities 1992, Resident Geologists, Ontario Geological Survey, Miscellaneous Paper 161, p.371-392.

LeBaron, P.S., Verschuren, C.P., Papertzian, V.C. and Kingston, P.W. 1990. Building stone potential in eastern Ontario; Ontario Geological Survey, Mineral Deposits Circular 30, 368p.

LeBaron, P.S. and Williams, D.A. 1990. Carbonate building stone resources of the Lake Simcoe–Kingston area, southeastern Ontario; Ontario Geological Survey, Open File Report 5730, 65p.

Liberty, B.A. 1969. Geology, Lake Simcoe area, Ontario; Geological Survey of Canada, Map 1228A, scale 1:253 440.

Lumbers, S.B. 1969. Geology of Limerick and Tudor townships; Ontario Department of Mines, Geological Report 67, 110 p. Accompanied by Map 2167, Limerick Township and Map 2168, Tudor Township, scale 1:31 680.

Lumbers, S.B. and Vertolli, V.M. 2003. Precambrian geology, Kawagama Lake area; Ontario Geological Survey, Preliminary Map P.3525, scale 1:50 000.

MacKinnon, A. 1990. Wollastonite in Ontario; Ontario Geological Survey, Open File Report 5715, 289p.

MacKinnon, A. and LeBaron, P.S. 1992. Graphite occurrences of the Frontenac Axis, eastern Ontario; Ontario Geological Survey, Mineral Deposit Circular 33, 31p.

Masson, S.L. and Gordon, J.B. 1981. Radioactive mineral deposits of the Pembroke–Renfrew area; Ontario Geological Survey, Mineral Deposits Circular 23, 155p.

MacNaughton, R.B., Cole, J.M., Dalrymple, R.W., Braddy, S.J., Briggs, D.E.G. and Lukie, T.D. 2002. First steps on land: arthropod trackways in Cambrian–Ordovician eolian sandstone, southeastern Ontario, Canada; Geology, v.30, p.391-394.

Menard, A.G. 1987. An inventory of the mineral resources in Peterborough County; Ontario Geological Survey, Open File Report 5635, 336p.

Moore, J.M., Jr. and Morton, R.L. 1986. Geology of the Marble Lake area, counties of Frontenac and Lennox and Addington; Ontario Geological Survey Report 238, 63p. Accompanied by Map 2499, scale 1:31 680.

Ontario Geological Survey 2004. Mineral deposit inventory version 2 (MDI2); Ontario Geological Survey.

Papertzian, C. 2002. Unpublished property visit report, Mineral Deposit Inventory file No. MDI31C14SE00135, "Gold Base", Kennebec Twp.; Ministry of Northern Development and Mines, Resident Geologist's Office, Tweed, Ontario.

Parks, W.A. 1912. Report on the building and ornamental stones of Canada, v.1; Mines Branch, Canada Department of Mines, Report No. 100, 376p.

Penn, M.W. 2006. Thin stone; article *in* Building Stone Magazine, summer 2006, www.buildingstonemagazine.com.

Rogers, M.C. 1996. Grade-tonnage deposit models of selected Ontario mineral deposit types; Ontario Geological Survey, Open File Report 5945, 105p.

Russell, D.J. 1993. Role of the Sylvania Formation in sinkhole development, Essex County; Ontario Geological Survey, Open File Report 5861, 122p.

Sabina, A.P. 1983. Rocks and minerals for the collector, Kingston, Ontario to Lac St-Jean, Quebec; Geological Survey of Canada, Miscellaneous Report 32, 132p.

Sangster, D.F. 2003. Non-sulphide zinc deposits: a new look. Introduction; Economic Geology, v.98, p.683-684.

Sangster, P.J., Laidlaw, D.A. and Papertzian, V.C. 2006. Southern Ontario Regional Resident Geologist (Southeastern Ontario District)—2005; *in* Report of Activities 2005, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report; Ontario Geological Survey, Open File Report 6186, 31p.

Shklanka, R. 1968. Iron deposits of Ontario; Ontario Department of Mines, Mineral Deposit Circular 11, 489p.

———. 1969. Copper, nickel, lead and zinc deposits of Ontario; Ontario Department of Mines, Mineral Deposit Circular 12, 394p.

Steele, K., Lee, C. and Barua, M. 2006. Southern Ontario Regional Resident Geologist (Southwestern Ontario District) and Mines and Minerals Information Centre—2005; *in* Report of Activities 2005, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report; Ontario Geological Survey, Open File Report 6186, 32p.

Tulonen, P.V.G. and King, B.R. 1998. 1998 OPAP technical summary report, Wolfe Lake exploration project, Lots 8 and 9, Concession VI, Tudor Township, Hastings County, Southern Ontario Mining District, Claim 1194956; Southern Ontario Resident Geologist office, unpublished assessment file report, file # OP98-244, 245.

Williams, D.A. 1991. Paleozoic geology of the Ottawa–St. Lawrence Lowland, southern Ontario; Ontario Geological Survey, Open File Report 5770, 292p.

Wilson, G.C. 1994. Mafic-ultramafic intrusions, base metal sulphides, and platinum group element potential of the Grenville Province in southeastern Ontario; Ontario Geological Survey, Open File Report 5880, 196p.

Wolf, R.R. 1993. An inventory of inactive quarries in the Paleozoic limestone and dolostone strata of Ontario; Ontario Geological Survey, Open File Report 5863, 272p.

Wolff, J.M. 1985. Geology of the Sharbot Lake area; Ontario Geological Survey, Report 228, 70p.

Wynne-Edwards, H.R. 1967. Westport map area with special emphasis on the Precambrian rocks; Geological Survey of Canada, Memoir 346, 142p.

Ontario

Ontario Geological Survey
Regional Resident Geologist Program

Southern Ontario Regional Resident Geologist (Mines and Minerals Information Centre)—2006

by

C.R. Lee, K.G. Steele and P.J. Sangster

2007

CONTENTS

Mines and Minerals Information Centre—2006

TABLES

Southern Ontario Regional Resident Geologist (Mines and Minerals Information Centre)—2006

C.R. Lee[1], K.G. Steele[2] and P.J. Sangster[3]

[1]Regional Client Service Geologist, Mines and Minerals Information Centre, Ontario Geological Survey

[2]Regional Land Use Geologist, Southern Ontario District, Ontario Geological Survey

[3]Regional Resident Geologist, Southern Ontario District, Ontario Geological Survey

---

INTRODUCTION

The Mines and Minerals Information Centre (MMIC) and the Southern Ontario Regional Land Use Geologist Office are located at 900 Bay Street in room M2-17, Macdonald Block, Queen's Park, Toronto. The MMIC is an information, research and publication sales office for the Mines and Minerals Division of the Ministry of Northern Development and Mines.

The Centre offers geological information and research materials, advisory services and provides access to expertise on the geology, mineral resources and mining industries of the province.

MINES AND MINERALS INFORMATION CENTRE (MMIC) STAFF AND ACTIVITIES

During 2006, the Mines and Minerals Information Centre was staffed by C.R. Lee, Regional Client Service Geologist. The office of K.G. Steele, Regional Land Use Geologist (RLUG) Southern Ontario is co-located with MMIC. D.A. Laidlaw, Regional GIS Specialist, based in Tweed, provides GIS support for the Southern Ontario RLUG program.

Under the Summer Experience Program, student assistants provided research assistance and support to public outreach projects conducted by MMIC and the Southern Ontario Regional Land Use Geologist.

