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Ontario Geological Survey
Open File Report 6132

Report of Activities, 2003 Resident Geologist Program

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

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by

P.J. Sangster, D. Farrow, V.C. Papertzian, C. Lee, M. Barua, D.A. Laidlaw, D. Hemmings and T.R. Carter

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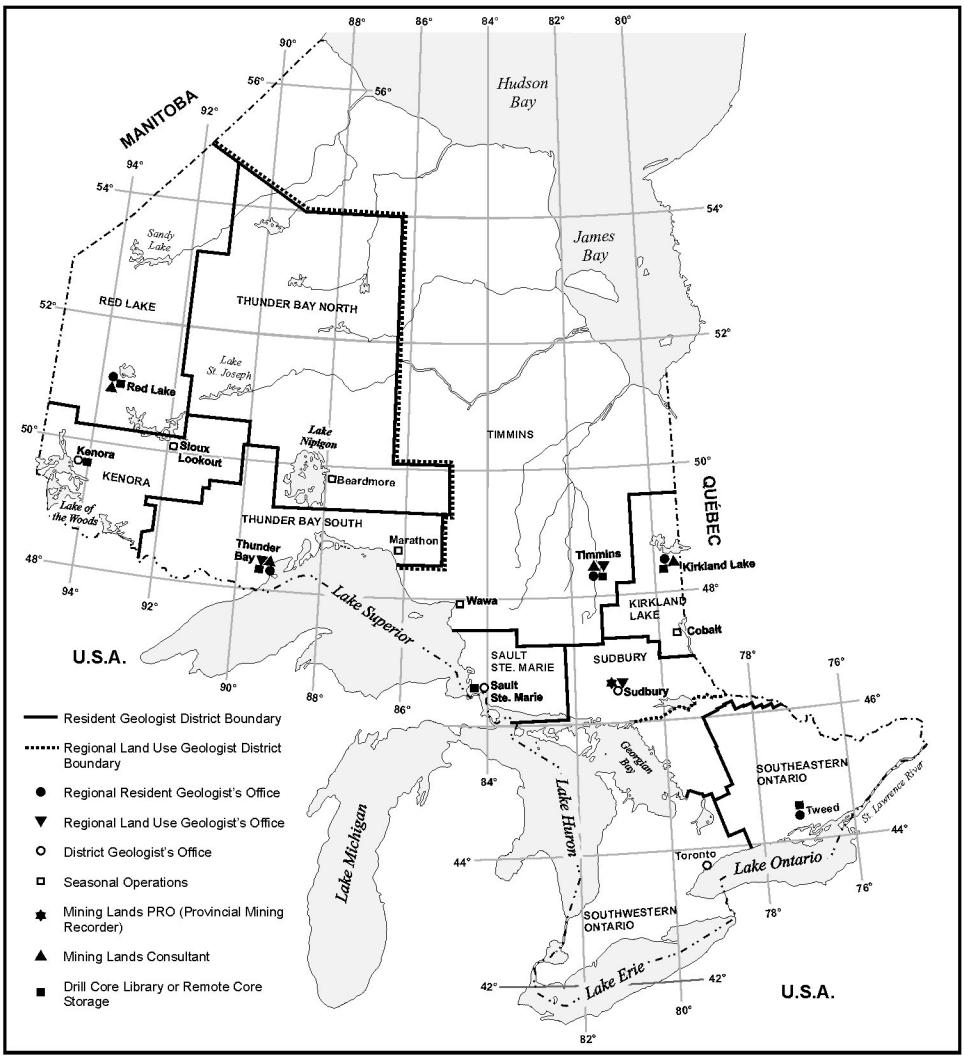

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ONTARIO GEOLOGICAL SURVEY

RESIDENT GEOLOGIST PROGRAM

REPORT OF ACTIVITIES—2003

SOUTHERN ONTARIO
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P.J. Sangster,[1] V.C. Papertzian[2] and D.A. Laidlaw[3]

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

[2] Southeastern Ontario District Geologist, Ontario Geological Survey

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

INTRODUCTION

In 2003, production from mines and quarries continued throughout the District within the Grenville Province and in the Palaeozoic rocks to the south and east. In March, Regis Resources Inc. brought its Canadian Vermiculite deposit into production. The new MRT Aggregates quarry in Methuen Township produced 100 000 t of traprock during its first year of production. Exploration for various nonmetallic commodities including diamonds, dimension stone, vermiculite and wollastonite remained strong. Junior mining ccompanies and prospectors showed a renewed interest in exploring for gold, copper-nickel and platinum group metals.

MINING ACTIVITY

During 2003, there were 46 mineral extraction operations in southeastern Ontario: 6 industrial mineral operations; 2 trap rock producers; 3 cement producer's quarries; 1 brick producer's quarry; 3 gemstone and mineral specimen sites and 31 stone quarries. For a complete listing of Mining Activity and locations of operating mines and mills in southeastern Ontario, please refer to Table 1 and Figure 1, respectively.

Table 1. Mining Activity in 2003—Southern Ontario Regional Resident Geologist (Southeast). (Keyed to Figure 1.)

No.	Company/Individual (Mine Name)	Township (Commodity)	Mining Activity
1.	AECON (formerly Armbro Construction)	Marmora (Limestone)	Limestone is quarried from former Marmoraton minesite for aggregate.
2.	Allan Franks Construction Ltd.	Madoc (Limestone)	Limestone has been quarried and crushed since 1991 for road aggregate.
3.	Amsen Quarries Ltd.	Harvey (Limestone)	Limestone landscaping stone products.
4.	Aqua Rose Quarries	Lyndoch (Gemstones, Mineral Specimens)	Quarrying operations for rose quartz, beryl, feldspar, lyndochite, amazonite, cleavlandite, 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.
5.	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.
6.	Bancroft Chamber of Commerce (Bear Lake Diggings)	Monmouth (Mineral Specimens)	Fee for collecting site near Wilberforce.

No.	Company/Individual (Mine Name)	Township (Commodity)	Mining Activity
7.	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.
8.	Canada 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 Tp. The brick plant, in Gloucester Tp., produced 42 million brick units.
9.	Canada Talc Division, Highwood Resources Ltd., (Henderson Mine)	Huntingdon (Talc, Dolomite)	Highwood Resources Ltd. purchased Canada Talc in 1999. Highwood has invested considerable time and capital into upgrading and expanding facilities at both the mine and the processing plant. 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.
10.	Central Ontario Natural Stone (Batty Quarry)	Laxton (Limestone)	Grey, buff and black limestone is produced as flagstone.
11.	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. (Cornwall Black marble.)
12.	Danford Construction (Springbrook Road Quarry)	Huntingdon (Limestone)	Limestone is quarried and crushed for road aggregate (seasonal operation).
13.	Drain Construction	Dummer (Limestone)	Limestone for use as road aggregate.
14.	Drain Construction	Methuen (Granite)	Crushed stone for aggregate.
15.	Elite Blue Granite	Chandos (Marble)	Stone split for flagging and landscape stone is marketed exclusively by Colonial Brick and Stone in Ontario and the USA.
16.	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.
17.	Haliburton Stone Works	McClintock, Laxton (Granite and Limestone)	A variety of granite and limestone dimensional and landscape stone are produced from 2 quarries.
18.	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 million t per year. A total of 70 people are currently employed at the quarry, mill and colouring plant.
19.	International Quartz Ltd.	McClintock (Quartz)	Crushed white quartz is produced on demand for local market.
20.	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. Burgandy coloured granite from the site is being tested for decorative stone, landscaping and dimension stone applications.

No.	Company/Individual (Mine Name)	Township (Commodity)	Mining Activity
21.	John Bacher Construction Limited	McClintock (Granite Gneiss)	Building stone, flagging stone, and landscaping stone.
22.	LaFarge Canada Inc. (Bath Quarry)	Ernestown (Cement)	A cement plant and on-site limestone quarry with a capacity to produce 1 million t of cement. Silica used in the production of cement is extracted from the company's Potsdam sandstone quarry in Pittsburgh Tp. as well as from recycled foundry sands.
23.	Nelson Windover Quarries (Windover, Buckhorn Quarry)	Harvey (Limestone)	Grey limestone is quarried as a seasonal operation for the production of flagstone.
24.	North Hastings Aggregate Ltd.	Dungannon (Decorative Aggregate)	Multicoloured granite is extracted for use as decorative aggregate. 15 000 tons were shipped in 1999.
25.	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.
26.	Payne, E.W. (Payne Quarry)	Dummer (Limestone)	Flagstone is produced seasonally from this quarry.
27.	Preston, Larry	Galway (Granite)	Burgandy coloured granite is quarried for use as crushed stone aggregate and decorative stone.
28.	Princess Sodalite Mine	Dungannon (Soldalite)	Decorative stone, landscaping stone, mineral specimens including fee for collecting.
29.	Redstone Quarries	Galway, Harvey, Cavendish (Limestone, Sandstone)	Beige limestone and red sandstone are quarried for weathered landscaping stone and armour stone blocks.
30.	Regis Resources Inc. – Canadian Vermiculite	Cavendish (Vermiculite)	The company announced that production began onsite in March 2003. During the year adjustments were made to the plant including upgrading of operation with a large rotary dryer. Additional bulk sampling has been completed. The first full level of commercial production will be reached by March 2004. The plant operates 24hours/day, 3 days/week and employs a full time staff of 9. Markets for the dried, screened vermiculite concentrate are in Canada, USA and Europe.
31.	Rideauview Contracts Ltd. (Ellisville Quarry)	Rear Leeds and Lansdowne, (Sandstone)	Sandstone produced for flagstone, granite blocks and masonry stone.
32.	Rideauview Contracts Ltd. (Pettworth and Renaud Quarries)	Camden (Limestone)	Limestone was quarried for building restoration work in Kingston.
33.	Rideauview Contracts Ltd. (Rideauview Quarry)	Storrington (Sandstone)	Red sandstone is produced for ashlar and flagstone.
34.	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.
35.	Royel Paving	Galway (Granite)	Granite is quarried and crushed onsite for road aggregate.

No.	Company/Individual (Mine Name)	Township (Commodity)	Mining Activity
36.	Senator Stone	Elzevir (Marble)	The quarry began production in 2001. White marble is quarried seasonally and crushed onsite.
37.	Senator Stone	Faraday (Marble)	The quarry site was brought to mining lease in 2002. (Temagami Pink marble breccia.)
38.	St. Lawrence Cement Inc. (Ogden Point Quarry)	Cramahe (Limestone, Cement)	The quarry has been in production since 1959. It produces between 1.9 - 2.1 million t 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.
39.	Stone Cottage Inn Ltd. (Attia Quarries)	Harvey (Limestone)	Grey limestone is quarried for dimension stone.
40.	Timminco Ltd. (Timminco Metals Quarry)	Ross (Magnesium, Strontium and 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.
41.	MRT Aggregates	Methuen (Aggregate)	Metagabbro is quarried and crushed onsite for use as premium aggregate for HL1 purposes. Portable crusher is moved onsite as required. Production began in December 2002. In 2003 production totaled 100 000 t. Product is used by Miller Paving and also sold outside the company.
42.	TRT Aggregates Ltd.	Ameliasburgh, Hilliard, Tyendinaga, Thurlow and 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.
43.	Unimin Canada Ltd. (Blue Mountain Quarry)	Methuen (Nepheline Syenite)	Nepheline syenite is mined from the quarry and processed in 2 mills. Magnetite is produced as a by-product. Production rate is 2 500 tons per day. The mine opened in 1955 and employs 152 people.
44.	Upper Canada Stone Co. Ltd. (Mephisto Lake quarry)	Cashel (Calcitic Marble)	White marble is quarried and sold as crushed marble, landscaping stone, decorative stone and in pre-cast architectural concrete and panels.
45.	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.
46.	Upper Canada Stone Co. Ltd. Upper Canada Minerals Inc.	Rear of Leeds and Landsdowne (Granite)	Red granite is quarried for armour stone, landscaping, architectural and structural stone from both quarries. (Kingston Red Granite Co. Ltd. (Seeley's Bay Quarry #1 & Seeley's Bay Quarry #2).)

*The Granimar Quarries Ltd. quarry was sold by auction in December 2003. New owners have indicated their intention to resume production of Rideau Red granite dimension stone from the site in Rear of Leeds and Landsdowne Township near Kingston.

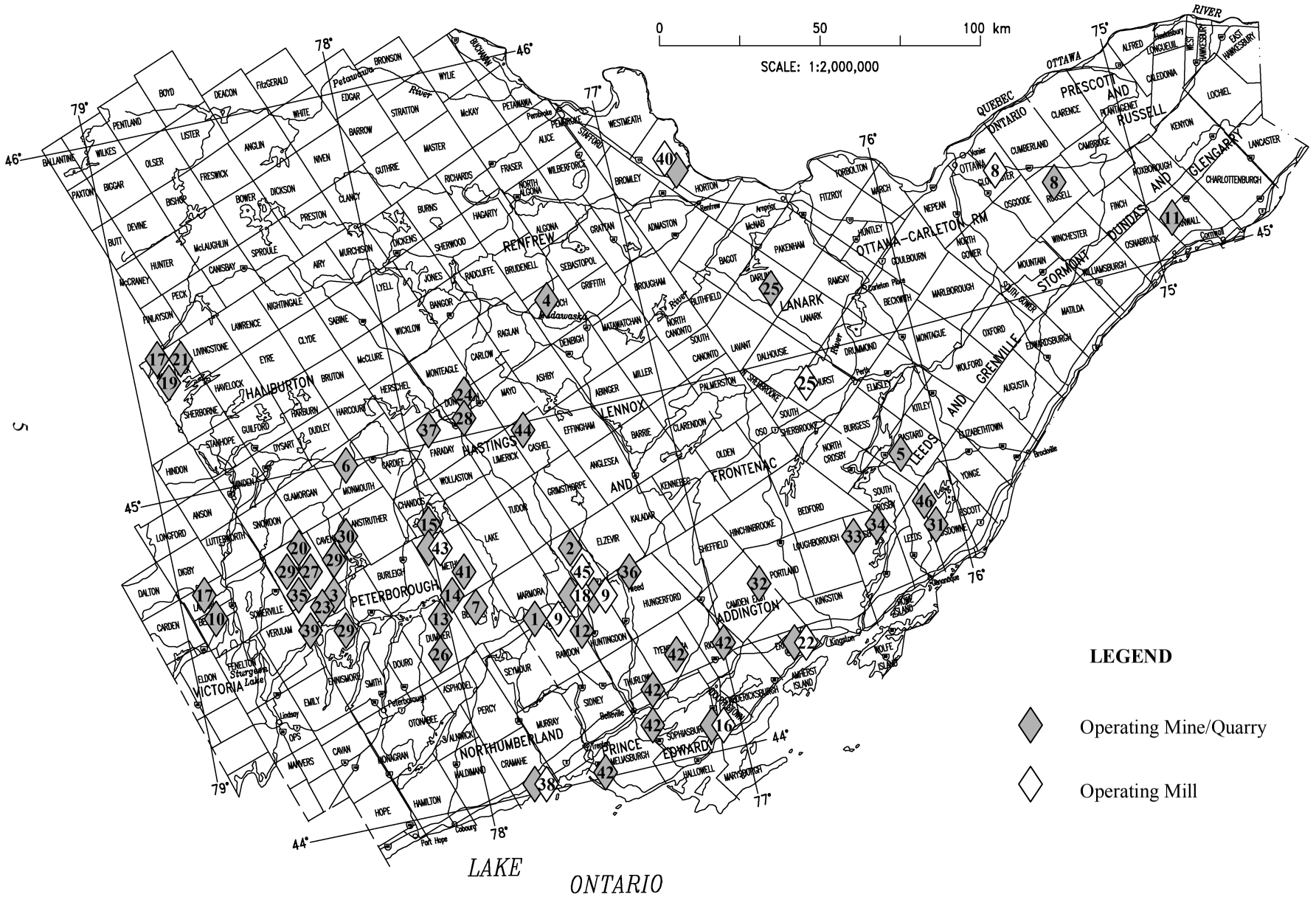

Figure 1: Mining/Quarrying Activity in 2003 - Southeast District, Southern Ontario Regional Resident Geologist

ADVANCED EXPLORATION AND DEVELOPMENT

Vermiculite Corporation of Canada, Incorporated—Galway Township

Details of previous exploration by Vermiculite Corporation of Canada Inc. are given in the 2001 Report of Activities, Southern Ontario Regional Resident Geologist (Southeast Ontario District). The company holds unpatented mining claims in Galway and Cavendish townships totaling over 4000 ha and has acquired rights to an additional 311 ha of patented land. Analysis of bulk sampling from the deposit showed no fibrous asbestos minerals. Metallurgical testing by the Ontario Research Foundation found no gangue or hazardous minerals associated with the vermiculite. (Vermiculite Corporation of Canada, Inc., personal communications, The Lakefield Herald, 2003.)

Canadian Wollastonite—St. Lawrence Wollastonite Deposit

In 2003, Canadian Wollastonite completed all required environmental and social impact studies and developed site specific 'best environmental management and mitigation practices'. Approximately 2 km of access roadways were constructed, a 1000 m of skarn was bisected, stripped and mapped, and engineering and extraction models developed for 3 potential open cast pit start-up locations. In the first quarter of 2004, the potential start-up locations will be deforested, stripped and mapped for a final pit and process design. All work will be completed prior to the 2004 breeding and nesting season for migratory birds. Bulk sampling and pilot plant testing are scheduled to be conducted in August 2004 after the breeding season for migratory birds, but prior to their migration season. Expected production start-up is anticipated to be sometime in 2005, subject to sales contracts being in place.

Previous evaluation of the deposit by U.S. Borax identified a mineral resource calculated to be 9.6 million t with an average grade of 38.1% wollastonite. Of that total, 5.1 million t has been confirmed with a high degree of confidence (measured, indicated and drill inferred reserves) with an average block reserve grade of 41.3%. The remaining 4.5 million t was calculated through geologic inference based predominantly on surface outcrop. A grade of 34.5% assigned to the inferred reserves is based on the overall average grade of both wollastonite and adjacent calc-silicate zones.

The deposit has an additional 3.7 million t of calc-silicate ore independent of the wollastonite skarn reserves. Diopside is a potential co-product. The following description of the deposit has been supplied by Canadian Wollastonite (B. Vasily, Canadian Wollastonite, Canadian Wollastonite web site: www.canadianwollastonite.com; accessed February 2003*)*:

> The Saint Lawrence Wollastonite deposit occurs within a horseshoe shaped band of quartzite open to the east. The deposit is composed of calc-silicate and silicate skarn layers interbanded and strongly folded within the enveloping quartzite. The southern boundary of the skarn is in thermal metamorphic contact with a gabbroic intrusive which has a syenitic and late pyroxenite phase. The entire package has undergone granulite facies metamorphism. Wollastonite skarn formation is limited to the inner portion of a southwest plunging fold, which closes to the west. The Wollastonite skarn zones present within this inner fold cover an area of 275 acres, of which 120 are included in the St. Lawrence deposit property. Wollastonite skarn (ca. 9.6 Mt) with an average wollastonite content of 41.3% is observed in bands averaging 12 meters folded repeatedly throughout the property. The average mineral content consistently associated with the wollastonite is: diopside/hedenbergite 40%, feldspar (predominantly albite with relatively minor microcline) 10%, quartz 5%, calcite trace <2%, sulfides (pyrrhotite and pyrite) <1% and garnet, graphite, phlogopite trace <1%. The wollastonite skarn typically grades into a calc-silicate skarn with a wollastonite content of >20% and <35% wollastonite. The decrease in wollastonite is generally accounted for by an increase in feldspar content.