During 2006, MMIC staff assisted approximately 2400 clients who visited or contacted MMIC. The Southern Ontario Regional Land Use Geologist dialogued with an estimated additional 1500 clients at various conferences and trade shows.

Staff responded to a wide variety of inquires within the general categories of commodities, topics and geographic areas. Inquiries are outlined below grouped by frequency.

Commodities

- Frequent: limestone, gold, uranium, diamond/kimberlite, nickel, platinum, dimension stone, aggregates, peat, iron, copper, shale/brick, oil and gas, lignite
- Common: silver, cement, molybdenum, landscape stone, brucite, lime, calcium, oil shale
- Occasional: mercury, titanium, nepheline syenite, basalt, mica, amethyst, sodalite, magnesium, magnesite, pumice, calcium carbonate, asbestos, marble, apatite, rose quartz, coal, talc, calcium hydroxide, salt, kyanite, niobium, phosphate, vermiculite

Topics

- Frequent: prospector's license, old mining stock certificates, mining lands, ARIP, surface rights, air photos
- Common: claim tags, aeromagnetic maps, Geoscape Toronto, mineral statistics, water wells, aggregate operations/*Aggregate Resources Act*, mineral kits, fossils
- Occasional: places to buy rocks and/or minerals in Toronto, MDI (Mineral Deposit Inventory database), Georgian Bay Formation, James Bay Lowland, mineral collecting sites in Ontario, Dundalk plateau/plain, mining equipment for sale, Oak Ridges Moraine, film location ideas, petroleum resources, Whirlpool Formation sandstone, Dundas shale, earthquakes, geotourism, radon gas, Niagara Escarpment, salt leases, drill holes, abandoned mines, drift thickness, Queenston Limestone

Areas

- Frequent: Attawapiskat, Bancroft, Brampton, Chapleau, Elliot Lake, Fort Hope, Kapuskasing, Kenora, Kirkland Lake, Parry Sound, Red Lake, Sault Ste Marie, Sudbury, Thunder Bay, Timmins
- Common: Barrie, Bruce Peninsula, Cobalt, Georgetown, Guelph, Haliburton, Hamilton, Iroquois Falls, Kaladar, Killarney, Kingston, Madoc, Manitoulin Island, Marmora, Michipicoten, Muskoka, Niagara, Orangeville, Peel region, Peterborough, Pickle Lake, Rainy River, Shinning Tree, Temagami, Toronto, Uxbridge, Wawa, Wiarton, Windsor, Winisk Lake

MMIC SERVICES

The Mines and Minerals Information Centre is an information, research and sales office for the Mines and Minerals Division (MMD) of the Ministry of Northern Development and Mines (MNDM). The MMIC provides information, publications, data and access to expertise on Ontario's geology, rocks, minerals and landscape, its exploration and mining industries, as well as access to other Ministry geoscience and technical resources.

The storefront information outlet serves one of the largest groupings of geoscientists, mineral industry specialists, mining companies and mining-related service companies in the world. In addition, government professionals, university and college students and practitioners in geoscience, engineering, architecture and land use planning use the MMIC's resources and information for research.

The MMIC provides computer access for clients who wish to access the CLAIMS database. The database is updated daily by the Provincial Recording Office (PRO) and provides information pertaining to mining claims and land tenure in Ontario. In addition, maps and digital data are available for download.

Publication Sales

The MMIC houses over 10 000 Ontario geological publications available for walk-in sales. The Centre maintains a retail stock of new and old publications produced by the Ministry's Mines and Minerals Division including

- Geology guidebooks and posters
- Geological, geochemical, and geophysical maps and reports
- Annual statistical reports
- Industrial mineral and mineral deposit circulars
- Mineral policy background papers
- Aggregate resources maps and reports
- Open file reports

Publications and digital data not available as in-stock items can also be ordered via telephone, mail, or e-mail, through the Ministry's Publication Sales Centre in Sudbury (toll free at 1-888-415-9845, or electronically at pubsales.ndm@ontario.ca).

Library Services

The MMIC library provides a selection of references and topical information on earth science and the minerals industry. Scientific journals, directories, industry periodicals, the complete collection of OGS publications dating back to 1891, and most Geological Survey of Canada (GSC) publications pertaining to Ontario are available to MMIC clients.

Tables 1 through 5 list new publications and materials added to the MMIC library during 2006: geoscience and mining newsletters (Table 1); journals and periodicals (Table 2); Geological Survey of Canada publications (Table 3); Ontario Geological Survey publications, with particular reference to southern Ontario (Table 4); and reference materials (Table 5).

The library also compiles topical papers and articles acquired by staff at meetings or from publications to which the library does not subscribe. Reports from exploration and mining companies in Ontario are also collected and available for MMIC clients. Library holdings are searchable via an in-house computer database. Clients may request inter-library publication transfers from the Sudbury-based Geoscience Library to the MMIC or from other Ministry offices.

Rock and Mineral Displays

The Mines and Minerals Information Centre has an extensive rock and mineral collection with samples on display and archived as resource material. The walls, counter, and floor of the MMIC facility showcase the natural beauty and variation of Ontario dimension stone.

Table 1. Newsletters received by the MMIC library in 2006.

Title
Alaska GeoSurvey News – Newsletter, Alaska Division of Geological & Geophysical Surveys
Canadian Copper – Canadian Copper & Brass Development Association
ICMM Newsletter – International Council on Mining and Metals
Nova Scotia Minerals Update – Nova Scotia Natural Resources
Ohio Geology – Ohio Department of Natural Resources
Ontario Petroleum Institute – Newsletter
PDAC in Brief – Prospectors and Developers Association of Canada
Pennsylvania Geology – Pennsylvania Department of Conservation and Natural Resources
R & D – Research and Development at the Alberta Research Council
Rock Chips – Alberta Geological Survey
Safety Focus – Mines and Aggregates Safety and Health Association
The Explorationist – Newsletter of the Ontario Prospectors Association
The Gangue – Mineral Deposits Division (Geological Association of Canada) Newsletter
What on Earth – University of Waterloo Department of Earth Sciences

Table 2. Journals and periodicals received by the MMIC library in 2006.

Title
Aggregates & Roadbuilding
American Association of Petroleum Geologists (AAPG) Bulletin
Canadian Journal of Earth Sciences
Canadian Geotechnical Journal
Canadian Mining Journal
Canadian Mining and Metallurgical Bulletin – Canadian Institute of Mining, Metallurgy and Petroleum
Economic Geology – Bulletin of the Society of Economic Geologists
Engineering and Mining Journal
Geoscience Canada
Industrial Minerals
Northern Miner
On Nature – Ontario Nature Magazine of the Federation of Ontario Naturalists
Pit & Quarry
Stone World
The Canadian Mineralogist – Mineralogical Association of Canada
The Ontario Prospector

Table 3. Geological Survey of Canada publications incorporated into the MMIC library during 2006.

Title	Author	Type and Year of Publication
Indicator Mineralogy of Kimberlite Boulders and Sand Samples from the Lac Baby and Sharp Lake Eskers, Lake Timiskaming Kimberlite Field, Western Quebec and Northeastern Ontario	McClenaghan, M.B., Kjarsgaard, I.M., Kjarsgaard, B.A. and Russell, H.A.J.	Open File 5050, 1 CD-ROM, 2006
Reconnaissance Sub-bottom Profiling Results from Selected Basins Along the Lower French River, Ontario	Brooks, G.R. and Medioli, B.E.	Open File 5083, 1 CD-ROM, 2006
Geology, Sudbury Bedrock Compilation, Ontario	Ames, D.E., Davidson, A., Buckle, J.L. and Card, K.D.	Open File 4570, 1 CD-ROM, scale 1:50 000, 2006
Principal Mineral Areas of Canada, Fifty-fifth Edition, 2005	Minerals and Metals Sector and National Energy Board	Map 900A, scale 1:6 000 000, 2005
Geology, Integrated Bedrock Geology-Radarsat-Digital Elevation Data of Sudbury, Ontario	Ames, D.E., Singhroy, V., Buckle, J. and Molch, K.	Open File 4571, 1 CD-ROM / 1 sheet, scale 1:75 000, 2006
Selective Leach Geochemistry of Soils Overlying the 95-2, B30 and A4 Kimberlites, Northeastern Ontario	McClenaghan, M.B., Hamilton, S.M., Hall, G.E.M., Burt, A.K. and Kjarsgaard, B.A.	Open File 5069, 1 CD-ROM, 2006
GIS Compilation of Geology and Tectonostratigraphic Assemblages, Western Uchi Subprovince, Western Superior Province, Ontario and Manitoba	Lemkow, D.R., Sanborn-Barrie, M., Bailes, A.H., Percival, J.A., Rogers, N., Skulski, T., Anderson, S.D., Tomlinson, K.Y., McNicoll, V., Parker, J.R., Whalen, J.B., Hollings, P. and Young, M.	Open File 5269, 1 CD-ROM, 2006
Buried Valley Aquifers: New Data Collection for Municipal Water Supply and Watershed Management, Caledon East, Ontario	Russell, H.A.J., Pullan, S.E., Hunter, J.A., Sharpe, D.R. and Holysh, S.	Open File 5275, 1 Colour Poster, 2006
Digital Surficial Geology Data of the Greater Toronto and Oak Ridges Moraine Area, Southern Ontario	Sharpe, D.R., Barnett, P.J., Brennand, T.A., Gorrell, G. and Russell, H.A.J.	Open File 5318, 1 CD-ROM, 2006
Quaternary Geology of the Cornwall Area	St-Onge, D.A.	Open File 5013, 1 CD-ROM / 1 sheet, scale 1:50 000, 2006

Table 4. Selected Ontario Geological Survey publications received by the MMIC library in 2006.

Title	Author	Type and Year of Publication
Precambrian Geology, Bannockburn and Montrose Townships	Préfontaine, S. and Berger, B.R.	Ontario Geological Survey, Preliminary Map P.3576, scale 1:20 000, 2006
Precambrian Geology, Powell Township	Berger, B.R. Préfontaine, S.	Ontario Geological Survey, Preliminary Map P.3577, scale 1:20 000, 2006
Sulphide Saturation Mechanisms in Gabbroic Intrusions in the Nipigon Embayment: Lake Nipigon Region Geoscience Initiative	Kissin, S.A., Heggie, G.J. and Somarin, A.K.	Ontario Geological Survey, Open File Report 6176, 17p., 2006
Stratigraphic, Geochemical and Isotopic Data from Lakehead University Researchers: Lake Nipigon Region Geoscience Initiative	Fralick, P.W., Hollings, P., Kissin, S.A., Heggie, G.J., Metsaranta, R., Richardson, A.J., Rogala, B. and Somarin, A.K.	Ontario Geological Survey, Miscellaneous Release—Data 190, 1 CD-ROM, 2006
Drill Hole Spectral IP for Poorly Conducting Cu/PGM Mineralization in the Sudbury Basin	JVX Ltd.	Ontario Geological Survey, Miscellaneous Release—Data 174, 1 CD-ROM, 2006
Processing of Hyperspectral Data from Northern Ontario using HE/LP (Hyperspectral Exploration/Lithological Processing) Software	A.U.G. Signals Ltd.	Ontario Geological Survey, Miscellaneous Release—Data 180, 1 CD-ROM, 2006
Development of a New Helicopter TEM System for Mineral Exploration	Gamma Technologies Inc.	Ontario Geological Survey, Miscellaneous Release—Data 183, 1 CD-ROM, 2006
Reprocessing and Interpretation of Abitibi–Grenville Line 12 for the Discover Abitibi Seismic Program: Discover Abitibi Initiative	Hajnal, Z., Reed, L.E. and Pandit, B.	Ontario Geological Survey, Miscellaneous Release—Data 196, 1 CD-ROM, 2006
Ground and Airborne Gravity Survey, Bouguer Gravity, Abitibi Greenstone Belt Compilation	Rainsford, D.	Ontario Geological Survey, Map 81 959, scale 1:250 000, 2006
Results of 2004 Oro Moraine Drilling Program in the Barrie Area, Central Ontario	Burt, A.K. and Russell, D.F.	Ontario Geological Survey, Miscellaneous Release—Data 198, 1 CD-ROM, 2006
Preliminary U/Pb Geochronology Results: Lake Nipigon Region Geoscience Initiative	Heaman, L.M. and Easton, R.M.	Ontario Geological Survey, Miscellaneous Release—Data 191, 1 CD-ROM, 2006
Preliminary Results of the Audiomagnetotelluric Study of the Nipigon Embayment: Lake Nipigon Region Geoscience Initiative	Craven, J.A., Shareef, S., Hart, T.R., Martí, A. and Farquharson, C.	Ontario Geological Survey, Miscellaneous Release—Data 192, 1 CD-ROM, 2006
Multidisciplinary Study of North- to North-Northeast-Trending Dikes in the Region West of the Nipigon Embayment: Lake Nipigon Region Geoscience Initiative	Ernst, R.E., Buchan, K.L., Heaman, L.M., Hart, T.R. and Morgan, J.	Ontario Geological Survey, Miscellaneous Release—Data 194, 1 CD-ROM, 2006
Geological Synthesis Along Highway 66 from Matachewan to Swastika	Berger, B.R.	Ontario Geological Survey, Open File Report 6177, 125p., 2006. Accompanied by Map 2677
Precambrian Geology, Highway 66 Area, Swastika to Matachewan	Berger, B.R., Pigeon, L. and Leblanc, G.	Ontario Geological Survey, Map 2677, scale 1:50 000, 2006
Precambrian Geology, Porter and Vernon Townships	Easton, R.M.	Ontario Geological Survey, Preliminary Map P.2845, scale 1:20 000, 2006
Geological, Geochemical and Geophysical Data from the Porter and Vernon Townships Area, Southern Province, Ontario	Easton, R.M.	Ontario Geological Survey, Miscellaneous Release—Data 197, 1 CD-ROM, 2006
Regional Modern Alluvium and Till Sampling Survey of the Tweed Area, Southeastern Ontario	Felix, V.E., Reid, J.L. and Easton, R.M.	Ontario Geological Survey, Open File Report 6178†, 134p., 2006
Kakagi Lake Area Lake Sediment Geochemical Survey, Northwestern, Ontario	Dyer, R.D., Ravnaas, C., Felix, V.E. and Russell, D.F.	Ontario Geological Survey, Open File Report 6188†, 68p., 2006
Modern Alluvium and Till Data Release, Tweed Area, Southeastern Ontario	Felix, V.E. and Reid, J.L.	Ontario Geological Survey, Miscellaneous Release—Data 199, 1 CD-ROM, 2006
Lake Sediment and Water Geochemical Data from the Kakagi Lake Area, Northwestern Ontario	Dyer, R.D.	Ontario Geological Survey, Miscellaneous Release—Data 201, 1 CD-ROM, 2006
Central Lake Ontario Groundwater Resources Study	SooChan, G.	Ontario Geological Survey, Groundwater Resource Study 1, 1 CD-ROM, 2006
Report of Activities 2005, Resident Geologist Program, Red Lake Regional Resident Geologist Report: Red Lake and Kenora Districts	Lichtblau, A.F., Ravnaas, C., Storey, C.C., Raoul, A., Gula. R. and Saunders, D.	Ontario Geological Survey, Open File Report 6180, 86p., 2006