EXPLORATION ACTIVITY

Gold

Prospectors **Robert Dillman and Jim Chard** explored known zones of gold mineralization and discovered new showings in 2003 on properties in Grimsthorpe and Tudor townships. Work included claim staking, linecutting and ground magnetometer surveys. In 2004 they will be conducting a diamond-drill program on their gold property in

Tudor Township. During the past year they staked additional ground previously held by Homestake Minerals and prospected and assayed grab samples collected on the property. (Assessment files, Tweed RRGO; J. Chard, personal communications, 2003)

Diamonds

Lydia Diamond Exploration of Canada Limited announced the staking of approximately 3000 acres of claims, contiguous to the Company's Wolf Lake property in southeastern Ontario. Historical Ontario Government records obtained in relation to the newly staked area include reports of a 30 m wide mineralized zone containing quartz veins and veinlets with gold values ranging from 1.03 to 9.26 g/t and rhyolite samples with gold values ranging from 1.37 to 15.77 g/t. The staked area surrounds the Gilmour Mine, a former gold producer that operated from 1909 to 1914.

An exploration program focussing on gold and diamonds is planned for the newly acquired ground, with the initial exploration phase consisting of additional geological compilation work, grid establishment, topographic surveying, bedrock mapping, channel sampling and assaying, and soil/till sampling and analysis. The new property extension is located in the up-ice direction from kimberlite indicator minerals and diamonds discovered in glacial till in the Wolf Lake area, as previously announced by the company in 2002. Positive results have been achieved with only 20% of the property having been explored to date. (Lydia Diamond Exploration of Canada Ltd., Press Release 2003; personal communication, February 2004.)

Copper

Pelangio Mines Incorporated reported in November 2003 that it had contracted Fugro Airborne Surveys to conduct a detailed airborne magnetic and electromagnetic survey over its Simon Copper property east of Bancroft. The property is 100% controlled by Pelangio and comprises 6 contiguous mining claims covering an area of 944 ha in Denbigh and Lyndoch townships, situated approximately 135 km west of Ottawa.

The property hosts a historical resource of 253 000 tons grading at 1.09% copper (south zone), originally outlined by Noranda Mines and Young Davidson Mines in the 1960s. Despite the presence of a deposit and a number of significant mineral occurrences, exploration has been limited to the main deposit area or roughly 2% of the current company's holdings. Geophysical exploration techniques used to survey this property to date are early 1960s vintage. As a result, a modern state of the art airborne survey has been initiated to further evaluate the extent of known zones of mineralization proximal to the south zone as well as the entire package of favorable geology that transects the current property holdings. (Pelangio Mines Inc., Press Release, November 2003)

Muscovite

Gleeson Rampton Explorations completed diamond-drill testing of its muscovite prospect in Lavant Township. Previous work on the property identified high-grade flake muscovite bearing schist ranging in thickness from 2 to 10 m over a continuous strike length of 1200 m. The total strike length of the prospective zone is over 4000 m. Field and petrographic estimates of the high-grade material range from 30 to 50% muscovite. Crushing and processing of small samples has indicated that the muscovite is relatively coarse, crushes and delaminates easily, is not particularly brittle, has a good aspect ratio and will produce a good concentrate of clean, clear mica. (V. Rampton, personal communications, December 2003 and February 2004)

Nickel-Copper

Limerick Mines Limited continued exploration on its nickel-copper prospect in Limerick Township. The Bicroft Division of Macassa Mines discovered the prospect in 1961 while investigating magnetic anomalies identified on government airborne magnetic maps.

Twenty-three diamond-drill holes drilled by Macassa Mines in 1962 tested the main anomaly and defined a resource of 1.8 million t grading 0.92% nickel and 0.22% copper. Between 1969 and 1971, Lac Minerals drilled an additional 70 holes on the property to further test this zone (referred to as the north zone) as well as to test a new "south zone". A new resource calculation for the north zone based on this drilling outlined a drill-indicated resource of 3.7 million t grading 0.57% nickel and 0.17% copper to a depth of 300 m. No additional work has been conducted on the deposit since that time. The south zone discovered in 1969 and situated 1200 m south of the north zone has a drill-indicated resource of 4.6 million t grading 0.17% nickel and 0.07% copper to a depth of 75 m.

To date the 2 zones have been investigated by 93 drill holes. The core from the 70 holes of the 1969–71 program is available, complete with drill logs, detailed assays and surveyed hole collars. Much of the currently defined resource is amenable to open pit mining, and mineralized widths suggest that the remainder of the deposit may be extracted by low-cost, underground bulk mining methods.

Massive and disseminated pyrrhotite, chalcopyrite and pentlandite sulphide mineralization occurs in folded ultramafic rocks of the Thanet complex. The drill hole data indicates that the sulphide mineralization lies within fine- to coarse-grained pyroxenitic rocks that are proximal to Van Sickle quartzites. The present interpretation classifies the mineralization as being a volcanogenic massive sulphide (VMS) deposit.

The 2 mineralized zones represent a resource totaling approximately 11 million tons that may be increased with additional diamond drilling. Further diamond drill evaluation of the deposit is scheduled to begin in February 2004. (D. McBride, Limerick Mines Ltd., personal communication, 2003)

Nickel-Copper-Cobalt-Platinum Group Metals

Randsburg International Gold Corporation announced in December 2003 that it had commenced drilling on its 100 percent-owned nickel-copper-cobalt-platinum group metals (PGM) properties located in McClintock Township. The properties comprise approximately 9000 acres and are located approximately 215 km north of Toronto and 50 km east of the town of Huntsville within the Central Gneiss Belt of the Grenville Province.

Based on a recently completed time domain electromagnetic airborne geophysical survey, the company has identified 5 new drill targets and has initiated a minimum 600 m, multiple-hole diamond-drill program.

The company's drill program will also attempt to verify and expand on the results obtained from previous drilling on the property conducted by Falconbridge Limited in 1959. Falconbridge's drilling intersected 15 feet (4.6 m) of sulphides that assayed 1.35% nickel, 0.20% copper and 0.098% cobalt.

Being located in the Central Gneiss Belt, the McClintock property is characterized by polydeformed granulite facies metamorphic rocks. The target sulphide mineralization is hosted within a 4 to 5 km wide anorthosite-gabbro-norite-ultramafic complex. The full extent of the complex and the nature of its layering are veiled by the high grade of metamorphism and the probable presence of intercalated beds or septa of country rock.

The sulphide mineralization grades from being weakly disseminated, to net textured, to being massive and comprised of pyrrhotite, chalcopyrite, and exsolved and free pentlandite. Previously trenched mineralized surface exposures exhibit a pinch-and-swell appearance over a strike length of 1300 m and a width of at least 27 m. (Randsburg International Gold Corporation, Press Releases, 2003.)

Table 2. Claims recorded and active claims 1993–2003—Southern Ontario Regional Resident Geologist (Southeast).

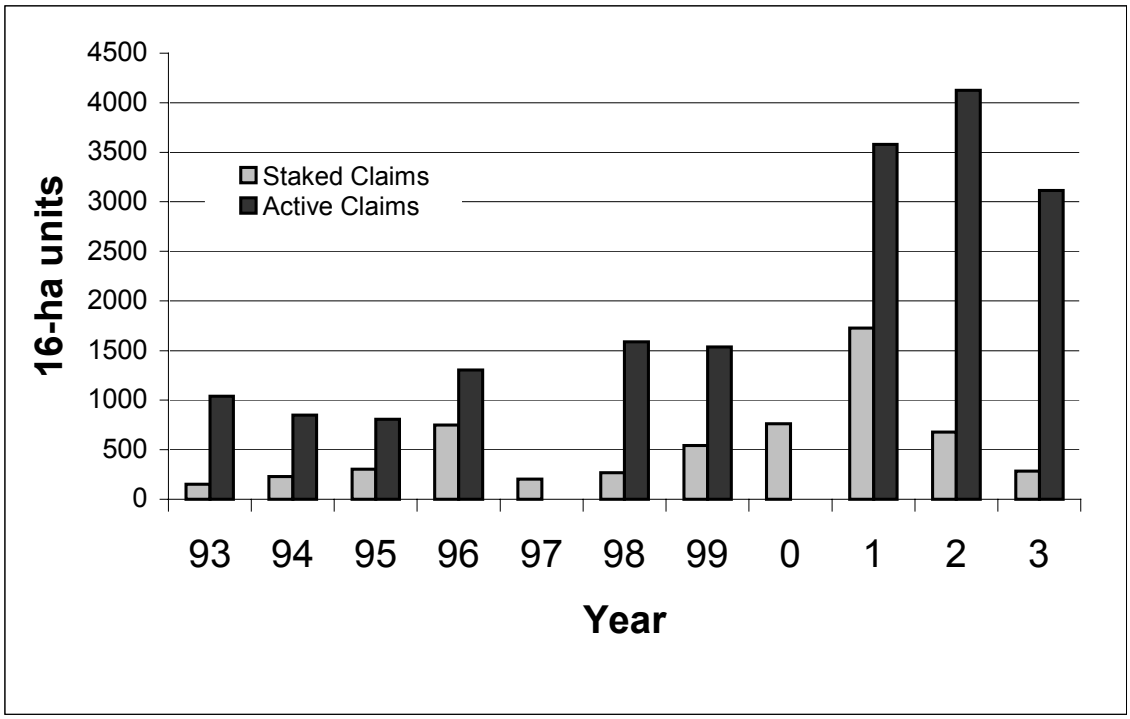

Table 3. Assessment Files Received in 2003—Southern Ontario Regional Resident Geologist (Southeast).

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

Table 3 Cont'd.

	Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
1.	Anstruther (Vermiculite)	Blue Marble Mining Corp.	2002, 2003	GM, Pr, Str, Samp	2.25107	89
2.	Anstruther (Vermiculite)	Blue Marble Mining Corp.	2002, 2003	Geol, Samp, Str	2.25305	90
3.	Ashby (Sillimanite)	Ralph V. Stewart	2002	Geol	2.25404	17
4.	Bedford (Graphite)	Graphite Mountain Inc.	2002	Str, Tr	2.24207	42
5.	Burleigh (Dim. Stone)	Jeff N. Chesher, Frederick T. Archibald	2003	Geol, Samp	2.25865	23
6.	Burleigh (U)	Newkirk Mining Corp. Ltd. – D Block	1955	DD		24
7.	Cavendish (BM, REE)	David J. Ross	2003	GM	2.26507	128
8.	Cavendish (REE, Au, BM)	David J. Ross	2001, 2002	Pr, Samp	2.24390	123
9.	Cavendish (Vermiculite	Regis Resources Inc.	2002	IM	2.23950	124
10.	Cavendish (Vermiculite)	Blue Marble Mining Corp.	2002, 2003	Geol, Samp, Str	2.25305	126
11.	Cavendish (Vermiculite)	Blue Marble Mining Corp.	2002, 2003	Geol, Samp, Str, Tr, IM	2.25434	127
12.	Cavendish (Vermiculite)	Regis Resources Inc.	2003	IM	2.25072	125
13.	Cavendish (Vermiculite)	Regis Resources Inc.	2003	Samp, Tr, Pr	2.26015	129
14.	Galway (Limestone)	Mervin J. Johnston	2002, 2003	Geol, Str	2.26760	51
15.	Galway (Marble)	Rhonda G. Smerchanski	2003	Geol, Str	2.26367	50
16.	Galway (Str, Tr)	John C. Archibald, Jeff N. Chesher	2001	Str, Tr	2.25023	47
17.	Galway (Vermiculite)	Blue Marble Mining Corp.	2003	Pr, GM, Samp	2.25592	48
18.	Galway (Vermiculite)	John C. Archibald	2001	Bulk, Tr, IM, DD	2.24155	46
19.	Galway (Vermiculite)	Murray K. McGill	2003	Pr	2.24652	45
20.	Galway (Vermiculite)	Murray K. McGill	2002	Pr, Geol	2.26255	49
21.	Griffith (Marble)	Dacre Industrial Minerals Inc.	2002	DD	2.24619	24
22.	Griffith (Marble)	Dacre Industrial Minerals Inc.	2001, 2003	Air Photo Interp.	2.25563	25
23.	Grimsthorpe (Au)	Robert J. Dillman	2002	Pr, Samp	2.25066	78
24.	Grimsthorpe (Diamonds)	Emilia Princess VonAnhalt, Jurgen Prinz VonAnhalt	2001	Geol	2.26754	79
25.	Grimsthorpe (Diamonds)	Emilia Princess VonAnhalt, Jurgen Prinz VonAnhalt	2001	Tr	2.26746	80
26.	Grimsthorpe (Diamonds)	Lydia Diamond Exploration of Canada Ltd.	2002	DD	2.24737	76

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
27. Grimsthorpe (Diamonds)	R.J. Dillman	2002	HM Samp	2.25063	77
28. Harvey (Limestone)	946606 Ontario Limited	2003	DD	2.25467	16
29. Hindon (BM)	Yvonne C. Fulton-Bell	2001-2003	Pr	2.25470	7
30. Hindon (BM)	Yvonne C. Fulton-Bell	2001-2003	Pr	2.25933	8
31. Lavant (Mica)	Vernon N. Rampton	2003	Drill	2.26605	58
32. Laxton (Limestone)	Ingram H. Wessell	2001	Drill	2.25671	7
33. Madoc (Limestone)	IKO Industries Ltd.	2003	Samp	2.26644	152
34. Madoc (Soil Conditioner)	Alan Reed	2003	Phys	2.25284	151
35. Matawatchan (Au, BM)	Roger Brisson, Kenneth Sibley	2003	Pr	2.26047	1
36. McClintock (BM, PGE)	Randsburg International Gold Corp.	2001	DD, Samp	2.24413	57
37. McClintock (BM, PGE)	Randsburg International Gold Corp.	2002	AEM	2.26363	60
38. McClintock (Quartz)	Floyd E. Jones	2003	Str	2.26663	58
39. McClintock (Quartz)	Floyd E. Jones	2003	Str	2.26513	59
40. Methuen (Gabbro as Aggregate)	Trigan Resources Inc.	003	DD	2.26262	43
41. Methuen (Gabbro as Aggregate)	Trigan Resources Inc.	003	Drill, IM	2.26749	44
42. Monmouth (Min. Specimens)	Bancroft and District Chamber of Commerce	2002	Tr, Phys	2.24578	157
43. Monmouth (Min. Specimens)	Mark D. Bramham	2003	Grid, GM	2.26321	158
44. North Burgess (Graphite)	Graphite Mountain Inc.	2003	Str, Tr	2.26288	23
45. Tudor (Au)	James M. Chard, Robert J. Dillman	2003	Lc, GM	2.25786	110
46. Tudor (Diamonds)	Lydia Diamond Exploration of Canada Ltd.	2000	Samp, HM	2.24321	108
47. Tudor (Diamonds)	Lydia Diamond Exploration of Canada Ltd.	2002	DD	2.24737	109
48. Tudor (Diamonds)	Lydia Diamond Exploration of Canada Ltd.	2001, 2002	DD	2.26490	111

Table 4. Exploration Activity in 2003—Southern Ontario Regional Resident Geologist (Southeast). (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
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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
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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	946606 Ontario Limited	Harvey (Limestone)	DD
2	Blue Marble Mining Corp.	Anstruther, Cavendish, Galway (Vermiculite)	Geol, Samp, Str, Tr, IM, GMAG, Pr
3	Bramham, M.D.	Monmouth (Min. Spec.)	Grid, GMAG
4	Brisson, R., Sibley, K.	Matawatchan (Au, BM)	Pr
5	Butts, N.	Madoc (Marble)	Pr
6	Byer, J.	Elzevir (Dim. Stone)	Pr
7	Canadian Wollastonite	Pittsburgh (Wollastonite)	Pr
8	Catherwood, L. & L.	McKay (BM)	Pr
9	Chard, J.M., Dillman, R.J.	Tudor (Au)	Lc, GMAG, Pr
10	Chesher, J.N., Archibald, F.T.	Burleigh (Limestone/Dimension Stone)	Geol, Samp
11	Christensen, C.	Bedford (Graphite)	Phys
12	Dacre Industrial Minerals Inc.	Griffith (Marble)	Air Photo Interpretation
13	Despres, J., Trudeau, K.	Hungerford (Dimension Stone)	Pr
14	Forget, M.	Tudor (PGE)	Pr
15	Fulton-Bell, Y.	Hindon (Cu)	Pr
16	Glanfield, M.	Barrie (Au)	Pr
17	Gold Base	Kennebec (Au)	Pr
18	Graphite Mountain Inc.	North Burgess (Graphite)	Str, Tr

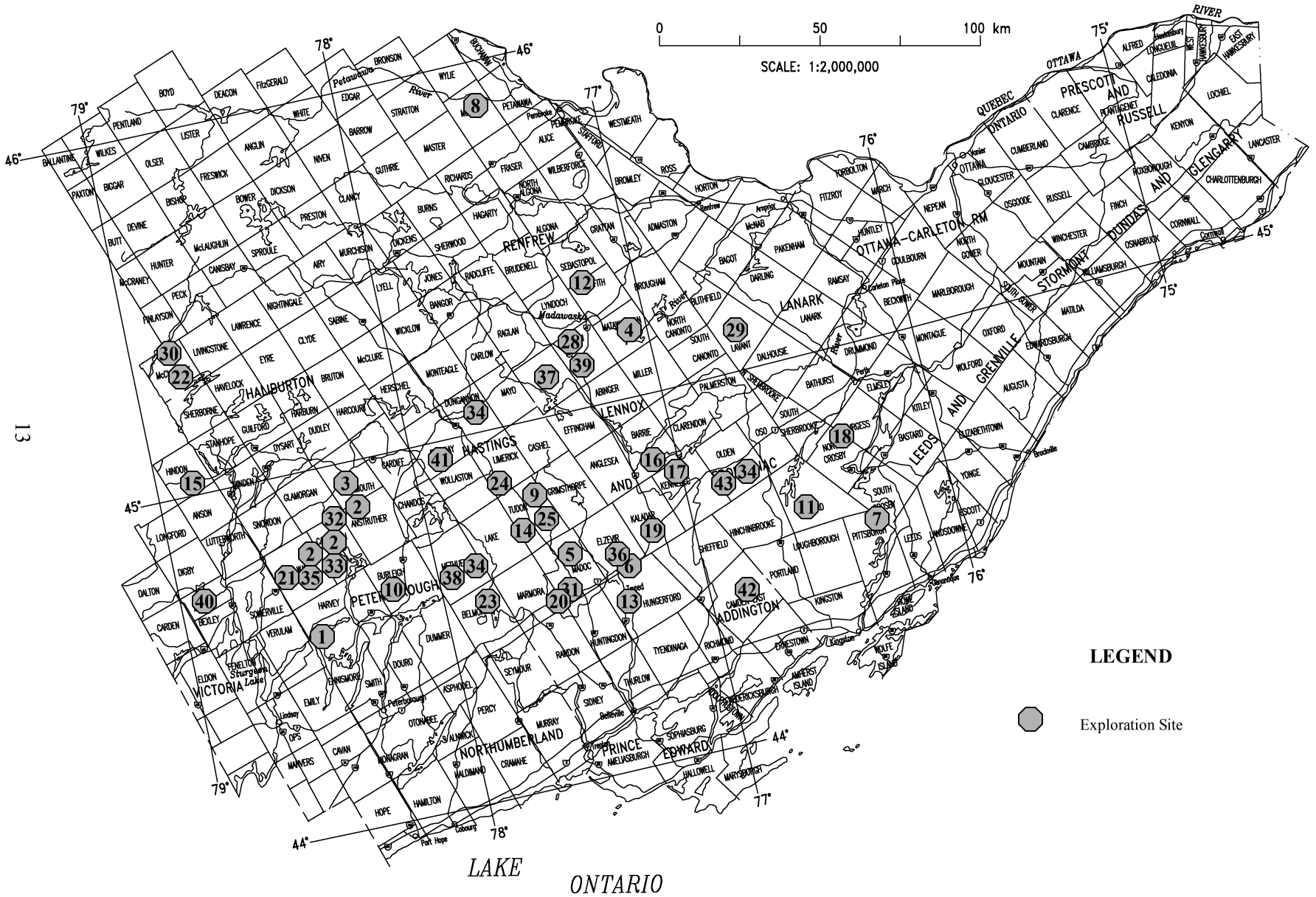

Figure 2: Exploration Activity in 2003—Southeast Ontario District, Southern Ontario Regional Resident Geologist

Table 4 Cont'd.