Title	Author	Type and Year of Publication
Report of Activities 2005, Resident Geologist Program, Thunder Bay North Regional Resident Geologist Report: Thunder Bay North District	Smyk, M.C., White, G.D., Magee, M.A. and Komar, C.L.	Ontario Geological Survey, Open File Report 6181, 44p., 2006
Report of Activities 2005, Resident Geologist Program, Thunder Bay South Regional Resident Geologist Report: Thunder Bay South District	Scott, J.F., Magee, M.A. and Komar, C.L.	Ontario Geological Survey, Open File Report 6182, 38p., 2006
Report of Activities 2005, Resident Geologist Program, Timmins Regional Resident Geologist Report: Timmins and Sault Ste. Marie Districts	Atkinson, B.T., Hailstone, M., Seim, G.Wm., Wilson, A.C., Draper, D.M., Pace, A. and Woo, H.	Ontario Geological Survey, Open File Report 6183, 88p., 2006
Report of Activities 2005, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Kirkland Lake District	Meyer, G., Grabowski, G.P.B., Guindon, D.L. and Chaloux, E.C.	Ontario Geological Survey, Open File Report 6184, 50p., 2006
Report of Activities 2005, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Sudbury District	Farrow, D., Gaudreau, J.M. and Ireland, J.	Ontario Geological Survey, Open File Report 6185, 41p., 2006
Report of Activities 2005, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report: Southeastern and Southwestern Ontario Districts, Mines and Minerals Information Centre, and Petroleum Resources Center	Sangster, P.J., Laidlaw, D.A., Papertzian, V.C., Steele, K.G., Lee, C.R., Barua, M. and Carter, T.R.	Ontario Geological Survey, Open File Report 6186, 77p., 2006
Report of Activities 2005, Resident Geologist Program, Regional Land Use Geologist Report: Northwestern, Northeastern and Southern Ontario Regions	Debicki, R.L., Hinz, P., Lichtblau, A.F. and Rowell, D.J.	Ontario Geological Survey, Open File Report 6187, 41p., 2006
Aqua Regia, Mobile Metal Ions and Enzyme Leach[SM] Soil Geochemical Survey Results from the Timmins Area: Discover Abitibi Initiative	Fedikow, M.A.	Ontario Geological Survey, Open File Report 6179[†], 22p., 2006
Acquisition, Inversion and Presentation of Geophysical Data for Geoscientific Profiles in the Timmins–Kirkland Lake Area: Discover Abitibi Initiative	Mueller, E.L., Reford, S.W., Dawson, D.J.W., Morrison, D.F., Pawluk, C., Grant, J., Spector, A., Rogers, D.S. and Savage, T.	Ontario Geological Survey, Open File Report 6189[†], 28p., 2006
Soil Geochemical Data (Aqua Regia, Mobile Metal Ions and Enzyme Leach[SM]) from 8 Transects in the Timmins Area: Discover Abitibi Initiative	Fedikow, M.A.F.	Ontario Geological Survey, Miscellaneous Release—Data 200, 1 CD-ROM, 2006
Geophysical Data Acquired for Geoscientific Profiles in the Timmins–Kirkland Lake Area: Discover Abitibi Initiative	Dawson, D.J., Morrison, D., Pawluk, C., Grant, J., Spector, A., Mueller, E. and Reford, S.W.	Ontario Geological Survey, Miscellaneous Release—Data 202, 1 CD-ROM, 2006
Regional GIS Database for the Lake Nipigon Area, Lake Nipigon Geoscience Initiative	Izumi, H.	Ontario Geological Survey, Miscellaneous Release—Data 195, set of 2 DVDs, 2006
Geology and Mineral Potential of the Eastern Tomiko Terrane, Grenville Province	Easton, R.M.	Ontario Geological Survey, Open File Report 5554, 117p., 2006. Accompanied by Preliminary Maps P.2846 and P.2847
Precambrian Geology, Jocko River Area	Easton, R.M.	Ontario Geological Survey, Preliminary Map P.2846, scale 1:50 000, 2006
Precambrian Geology, Songris Area	Easton, R.M.	Ontario Geological Survey, Preliminary Map P.2847, scale 1:50 000, 2006
GIS Compilation of Geology and Tectonostratigraphic Assemblages, Western Uchi Subprovince, Western Superior Province, Ontario and Manitoba	Lemkow, D.R., Sanborn-Barrie, M., Bailes, A.H., Percival, J.A., Rogers, N., Skulski, T., Anderson, S.D., Tomlinson, K.Y., McNicoll, V., Parker, J.R., Whalen, J.B., Hollings, P. and Young, M.	Ontario Geological Survey, Miscellaneous Release—Data 203, 1 CD-ROM, 2006
Index to Maps, Bedrock Geology 1991–2005, Northern Sheet	Ontario Geological Survey	Ontario Geological Survey, Index Map, 1 sheet, scale 1:1 000 000, 2006
Index to Maps, Bedrock Geology 1991–2005, Southern Sheet	Ontario Geological Survey	Ontario Geological Survey, Index Map, 1 sheet, scale 1:1 000 000, 2006
Index to Maps, Bedrock Geology 1991–2005, East-Central Sheet	Ontario Geological Survey	Ontario Geological Survey, Index Map, 1 sheet, scale 1:1 000 000, 2006
Index to Maps, Bedrock Geology 1991–2005, West-Central Sheet	Ontario Geological Survey	Ontario Geological Survey, Index Map, 1 sheet, scale 1:1 000 000, 2006