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
19	Guillet, R.	Kaladar (Mica)	Samp
20	IKO Industries Ltd.	Madoc (Limestone)	Assay
21	Johnston, M.	Galway (Limestone)	Geol, Str
22	Jones F.E.	McClintock (Quartz)	Str
23	Kretschmar, U.	Belmont (Marble)	Pr
24	Limerick Mines	Limerick (BM)	Pr, Samp
25	Lydia Diamond Exploration of Canada Ltd.	Tudor, Grimsthorpe (Diamonds)	DD, HM, Samp
26	OMYA (Canada) Inc.	SE Ontario (Marble)	Pr
27	Palu, J.	SE Ontario (Dim. Stone)	Pr
28	Pelangio Mines Inc.	Denbigh/Lyndoch (BM)	AEM, AM
29	Rampton, V.N.	Lavant (Mica)	Drill
30	Randsburg International Gold Corp.	McClintock (BM, PGE)	AEM, DD
31	Reed, A.	Madoc (Metapelite)	Phys, Grid
32	Regis Resources Inc.	Cavendish (Vermiculite)	IM, Samp, Tr, Pr
33	Ross, D.J.	Cavendish (BM, REE)	GMAG
34	Skarn Co. Ltd.	Methuen, Dungannon, Olden (Dimension Stone)	Pr
35	Smerchanski, R.G.	Galway (Marble)	Geol, Str
36	Solmes, S.	Elzevir (Soapstone)	Pr
37	Stewart, R.V.	Ashby (Sillimanite)	IM (2002)
38	Trigan Resources Inc.	Methuen (Gabbro as Aggregate)	DD, IM
39	Wagg, C.	Griffith	Pr
40	Wessell, I.H.	Laxton (Limestone)	Drill (2001)
41	Whotton, J.	Faraday (Au)	Pr
42	Wilson, M.	Camden East (Soapstone)	Pr
43	Wollasco Minerals	Olden (Wollastonite)	Samp

LAND USE PLANNING ACTIVITY

Ministry of Municipal Affairs and Housing

Mineral-related Provincial Policy Statements contained within the *Planning Act* require staff of the Resident Geologist Program (RGP) to provide comment and input into the development of municipal Official Plans and Official Plan Amendments through the Ministry of Municipal Affairs' (MMA) one-window approach. A summary of Tweed RGP Official Plan related activities is shown in Table 5.

For additional information on land use planning activity related to the Southeast District, the reader is directed to the report contained within the 2003 Report of Activities authored by D. Rowell, Southern Ontario Regional Land Use Geologist. Mr. Rowell is responsible for land use planning issues and initiatives in southern Ontario south of the French River and on Manitoulin Island, and is based in Sudbury.

The Regional Resident Geologist and the District Geologist from the Tweed office attended a number of inter-ministerial meetings hosted by the MMA to review current municipal official plans and related planning issues.

Table 5. Municipal Plans Reviewed in 2003—Southern Ontario Regional Resident Geologist (Southeast).

County	Municipality	Plan Type
	Laurentian Hills	Draft OP
Frontenac	North Frontenac	OP review - 2nd draft
Frontenac	North Frontenac	Abandoned Mine Data
Frontenac	Frontenac Islands	Decision
Frontenac	South Frontenac	Abandoned Mine Data Bedford
Haliburton	Algonquin Highlands	OP review
Haliburton	Dysart et al.	OP pre-consultation
Haliburton	Dysart et al.	OP review
Haliburton	Highlands east	OP review
Haliburton	Minden Hills	Draft OP review
Kingston, City of	City of Kingston	OPA 59
Lanark	Lanark Highlands	OP Review
Lanark	Mississippi Mills	OP pre-consultation
Leeds and Grenville	Augusta Tp.	Draft OP review
Leeds and Grenville	Augusta Tp.	OP review
Leeds and Grenville	Elizabethtown-Kitley	OP pre-consultation
Leeds and Grenville	Elizabethtown	OP review
Leeds and Grenville	Rideau Lakes	Abandoned Mine Data
Leeds and Grenville	Rideau Lakes	OP review
Lennox and Addington	Addington Highlands	OP pre-consultation
Northumberland	Cramahe Tp.	OP Amendment
Northumberland	Cramahe Tp.	OP Amendment
Northumberland	Hamilton Tp.	OP review
Northumberland	Municipality of Port Hope	Draft OP review
Stormont, Dundas and Glengarry	Stormont, Dundas and Glengarry	2nd draft OP

RESIDENT GEOLOGIST PROGRAM (RGP) STAFF AND ACTIVITIES

During 2003, staff of the Southern Ontario Regional Resident Geologist (Southeast) office included P.J. Sangster, Regional Resident Geologist; V.C. Papertzian, Southeast District Geologist and D.A. Laidlaw, Southeast District Support Geologist. J. Taborez and S. Prevost provided field season support under the Summer Experience Program.

There are over 6900 Mineral Deposit Inventory (MDI) records for southeastern Ontario. During 2003, the District Support Geologist was principally responsible for verifying the MDI database. Other staff continued adding information related to new client property visits. In 2003, 470 MDI files were reviewed.

In January 2003, the District Geologist provided the Southern Ontario perspective at the Ministry of Northern Development and Mines (MNDM) poster session at the Cordilleran Roundup in Vancouver.

Southern Ontario mineral potential and recommendations for exploration were represented at the annual Prospectors and Developers Association of Canada Convention in Toronto as part of the Ontario Geological Survey poster session in March.

In April, the Regional Resident Geologist presented a talk and a poster on Southern Ontario mineral industries at the Northeastern Ontario Mines and Minerals Symposium in Haileybury. J.W. Newsome, RGP Sr. Manager, presented the Southern Ontario talk and poster session at the Northwestern Ontario Mines and Minerals Symposium in Thunder Bay. Working with M. Gerow, MNDM's Mineral Commodities Coordinator, the Resident and District Support Geologist staffed and created the Ontario poster session at the Industrial Minerals congress in Montreal.

In July, Southern Ontario RGP staff hosted Kirkland Lake District Geologist, D. Guindon during a two-week visit to the region to gain insight into the industrial minerals industry in southern Ontario.

In August, staff of the Southern Ontario RGP office partnered with the Southern Ontario Prospectors Association (SOPA) to present a booth and poster session at the 40th Annual Bancroft Gemboree, Canada's largest mineral and gem show.

In September, The Southern Ontario Regional Resident Geologist provided 2 talks related to mining and exploration in Southern Ontario and municipal planning at the Ontario East Municipal Conference in Kingston. The Southern Ontario Regional Land Use Geologist and MNDM Mineral Development staff supplied background material used in the presentation. The District Geologist and District Support Geologist collaborated with the Regional Resident Geologist in creating and presenting a poster at the conference.

In October, staff of the Southern Ontario RGP office partnered with the Southern Ontario Prospectors Association to host the annual Friends of the Grenville meeting, banquet and field tour. Staff provided logistical support to the field tour entitled "Connection between Grenvillian Deformation and Granitoid Pluton Emplacement in the Composite Arc Belt (Tweed–Kaladar Area)."

In November, the District Support Geologist attended *Quebec Exploration 2003,* where a poster display highlighting mining and exploration in Ontario was presented by staff of the Resident Geologist Program and other Ontario Geological Survey personnel. Over 1100 registrants attended the geoscience conference and exposition organized by the Ministère des Ressources Naturelles, de la Faune et des Parcs and the Quebec Mineral Exploration Association.

In December, staff attended the Ontario Prospectors Association symposium in Toronto, where a poster display on Industrial Mineral Resources of Southern Ontario was presented. In addition the Regional Resident Geologist prepared and presented a talk highlighting current production and potential for additional exploration and development of industrial minerals in southern Ontario. The Regional Resident Geologist and MNDM's Mineral Commodities Coordinator staffed and created the Ontario partners booth at Stonexpo2003.

Staff conducted visits to 39 properties in the Southeast District during the 2003 field season. A complete listing of 2003 field visits is presented in Table 6.

During the course of the year, 48 industry assessment reports were processed and added to the Tweed RGP office assessment file library as outlined in Table 3. Table 7 provides a summary of year-over-year program activity and Table 8 lists new publications that were added to the Tweed RGP office technical library during 2003.

Southern Ontario Prospectors Association (SOPA)

During 2003, the Tweed Regional Resident Geologist Office (RRGO) continued regular liaison with the Southern Ontario Prospector's Association (SOPA) to provide improved service to the client group. The RRGO organized and

co-hosted “meet the Mining Lands Section” for SOPA members. Presentations by R. Gashinski and R. Denomme were followed by a discussion period with the 40 attendees. A. Wilson, District Geologist, Timmins, provided a presentation on diamond exploration and recent discoveries in the Wawa area. The RRGO also organized a meeting with SOPA members and the Ontario Exploration Corporation (OEC) concerning the OEC Prospectors Grant Program.

Table 6. Field visits completed in 2003 – Southern Ontario Regional Resident Geologist (Southeast). (Field visits within the District are keyed to Figure 3.)

NO.	PROPERTY/OPERATION	COMMODITY
1.	Bear Lake Diggings, Monmouth Tp.	Mineral specimens
2.	Canada Talc mine, Madoc Tp.	Talc
3.	Canadian Vermiculite, Cavendish Tp.	Vermiculite
4.	Canadian Wollastonite, St. Lawrence deposit, Pittsburgh Tp.	Wollastonite
5.	Carmeuse Lime (Beachville) quarry, SW Ontario	Limestone
6.	Cement quarry, Bedford, Quebec	Limestone
7.	D. Ross prospect, Cavendish Tp.	Beryl, mineral specimens
8.	Eisen Quarries Incorporated, Wiarton quarry, Amabel Tp.	Building stone
9.	Gold Base property, Kennebec Tp.	Gold
10.	Granimar quarry, Rear of Leeds and Lansdowne Tp.	Granite dimension stone
11.	Grenville Gold property, Grimsthorpe Tp.	Gold, carbonatite
12.	H.L. King quarry, Owen Sound	Dimension/building stone
13.	Hwy 7 road-cut, Madoc Tp.	Marble, calcite, pyrite
14.	J. Palu property, Sheffield Tp.	Dimension stone
15.	J. Whotton property, Faraday Tp.	Gold, mineral specimens
16.	Jeff Parnell quarry, Cavendish Tp.	Limestone dimension stone
17.	Koizumi muscovite, R. Guillet/R. Young property, Kaladar Tp.	Mica
18.	Larry Preston quarry, Cavendish Tp.	Granite decorative aggregate
19.	MacDonald Feldspar mine, Monteagle Tp.	Mineral specimens
20.	March Formation, Montague Tp.	Dolostone, scientific interest
21.	Marmoraton mine, Marmora Tp.	Iron
22.	Mundic pyrite mine, Madoc Tp.	Pyrite, rehabilitated mine site
23.	NYCO quarry, New York state	Wollastonite
24.	OMYA Canada Inc., Perth Plant, Darling Tp.	Calcium carbonate mineral filler
	OMYA Canada Inc. Quarry	High purity white marble
25.	Owen Sound Ledgerock Ltd., plant and quarry	Dimension/building stone
26.	Petrolia Oilfields, Petrolia	Oil
27.	PGC Glass Co. Ltd., Owen Sound	Glassworks
28.	Platinova property, Marmora Tp.	Wollastonite

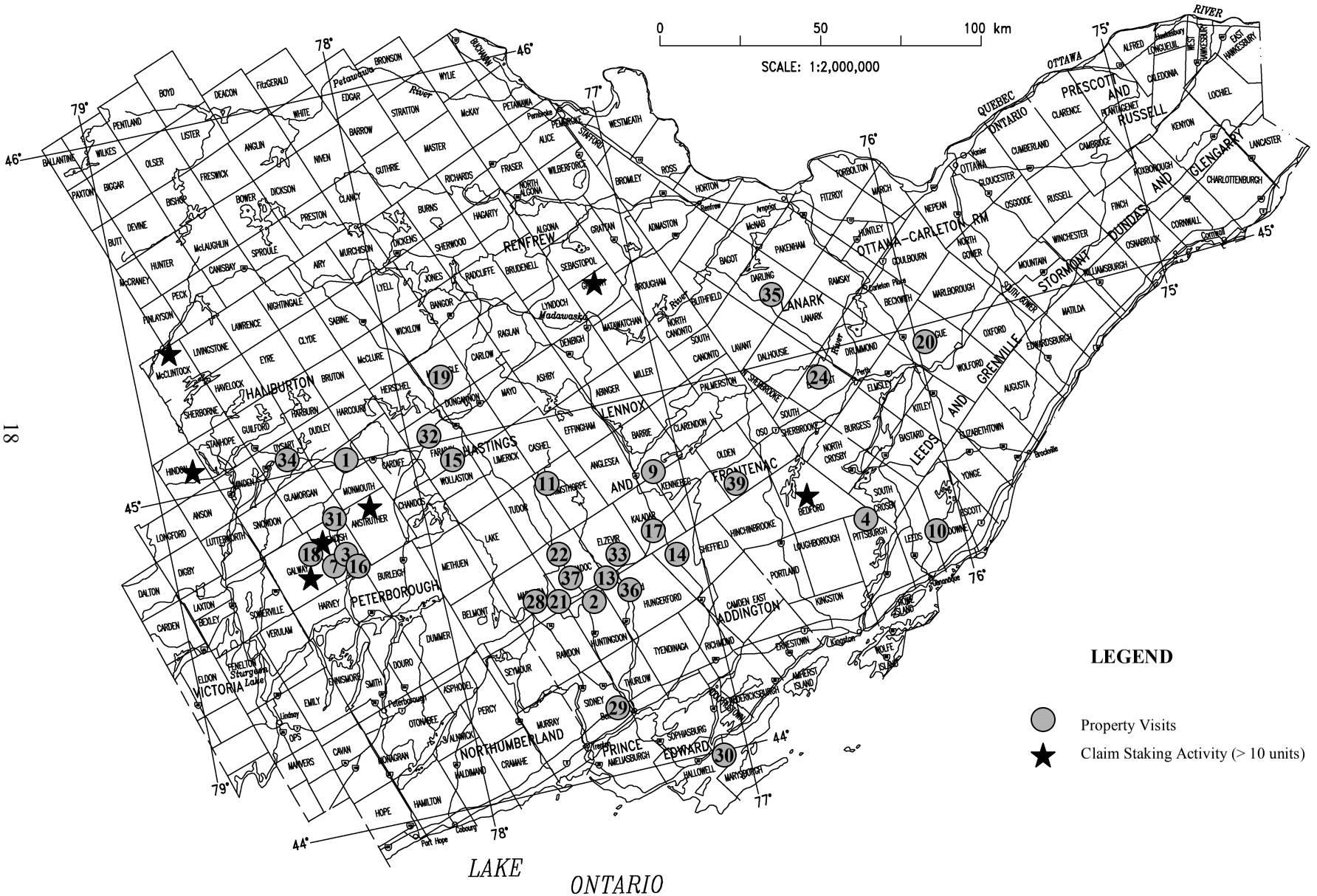

Figure 3: Property Visits and Claim Staking Activity in 2003—Southeast Ontario District, Southern Ontario Regional Resident Geologist

Table 6. Cont'd.

NO.	PROPERTY/OPERATION	COMMODITY
29.	Quinte Conservation Centre, Belleville	Education
30.	Quinte Conservation Centre, Picton	Education
31.	Regis Resources, Cavendish Tp.	Vermiculite
32.	Silver Crater mine, Faraday Tp.	Mineral specimens
33.	Solmes occurrence, Elzevir Tp.	Soapstone
34.	Skyslider site, Dysart Tp.	AMIS site
35.	Tatlock quarry, OMYA Canada Ltd., Darling Tp.	Calcitic marble
36.	Tweed Marble quarry, Champlain Marble, Hungerford Tp.	Marble dimension stone
37.	Upper Canada Minerals Co. Ltd., Madoc Tp.	Marble
38.	Windsor Salt, Ojibway mine, Windsor	Salt
39.	Wollasco prospect, Olden Tp.	Wollastonite

Table 7. Program Activities for 2003—Southern Ontario Regional Resident Geologist (Southeast).

Activity	1999	2000	2001	2002	2003
Field Investigations/Property Visits	45	47	44	45	44
Field Trips Given/Field Guide Written	4	1	3	3	2
MDI Records Revised	1550	2690	906	481	470
OPAP Recipients/OEC Grant Recipients	22	N/A	N/A	N/A	4
MMAH Presentations	3	2	4	2	4
Clients Visits to Tweed RGP Office	508	676	496	428	470
Drill Core Library Users	23	31	58	17	26
Client Communications/Interactions (Presentations/Poster Sessions)	2375	2619	3000+	2550	2550
Client Inquiries (Telephone/E-mail/Mail)	2079	2163	2668	2400	2461
OGS Publications Sold	73	93	89	108	62
Prospector's Licenses Sold	10	21	15	14	20
Claim/Line Tags Sold	408	261	742	131	27

Table 8. Library Acquisitions in 2003—Southern Regional Resident Geologist (Southeast).

TITLE	AUTHOR	TYPE AND YEAR OF PUBLICATION
Canadian Mines Handbook 2003–2004	Giancola, D. (ed.)	Business Information Group, Toronto, 768p., 2003
16th Industrial Minerals International Congress – Montreal	Taylor, L (ed.)	Industrial Minerals Information, Surrey, U.K., 188p., 2003
Oak Ridges Moraine Conservation Plan		Ministry of Municipal Affairs and Housing, Toronto, 82p., map, 2002
Determining Provincially Significant Mineral Potential (PSMP) Using ArcView 3.2	Allen, I.	Geoscience Information Services, Mount Albert, Ontario, 93p., 5 CD-ROMs, 2003
Indicator Mineral Methods in Mineral Exploration	Thorleifson, H. and McClenaghan, B. (organizers)	Short Course Proceedings, Prospectors and Developers Association of Canada, Toronto, 100p and CD-ROM, 2003
Diamond Talk Presentation	Wilson, A.	Ontario Geological Survey, Timmins, CD-ROM, 2003
Connection between Grenvillian Deformation and Granitoid Pluton Emplacement in the Composite Arc Belt (Tweed–Kaladar Area), southeastern Ontario	Schwerdtner, W.M., Robin, P.-Y., Alexander, S., Burke, J., Downey, M.W. and Serafini, G.	Field Trip Guidebook, Friends of the Grenville, University of Toronto, Toronto, 2003
Inside a Geologist's Bag	Rhodes, L.	Miller Publishing, Sudbury, 8p., 2003
Legacy in Stone – The Rideau Corridor	Spalding-Smith, F. and Humphreys, B.A.	Boston Mills Press, Erin, Ontario, 96p., 1999
My Childhood in the Bush – Growing up in Brent on the CNR in Algonquin Provincial Park (1913-1919)	Atkins, R. with MacKay, P&D	Past Forward Heritage Limited, Toronto, 48p., 2001
Mineral Industries of Southwest Ontario – Mines, Quarries, Brine Fields and Wells	Steele, K. and Carter, T.	Field Trip Guidebook, CIM Toronto Branch, Toronto, 30p., 2003
ArcView 8 for Geoscientists	Allen, I.	Geoscience Information Services, Mount Albert, Ontario, 2003
Report of Activities 2002, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Kirkland Lake and Sudbury Districts	Meyer, G., Cosec, M., Grabowski, G.P.B., Guindon, D.L., Beauchamp, S. and Chaloux, E.C.	Ontario Geological Survey, Open File Report 6114, 72p., 2003
Report of Activities 2002, Resident Geologist Program, Red Lake Regional Resident Geologist Report: Red Lake and Kenora Districts	Lichtblau, A., Ravnaas, C., Storey, C.C., Raoul, A., Kosloski, L. and Wilson, S.	Ontario Geological Survey, Open File Report 6110, 112p., 2003
Report of Activities 2002, Resident Geologist Program, Regional Land Use Geologist Report: Northwestern, Northeastern and Southern Ontario Regions	Debicki, R.L., Drost, A.P., Hinz, P., Rowell, D.J. and Yule, G.R.	Ontario Geological Survey, Open File Report 6116, 27p., 2003
Report of Activities 2002, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report: Southeastern and Southwestern Districts, Mines and Minerals Information Centre and Petroleum Resources Centre	Sangster, P.J., McGuinty, W.J., Papertzian, V.C., Steele, K.G., Lee, C.R., Barua, M., Laidlaw, D.A. and Carter, T.R.	Ontario Geological Survey, Open File Report 6115, 118p., 2003
Report of Activities 2002, Resident Geologist Program, Thunder Bay North Regional Resident Geologist Report: Thunder Bay North District	Mason, J.K., White, G.D., O'Brien, M.S. and Komar, C.	Ontario Geological Survey, Open File Report 6111, 37p., 2003

TITLE	AUTHOR	TYPE AND YEAR OF PUBLICATION
Report of Activities 2002, Resident Geologist Program, Thunder Bay South Regional Resident Geologist Report: Thunder Bay South District	Schneiders, B.R., Scott, J.F., Smyk, M.C., and O'Brien, M.S.	Ontario Geological Survey, Open File Report 6112, 55p., 2003
Report of Activities 2002, Resident Geologist Program, Timmins Regional Resident Geologist Report: Timmins and Sault Ste. Marie Districts	Atkinson, B.T., Hailstone, M., Seim, G.Wm., Draper, D.M., Farrow, D., Hope, P. and Koroschetz, A.M.	Ontario Geological Survey, Open File Report 6113, 84p., 2003
Industrial Minerals 2003 – the Fifteenth Annual Canadian Conference on Markets for Industrial Minerals		Proceedings, Blendon Information Services, Toronto, 2003
Our Environment Your Rights		Environmental Commissioner of Ontario, CD-ROM, 2003
Aggregates and Roadbuilding		Journal, Franmore Communications Inc., Edmonton, 2003
Taxation Issues Relating to Exploration and the Restructuring of Resource Taxation	Intergovernmental Working Group on the Mineral Industry	Report, Mines Ministers' Conference, Halifax, 40p., 2003

PROPERTY EXAMINATIONS

Gold Base Occurrence—Kennebec Township

In May 2003, the Regional Resident Geologist and District Geologist accompanied property owner H. Veley on a visit to the Gold Base occurrence in Kennebec Township. A detailed history of the property including a summary of the work completed on the site is reported in the 1997 and 1998 Report of Activities, Southern Ontario Regional Resident Geologist (Southeast Ontario District). A sample collected for assay immediately east of the main showing returned a fire assay value of 1231 ppb gold from the OGS Geoscience Laboratory in Sudbury. The sample was re-assayed and returned a value of 712 ppb gold.

Canadian Soapstone—Elzevir Township

In May 2003, the District Geologist visited the Canadian Soapstone deposit with property owner K. West.

The property is located in concessions 6 and 7, lots 4 and 5 in Elzevir Township, Hastings County. Access to the property is via a side road that leads to the Hayloft campground east of the Flinton Road, which runs north from Highway 7 about a kilometer east of the junction of highways 7 and 37. The talcose rocks that host the soapstone deposit are located at the Hayloft campgrounds.

HISTORY OF THE PROPERTY

From 1883 to 1908, the talcose bedrock was quarried from several pits for the manufacture of roofing material. From 1908 to 1921, the Actinolite Mining Company, Limited of Bloomfield, New Jersey, operated the property and built a grinding plant at Actinolite where a small amount of ground roofing material was produced annually. Three of the pits were located on Lot 5, Concession 6 while another 3, including the main pit, were located on Lot 4, Concession 7, known as the Willet Farm. One other pit, the last to be worked, was located on Lot 5, Concession 7, and was know as the Erwin Farm.

The 7 small, scattered pits exploit rusty talc-dolomite schist or a similar rock mixed with greenstone (serpentine). The latter rock type is highly sheared and jointed and exhibits the development of fibrous asbestos-like actinolite along fractures. The main mass of the rock consists of a heterogeneous mixture of dolomite, talc, serpentine and actinolite, with talcose greenstone being the dominant material. In 1985 J. Byer drilled 2 diamond-drill holes for talc on the northeast corner of Lot 4, Concession 7. (LeBaron and van Haaften, 1989.)

The northeast ¼ of Lot 4, Concession 6 and the southeast ¼ of Lot 5, Concession 6, Elzevir Township, were visited by the District Geologist in May 2003. The 2 pits located on this area, which are now fairly overgrown, were dug into massive, fine-grained, dark green to black-weathered amphibolite. The surrounding intermediate to mafic intrusive country rock is composed mainly of fine- to medium-grained diorite. North of the diorite occurs massive to schistose, brown-red talcose rock with varied amounts of hematite, magnetite, carbonate, chlorite and serpentine. Fine- to medium-grained, pink to white, biotite granodiorite of the Elzevir batholith is located to the north, east and southeast of the pits. Sparse outcrops on the property make it difficult to delineate the extent of the talcose zones that contain green and grey soapstone. (C. Papertzian, personal observations, 2003)

The talc-actinolite-dolomite schist exposed in pits and outcrops may be classified as soapstone. This rock unit was visually estimated to contain between 5 to 15% talc by volume, but a thin section made from a sample collected from pit number 2 reportedly contains 40% talc (Lebaron and Van Haaften 1989). Pit number 2 is located immediately north of the Canadian Soapstone property.

The owner is currently conducting exploration to delineate the best areas for soapstone extraction. Soapstone from this site has been distributed to carvers for testing in Ontario and the USA and results have reportedly been positive.

Koizumi Mica—Kaladar

The Regional Resident Geologist and District Geologist accompanied property owner R. Guillet on a site visit in April 2003. The purpose of the visit was to collect samples of muscovite from an existing test pit. The pit is approximately 40 by 30 by 5 m, respectively, with the west wall being a shear rock face. At the time of the visit, the floor of the pit was covered by approximately 15 cm of water. The property is currently available for joint venture or option.

The property consists of 1100 acres located 70 km northwest of Kingston, some 5 km southwest of the village of Kaladar. The deposit is located in part of lots 1 to 5, concessions 4 and 5, Kaladar Township.

The property is accessible by truck via a gravel road, leading south from Highway 7, 3.5 km west of the village of Kaladar. Three hundred metres south of the highway, the road crosses the abandoned CP railway bed, now part of the Eastern Ontario Trails Association network, and continues 2.7 km south to the test pit. In the spring of 2003, this route could not be used due to washouts and flooding caused by numerous beaver dams. An alternate route further to the west along the railway bed was utilized. This road was also washed out and access for the last 400 m to the pit was on foot.

The following detailed information was derived from Open File Report 6086, *Industrial Mineral Assessment and Sampling of Mica in Central and Eastern Ontario*, by Watts, Griffis and McOuat and the Ontario Geological Survey.

> The property was first explored for muscovite in 1978 by Roger Young and Robert Guillet, who later optioned the property to Omya Inc. of Proctor, Vermont. Four diamond-drill holes were completed during 1978–79 for a total of 264 m in the area of the later test pit. Two holes were drilled on the property in lot 1, Concession 4 for a total of 131.4 m. Drill logs filed with MNDM indicate mica schist intersections of 175 feet to 195 feet in the test pit area, to a vertical depth of about 46 m.
>
> Omya Inc., of Vermont, subsequently joint ventured with Koizumi Group, of Japan, and a Canadian subsidiary, Kaladar–Aimco was formed to further explore the property.
>
> In 1982 Koizumi excavated and shipped a 5000 t sample of mica schist to Japan for testing (Kingston and Papertzian 1983). The results of this work have not been published.

In 1982, Verschuren mapped the stratigraphy of the west limb of the Clare River structure from Highway 7 to Otter Creek in an attempt to define the extent of muscovite-rich units (Verschuren 1983a, 1983b).

In 1984, two diamond drill holes totaling 403 feet (DDH 84-1 and DDH 84-2) were completed by Kaladar–Aimco about 1.5 km northeast of the test pit (Guillet and Young 1984).

In 1985, Bright mapped the Mellon Lake area at a scale of 1:15 780, which includes the Clare River structure, and the Koizumi muscovite deposit.

In 1986, the property was optioned to Lacana Mining Corp. Lacana constructed a grid, performed geological mapping and drilled 2 diamond drill holes for a total of 578 feet (176 m) (Lacana Mining Corp. 1987). The drill core section from 127 feet to 239 feet (34.1 m) from hole KMP-1-86, and the drill core section from 84 feet to 104 feet (6 m) from hole KMP-2-86 were submitted for beneficiation tests. No results of this work are available. The balance of the core, drill logs and location plan are stored in on file at the Southern Ontario Regional Resident Geologist Office in Tweed.

In 1988, the property was optioned to Steep Rock Resources Inc. Steep Rock completed 3 diamond drill holes that totaled 906 feet (276 m). The core was split and presumably submitted for beneficiation tests. The results were reported to be good, but work was discontinued owing to the purchase of Steep Rock by Pluess–Stauffer Industries Inc. (Kingston, MacKinnon and Caley 1990). Drill logs and split core samples are stored at the Ministry's drill core library in Tweed.

In 1991, the property was under option to Nanisivik Mines Ltd. from Steep Rock Resources Incorporated. Strathcona Mineral Services Limited, under contract to Nanisivik Mines Ltd., completed 68 m of diamond drilling on the property. Results of this work are on file with MNDM. (Assessment Files, MNDM, Tweed).

In 1993, the property owner reported that over $1 000 000 had been spent on the property since 1978, and that “a superior product of silvery-white muscovite with a high aspect ratio is indicated at a ratio of 4 to 1… The deposit is 50 m thick with a strike length of 2.5 km and a reserve in excess of 10 million ton is indicated to a shallow depth." (Assessment Files, MNDM, Tweed).

In 1999 the property was optioned to Highwood Resources Ltd. The company completed detailed geological mapping, a diamond drill program and collected a small bulk sample for beneficiation testing.

The property and documentation of all the work completed were returned to the owners in 2003. (R. Guillet, personal communication, April 2003)

PROPERTY GEOLOGY

A detailed description of the regional geology is provided in Open File Report 6086, *Industrial Mineral Assessment and Sampling of Mica in Central and Eastern Ontario*, by Watts, Griffis and McOuat and the Ontario Geological Survey.

The following descriptions and history of exploration outlined above have been compiled from information sources available in the public record.

Guillet and Kriens (1984) stated that, “The muscovite schist zone varies from 30 m to more than 100 m in thickness and can be traced over a length of several kilometres.” They reported a muscovite grade of “. . . about 60% muscovite.” Drill core data indicate that muscovite-rich schists extend further into the footwall west of the pit.

Drill logs provided by Lacana Mining Corp. in 1987 and 1992 indicate the following rock types from east to west (hanging wall to footwall):

- Interbedded biotite schist, epidote-chlorite schist and marble;
- Quartz-biotite-muscovite schist with minor garnet and kyanite and considerable quartz veining with minor pyrite and chalcopyrite;
- Quartz-muscovite-biotite schist with porphyroblasts of biotite and kyanite, and muscovite content estimated between 40% and 60%; and
- Quartz-muscovite-biotite schist with less muscovite, bands of biotite and extensive quartz veining.

Lacana's drill hole KMP-2-86 intersected the zone between 83.5 feet and 224.5 feet (43.0 m). The muscovite zone is described as a fine-grained homogeneous schist with 2% very fine-grained ilmenite, 60% muscovite (less than 1 mm), 35% quartz, minor biotite or phlogopite.

Diamond drill hole KMP-1-86 intersected the muscovite zone between 109.5 feet and 239.0 feet (39.5 m). The muscovite zone was logged as mineralogically more inhomogeneous. The grade of muscovite was estimated to be 40% over 40 feet within the upper part of the muscovite zone.

D. Ross Property

In September, the Regional Resident Geologist and District Geologist accompanied property holder D. Ross and Consultant G. Jones on a visit to the Ross claims in Cavendish Township. Mr. Ross is a mineral collector and prospector who has completed a systematic investigation of documented pegmatite bodies across Ontario with the goal of identifying new mineral collecting sites. Ontario Geological Survey reports and maps have been the primary source of information. Following library research, Mr. Ross completed field investigations that ultimately led him to Cavendish Township.

Ontario Geological Survey mapping (Bright 1981), identified a tourmaline-bearing pegmatite on the property. Prospecting, geological mapping, and sample collection and assays by Ross and Jones has also confirmed the presence of garnet, beryl, niobium, tantalum and anomalous values of rubidium, cerium and lanthanum.

Samples from the garnet biotite schist unit were collected during the property visit. The quality and size of the eudhedral almandine garnets may indicate potential for mineral collecting and abrasive applications.
Samples were also collected from the beryl-bearing pegmatite and have been forwarded to the OGS in Sudbury for further examination. (Assessment file 2.20579, personal observations, 2003.)

RECOMMENDATIONS FOR EXPLORATION

There are many high mineral potential areas in southeastern Ontario that remain inadequately explored despite the region's long history of mineral exploration and production. Historically, mineral exploration projects in the Grenville Province of southeastern Ontario have focused primarily on vein-hosted gold and base metal deposits. In recent decades the focus has also been placed on the search for industrial mineral deposits. Changing technology has resulted in new demand for certain commodities not previously considered to be significant. Table 9 provides a listing of known mineral deposits in southeastern Ontario that are not currently being mined. Table 10 provides a list of titanium, tantalum and rare earth element (REE) occurrences in Southern Ontario. Tables 11, 12, 13, 14 and 15 of this report record the region's historic mineral production.

Gold

Gold was first discovered in Ontario in 1866 near the community of Eldorado, north of Madoc. Between 1895 to 1908, gold production in the area peaked with 12 mines in production. In the 1930s Cominco Limited undertook extensive underground exploration at both the Cordova and Addington gold mines. By 1939 all gold production and exploration activity in the region had ceased. It was not until the late 1970s that exploration for gold recommenced in this area, mainly due to the commodity's increased price. Exploration capital raised by "flow through financing" along with new discoveries fueled renewed gold exploration activity during the 1980s. In 1990, gold exploration activity diminished once again to be revived in 1996. In 2003, renewed interest in gold exploration occurred within the Southeast District. There are a number of currently inactive gold prospects with identified resources in a variety of environments presented in Table 9. Positive results from previous exploration projects identified areas of high potential where further investigation is warranted. One such area is near Harlowe in Kennebec Township.

Harlowe Gold

In the Harlowe area, a 2 km wide belt of tightly folded mafic metavolcanic and metasedimentary rocks host a number of gold occurrences. The belt trends northeast along the margin of a granodiorite pluton. In 1990–91, Rio Algom Exploration Limited completed geological and geochemical surveys, trenching and diamond drilling on 2 blocks of patented land acquired through option agreements. The company examined previously known gold showings and identified a new occurrence. Gold values of up to 32g/t but more commonly 10g/t were returned from surface sampling. Drill core and logs from the program are on file with the Tweed RGP office. Further examination of this area to evaluate its potential is recommended. (LeBaron 1991, MDI Files Tweed RGO, Drill Core Library Files Tweed RGO.)

Mineral Abrasives

The coating and surface preparation industries are moving away from silica sand in favour of non-silica and recyclable products. Significant growth is expected in recyclable products in the next 8 to 10 years.

Historically, southeastern Ontario saw production of a variety of abrasives including corundum, garnet and emery. At the peak of production in 1906, Ontario supplied 82% of the world's corundum. Subsequently, many of these abrasives were replaced by silica and synthetic materials. New health and safety regulations recognize hazard and control the use of free silica in abrasive products and compounds.

There is a demand for alternate natural abrasives including corundum, garnet and staurolite. Mineral deposit inventory records on file with the Tweed RGO office document 20 garnet occurrences and 25 corundum occurrences, including past producers with identified resources. These are worthy of further investigation. In the 1980's during research and geological mapping completed as part of a refractory mineral project, the Tweed RGP office identified a large area of staurolite mineralization near Ferleigh. These results remain unpublished. Investigation of this area as a potential source of staurolite is recommended. (C. Verschuren, personal communications, February 2004, Grundy and Klynstra, 2003, Tweed RGO unpublished reports)

Table 9. Mineral Deposits Not Currently Being Mined 2003—Southern Ontario Regional Resident Geologist (Southeast)*.
Table legend: MDI = Mineral Deposit Inventory; I = Inactive; A = Active.