Title	Author	Type and Year of Publication
Index to Maps, Surficial Geology 1991–2005, Northern Sheet	Ontario Geological Survey	Ontario Geological Survey, Index Map, 1 sheet, scale 1:1 000 000, 2006
Index to Maps, Surficial Geology 1991–2005, Southern Sheet	Ontario Geological Survey	Ontario Geological Survey, Index Map, 1 sheet, scale 1:1 000 000, 2006
Index to Maps, Surficial Geology 1991–2005, East-Central Sheet	Ontario Geological Survey	Ontario Geological Survey, Index Map, 1 sheet, scale 1:1 000 000, 2006
Index to Maps, Surficial Geology 1991–2005, West-Central Sheet	Ontario Geological Survey	Ontario Geological Survey, Index Map, 1 sheet, scale 1:1 000 000, 2006
Gravity and Magnetic Three-Dimensional (3D) Modelling: Lake Nipigon Region Geoscience Initiative	Reed, L.E. and Rainsford, D.R.B.	Ontario Geological Survey, Miscellaneous Release—Data 193, 1 DVD, 2006
A New Metamorphic Framework for the Hemlo Greenstone Belt: Implications for Deformation, Plutonism, Alteration and Gold Mineralization	Thompson, P.H.	Ontario Geological Survey, Open File Report 6190, 80p., 2006
Paleozoic Geology of Cockburn Island, Manitoulin Area	Wolf, R.R.	Ontario Geological Survey, Open File Report 5424, 55p., 2006. Accompanied by Preliminary Map P.2987
Results of 2003–2004 Overburden Drilling Programs in the Region of Waterloo, Southwestern Ontario	Bajc, A.F. and Hunter, J.A.	Ontario Geological Survey, Miscellaneous Release—Data 205, 1 CD-ROM, 2006
An Updated Guide to the Subsurface Paleozoic Stratigraphy of Southern Ontario	Armstrong, D.K. and Carter, T.R.	Ontario Geological Survey, Open File Report 6191†, 214p., 2006
1:250 000 Scale Bedrock Geology of Ontario	Ontario Geological Survey	Ontario Geological Survey, Miscellaneous Release—Data 126 – Revised, 1 CD-ROM, 2006
An Updated Guide to the Subsurface Paleozoic Stratigraphy of Southern Ontario	Armstrong, D.K. and Carter, T.R.	Ontario Geological Survey, Miscellaneous Release—Data 204, 1 DVD, 2006
Precambrian Geology of the Cloyne–Plevna–Ompah Area, Grenville Province	Easton, R.M.	Ontario Geological Survey, Open File Report 5454, 165p., 2006. Accompanied by Preliminary Map P.3443
Fertile and Peraluminous Granites and Related Rare-Element Mineralization in Pegmatites, North-Central and Northeastern Superior Province, Ontario	Breaks, F.W., Selway, J.B. and Tindle, A.G.	Ontario Geological Survey, Open File Report 6195†, 143p., 2006
Precambrian Geology, Cloyne–Plevna–Ompah Area	Easton, R.M.	Ontario Geological Survey, Preliminary Map P.3443, scale 1:50 000, 2006
Precambrian Geology of the Northwest Portion of the Nipigon Embayment, Northwestern Ontario	Hart, T.R.	Ontario Geological Survey, Preliminary Map P.3579, scale 1:100 000, 2006
Precambrian Geology of the Southwest Portion of the Nipigon Embayment, Northwestern Ontario	Hart, T.R.	Ontario Geological Survey, Preliminary Map P.3580, scale 1:100 000, 2006
Geological Compilation of the Cobalt–Temagami Area, Abitibi Greenstone Belt	Ayer, J.A., Chartrand, J.E., Grabowski, G.P.D., Josey, S., Rainsford, D. and Trowell, N.F.	Ontario Geological Survey, Preliminary Map P.3581, scale 1:100 000, 2006
Precambrian Geology of the Butler Lake–Dinorwic Lake Area	Beakhouse, G.P. and Idziszek, M.	Ontario Geological Survey, Preliminary Map P.3582, scale 1:20 000, 2006
Digital GIS Compilation: Bedrock Geology of Powell, Bannockburn and Montrose Townships	Berger, B.R., Préfontaine, S. and McIlraith, S.J.	Ontario Geological Survey, Miscellaneous Release—Data 208, 1 CD-ROM, 2006
Lithogeochemical Data for Intermediate to Felsic Intrusive Rocks Sampled in 2005	Beakhouse, G.P. and Cassidy, K.F.	Ontario Geological Survey, Miscellaneous Release—Data 209, 1 CD-ROM, 2006
Electron Microprobe and Bulk Rock and Mineral Compositions of Barren and Fertile Peraluminous Granitic Rocks and Rare-Element Pegmatites, North-Central and Northeastern Superior Province of Ontario	Tindle, A.G., Selway, J.B. and Breaks, F.W.	Ontario Geological Survey, Miscellaneous Release—Data 210, 1 CD-ROM, 2006
Lithogeochemical Data Compilation for the Shaw Dome Area: Shaw, Adams, Eldorado, Carman, Langmuir, Deloro, Ogden and Price Townships	Houlé, M.G. and Hall, L.A.F.	Ontario Geological Survey, Miscellaneous Release—Data 211, 1 CD-ROM, 2006
Upper Manitou Lake Area High-Density Regional Lake Sediment and Water Geochemical Survey, Northwestern Ontario	Felix, V.E.	Ontario Geological Survey, Open File Report 6194†, 77p., 2006
Quaternary Geology, Castlebar Lake–Pagwachuan Lake Area	Slattery, S.R.	Ontario Geological Survey, Map 2678, scale 1:50 000, 2006

Title	Author	Type and Year of Publication
Lake Sediment and Water Analytical Data for the Upper Manitou Lake Area, Northwestern Ontario	Felix, V.E.	Ontario Geological Survey, Miscellaneous Release—Data 206, 1 CD-ROM, 2006
Bedrock Topography and Overburden Thickness Mapping, Southern Ontario	Gao, G., Shirota, J., Kelly, R.I., Brunton, F.R. and van Haaften, S.	Ontario Geological Survey, Miscellaneous Release—Data 207, 1 CD-ROM, 2006
Summary of Field Work and Other Activities, 2006	Baker, C.L., Debicki, E.J., Kelly, R.I., Rowell, D.J., Mason, J.K., Ayer, J.A., Easton, R.M. and Stott, G.M. (eds.)	Ontario Geological Survey, Open File Report 6192, 2006

† Geochemical data / chemical analyses / appendixes available in digital format.

Table 5. Selected new reference publications received by the MMIC library in 2006.

Title	Author	Type and Year of Publication
Ontario Mining and Exploration Directory 2006	O'Neil, J. (ed.)	Directory, Naylor Publications Company (Canada), Winnipeg Manitoba, 62p., 2006
Prospecting the Future – Meeting Human Resource Challenges in the Canadian Minerals and Metals Industry	Mining Industry Training and Adjustment Council (MITAC)	Summary Report, MITAC, Ottawa, 22p., 2005
Ontario's Mineral Development Strategy	Ministry of Northern Development and Mines (MNDM)	Mineral Development Strategy, MNDM, Toronto, 17p., 2006
Nonferrous Metals Outlook December 2005	Minerals and Metals Sector	Outlook, Natural Resources Canada, Ottawa, 44p., 2006
Overview of Trends in Canadian Mineral Exploration	Canadian Intergovernmental Working Group on the Mineral Industry (IGWG)	Overview Report, IGWG, Ottawa, 187p., 2006
Waterfalls of Ontario	Harris, M.	Illustrated Guide, Firefly Books Ltd., Toronto, 223p., 2003
Platinum 2006	Kendall, T.	Platinum Report, Johnson Matthey Public Limited Company, Hertfordshire, England, 52p., 2006
Manitoulin Rocks! Rocks, Fossils and Landforms of Manitoulin Island	Coniglio, M., Karrow, P. and Russell, P.	Guide, Earth Sciences Museum, University of Waterloo, Waterloo, Ontario, 123p., 2006
Platinum 2006 Interim Review	Jollie, D.	Platinum Report, Johnson Matthey Public Limited Company, Hertfordshire, England, 28p., 2006
Canadian & American Mines Handbook 2006–2007	Giancola, D. (ed.)	75th Edition, Business Information Group, Toronto, 672p., 2006
Exploration for Platinum-Group Element Deposits	Mungall, J.E. (ed.)	Short Course Series, Volume 35, Mineralogical Association of Canada, Ottawa, 512p., 2005
2006/2007 CAMESE Compendium of Canadian Mining Suppliers	Canadian Association of Mining Equipment and Services for Export	The Canadian Association of Mining Equipment and Services for Export, Markham, Ontario, 146p., 2006