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 oz/ton Au, 5.64 oz/ton Ag, 2.0% Zn and 1.0% Pb	MDC 12 p132 MDC 18 p33
Macassa Nickel Limerick Township	MDI31C13SE-00099 (SO 0595)	I	Ni ,Cu	2 000 000 tons @ 1.0% Ni, 0.25% Cu	MDC 12 p138
Renfrew Zinc (Renprior) Admaston Township	MDI31F07NE-00063 (SO 0286)	A	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 p226 MDC 20 p17
Harvey Simon Prospect Lyndoch Township	MDI31F03NW-00044 (SO 0259)	I	Cu, Fe, Zn	250 000 tons @ 1.1% Cu to 350 feet	MDC 12 p226 MDC 20 p45
Clyde Forks Deposit Lavant Township	MDI31F02SE-00064 (SO 0351)	I	Cu, Sb, Ag, Hg	60 000 tons @ 0.67% Cu, 0.37.0% Sb, 0.03% Hg and 1.32 oz/ton Ag	MDC 20 p36
Twin Lakes Diorite Methuen Township	MDI31C12NW-00114 (SO 3840)	I	Ti	13.2 million t of 21.7% TiO2, recoverable from open pit to a depth of 165 m, with rock : ore ratio = 0 : 54	CIM Bulletin, Vol. 83, No. 934, p99

Deposit/Township	MDI File Number	Status	Commodity	Reserves**	Reserve Reference
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 p98
Radenhurst-Caldwell Deposit Lavant Township	MDI31F02NE-00012 (SO 0349)	I	Fe	Main lens 2000 feet long by 31.3 feet wide; contains 6 500 tons per slope foot at a grade of 32.77% Fe; 3 additional zones totaling 1600 feet in length average 17%, 16.7% and 25.5% Fe respectively	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 p110
Childs Deposit Mayo Township	MDI31F04SE-00013 (SO 0236)	I	Fe	6 193 330 tons @ 19.25% recoverable Fe	MDC 20 p114
Tomclid Magnetite South Canonto Township	MDI31F02SW-00032 (SO0282)	I	Fe	1993 published reserves estimated at 3 million t averaging 40% Fe; reserve estimate has not been adjusted to reflect production from the deposit in late-1990s	MP 161 p377
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 p314
Buckhorn Deposit Bagot Township	MDI31F07NE-00069 (SO0362)	I	Mo	Largest of numerous small lenses contains 1500 tons @ 1% MoS_2	MDC 20 p132
Bannockburn (Madoc Mining Company Ltd.) Madoc Township	MDI31C12NE-00195 (SO 7274)	I	Au	225 000 tons grading 0.267 oz/ton Au	MP 161 p.377
Cooper Spruce Ridge Resources Ltd. Elzevir Township	MDI31C11SW-00044 (SO 2679)	I	Au, Talc	3 million t @ 30-33% recoverable talc and 40 000 t @ 8.0 gpt Au	OFR 5945 p.92 OFR 5808 p.79
Dingman Deposit Deloro Minerals Ltd. Marmora Township	MDI31C12SE-00040 (SO 3590)	A	Au	7 million t @ 1.8 gpt Au	OFR 5958 p11-13
Hawley Ram Petroleum Limited Olden Township	MDI31C10NW-00117 (SO 4057)	A	Wollastonite	2.5 million t @ 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 million t 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 million t grading 9.5% graphite in 2 separate zones	MDC 33 p16
Cal Graphite Corp. Butt Township	MDI31E11NE-00004 (N0129)	I	Graphite	Reserves of 60 million t grading 3% graphitic carbon	MDC 33 p10

Deposit/Township	MDI File Number	Status	Commodity	Reserves**	Reserve Reference
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 p25
St. Lawrence Pacific Coast Mines Inc. Pittsburgh Township	MDI31C08NW-00058 (SO 8487)	I	Wollastonite	9-11 million t @ 43% wollastonite; 4-5 million t @ 34% wollastonite	MNDM www 1997

**Table does not include nepheline syenite, trap rock, REE and dimension stone deposits.*

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

Abbreviations: gpt = grams per ton.

Table 10. Titanium, Tantalum, REE Occurrences Compiled from MDI-2 Database—Southern Ontario Regional Resident Geologist (Southeast).

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

Name	Township	MDI File #	Commodity	Deposit Status
East Rockingham	Brudenell	MDI31F06NW00085	Au, Ti	Occurrence
South Lamberts	Griffith	MDI31F06SE00161	Ti	Occurrence
Horton Tp., 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
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

Name	Township	MDI File #	Commodity	Deposit Status
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. Hard copies of these complete MDI files are located at RGP office in Tweed.

Table 11. Historic Production of Gold – Southern Ontario Regional Resident Geologist (Southeast).

Mine	Township	Operating Years	Tons Milled	Ounces Produced	Grade (oz/ton)
Big Dipper	Barrie	1907-09	52	17	0.33
Cook	Marmora	1901-04	1 483	289	0.26
Cordova	Belmont	1892	120 670	22 774	0.19
Craig	Tudor	1905-06	1 850	248	0.13
Deloro	Marmora	1897-02	39 143	10 360	0.26
Gatling 5 Acre	Marmora	1900-03	6 114	2353	0.38
Gilmour	Grimsthorpe	1909-10	550	172	0.31
Golden Fleece	Kaladar	1919-22	Unknown	480	Unknown
Ledyard	Belmont	1893-94	55	13	0.24
Pearce	Marmora	1893-08	239	302	1.26
Richardson	Madoc	1866-1868	Unknown	75 to 100 oz.	0.408
Sophia	Madoc	1900-41	1 800	110	0.06
Sovereign	Marmora	1878	Unknown	970	Unknown
		1892-1900	1 962	370	0.19
Star of the East	Barrie	1905-07	976	134	0.14
		Total	174 894	38 592	

Table 12. Historic Production of Copper, Lead, Zinc—Southern Ontario Regional Resident Geologist (Southeast).

Mine	Tp.	Operating	Tons Milled	Production
Kingdon	Fitzroy	1884–85, 1914–31	905 000	76 821409 lbs Pb conc.; 857 312 lbs Zn conc.; 60 074 072 lbs Pb rec
Long Lake	Olden	1897–25, 1973–74	3442 , NA	$41 550 ore value, 9467 tons Zn valued at $1 227 000
Eldorado Copper	Madoc	1906	NA	234 000 lbs Cu matte containing 230 oz Au, 182 oz Ag, 109 000 lbs Cu
Hollandia Lead	Madoc	1903–06	NA	2 653 365 lbs Pb

Table 13. Historic Production of Iron—Southern Ontario Regional Resident Geologist (Southeast).

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	1880–90	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	1866–71	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, 1950–57	2096	50.9
Wilbur	Lavant	Pre 1900, 1907–8	146 892	56.69
Magnetawan	Lount	1910–1912	6000	59.55
Paxton	Lutterworth	Before 1910	1000	NA
Miller	Madoc	1899	6823	NA
Wallbridge	Madoc	1900–01, 1919, 1921	3421	NA
Marmoraton	Marmora	1952–1978	28 000 000	40
Bessemer	Mayo	1902–13	99 613	42.18
Childs	Mayo	1913	9649	38.7
McNab	McNab	1873–74	15 000	68
Robertsville & Mary	Palmerston	1895, 1900–1, 1918–9	13 477	70.5
Fournier	S. Sherbrooke	1873	600	60
Howland	Snowdon	1880–2	1500	58
Victoria	Snowdon	1882	?	58.35
Dog Lake	Storrington	1899	600	51.12
St. Charles	Tudor	1900–02	5186	57-60
Coe Hill	Wollaston	1884–1914	100 000	51.4
Total			28 841 914	

Table 14. Historic Production of Fluorite – Southern Ontario Regional Resident Geologist (Southeast).

Mine	MDI Number	Township	Operating Years	Total Production (Tons)
Bailey	31C06NW00003	Madoc	1907, 1916, 1917, 1944–50	25 000
Blakely	31C06NW00019	Huntingdon	1918–20, 1928, 1941–47	5026
Coe	31C06NW00008	Huntingdon	1941–42	114
Dwyer	31E01SE00091	Cardiff	1918–20, 1943, 1944	97
Herrington South	31C05NE00009	Huntingdon	1917	13
Howard, Fred Hill	31C06NW00014	Huntingdon	1918, 1920, 1929, 1940–42, 1944	2500

Mine	MDI Number	Township	Operating Years	Total Production (Tons)
Johnston	31C06NW00013	Huntingdon	1943, 1944–47, 1949	187
Keene	31C06NW00004	Huntingdon	1918–19, 1943, 1944, 1950	5000
Kilpatrick	31C06NW00005	Huntingdon	1944, 1953–1959	11 566
Lee Junior	31C05NE00008	Madoc	1917, 1940, 1943–45	2000
Lee Senior	31C05NE00006	Madoc	1916–1918, 1942, 1943	1600
McIlroy	31C05NE00003	Madoc	1917–18, 1923, 1944	540
Miller	31C05NE00005	Madoc	1917–1919	460
Noyes	31C06NW00011	Huntingdon	1917–20, 1941–43	25 000
Palmateer	31C06NW00016	Huntingdon	1942	44
Perry	31C06NW00009	Huntingdon	1915–20, 1941–43	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	1916–18	100
South Reynolds	31C06NW00010	Huntingdon	1917–18, 1943	100
Wallbridge & Herrington	31C05NE00007	Madoc	1920–1922, 1941–1943	6600
William Reynolds	31C12SE00002	Madoc	1941–42	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 (G. Guillet, IMR 12, p.1).

OGS ACTIVITIES

There were no OGS Precambrian or Sedimentary Geoscience sections field projects in the District during 2003.

Table 15. Publications of Ontario Geological Survey Activities 2003 - Southern Regional Resident Geologist (Southeast).

Title	Author	Type and Year of Publication
Investigation of Mafic-Ultramafic Intrusions in Ontario and Implications for Platinum Group Element Mineralization: Operation Treasure Hunt	Vaillancourt, C., Sproule, R.A., MacDonald, C.A. and Lesher, C.M.	Ontario Geological Survey, Open File Report 6102, 335p., 2003
Report of Activities 2002, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report: Southeastern and Southwestern Districts, Mines and Minerals Information Centre, and Petroleum Resources Centre	Sangster, P.J., McGuinty, W.J., Papertzian, V.C., Steele, K.G., Lee, C.R., Barua M., Laidlaw, D.A. and Carter, T.R.	Ontario Geological Survey, Open File Report 6115, 2003
Report of Activities 2002, Resident Geologist Program, Regional Land Use Geologist Report: Northwestern, Northeastern and Southern Ontario Regions	Debicki, R.L., Drost, A.P., Hinz, P., Rowell, D.J. and Yule, G.R.	Ontario Geological Survey, Open File Report 6116, 27p, 2003

Title	Author	Type and Year of Publication
Precambrian Geology, Kawagama Lake Area	Lumbers, S.B. and Vertolli, V.M.	Ontario Geological Survey, Preliminary Map P.3525, scale 1:50 000, 2003
Precambrian Geology, Wilberforce Area	Lumbers, S.B. and Vertolli, V.M.	Ontario Geological Survey, Preliminary Map P.3526, scale 1:50 000, 2003
Ontario Airborne Magnetic and Electromagnetic Surveys, Processed Data and Derived Products: Archean and Proterozoic "Greenstone" Belts	Ontario Geological Survey	Ontario Geological Survey, ERLIS Dataset 1038, CD-ROM, 2003
1:250 000 Scale Bedrock Geology of Ontario	Precambrian Geoscience Section	Ontario Geological Survey, Miscellaneous Release—Data 126, CD-ROM, 2003
Surficial Geology of Southern Ontario	Sedimentary Geoscience Section	Ontario Geological Survey, Miscellaneous Release—Data 128, 2 CD-ROMs, 2003
Summary of Field Work and Other Activities 2003, Ontario Geological Survey	Baker, C.L., Kelly, R.I., Parker, J.R., Ayer, J.A. and Easton, R.M. (eds)	Ontario Geological Survey, Open File Report 6120, 411p, 2003

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Ontario

Ontario Geological Survey
Resident Geologist Program

Southern Ontario Regional Resident Geologist (Southwest Ontario District and Mines and Minerals Information Centre)–2003

by

D. Farrow, M. Barua, D. Hemmings and C. Lee

2004

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D. Farrow[1], M. Barua[2], C. Lee[3] and D. Hemmings[4]

[1]District Geologist (Acting), Southwest Ontario District, Ontario Geological Survey

[2]District Support Geologist, Southwest Ontario District, Ontario Geological Survey

[3]Regional Support Geologist, MMIC, Ontario Geological Survey

[4]Geological Assistant, MMIC, Ontario Geological Survey

INTRODUCTION

The Mines and Minerals Information Centre (MMIC) and the Southwest Ontario District Geologist's Office are located at 900 Bay Street in room M2-17, Macdonald Block, Queen's Park, Toronto. The MMIC is an information, research and sales office for the Mines and Minerals Division (MMD) of the Ministry of Northern Development and Mines (MNDM). The Southwest Ontario District Geologist's Office, a division of the Resident Geologist Program, provides geological expertise and assistance to the mining, consulting, academic, land use planning and exploration communities, and various earth science-related services to the general public.

The Centre offers geological information and research materials, advisory services and expertise on Ontario's geology, mineral industries, and provincial regulations. Staff also provide assistance and referral for clients who seek information concerning Ontario's Mining Act, and pertinent information administered and maintained by other ministries such as soils (Ontario Ministry of Agriculture, Food, and Rural Affairs—OMAFRA), oil and gas, pits and quarries, and aggregates (Ministry of Natural Resources—MNR).

Four mines, 40 quarries and 3 brine fields extracted industrial minerals, non-aggregate stone and dimension stone throughout the year (Figure 1). These operations, including on-site processing facilities, employed approximately 3000 people in southwestern Ontario.

All Ontario production of salt, gypsum/wallboard, natural gas and petroleum, and most of the province's production of shale/brick, lime/dolime, sand and gravel, cement and stone comes from the Southwest Ontario District. Market demand for clay brick, cement, dimension stone and aggregate was very strong during 2003. Table 1 lists selected industrial mineral and fuel production in Ontario for 2000 to 2002.

Exploration, advanced exploration and development in the Southwest Ontario District maintained a healthy level of activity in 2003. The search for undiscovered deposits of dimension/landscape stone, cement stone, high-calcium limestone, aggregate, shale/brick, zinc and other commodities should result in new quarries and/or mines coming into production in the future.

Figure 1. Producing mines and quarries—Southwest Ontario District, 2003.

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.	Georgia Pacific Canada Inc., Caledonia No. 3 Mine, Caledonia	gypsum
4.	CGC Inc., Hagersville Mine, Hagersville	gypsum

Producing Quarries – Cement

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

Producing Quarries – Brick Products

9.	Brampton Brick Ltd., Cheltenham Quarry, Chinguacousy Tp.	shale
10.	Century Brick, Georgetown Quarry, Esquesing Tp.	shale
11.	Hanson Canada Brick, Milton Quarry, Esquesing Tp.	shale
12.	Hanson Canada Brick, Burlington Quarry, Burlington	shale
13.	Hanson Canada Brick, Aldershot Quarry, Burlington	shale
14.	George Coultis and Son Ltd., Thedford Quarry, Bosanquet Tp.	shale

Producing Quarries – Chemical, Metallurgical, and Filler Stone Products

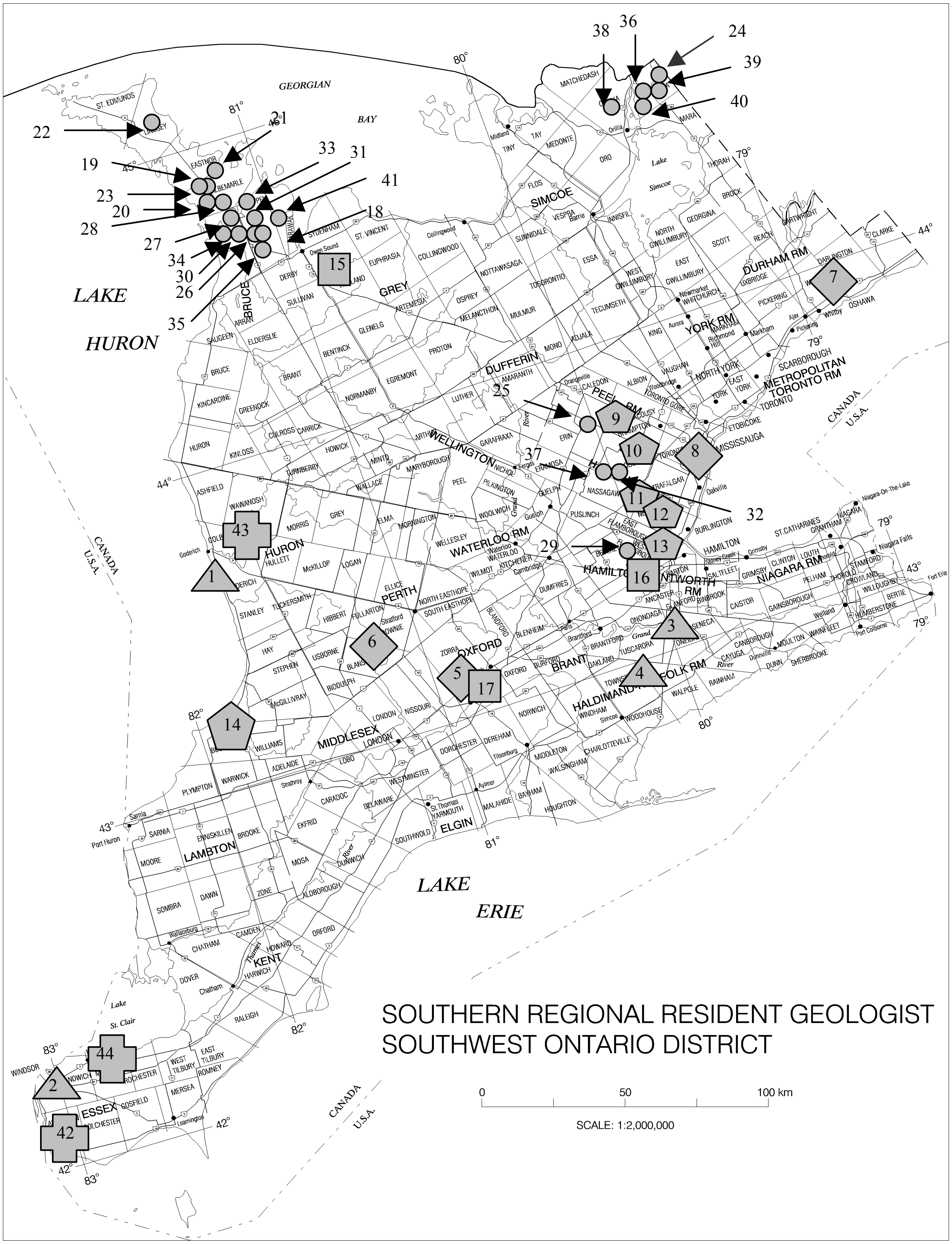
15.	E.C. King Contracting Ltd., Sydenham Quarry, Sydenham Tp.	dolostone
16.	Lafarge Canada Inc., Dundas Quarry, West Flamborough Tp.	dolostone
17.	Carmeuse Lime (Beachville) Ltd., Centre Quarry, Zorra Tp.	limestone

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.	Ebel Quarries Inc., Ebel Quarry, Amabel Tp.	dolostone
27.	Ebel Quarries Inc., Arnold Property Quarry, Amabel Tp.	dolostone
28.	Eisen Quarries Inc., Wiarton Quarry, Amabel Tp.	dolostone
29.	Flamboro Quarries Ltd., Flamboro Quarry, West Flamborough Tp.	dolostone
30.	Georgian Bay Marble and Stone, Wiarton Quarry, Amabel Tp.	dolostone
31.	Georgian Bay Marble and Stone, Cook Quarry, Amabel Tp.	dolostone
32.	Hilltop Stone and Supply Inc., Hilltop Quarry, Esquesing Tp.	sandstone
33.	Owen Sound Ledgerock Ltd., Senesun Quarry, Amabel Tp.	dolostone
34.	Owen Sound Ledgerock Ltd., Wiarton Quarry, Amabel Tp.	dolostone
35.	Owen Sound Ledgerock Ltd., Owen Sound Quarry, Keppel Tp.	dolostone
36.	Rama Stone Quarries Ltd., Fleming Quarry, Rama Tp.	gneiss
37.	Rice and McHarg Ltd., Rice and McHarg Quarry, Esquesing Tp.	sandstone
38.	Rockleith Quarry Ltd., Rockleith Quarry, Orillia Tp.	limestone
39.	Speiran Quarries Ltd., Speiran Quarry, Rama Tp.	limestone
40.	Stone Cottage Inn Ltd., Attia Quarry, Rama Tp.	dolostone
41.	Wiarton Stone Quarry Inc., Wiarton Stone Quarry, Amabel Tp.	dolostone

Producing Brine Well Fields – Salt

42.	General Chemical Canada Ltd., Anderdon Brine Field, Anderdon Tp.	salt in brine
43.	Sifto Canada Inc., Goderich Brine Field, Goderich	salt in brine
44.	The Canadian Salt Company Ltd., Windsor Brine Field, Windsor	salt in brine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SOUTHWEST ONTARIO DISTRICT
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Lake Simcoe
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GREY
BRUCE
DUFFERIN
WELLINGTON
HURON
PERTH
WATERLOO RM
OXFORD
BRANT
MIDDLESEX
ELGIN
LAMBTON
KENT
ESSEX
DURHAM RM
YORK RM
METROPOLITAN TORONTO RM
NIAGARA RM
HAMILTON-WENTWORTH RM

Table 1. Selected industrial mineral and fuel production in Ontario, 2000-2002.

Year	2000	2000	2001	2001	2002p	2002p
Unit	**Tonnes**	**$ x 1000**	**Tonnes**	**$ x 1000**	**Tonnes**	**$ x 1000**
Non-metals						
Gypsum (1)	913 000	18 087	913 000	15 840	971 000	16 853
Salt (1)	7 237 000	212 215	8 473 000	288 967	8 720 000	297 391
Total, Non-metals		**401 055ə**		**455 885ə**		**467 867ə**
Structural Materials*						
Clay products	na	134 033	na	155 061	na	192 531
Cement	5 344	507 182	5 696	546 349	5 615	552 438
Lime	1 293	115 280	1 067	96 849	1 118	103 876
Sand and Gravel	99 848	395 832	96 466	390 272	98 979	438 239
Stone	56 272	434 935	60 918	474 267	55 633	514 805
Total, Structural Materials		**1 626 482ə**		**1 660 309ə**		**1 766 744ə**
Total, Industrial Minerals		**2 027 537**		**2 116 194**		**2 234 611**
Fuels	**Volume - m^3**	**Value - $**	**Volume - m^3**	**Value - $**	**Volume - m^3**	**Value - $**
Natural Gas (1)	580 000	94 157 000	352 000	69 428 000	373 000	51 105 000
Petroleum (1)	231 000	61 908 000	259 000	61 057 000	226 000	55 165 000
Total, Fuels	**811 000**	**156 065 000**	**611 000**	**130 485 000**	**599 000**	**106 270 000**

after Ontario Mineral and Exploration Statistics 2002, MNDM 2003.
(1) all production from Southwest Ontario District
p preliminary data
na data not available
ə total includes other minerals, such as nepheline syenite, barite, silica and smelter gas sulphur, etc.
* 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

MINING ACTIVITY

All of the province's salt, gypsum, natural gas and petroleum production, almost all of the clay/shale products and lime production, as well as a large percentage of the cement, sand and gravel, and stone production comes from the Southwest Ontario District. The locations of all active mineral extraction operations in southwest Ontario are shown on Figure 1 (operations that extract construction aggregate, natural gas or petroleum are not included). The mines, quarries and brine well fields listed extract a variety of commodities for numerous end products, including salt (road salt, chemicals, food), gypsum (wallboard), limestone (lime, cement, glass, steel, building stone), shale (cement, bricks), dolostone (chemicals, glass, steel, building stone), sandstone (building stone) and gneiss (building stone, speciality aggregate).

Reported production figures for the 2 underground salt mines and 2 underground gypsum mines operating in the Southwest Ontario District are presented in Table 2.

All of the province's oil and gas production occurs in the Southwest Ontario District. For information on oil and gas exploration and development activity in Ontario in 2003, please refer to the report of the Petroleum Resources Centre, this volume.

Table 2. Salt and gypsum mine production and reserves in the Southwest Ontario District.

Mine	2003 Production Tonnage @ Grade	2002 Production Tonnage @ Grade	2001 Production Tonnage @ Grade	2000 Production Tonnage @ Grade	1999 Production Tonnage @ Grade	Reserves at end of 2003 Tonnage @ Grade
Caledonia No. 3 Mine	271 376 t @ 75-80% gypsum	274 264 t @ 75-80% gypsum	272 240 t @ 75-80% gypsum	287 000 t @ 75-80% gypsum	418 000 t @ 75-80% gypsum	38 629 000 t @70-75% gypsum
Hagersville Mine	700 000 t @ 85% gypsum	690 000 t @ 85% gypsum	700 000 t @ 85% gypsum	700 000 t @ 85% gypsum	725 000 t @ 85% gypsum	10 200 000 t @ 85% gypsum
Goderich Mine	6 008 000 t @ 97% NaCl	5 082 000 t @ 97% NaCl	6 002 000 t @ 97% NaCl	4 200 000 t @ 97% NaCl	4 750 000 t @ 97% NaCl	343 992 000 t @ 97% NaCl
Ojibway Mine	2 712 000 t @ 97% NaCl	2 302 000 t @ 97% NaCl	2 600 000 t @ 97% NaCl	2 350 000 t @ 97% NaCl	2 436 000 t @ 97% NaCl	81 588 000 t @ 97% NaCl

PRODUCERS AND RECENT DEVELOPMENTS

Salt

In 2003, three companies extracted salt in Ontario. Sifto Canada Inc., in Goderich and The Canadian Salt Company Limited, in Windsor, continued to operate both rock salt mines and brine well fields. General Chemical Canada Limited operated, in a limited manner, a brine well field south of Windsor near Amherstburg.

Compass Minerals Group Inc., the parent company of Sifto Canada Inc., is the second largest producer of salt and the largest producer of concentrated phosphates in North America and the largest producer of salt in the UK. Rohm and Haas Co., the parent company of The Canadian Salt Company Limited, is the largest producer of salt in North America (Blendon Information Services, April 2002).

Ontario rock salt production in 2003, at 8.7 Mt, was higher than production in 2002 (Table 2). Both the Ojibway and Goderich mines achieved record production levels in 2003 (J.Vincent, The Canadian Salt Company Ltd. and K. Cassidy, Sifto Canada Inc., personal communication, February 2004). Winter weather conditions of 2003-2004 suggest that rock salt production will be up again in 2004.

In the past year, demand for general trade salt remained strong and production from brine at Goderich and Windsor continued at plant capacities. In 2002, Sifto Canada Inc. significantly increased production capacity at its Goderich Evaporation Plant through the addition of a fifth evaporator at a cost of $1.8 million. The increased capacity upped production to approximately 135 000 t in 2003 (F. D'Entremont, February 2004). Compass Minerals Group, including Sifto Canada, is now concentrating its marketing efforts on higher value-added applications in water conditioning and agriculture. The Canadian Salt Co. Windsor brine field produced approximately 200 000 t in 2003 (G. Sutherland, February 2004).

The salt extraction and processing industry employed approximately 775 workers in southwestern Ontario in 2003.

Gypsum

In 2003, gypsum was mined at Caledonia by Georgia-Pacific Canada Inc. and at Hagersville by CGC Inc. Both operations have on-site wallboard manufacturing facilities. BPB Westroc Inc. operates a wallboard facility in Mississauga, using flue gas desulphurization (FGD) gypsum supplied by Ontario Power Generation and other sources. All gypsum mines and wallboard manufacturing operations are within the Southwest Ontario District (Figure 1).

In Canada, particularly in southern Ontario, the demand for wallboard remains strong in the residential and renovation sectors. Total gypsum extraction in 2003 was 971 000 tonnes. This production level has been maintained for the past four years (Table 2).

CGC Inc., Ontario's largest miner of gypsum and manufacturer of drywall, increased its 2003 third quarter operating profit from US$7 million to US$11 million on a US$13 million increase in net sales to US$69 million. The improvement is attributed to higher shipments of sheetrock and a strong Canadian dollar (Blendon Information Services, November 2003).

BPB Westroc also enjoyed a robust construction market in 2002/03 with the housing market continuing to benefit from lower interest rates. Through its acquisition of James Hardie Gypsum, BPB's wallboard sales increased by 76% in the year, doubling its share of the North American market to about 16% (Blendon Information Services, June 2003).

Ontario gypsum mines and on-site wallboard manufacturing plants employed approximately 540 personnel in 2003.

Cement

Five cement plants, 3 limestone quarries and 1 shale quarry are located in southwestern Ontario. St. Marys Cement Inc. operates limestone quarry and cement plant complexes at Bowmanville and St. Marys. Lafarge Canada Inc. operates a limestone quarry and cement plant near Woodstock. St. Lawrence Cement Inc. operates a cement plant and adjacent shale quarry in Mississauga. Limestone is shipped to this plant from the company's Ogden Point quarry in southeastern Ontario. Federal White Cement Ltd. operates a specialized product cement plant near Woodstock using limestone purchased from a local quarry.

Cement production levels remained high in 2003 in response to continuing strong demand in the southern Ontario and US Great Lakes markets. Total cement production from Southwest Ontario District plants is estimated at over 5.6 million tonnes in 2003. This represents an increase of 22% over 2002 production (Natural Resources Canada, 2003).

Votorantim Group, one of the largest private industrial conglomerates in Brazil, continues to operate its Ontario plants under the St. Marys Cement Inc. name. With assets that include 2 cement plants and several concrete and aggregate facilities in Ontario, St. Marys Cement Inc. holds 10% of the Canadian cement market. The company owns 9 cement distribution terminals in the Great Lakes region (US and Canada) which are supplied with cement produced at the Bowmanville, Ontario plant by ships belonging to St. Mary's (Votorantim news release, September 23, 2003).

Early in 2003, St. Lawrence Cement Inc. acquired the assets of Flamboro Quarries Ltd. of Hamilton, Ontario. The main asset is the Flamboro Quarry, which produces architectural landscape stone and construction aggregates. The quarry has reserves of 50-60 Mt and annual production of 600 000-700 000 tonnes. The acquisition will allow the company to expand its construction aggregates business into the Hamilton-Niagara region (Blendon Information Services, May 2003).

Cement quarries and plants employed approximately 640 Ontario residents in 2003.

Clay / Shale Products

Southwest Ontario contributes 95% of Ontario's brick production. In 2003, four companies extracted shale from 6 quarries in southwest Ontario for heavy clay products, supplying 7 brick and tile manufacturing operations within the District. Two large operators, Hanson Canada Brick and Brampton Brick, administer both quarrying and manufacturing facilities. One smaller operator, Century Brick, also has both quarrying and manufacturing facilities. These companies extract Queenston shale in the area between north Brampton and Hamilton. A small quarry operated by George Coultis & Son Ltd. near Thedford, Ontario, supplied shale to Paisley Brick and Tile Co. and Norwich Brick and Tile. Arkona Formation shale forms the resource rock at the Thedford Quarry.

Increased production in recent years reflects new investments to increase manufacturing capacity, driven by the strong demand for brick, particularly in the residential construction market in southern Ontario. Demand for brick products continues to be very strong across North America.

Brampton Brick is Canada's second largest manufacturer of clay brick and also holds a 38.2% equity investment in the largest producer of concrete block in Ontario. The Company's products are used for residential construction and industrial, commercial and institutional building projects. A subsidiary, Oaks Concrete Products Ltd., manufactures concrete paving stones, retaining walls and enviro-products. Early in 2003, the company invested $4 million in kiln repairs, a move which is expected to extend the useful life of its kilns by about 10 years and increase throughput by 8% with very little increase in natural gas consumption (Brampton Brick Press Release, May 2, 2003).

Hanson Canada Brick's Aldershot quarry and brick plant uses four industrial robots, each capable of setting 5 760 brick units per hour. In 2003, it produced over 100 million brick units, enough to build 10 000 new homes. The plant location in the west end of Burlington is directly beside the quarry, where 125 t of Queenston shale are extracted each hour. At current brick manufacturing rates, the quarry contains resources to meet production needs for the next 40 years. A limestone scrubbing system, in combination with recycling techniques, minimizes waste and assures that the plant meets the highest environmental standards and government regulations.

Urban expansion of the Greater Toronto Area threatens long-term development of the brick industry in Ontario, occupying areas containing increasingly scarce, accessible Queenston shale resources.

Shale quarries and brickmaking plants provided approximately 400 jobs in southwestern Ontario in 2003.

Chemical, Metallurgical and Filler Limestone and Dolostone

Ontario's lime industry is primarily situated in the Southwest Ontario District. Within the District in 2003, three quarrying operations extracted limestone or dolostone for use in the lime, chemical, metallurgical and filler products industries. Southwestern Ontario limestone is also sold for aglime, aggregate, landscaping and engineering uses. Carmeuse Lime (Beachville) Ltd., located between Woodstock and Ingersoll, produces high-calcium lime from Devonian Lucas Formation limestone. Carmeuse Lime (Dundas) Ltd. produces dolomitic lime or dolime from Silurian Guelph Formation rock purchased from the adjacent Dundas Quarry of Lafarge Canada Inc. This quarry is one of only three producers of refractory-grade dolomite in North America. E. C. King Contracting extracts glass-grade dolostone from the Silurian Amabel Formation at the Sydenham Quarry near Owen Sound.

Lime and dolime production has been reduced over the past several years due to less demand for product from the steel making industry, generally less marked in Canada than in the United States. Though the steel industry is still the dominant market for high-purity limestone and dolostone products, sales into other markets and uses are gaining ground. Float glass use is growing above general economic growth rates as a result of strong construction and automotive markets. Float glass plants and projects therefore represent attractive potential for raw dolostone.

Ground calcium carbonate (GCC) is one of the most widely used industrial minerals for a number of applications, due to characteristics such as widespread availability, low cost, good white colour, low oil absorption, and a wide range of particle sizes. It has become an increasingly important functional additive in product formulations as processing techniques have improved quality. In North America, the construction and automotive markets drive the

functional filler industry. Carmeuse Lime (Beachville) Ltd. produces GCC and lime used in various industries, including paper, plastics, and rubber, as well as chemical, construction, fertilizers, glass and metallurgy.

The investment in flue gas desulfurization (FGD) technologies to remove SO_2 from power plant exhausts is already sizeable in the United States and is expected to rise significantly. It is estimated that power plant operators in North America will order FGD systems costing over US $30 billion in the next 7 years. As a result, requirements for limestone, lime and other reagents will steadily increase. The bulk of the systems in operation and those built in the future will use high-purity limestone. World-wide consumption of limestone and lime for FGD is forecast to exceed 40 million tpa by 2010. The FGD market represents an important strategic focus for limestone and lime producers in Ontario (*Industrial Minerals*, November 2002).

At Carmeuse Lime (Beachville) Ltd., the valuable limestone deposit is covered by up to 25 m of overburden as well as a layer of weathered cap rock. Each year about 750 000 m^3 of overburden has to be moved to allow a similar volume of rock to be mined. This one-to-one ratio would be prohibitively expensive in most situations, but at Beachville the stripping process incorporates the extraction of commercial quantities of sand, gravel and armour stone. Stripping continues until a 1.5-m bench of thinly bedded cap rock overlying the main limestone bench is exposed. The high silica content of the cap rock rules out its use in metallurgical applications, but it is in strong demand for construction applications such as decorative landscaping, retaining walls and erosion control, with annual production exceeding 200 000 tonnes.

Quarries extracting limestone or dolostone for use in the lime, chemical, metallurgical and filler products industries, and associated on-site processing plants, employed approximately 200 people in southwestern Ontario in 2003.

Dimension / Building Stone

In 2003 in the Southwest Ontario District, materials for dimension, building and landscape stone uses were extracted from 24 quarries operated by 18 companies (see Figure 1). A limited 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 Canada and the United States, with additional product being shipped farther afield.

Quarries extracting limestone, dolostone, sandstone and gneiss for dimension, building and landscape stone use, and associated on-site processing plants, employed approximately 455 people in southwestern Ontario in 2003, including 410 in the Owen Sound – Wiarton area (personal communication with all quarry owner/operators, 2002-2003).

WIARTON AREA QUARRIES

The largest concentration of stone producers in the Southwest Ontario District is in the Wiarton area, where 13 operations extracted Eramosa Member dolostone for building stone, landscaping and flag stone markets, and 2 operations quarried other stone types.

Owen Sound Ledgerock Limited

Owen Sound Ledgerock Ltd., the largest stone quarrying and processing operation in Ontario, cut and polished Eramosa Marble dimension stone using over 100 large-format stone-cutting machines. The source rock for Eramosa Marble is dolostone from the Eramosa Member of the Guelph Formation.

The company continues to import blocks for processing. In 2003, approximately $1 million worth of raw limestone blocks were purchased from Indiana. Owen Sound Ledgerock has shifted more of its attention to the Indiana cut stone markets both domestically and in the United States, a decisive market departure from processing locally quarried cut stone. Recent Ontario examples of Indiana limestone use are the Magna Corporation Golf Course Club House in Aurora, and the Grand River Cancer Centre in Kitchener.

Several construction projects begun or completed during 2003 highlight Owen Sound Ledgerock's diverse capabilities, including the Canadian Embassy in Berlin, Germany. The first installment of Eramosa marble wall panels was shipped overseas in November, with 3 more allotments to follow. Other projects include the Schulich School of Business building at York University, which required 40 000 square feet of facing using panels of Algonquin limestone from the company's quarry in Wiarton, stone for the London Cancer Clinic and the planned Grey County Visitor Centre, which will feature wallstone and flagstone from Ledgerock's Owen Sound quarry.

In 2002, Owen Sound Ledgerock started a major upgrade to processing equipment. The company has opened a new business line with a "Terzzago" tile line purchased from Italy, to which a new saw has been added in 2003. A large dome building has been erected on the Owen Sound property to house a marble tile line and a sandblast / new bush hammering line on the other side of the building. The new facility is now fully operational, with marketing plans for processing stone types from other regions of Ontario.

Owen Sound Ledgerock reports that business continued to prosper in 2003, enhanced by good response from both European and United States contacts achieved during their participation in StoneExpo 2003, held in Atlanta, Georgia. The Company has strengthened its cut stone position in the market and looks forward to expanding markets in 2004 (S. McCallum, Owen Sound Ledgerock Ltd., personal communication, February 2004).

Other Wiarton Area Quarries

Ebel Quarries Inc. extracted quarry blocks from the Eramosa Member of the Guelph Formation at the Ebel Quarry, in addition to other Eramosa Member material for building and landscape stone products. The company's Arnold Property Quarry continued in development and limited production mode in 2003. Two other Eramosa Member producers also supplied building and landscape stone products: the Wiarton Quarry of Eisen Quarries Inc., which started production last year, is expecting a significant increase in production and processing capability in 2004; and the Emerson McLay Quarry, located north of Wiarton, resumed operations in 2003 under the name of Limberlost Stone Inc.

Bruce Peninsula Stone Ltd. at the Lindsay Quarry on the northern portion of the Bruce Peninsula extracted Guelph Formation dolostone for supplying building and landscape stone products.

Arriscraft International Inc. operated the Adair Marble Quarry just north of Wiarton. Blocks of the Wiarton/Colpoy Bay Member of the Amabel Formation are extracted and either processed on-site or transported to contractors' processing plants across southern Ontario.

SANDSTONE QUARRIES

In the Georgetown–Inglewood area, white and maroon Whirlpool Formation sandstone was extracted at the Deforest Brothers' Rice & McHarg Hilltop Stone and Supply Quarry for the production of squared and irregularly shaped landscaping stone.