REGIONAL LAND USE GEOLOGIST ACTIVITIES

Conferences and Meetings

The Southern Ontario Regional Land Use Geologist attended a number of industry-related conferences and workshops in 2006. Events such as these offer opportunities for interactions with clients to discuss points of interest and concern. Events attended were

- Landscape Ontario Congress 2006 tradeshow to liaise with stone quarries
- Ontario Stone, Sand and Gravel Association annual meeting in February in Toronto, land use planning presentations included "Grey County Aggregate Inventory Master Plan"
- Ontario Geological Survey Southeastern Ontario gap analysis meeting in February in Tweed, this brainstorming session with a wide-range of clients discussed potential geoscience projects for southeastern Ontario
- Prospectors and Developers Association of Canada convention in March in Toronto
- Ontario Exploration and Geoscience Symposium in Sudbury in December

Economic Development and Industry Interaction

The Southern Ontario Regional Land Use Geologist contributed to, and took part in, a number of projects to further the economic development of mineral resources in southern Ontario. Projects included

- provision of information, references and suggestions, to over seven quarry companies who have joined to fight the trademark registration of "Wiarton stone" and other names by a company which manufactures a concrete stone which imitates real stone
- assistance to the Municipality of South Bruce Peninsula on a study of "Economic Impact of the Quarry Sector in the Town of South Bruce Peninsula"
- organization and leadership of the Canadian Institute of Mining and Metallurgy (CIM) Toronto Branch field trip "St. Marys Cement Bowmanville - Mega Mining and Mineral Processing in Our Backyard + Rock Crushers and Geo-energy" on Wednesday, September 27
- presentation of 2 talks at Association of Professional Geoscientists of Ontario and Toronto and Region Conservation Authority sponsored "Geoscience Orientation Program" for internationally trained geoscience professionals
- provision of technical guidance via advisory panel to with Ontario Mining Association Virtual Mine Tour video
- presentation to CIM Toronto Branch Student–Industry student networking seminar

Land Use Planning Activities

The primary responsibilities of the Southern Ontario Regional Land Use Geologist are to represent Ministry of Northern Development and Mines interests in land use planning processes across southern Ontario. These interests include the appropriate use and consideration of geoscience information and expertise related to mineral resources and deposits, areas of mineral potential, mineral extraction operations, mining lands tenure and mining hazards. The Regional Land Use Geologist's activities for 2006 are summarized below.

In 2006, the GIS/Data Specialist provided GIS (geographic information system) and database support to the Southern Ontario Resident Geologist Program and the Regional Land Use Geologist. Maps displaying the mineral resources and geology of Haliburton, Renfrew and South Wald and Yarmouth townships were compiled for meetings with County and Municipal planners.

Poster presentations highlighting mineral occurrences, geological features and past and present mineral producers of Hastings County and Peterborough County were exhibited at the Bancroft Gemboree and at the International Plowing Match, respectively.

CROWN LAND

During 2006, the Southern Ontario Regional Land Use Geologist provided input to Ontario Parks and the Ministry of Natural Resources with regard to several parks and conservation reserves. Two projects of note were assessing lands for a possible addition to Bonnechere Provincial Park, and developing the management plan for Egan Chutes and Egan Chutes Addition Provincial Park.

MUNICIPAL/PRIVATE LANDS

Table 6 provides a summary of the Southern Ontario Regional Land Use Geologist's contributions to, and review of, planning documents. These documents are listed by the primary contribution. In many cases, dealings with one municipality through a process will involve a number of contributions—for example an Official Plan 5-year review, may include consultation, request for data, review of draft Official Plan and review of final adopted Official Plan.

Table 6. Planning documents reviewed by the Southern Ontario Regional Land Use Geologist in 2006.

Planning Document Type	Number Reviewed
Draft Official Plan	10
Final Official Plan	6
Official Plan Data Request	2
Official Plan 5-Year Review	2
Official Plan Amendment	4
Niagara Escarpment Plan Amendment	2
Waste Management Review	1
Major Transportation Review	2

The Southern Ontario Regional Land Use Geologist reviewed, commented on and/or input data and expertise into 24 Official Plans and related processes during 2006. The municipalities involved in these planning processes are listed in Table 7.

Table 7. Municipal Official Plans with MNDM input in Southern Ontario in 2006.

Municipality	Municipality	Municipality
Township of Alnwick–Haldimand	Haldimand County	Township of North Glengarry
Town of Amherstburg	Region of Halton	Pine Ridge Municipal Planning Agency
City of Brantford	City of Hamilton	Municipality of Port Hope
Village of Burk's Falls	City of Kawartha Lakes	United Counties of Prescott–Russell
Central Elgin Planning Area	Town of Kincardine	Town of Saugeen Shores
Regional Municipality of Durham	Town of Lakeshore	Municipality of Southwest Middlesex
Township of Front of Yonge	Township of McNab–Braeside	Wellington County
Grey County	Norfolk County	Municipality of West Elgin

In addition to official plans, the Southern Ontario Regional Land Use Geologist reviewed and/or contributed to number of other planning documents including Grey County Aggregate Resource Inventory Master Plan, United Counties of Prescott–Russell aggregate study and northwest Brampton shale resources strategy.

The Southern Ontario Regional Land Use Geologist provided expertise into information sessions on topics which have had, and will have, more influence in the future on land use planning processes in southern Ontario. These topics include the mapping of karst, features which have a potential impact on public health and safety and groundwater management; the mapping of overburden thickness, which can help to identify aggregate resource areas; aggregate resource mapping; and geochemistry and mineralogy of bedrock, which also relate to groundwater quality.

The Southern Ontario Regional Land Use Geologist and Regional Resident Geologist staffed the Ministry of Northern Development and Mines display at the Ontario East Municipal Conference in Kingston, September 13-14. The display, "Resident Geologist Program – Your Partner in Planning", was a co-operative project of the Southern Ontario Regional Land Use Geologist and the Southern Ontario Regional Resident Geologist office. Geology and Mineral Deposit Inventory (MDI) information for Hastings County were used as an example of planning related information available from MNDM.

The Southern Ontario Regional Land Use Geologist contributed to, reviewed reports on, and attended training workshops on several provincial planning initiatives, including

- Natural Spaces/ Natural Heritage System: During 2006, through the Natural Spaces Program, the Ministry of Natural Resources developed and started testing an approach for identifying landscape-scale natural heritage systems for southern Ontario.
- Places to Grow/Growth Plan for the Greater Golden Horseshoe: On June 16, 2006, the Government of Ontario, through the Ministry of Public Infrastructure Renewal, released the "Growth Plan for the Greater Golden Horseshoe".
- Niagara Escarpment Plan: Two Niagara Escarpment Plan amendment applications.

Public Education Activities

The Southern Ontario Regional Land Use Geologist contributed to, and took part in, a number of education projects to further inform students, educators and interested public on the geology, mineral resources and mining industry of Ontario. Projects included

- "Southern Ontario Minerals in Your Life – production and products" a presentation to the Kitchener–Waterloo Gem & Mineral Club emphasizing mineral commodities extracted in southern Ontario, the associated companies and operations, and the products made from these commodities.
- "Geology, Minerals and Mining of Peterborough County" a presentation with the Regional Resident Geologist Office and the Southern Ontario Prospectors Association and given at the International Plowing Match in Keene. Over 100 000 people attended the event. MNDM distributed 370 posters - almost exclusively to teachers and students, 500 geology maps, and 3000 rock and mineral samples.
- Promotion of the "Geoscape Toronto" poster and related teacher lesson plans, by distributing the poster to interested educators in co-operation with PDAC Mining Matters staff.

ACKNOWLEDGMENTS

The Southern Ontario Resident Geologist Program would like to thank all mineral producers who provided access to their operations or supplied information throughout 2006. Strong communication links between stakeholder groups and government ministries is essential to effective program delivery and ultimately improves the delivery of government services. The help and co-operation of staff from the Ministry of Municipal Affairs and Housing, the Ministry of Natural Resources and other provincial ministries involved in the one-window approach to municipal planning is gratefully acknowledged.

Ontario

Ontario Geological Survey
Regional Resident Geologist Program

Petroleum Resources Centre—2006

by

M.R. Lazorek and T.R. Carter

2007

CONTENTS

Petroleum Resources Centre—2006

TABLE

FIGURE

Petroleum Resources Centre—2006

Oil and Gas Exploration and Development Activity in Ontario in 2006

M.R. Lazorek[1] and T.R. Carter[2]

[1]Sedimentary Geologist, Petroleum Resources Centre, Ministry of Natural Resources, London, Ontario

[2]Chief Geologist, Petroleum Resources Centre, Ministry of Natural Resources, London, Ontario

---

INTRODUCTION

Drilling activity in Ontario increased compared to 2005, but not enough to prevent a decline in production. World oil prices remained high, but declined from the record levels reached in 2005. Natural gas prices also declined, but remained at higher levels than long-term averages despite healthy inventories of natural gas in storage reservoirs.

Preliminary production figures compiled from annual production reports submitted to the Petroleum Resources Centre indicate annual oil production declined 9% to 124 657 m^3 in 2006, compared to 137 444 m^3 the previous year. Production of natural gas was down 2% from the previous year with total production of 340 378 10^3m^3 in 2006, compared to 346 093 10^3m^3 in 2005. The decline in oil production was directly related to reduced levels of drilling activity in 2004, 2005 and 2006 such that there is insufficient new production to replace reserves produced from existing wells. Gas production declined despite an increase in drilling, possibly due to a delay in completing newly drilled wells for production.

EXPLORATION ACTIVITY

A total of 146 licences to drill and operate new wells were issued by the Ministry of Natural Resources in 2006, compared to 92 in 2005. An additional 27 licences were issued for plugging of orphan wells, 41 existing wells were licensed for oil production from historical oil fields and 18 existing wells were licensed for production as private gas wells.

At the time of writing, the drilling of 94 new wells was reported to be complete, compared to 75 wells drilled in 2005. These consisted of 38 exploratory wells and 56 development wells. Horizontal drilling accounted for only 5 of the total wells drilled in 2006. 2006 exploratory drilling resulted in 14 wells reported as gas producers (Table 1; Figure 1) with no wells completed for production of oil. Development drilling was very successful with 5 wells reported to be oil producers, 27 as gas producers and 12 as private gas wells, compared with 8 oil producers, 22 gas producers and 6 private gas wells in 2005. Successful oil wells were completed in Ordovician and Silurian reef targets, whereas completions in Silurian sandstone reservoirs in Norfolk, Haldimand and Elgin counties and offshore Lake Erie dominated the gas-producing wells. Of the 25 wells drilled offshore Lake Erie in 2006, 22 wells were reported as gas producers.

The number of successful exploration wells drilled in Ontario in 2006 was up from 5 in 2005 to 14 in 2006. Talisman Energy Inc. continued to be the most active exploration company in Ontario's petroleum industry with 12 exploration wells drilled in 2006.

Cambrian Play

One development and 3 exploratory wells were drilled to test Cambrian targets for oil and natural gas potential in 2006. The one exploration well was reported as a capped gas well by Echo Energy Canada Inc. in a deeper pool test beneath the Bayham Silurian sandstone natural gas pool.

Ordovician Play

One exploration and 3 development wells were drilled in Ordovician targets in 2006, compared to 7 development wells in 2005. The Ordovician development drilling resulted in 3 new oil producers for Talisman Energy. Successful oil wells were completed in the Romney 3-8-II, Wigle–Olinda and Goldsmith–Lakeshore Pools. All 3 of these wells were drilled horizontally in the reservoirs.

Silurian Sandstone Play

Exploration and development of Silurian sandstone targets was up from 2005, with a total of 30 exploration and 48 development wells compared to 9 and 27, respectively in 2005. Of the 30 exploration wells, 5 were completed as gas wells, 8 were capped and 11 were reported as potential producers.

There were 48 development wells drilled in Silurian sandstone targets in 2006. Of these, 1 was abandoned, 2 were suspended, 7 were capped, 7 were listed as potential gas producers and 31 were completed as gas producers. Successful gas wells were reported in the Houghton 5-8-ENR Pool, Haldimand Pool, Welland Pool, Bayham Pool, and Lake Erie Maitland and Clear Creek pools. Capped wells were primarily from the Norfolk Pool and potential gas wells were reported from the Norfolk, South Walsingham 5-6-VI, and Lake Erie–Silver Creek Pools. Of the 31 completed wells, 12 were listed as private gas wells, producing from the Haldimand and Welland Pools.

Silurian Carbonate Play

Three exploratory wells were drilled to test Silurian Guelph reef and/or Salina Formation structural targets in 2006. One well was plugged and abandoned, one was suspended and one well was reported by Onco Petroleum as a potential oil/gas well.

There were 4 development tests of Silurian Guelph–Salina targets in 2006. Enbridge Gas Distribution Inc. completed 2 oil producers in the Corunna Pool, Lindross Holdings (Sarnia) Ltd. reported 1 oil and gas producer from the Dawn 6-28-IX Pool and 1031094 Ontario Ltd. reported 1 gas well in the Wardsville Pool.

Devonian Play

One exploratory well was drilled to test Devonian targets and was reported as a potential gas producer.

RECOMMENDATIONS FOR EXPLORATION

Recommendations for exploration are similar to 2005. Ordovician reservoirs are still the focus of exploration directed at discovery or development of oil reservoirs, but interest in Cambrian targets has increased. Exploration in the Ordovician play has declined considerably in the past 4 years with a focus on extension or development drilling of known trends. Essex County and southern Kent County are still the most attractive onshore locations, but exploration will have to expand to the north and east if oil production is to be maintained. There is considerable remaining untested potential for natural gas in this play beneath the eastern basin of Lake Erie and onshore east and north from Kent County to the Niagara Escarpment. A recent reassessment of potential in this play by the Ministry of Natural Resources indicates potential remaining undiscovered resources totalling 201 billion cubic feet [5.7 billion m^3] of natural gas and 16.6 million barrels [2.64 million m^3] of oil. There also may be potential for trapping of natural gas in sandy facies of the Ordovician Shadow Lake Formation over the crest of the Algonquin Arch.

Although natural gas prices are lower than last year, they are still high compared to 5 years ago. High natural gas prices greatly enhance the economics of all the gas plays in Ontario. There was a significant increase in drilling in the Lower Silurian sandstone play in 2006. There is potential for discovery of Cambrian gas or oil pools along the pinch-out edge of the Cambrian sandstone in the subsurface, or in fault-controlled structures. There may be considerable unrealized potential in fault-related structural traps in the Salina A-1 and A-2 Carbonate units in Kent, Elgin and Middlesex counties. There is also conceptual potential for a new unconventional gas play in the black shales of the Kettle Point Formation, analogous to the very successful Antrim shale play in Michigan and the Ohio shales in Ohio. Shows of natural gas have been reported in the Kettle Point Formation in Ontario, but it has never been targeted for exploration and no scientific studies of its potential have been completed.