ORILLIA AREA QUARRIES

In the Orillia area, Gull River Formation limestone was extracted for sale as building and landscape stone by four companies: Rockleith Quarry Ltd.; Speiran Quarries Ltd.; Cut Above Natural Stone; and Stone Cottage Inn Ltd. At the Rama Stone Quarries Ltd. property, Fowler Construction quarried gneiss for landscape stone, and crushed stone for premium-quality and speciality aggregate. In 2003, Stone Cottage Inn Ltd. explored for and test marketed new stone products. Rockleith Quarry Ltd., in business for three years, increased production to 8000 t and doubled their sales in 2003. The company, which employed between 10 and 12 persons full- and part-time, has made capital investments in a new saw and guillotine, and will soon add another saw to strengthen their processing capabilities (D. Simpson, Rockleith Quarry Ltd., February 2004).

Aggregate

Crushed stone aggregate is a major mineral commodity produced in southwest Ontario. In July/August 2003, *Aggregates & Roadbuilding* magazine published their annual listing of Canada's top 20 stone quarries. For 2002, 8 of Canada's top 20 quarries were located in Ontario, including 3 of the top five. Seven of the 8 Ontario quarries on the list, the only exception being the Manitoulin Quarry, are within the Southwest Ontario District. All are primarily aggregate quarries with the exception of the Ingersoll Quarry, which supplies high-purity limestone for the chemical industry. The Ontario quarries, showing ranking and 2002 production, are:

Rank	Operation	2002 Production (Mt)
1	Milton Quarry – Dufferin Aggregates	4.82
3	Dundas Quarry – Lafarge Canada	4.16
5	Manitoulin Quarry – Lafarge Canada	3.50
7	Acton Quarry – Dufferin Aggregates	3.00
9	Burlington Quarry – Nelson Aggregate	1.92
12	Brechin Quarry – Lafarge Canada	1.75
14	Ingersoll Quarry – Carmeuse North America	1.60
17	Amherstburg Quarry – Amherst Quarries	1.30

(*Aggregates & Roadbuilding* magazine, July/August, 2003)

The major crushed stone source areas are along the Niagara Escarpment, particularly in the Milton area, east of Lake Simcoe in the Port Colborne area and south of Windsor. Most of the production is trucked to local major urban centres.

ADVANCED EXPLORATION AND DEVELOPMENT

Dimension / Landscape Stone

Proponents of several dimension/building stone projects have started the licensing process under the Aggregate Resources Act. For reasons of legal privacy and confidentiality, the companies and individuals working on these projects and their exact locations cannot be identified. The projects include limestone quarries in Rama and Orillia townships, applications for new licenses to quarry Eramosa Member dolostone/marble in Keppel, Albemarle and Amabel townships, and applications for new licenses to quarry dolostone in Lindsay and Albemarle townships. These applications and projects are at varying stages within the licensing process.

Cement Stone

Federal White Cement is the only manufacturer of white portland cement in Canada. In 2003, approximately 250 000 t were produced, with about 75% exported to the United States. The company currently has a license to quarry in the Woodstock area, however they have not to date extracted rock, choosing to purchase raw materials from local and other sources. There is an ongoing process to expand the aggregate license of Federal White Cement Limited in Zorra Township in preparation for future possible extraction. The company employs 65 staff (J.P. Zannier, February 2004).

Greenock High-Calcium Limestone Quarry

Fortune Minerals Limited/Formosa Environmental Aggregates Ltd. owns 107 hectares in the Municipality of Brockton in South Bruce County, 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 15 Mt resource, grading 99% calcium carbonate. The product will be suitable for application in a number of chemical, industrial, environmental, agricultural and construction materials markets. The company has received all the requisite Official Plan and zoning amendments and continues monitoring of Greenock Creek and a number of test wells on the property. Site plans will be re-submitted to the Ministry of Natural Resources in 2004 for approval. The Company expects to receive this license shortly and bring the property into commercial production (D. Mulligan, Fortune Minerals Limited, personal communication, February 2004).

As of February 2004, discussions between Fortune Minerals Limited/Formosa Environmental Aggregates Ltd. and the Ministry of Natural Resources continue.

EXPLORATION ACTIVITY

All exploration activity in the Southwest Ontario District occurs 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 the Southwest Ontario District Geologist Office. Through informal discussions and research, however, staff of the Southwest Ontario District Geologist Office acquire information on most 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.

Numerous companies and individuals contacted the Southwest Ontario District Geologist Office throughout 2003 for information and/or advice with respect to exploration areas, commodities, exploration methods, processes for acquiring mineral properties and exploration opportunities. 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 in southwest Ontario and/or the locations of their prospects. However, most exploration centres on the commodities that are currently experiencing strong market conditions, including aggregate, dimension/building stone, shale/brick, limestone and dolostone.

ONTZinc Corporation

OntZinc Corporation has an exploration project for Mississippi Valley-type zinc mineralization in southwestern Ontario. Exploration completed to-date has geophysically and geochemically defined 24 zinc anomalies that suggest the presence of a district-sized exploration target. The company currently holds approximately 6800 hectares of mineral leases. A major exploration program is planned for early 2004. The company has held information sessions with several municipalities in southwestern Ontario (P. George, ONTZinc Corporation, personal communication, February 2004; ONTZinc Corporation press releases, 2003).

LAND USE PLANNING ACTIVITY

The District Geologist and District Support Geologist were involved in a number of land use planning initiatives in 2003. These included official plan, quarry application and exploration issues, Provincially Significant Mineral Potential (PSMP) updates, resource designations and provision of geological and other data to various municipal, provincial and private authorities.

For approximately 3 years, the District Geologist has provided advice in a process to further delineate and designate, for potential future extraction, shale resources in the northwest Brampton area. In 2003, the District Support Geologist supplied data to regional planning departments for a hearing on this issue. Detailed comments on the City of Brampton – Shale Resources Review Final Report were prepared and forwarded by the District Geologist at the request of the Region of Peel. These comments were discussed with MNR and forwarded to the Ministry of Municipal Affairs and Housing (MMAH). The District Support Geologist also provided information on sandstone resources of the Georgetown area to MMAH.

The District Support Geologist provided geological and mineral resource information for the Norfolk County Official Plan, attended a meeting at Ontario Native Affairs Secretariat (ONAS) representing the Regional Resident Geologist, responded to Greater Toronto Airports Authority consultants, supplied regional surficial geology mapping and references, and discussed mineral exploration process and regulations with staff at Perth County, where zinc exploration has recently begun.

The District Geologist was a witness before an Ontario Municipal Board (OMB) hearing in May, addressing a building stone quarry application in Ramara Township. Information on the types, properties and locations of the building stone resource, the current industry in terms of locations, products, production volumes, extraction and processing techniques, marketing and market areas was provided at both provincial and regional scales. Additional information was researched and provided for staff at MNR, MNDM and Natural Resources Canada. The hearing officer's report indicated there are no significant issues to stop the license and that the Township and the proponent should quickly come to an agreement.

The District Support Geologist completed transferring areas of known mineral resources (shale, high-purity limestone, building stone, salt and gypsum) from published sources to the 1:250 000 scale PSMP maps of the Southwest Ontario District. These maps were then sent to the Southern Ontario Regional Land Use Geologist in Sudbury.

MMIC AND DISTRICT GEOLOGIST STAFF AND ACTIVITIES

During 2003, the Mines and Minerals Information Centre (MMIC) was staffed by B. McGuinty, C. Lee and D. Hemmings, with support from K. Steele and M. Barua of the District Geologist's Office. The Southwest Ontario District Geologist Office is co-located with MMIC. All files, mineral deposit records and reference materials for the Southwest Ontario District are available for viewing at the MMIC.

Southwest Ontario District staff visited 14 mineral extraction or processing sites, revised or added 73 Mineral Deposit Inventory (MDI) records, provided field trips for industry clients and exhibited at 4 conferences and trade shows. Staff made significant contributions to two public education projects – PDAC Mining Matters and Geoscape Toronto.

K. Steele, Southwest Ontario District Geologist, provided expertise regarding the geology, resources, and minerals industry in Southwest Ontario with the assistance of M. Barua, the Southwest District Support Geologist. In September, D. Farrow, District Support Geologist Sudbury, became Acting District Geologist as K. Steele accepted a secondment to the Corporate Policy Secretariat.

C. Lee, Regional Support Geologist for Southern Ontario, supplied lead service for MNDM's online information system, the Earth Resources and Mineral Exploration webSite (ERMES), and for MMIC library functions. B. McGuinty, Industry Liaison Geologist, provided geoscience, mineral and provincial policy assistance to industry clients before accepting a position in the private sector in the spring of 2003. In July, D. Hemmings joined the centre as Geological Assistant, providing MMIC customer service to front counter sales, telephone inquiries, and assisting the District Geologist.

Through the Ontario Summer Experience Program, K. Lee and N. Fonseca provided research assistance and support to public outreach projects conducted by MMIC and the Southwest Resident Geologist Program, gained knowledge of the operations of the OGS and assisted clients at the MMIC.

During 2003, Southwest Ontario District staff assisted approximately 1900 clients who visited or contacted the District office, as well as dialogued with an estimated additional 2500 clients at various conferences and trade shows. Staff responded to a wide variety of inquires, the most frequent requests being for information focused on the following southern Ontario commodities and topics:

- aggregate, coloured aggregate, sand and gravel, limestone, dolostone, high-purity limestone, high purity dolostone, calcium carbonate (PCC and GCC), lime, cement, building/dimension/landscape stone, sandstone,

marble, Queenston Limestone, Eramosa Marble, gypsum, salt, shale/brick, clay, high-purity silica, silica sand, lead/zinc, filler minerals, basalt, wollastonite, nepheline syenite, mica, vermiculite, trap rock, peat, granite, kimberlites and/or diamonds, chert, groundwater, quartz, feldspar

- petroleum royalties, surface and mineral rights, exploration on private land, Mining Act, Aggregates Resources Act, quarrying techniques, drilling regulations and techniques, drill hole records, blasting rules and regulations, geophysical surveys, geochemical sampling, oil and gas potential, property evaluations, drift thickness, Abandoned Mines database, fossils, Aggregate Producers Association of Ontario
- Trafalgar Moraine, Oak Ridges Moraine, Niagara Escarpment, Scarborough Bluffs, Bruce Peninsula

Education Activities

The MMIC summer students assisted with the collection and preparation of rock and mineral samples for teaching kits in collaboration with the Prospectors and Developers Association of Canada (PDAC). The teaching kits are designed to assist Ontario public school teachers in delivering an earth science curriculum. During 2003, the District Geologist and the District Support Geologist worked with the PDAC and Mining Matters in program development. More information about this program is available at www.pdac.ca/miningmatters.

Conferences and Meetings

During 2003, MMIC and Southwest Ontario District staff attended the following conferences and meetings:

- Prospectors and Developers Association Annual Convention
- Ontario Exploration and Geoscience Symposium
- Canadian Institute of Mining (CIM), Toronto Branch meetings
- Toronto Geological Discussion Group meetings
- University of Toronto Special Seminars, Department of Geology
- Southern Ontario Resident Geologist Program meeting in Orillia
- Northeastern Ontario Mines and Minerals Symposium
- Northwestern Ontario Mines and Minerals Symposium
- Presentations across the GTA to public school children titled “Minerals in your Life”

Mineral Deposit Inventory (MDI)

Updating the Mineral Deposit Inventory for the Southwest Ontario District was continued during 2003. Eight new records were added, the names of 2 records were changed and a total of 63 records were updated. A project to update the information of the mines and quarries listed in the “Limestone Industries of Ontario” Vol III for the Southwest District was started and will continue in 2004.

FIELD TRIPS AND PROPERTY EXAMINATIONS

Mine, quarry, property and site visits are part of the ongoing responsibilities of the Resident Geologist Program to monitor current mineral activities, document known mineral deposits and occurrences, and identify areas of high mineral potential. Site visits also provide useful information for application to land use planning processes.

In 2003, site visits conducted by Southwest Ontario District staff focused on the following 5 topic areas:

- to acquire information from mineral industry operations who produce commodities that are currently in high demand, have potential for higher demand in the near future, and/or have production or marketing issues;
- to visit prospective, proposed or developing mineral properties;
- to investigate mineral sites with current or potential land-use conflicts;
- to acquire information for subsequent field trip visits;
- to obtain information to update records contained within the Mineral Deposit Inventory (MDI) database.

There are 44 industrial mineral and dimension stone operations and approximately 40 aggregate quarries active in the Southwest Ontario District. During 2003, the District Geologist made contact with several industrial mineral and dimension stone producers. The District Geologist and/or District Support Geologist visited 14 quarries or mineral extraction sites, mineral processing plants, mineral distribution and/or marketing locations, development sites and prospects across the Southwest Ontario District (Table 3). Site visits provided information on commodities, mineral deposits, local and regional geology, extraction techniques, processing, products, markets, production and economic statistics and issues.

Table 3. Property visits by Southwest Ontario District geologists in 2003.

Property/Occurrence/Plant/Geological Site	Location	Commodity
The Canadian Salt Company Ltd. – Ojibway Mine	Windsor	Salt
The Canadian Salt Company Ltd. – Brine Field/Evaporator	Windsor	Salt
Carmeuse Lime (Beachville) Ltd. – Quarry and Lime Plant	Beachville	High-Purity Limestone
Petrolia Discovery Oil Field	Petrolia	Petroleum
Amherst Quarries	MacGregor Twp	Limestone, High-Purity Limestone, Aggregate
E.C. King Contracting – Sydenham Quarry	Sydenham Twp	Dolostone, High-Purity Dolostone, Aggregate
Owen Sound Ledgerock – Quarry	Keppel Twp	Dolostone, Landscape Stone
Owen Sound Ledgerock – Wiarton Quarry	Amabel Twp	Dolostone, Marble, Dimension Stone
Owen Sound Ledgerock – Processing Plant	Owen Sound	Dimension and Landscape Stone
Eisen Quarries Inc. – Wiarton Quarry	Amabel Twp	Dolostone, Landscape Stone
PPG Canada Ltd. – Float Glass Plant	Owen Sound	Glass Manufacturing
St. Lawrence Cement – Mississauga Plant	Mississauga	Cement Manufacturing
George Coultis & Son Ltd. – Thedford Quarry	Thedford	Shale
Hungry Hollow Conservation Area	Arkona	Devonian Fossils

PPG Glass Plant

In July 2003, the District Geologists from the Southwest, Southeast and Kirkland Lake districts visited the PPG Glass Plant in Owen Sound. The company started flat glass production at this location in 1968 at 330 t per day. Specialized products involving thermal fabrication and tempering of glass were also produced. When the plant was modernized in 1977, capacity and thermal efficiency were increased and a float glass process was introduced.

In 1996 the furnace was rebuilt and the operation again modernized. On average, the furnace is rebuilt every 12 years, requiring a shutdown period of approximately 6 weeks. Otherwise the operation runs 365 days each year, and 25 people per shift operate the plant. The company primarily produces clear float glass and solex flat glass for the automotive industry. In 1996, a total of 140 000 t of glass products were shipped.

Raw materials, including silica sand from Badgely Island, soda ash from Windsor, nepheline syenite from northeast of Peterborough, limestone, dolomite, salt cake, rouge, up to 25% recycled glass and carbon are trucked in and loaded into silos. The raw materials are mixed and fed to the furnace by conveyor belt. The furnace holds more than 1500 t of molten glass, which is maintained at a minimum temperature of 2000°F. When a standard, 500 t batch enters the furnace, it is melted at approximately 2800°F. The molten glass is moved onto a molten tin bath where it is formed and allowed to cool slightly. When it leaves this area the glass is approximately ¼ inch thick by 13 feet wide and is conveyed on rollers to the lehr, a cooling unit approximately 400 feet in length. The glass enters the lehr at 1100°F and leaves at room temperature, completing the process known as annealing. The product then enters an area where it is inspected by computer and defects are noted and removed. The glass is then dimensioned for various uses, packaged and shipped. Typically, 300 t of glass is packed out of a 500 t batch of raw materials. Approximately 1000 t of glass is produced and shipped by truck each day (about 100 truckloads per week) to customers in Canada and the United States. Other customers are located in the United Kingdom and South America (PPG, personal communication, July 2003).

MMIC SERVICES

ERMES/Geoscience Databases

ERMES is an Internet-based data storage and retrieval system that contains over 200 gigabites of geoscience information. The database application site is hosted in the MNR's Land Information Ontario (LIO) system of digital information. ERMES allows users to perform Internet-based spatial (map-based) or text-based searches of geoscience information generated and collected by the Ministry of Northern Development and Mines. The MMIC has two designated computer terminals for clients to access ERMES, or clients may access ERMES through the MNDM web page at www.ermes.mndm.gov.on.ca.

The geoscience databases accessible on ERMES include:

- **Assessment Files Research Image (AFRI) database**: approximately 68 000 hardcopy assessment reports filed by exploration companies and prospectors since the 1940's and captured digitally, comprise the AFRI database. Reports contain geophysical, geochemical, geological, drilling, and trenching information. The purpose of this database is to assist exploration activities in Ontario by providing access to past exploration records.
- **Mineral Deposit Inventory (MDI) database**: an inventory of over 18 000 mineral deposits and occurrences in Ontario. Data for MDI have been collected since the early 1970's and are regularly updated.
- **Drill Hole (DH) database**: a detailed index of drill hole information in Ontario. It contains information for approximately 113 000 overburden, percussion, sonic, and diamond drill holes derived from assessment files on record with the Mines and Minerals division of MNDM.

- **Lithogeochemical (LGC) database**: a comprehensive index of lithogeochemistry information in Ontario. It contains detailed information on more than 31 500 rock samples collected and described by Ministry staff geoscientists during field projects. The database also contains mineralogical data (major and trace element concentrations) analyzed by Ministry staff at the Ministry's Geoscience Laboratory.
- **Ontario Geological Survey Publications database**: Ontario geological text and map publications have been converted to raster images and coupled with a full-text search, retrieval, and viewing system. Over 225 000 pages and 8500 Ontario Geological Survey maps have been captured in raster form.
- **Geology of Ontario maps**: two attributed Geology of Ontario maps are available in ERMES. The Bedrock Geology Data Set describes the distribution of the bedrock geology in Ontario, and the Quaternary Geological Data Set is a digital interpretation of the surficial geology of Ontario.

MMIC also houses one computer for clients who wish to access the CLAIMapsIII database. CLAIMapsIII is updated daily by the Provincial Recorder's Office (PRO) and provides information pertaining to mining claims and land tenure in Ontario. In addition, maps and digital data are available for download. CLAIMapsIII can be found on the internet at www.mndm.gov.on.ca/MNDM/MINES/lands/claimap3.

Publication Sales

Mines and Minerals Information Centre 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 (MMD) 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 can 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.gov.on.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. Table 4 lists current subscriptions to geoscience and mining related newsletters. Table 5 lists the journals and periodical publications added to the Mines and Minerals Information Centre library, while Tables 6 and 7 list titles of new library publications from the Geological Survey of Canada and the Ontario Geological Survey, respectively. Table 8 lists all of the new reference publications the library received in 2003. Table 9 lists publications of particular reference to southwest Ontario received in 2003.

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 may be searched by an in-house computer database, while titles held at the Geoscience Library in Sudbury can be queried using an MMIC computer linked to GeoRef. Clients may request inter-library publication transfers from the Geoscience Library to the MMIC or to other Ministry offices.