Table 1. Successful exploratory wells in southwestern Ontario in 2006 (*see* Figure 1 for well locations).

Well #	Well Name	Results	Target	TD	Latitude	Longitude	TD Date
1	NOG #2, Windham 1-5-XI	GP - CAP	CLI	293.00	42.88543111	-80.35482306	2006/05/08
2	NOG #7, Windham 1-10-XI	GP - CAP	CLI	315.00	42.87949111	-80.39124889	2006/12/20
3	NOG #8, Windham 2-1-XI	GP - CAP	CLI	293.50	42.88986472	-80.32892722	2006/06/28
4	Leader No. 3, North Walsingham 8-10-X	GP - CAP	CLI	405.40	42.71506944	-80.57543611	2006/08/24
5	Leader No. 4, North Walsingham 3-10-IX	GP - CAP	CLI	407.00	42.70946389	-80.57522778	2006/11/06
6	Echo No.57, Bayham 3-1-II	GP - CAP	CAM	1102.00	42.68610000	-80.85770278	2006/10/04
7	Leader No. 10, North Walsingham 2-2-VII	GP - CAP	CLI	415.50	42.66696389	-80.61325833	2006/07/05
8	Leader No. 8, North Walsingham 6-1-VII	GP - CAP	CLI	422.80	42.65975556	-80.61587778	2006/10/14
9	TLM Central, Lake Erie 183-K-3A	GP - ACT	CLI	659.40	42.28851667	-81.01025000	2006/07/16
10	TLM Central, Lake Erie 157-V-4D	GP - ACT	CLI	646.00	42.33618333	-80.85280000	2006/07/10
11	TLM Central, Lake Erie 93-Q-2D	GP - ACT	CLI	531.00	42.52698333	-80.39403333	2006/08/26
12	TLM Central , Lake Erie 127-F-4D	GP - ACT	CLI	563.00	42.46891667	-80.31941667	2006/09/09
13	TLM East, Lake Erie 130-K-4C	GP - ACT	CLI	575.00	42.45326667	-80.00433333	2006/06/23
14	TLM East, Lake Erie 88-N-4	GP - CAP	CLI	533.00	42.53578333	-79.96975000	2006/06/15

Abbreviations: ACT, active; CAM, Cambrian; CAP, capped; CLI, Silurian Clinton–Cataract; GP, gas producer; TD, target depth in metres.

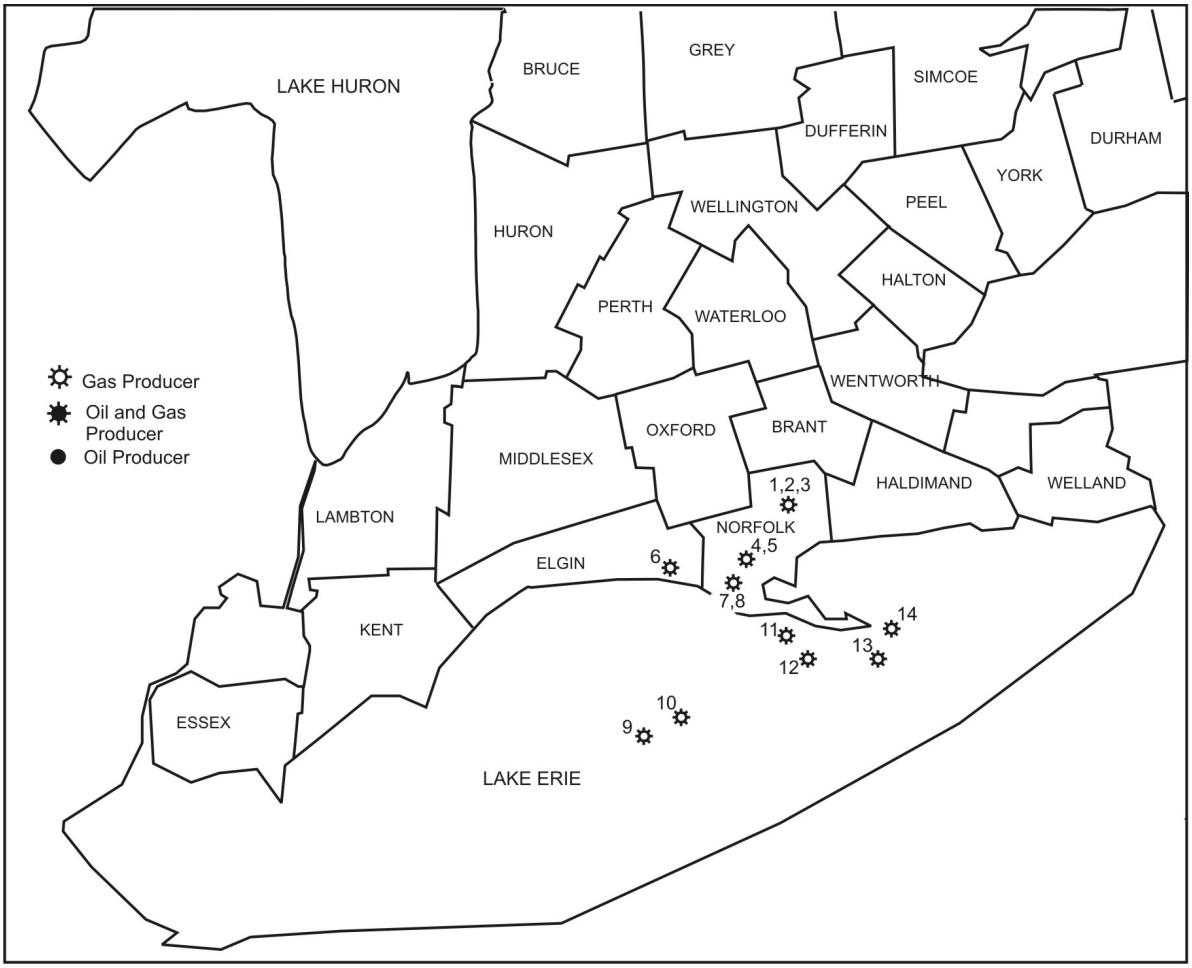


Figure 1. Successful exploratory wells in Ontario in 2006.

Metric Conversion Table

Conversion from SI to Imperial			Conversion from Imperial to SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
		LENGTH			
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
		AREA			
1 cm^2	0.155 0	square inches	1 square inch	**6.451 6**	cm^2
1 m^2	10.763 9	square feet	1 square foot	**0.092 903 04**	m^2
1 km^2	0.386 10	square miles	1 square mile	2.589 988	km^2
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
		VOLUME			
1 cm^3	0.061 023	cubic inches	1 cubic inch	**16.387 064**	cm^3
1 m^3	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m^3
1 m^3	1.307 951	cubic yards	1 cubic yard	0.764 554 86	m^3
		CAPACITY			
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
		MASS			
1 g	0.035 273 962	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 747	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 622 6	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.102 311 3	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 90**	t
		CONCENTRATION			
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

	Multiplied by	
1 ounce (troy) per ton (short)	31.103 477	grams per ton (short)
1 gram per ton (short)	0.032 151	ounces (troy) per ton (short)
1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight per ton (short)	0.05	ounces (troy) per ton (short)

Note: Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries, published by the Mining Association of Canada in co-operation with the Coal Association of Canada.

ISSN 1484-9402
ISBN 978-1-4249-3583-3