Rock and Mineral Displays

The Mines and Minerals Information Centre has a comprehensive rock and mineral collection with samples on display and archived as resource material. A notable portion of the collection highlights and promotes Ontario's industrial mineral sector. Ontario diamonds, base and precious metal deposits are also represented. The walls, counter, and floor of the MMIC facility showcase the natural beauty and variation of Ontario dimension stone.

Table 4. Newsletters received by the MMIC library in 2003.

Alaska GeoSurvey News – Newsletter, Alaska Division of Geological & Geophysical Surveys
AusGeo News – Geoscience Australia
Canadian Copper – Canadian Copper & Brass Development Association
CANQUA Newsletter – Canadian Quaternary Association
Explore – Newsletter for the Association of Exploration Geochemists
GEOLOG – News Magazine of the Geological Association of Canada
ICME – Newsletter – International Council on Metals and the Environment
ICMM Newsletter – International Council on Mining and Metals
Iowa Geology – Iowa Department of Natural Resources
Lunar and Planetary Information Bulletin – Lunar and Planetary Institute
Mineralogical Association of Canada Newsletter
Mining Matters and Mining in Ontario – Ontario Mining Association
Nevada Geology – Newsletter of the Nevada Bureau of of Mines and Geology
Newsletter – Environmental Earth Sciences Division, GAC
Newsletter – International Liason Group on Gold Mineralization
Nova Scotia Minerals Update – Nova Scotia Natural Resources
Ohio Geology – Ohio Department of Natural Resources
Outlook – Missouri Department of Natural Resources
Wat on Earth – University of Waterloo Department of Earth Sciences

Table 5. Journals and periodicals received by the MMIC library in 2003.

Aggregates & Roadbuilding
Canadian Journal of Earth Sciences
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
Géographie Physique et Quaternaire
Geoscience Canada
Industrial Minerals
Mineralogical Association of Canada – The Canadian Mineralogist
Mining and Exploration Company Financings – Gamah International Limited
Mining Magazine
Northern Miner
Northern Ontario Business
Provincial Geologists Journal – Committee of Provincial Geologists
The Ontario Prospector

Table 6. Geological Survey of Canada publications received by the MMIC library during 2003. (Asterisks [*] indicate publications of particular interest to southwest Ontario.)

Title	Author	Type and Year of Publication
Geology and Tectonostratigraphic Assemblages, West Uchi Map Area, Manitoba and Ontario	Bailes, A.H., Percival, J.A., Corkery, M.T., McNicoll, V.J., Tomlinson, K.Y., Sasseville, C., Rogers, N., Whalen, J.B. and Stone, D.	Open File 1522, scale 1:250 000, 2003
Airborne Gamma Ray Spectrometry Compilation Series, Ottawa, Ontario–Québec	Carson, J.M., Holman, P.B., Ford, K.L., Grant, J.A. and Shives, R.B.K.	Open File 4460, scale 1:1 000 000, 2003
*Detailed Outcrop and Core Measured Sections of the Upper Ordovician/Lower Silurian Succession of Southern Ontario	Hamblin, A.P.	Open File 1525, 1 CD-ROM, 2003
Étude de l'impact Potentiel des Changements Climatiques sur les Ressources en Eau Souterraine dans l'Est du Canada	Rivard, C., Marion, J., Michaud, Y., Benhammane, S., Morin, A., Lefebvre, R. et Rivera, A.	Dossier Public 1577, 39p. et annexes, 2003
*GSC High-quality Borehole, "Golden Spike", Data Oak Ridges Moraine, Southern Ontario	Sharpe, D.R., Dyke, L.D., Good, R.L., Gorrell, G., Hinton, M.J., Hunter, J.A. and Russell, H.A.J.	Open File 1670, 21p., 2003
Surficial Geology, Minden, Ontario	Kaszycki, C.A.	Open File 3963, 1 CD-ROM / 1 sheet, scale 1:50 000, 2003
Surficial Geology, Gooderham, Ontario	Kaszycki, C.A.	Open File 3964, 1 CD-ROM / 1 sheet, scale 1:50 000, 2003
Surficial Geology, Wilberforce, Ontario	Kaszycki, C.A.	Open File 3965, 1 CD-ROM / 1 sheet, scale 1:50 000, 2003
Surficial Geology, Haliburton, Ontario	Kaszycki, C.A.	Open File 3966, 1 CD-ROM / 1 sheet, scale 1:50 000, 2003
*Deglaciation of North America	Dyke, A.S., Moore, A. and Robertson, L.	Open File 1574, 2 Sheets / 1 CD-ROM, 2003
Detailed Geology, Hydrothermal Alteration and Gold Mineralisation of the Cochenour Stripped Outcrop, Red Lake Gold District, Ontario	Williamson, P.K. and Dubé, B.	Open File 1673, 1 Sheet, 2003

Title	Author	Type and Year of Publication
Pontypool 'Golden Spike' Borehole Data Compilation	Russell, H.A.J., Peets, J., Gorrell, G., Sharpe, D.R. and Hunter, J.A.M.	Open File 1746, 1 Poster, 2003
Mineralogy of the McLean Kimberlite and Associated Glacial Sediments, Lake Timiskaming, Ontario	McClenaghan, M.B., Kjarsgaard, I.M. and Kjarsgaard, B.A.	Open File 1762, 1 CD-ROM, 2003
Seismostratigraphy of Quaternary Sediments Beneath Lake Simcoe, Ontario: Results of 1992 and 1993 Expeditions of the MV J. Ross Mackay	Todd, B.J., Hunter, J.A.M., Good, R.L., Burns, R.A., Douma, M., Pullan, S.E. and Lewis, C.F.M.	Open File 3037, 1 CD-ROM, 2003
Geology, Southeastern Sturgeon Lake Greenstone Belt, Ontario	Brown, J.L. and Percival, J.A.	Open File 4286, scale 1:25 000, 2003
Background Pt-Pd Levels in Mafic Large Igneous Provinces (LIPs) in Canada	Ernst, R.E. and Hulbert, L.J.	Open File 4472, 1 Sheet, 2003
A Review of the Geology and Geotechnical Characteristics of Champlain Sea Clays of the Ottawa River Valley with Reference to Slope Failures	Scott, J.S.	Open File 4475, 62p., 2003
Sudbury Ni-Cu-PGE Ore Mineralogy Compilation: Sudbury Targeted Geoscience Initiative (TGI)	Ames, D.E., Kjarsgaard, I.M. and Douma, S.L.	Open File 1787, 1 CD-ROM, 2003
*Geoscape Canada : A Map of Canada's Earth Materials	Turner, R.J.W., Clague, J.J. and Hastings, N.L.	Miscellaneous Report 81, 1 Colour Poster, 2003
*Géopanorama du Canada : Les Matériaux Géologiques de Notre Pays	Turner, R.J.W., Clague, J.J. et Hastings, N.L.	Rapport Divers 81, 1 Colour Poster, 2003
Rocks and Minerals for the Collector: Îles de la Madeleine, Quebec, the Island of Newfoundland, and Labrador	Sabina, A.P.	Miscellaneous Report 58, 304p., 2003
Soil Profiles in Naturally Metal-Rich Terrains of Eastern Canada: Physical Properties and Geochemical Data	Klassen, R.A.	Open File 1745, 1 CD-ROM, 2003
The Seed and Triple B Kimberlites and Associated Glacial Sediments, Lake Timiskaming, Ontario	McClenaghan, M.B. and Kjarsgaard, B.A.	Open File 1492, 1 CD-ROM, 2003
Geology, Bee Lake Greenstone Belt, Ontario–Manitoba	Rogers, N.	Open File 4315, 1 Sheet, 2003
*Tunnel Channels of the Greater Toronto and Oak Ridges Moraine Areas, Southern Ontario	Russell, H.A.J., Sharpe, D.R., Brennand, T.A., Barnett, P.J. and Logan, C.	Open File 4485, 1 Sheet, 2003
Rocks and Minerals for the Collector: Kirkland Lake – Rouyn-Noranda – Val-d'Or and Quebec	Sabina, A.P.	Miscellaneous Report 77, 308p., 2003
Selected World Mineral Deposits Database	Kirkham, R.V. and Rafer, A.B.	Open File 1801, 1 CD-ROM, 2003
Geochemistry of Groundwater from Jurassic Kimberlites in the Kirkland Lake and Lake Timiskaming Kimberlite Fields, Northeastern Ontario	Sader, J.A., Leybourne, M.I., McClenaghan, M.B. and Hamilton, S.M.	Open File 4515, 1 CD-ROM, 2003
†Aeromagnetic Survey, Residual Magnetic Total Field, Keown Lake, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4523 / Ontario Geological Survey Map 81 788, NTS 42J/4, scale 1:50 000, 2003
†Aeromagnetic Survey, Residual Magnetic Total Field, Serinack Lake, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4524 / Ontario Geological Survey Map 81 789, NTS 42J/5, scale 1:50 000, 2003

Title	Author	Type and Year of Publication
†Aeromagnetic Survey, Residual Magnetic Total Field, Martison Lake, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4525 / Ontario Geological Survey Map 81 790, NTS 42J/6, scale 1:50 000, 2003
†Aeromagnetic Survey, Residual Magnetic Total Field, Crawford Lake, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4526 / Ontario Geological Survey Map 81 791, NTS 42J/11, scale 1:50 000, 2003
†Aeromagnetic Survey, Residual Magnetic Total Field, Moir Lake, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4527 / Ontario Geological Survey Map 81 792, NTS 42J/12, scale 1:50 000, 2003
†Aeromagnetic Survey, Residual Magnetic Total Field, Limestone Rapids, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4516 / Ontario Geological Survey Map 81 793, NTS 42K/1, scale 1:50 000, 2003
†Aeromagnetic Survey, Residual Magnetic Total Field, Feagan Lake, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4517 / Ontario Geological Survey Map 81 794, NTS 42K/2, scale 1:50 000, 2003
†Aeromagnetic Survey, Residual Magnetic Total Field, Pagwa River, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4518 / Ontario Geological Survey Map 81 795, NTS 42K/3, scale 1:50 000, 2003
†Aeromagnetic Survey, Residual Magnetic Total Field, Jog Lake, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4519 / Ontario Geological Survey Map 81 796, NTS 42K/6, scale 1:50 000, 2003
†Aeromagnetic Survey, Residual Magnetic Total Field, Little Ash River, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4520 / Ontario Geological Survey Map 81 797, NTS 42K/7, scale 1:50 000, 2003
†Aeromagnetic Survey, Residual Magnetic Total Field, Mammamattawa, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4521 / Ontario Geological Survey Map 81 798, NTS 42K/8, scale 1:50 000, 2003
†Aeromagnetic Survey, Residual Magnetic Total Field, Little Drowning Lake, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4522 / Ontario Geological Survey Map 81 799, NTS 42K/11, scale 1:50 000, 2003
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Keown Lake, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4535 / Ontario Geological Survey Map 81 800, NTS 42J/4, scale 1:50 000, 2003
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Serinack Lake, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4536 / Ontario Geological Survey Map 81 801, NTS 42J/5, scale 1:50 000, 2003
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Martison Lake, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4537 / Ontario Geological Survey Map 81 802, NTS 42J/6, scale 1:50 000, 2003
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Crawford Lake, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4538 / Ontario Geological Survey Map 81 803, NTS 42J/11, scale 1:50 000, 2003
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Moir Lake, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4539 / Ontario Geological Survey Map 81 804, NTS 42J/12, scale 1:50 000, 2003
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Limestone Rapids, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4528 / Ontario Geological Survey Map 81 805, NTS 42K/1, scale 1:50 000, 2003

Title	Author	Type and Year of Publication
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Feagan Lake, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4529 / Ontario Geological Survey Map 81 806, NTS 42K/2, scale 1:50 000, 2003
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Pagwa River, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4530 / Ontario Geological Survey Map 81 807, NTS 42K/3, scale 1:50 000, 2003
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Jog Lake, Kenogami River-James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4531 / Ontario Geological Survey Map 81 808, NTS 42K/6, scale 1:50 000, 2003
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Little Ash River, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4532 / Ontario Geological Survey Map 81 809, NTS 42K/7, scale 1:50 000, 2003
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Mammamattawa, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4533 / Ontario Geological Survey Map 81 810, NTS 42K/8, scale 1:50 000, 2003
†Aeromagnetic Survey, Magnetic First Vertical Derivative With Keating Coefficients, Little Drowning Lake, Kenogami River- James Bay Lowlands Area, Ontario	Oneschuk, D., Coyle, M. and Dumont, R.	Geological Survey of Canada, Open File 4534 / Ontario Geological Survey Map 81 811, NTS 42K/11, scale 1:50 000, 2003

†indicates joint GSC-OGS publication

Table 7. Ontario Geological Survey publications received by the MMIC library in 2003. (Asterisks [*] indicate publications of particular interest to southwest Ontario.)

Title	Author	Type and Year of Publication
Geological Synthesis of the Highway 101 Area, East of Matheson, Ontario	Berger, B.R.	Ontario Geological Survey, Open File Report 6091, 124p., 2002. Accompanied by Map 2676
Precambrian Geology of the Highway 101 Area, East of Matheson, Ontario	Berger, B.R., Luinstra, B. and Ropchan, J.C.	Ontario Geological Survey, Map 2676, scale 1:50 000, 2003
Geology and Tectonostratigraphic Assemblages, West Uchi Map Area, Manitoba and Ontario	Bailes, A.H., Percival, J.A., Corkery, M.T., McNicoll, V.J., Tomlinson, K.Y., Sasseville, C., Rogers, N., Whalen, J.B. and Stone, D.	Ontario Geological Survey, Preliminary Map P. 3461, scale 1:250 000, 2003
Precambrian Geology, Shining Tree Area	Johns, G.W.	Ontario Geological Survey, Preliminary Map P. 3521, scale 1:50 000, 2003
Data for the Comparative Resource Evaluation of Selected Shale Units, Southern Ontario	Armstrong, D.K. and Sergerie, P.	Ontario Geological Survey, Open File Report 6094†, 160p., 2002
The Physical Environment of the City of Greater Sudbury	Rousell, D.H. and Jansons, K.J. (eds.)	Ontario Geological Survey, Special Volume 6, 229p., 2002
Results of the "Spider 3" Regional Kimberlite Indicator Mineral and Geochemistry Survey Carried Out in the Vicinity of the Upper Attawapiskat and Ekwan Rivers, Northern Ontario	Crabtree, D.C. and Gleeson, C.F.	Ontario Geological Survey, Open File Report 6097, 127p., 2003

Title	Author	Type and Year of Publication
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Residual Magnetic Field, and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Map 82 253, scale 1:50 000, 2003
Airborne Magnetic Survey, Residual Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 254 - 82 256, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Residual Magnetic Field, and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Map 82 260, scale 1:50 000, 2003
Airborne Magnetic Survey, Residual Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 261 - 82 262, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Residual Magnetic Field, and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Map 82 267, scale 1:50 000, 2003
Airborne Magnetic Survey, Residual Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 268 - 82 269, scale 1:50 000, 2003
Airborne Magnetic Survey, Residual Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 275 - 82 276, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Map 82 282, scale 1:50 000, 2003
Airborne Magnetic Survey, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 283 - 82 285, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Map 82 289, scale 1:50 000, 2003
Airborne Magnetic Survey, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 290 - 82 291, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Map 82 296, scale 1:50 000, 2003
Airborne Magnetic Survey, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 297 - 82 298, scale 1:50 000, 2003
Airborne Magnetic Survey, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 304 - 82 305, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 225 - 82 251, scale 1:20 000, 2003

Title	Author	Type and Year of Publication
Airborne Magnetic, Electromagnetic and Gamma-Ray Spectrometric Surveys, Residual Magnetic Field, Electromagnetic Anomalies and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 252, 82 257 - 82 259, scale 1:50 000, 2003
Airborne Magnetic, Electromagnetic and Gamma-Ray Spectrometric Surveys, Residual Magnetic Field, Electromagnetic Anomalies and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 263 - 82 265, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Residual Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Map 82 266, scale 1:50 000, 2003
Airborne Magnetic, Electromagnetic and Gamma-Ray Spectrometric Surveys, Residual Magnetic Field, Electromagnetic Anomalies and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 270 - 82 271, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Residual Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 272 - 82 274, scale 1:50 000, 2003
Airborne Magnetic, Electromagnetic and Gamma-Ray Spectrometric Surveys, Residual Magnetic Field, Electromagnetic Anomalies and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 277 - 82 278, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Residual Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 279 - 82 280, scale 1:50 000, 2003
Airborne Magnetic, Electromagnetic and Gamma-Ray Spectrometric Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 281, 82 286 - 82 288, scale 1:50 000, 2003
Airborne Magnetic, Electromagnetic and Gamma-Ray Spectrometric Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 292 - 82 294, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Map 82 295, scale 1:50 000, 2003
Airborne Magnetic, Electromagnetic and Gamma-Ray Spectrometric Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 299 - 82 300, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 301 - 82 303, scale 1:50 000, 2003

Title	Author	Type and Year of Publication
Airborne Magnetic, Electromagnetic and Gamma-Ray Spectrometric Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 306 - 82 307, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 308 - 82 309, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, EM Decay Constant and Electromagnetic Anomalies, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 310 - 82 320, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Apparent Conductance and Electromagnetic Anomalies, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 321 - 82 331, scale 1:50 000, 2003
Fertile Peraluminous Granites and Related Rare-Element Mineralization in Pegmatites, Superior Province, Northwest and Northeast Ontario: Operation Treasure Hunt	Breaks, F.W., Selway, J.B. and Tindle, A.G.	Ontario Geological Survey, Open File Report 6099†, 179p., 2003
Investigation of Mafic–Ultramafic Intrusions in Ontario and Implications for Platinum Group Element Mineralization: Operation Treasure Hunt	Vaillancourt, C., Sproule, R.A., MacDonald, C.A. and Lesher, C.M.	Ontario Geological Survey, Open File Report 6102†, 335p., 2003
Dayohessarah Lake Area High Density Regional Lake Sediment and Water Geochemical Survey, Northeastern Ontario	Jackson, J.E.	Ontario Geological Survey, Open File Report 6103†, 102p., 2003
Preliminary Results from the James Bay Lowland Indicator Mineral Sampling Program	Crabtree, D.C.	Ontario Geological Survey, Open File Report 6108, 115p., 2003
*Geoscape Toronto	Doyle, V.C. and Steele, K.G. (comp.)	Ontario Geological Survey, Poster 6, 1 sheet, colour, 2003
*Géopanorama de Toronto	Doyle, V.C. et Steele, K.G. (prep.)	Commission géologique de l'Ontario, Affiche 6, 1 feuillet, en couleur, 2003
Report of Activities 2002, Resident Geologist Program, Red Lake Regional Resident Geologist Report: Red Lake and Kenora Districts	Lichtblau, A., Ravnaas, C., Storey, C.C., Raoul, A., Kosloski, L., and Wilson, S.	Ontario Geological Survey, Open File Report 6110, 112p., 2003
Report of Activities 2002, Resident Geologist Program, Thunder Bay North Regional Resident Geologist Report: Thunder Bay North District	Mason, J.K., White, G.D., O'Brien, M.S. and Komar, C.	Ontario Geological Survey, Open File Report 6111, 37p., 2003
Report of Activities 2002, Resident Geologist Program, Thunder Bay South Regional Resident Geologist Report: Thunder Bay South District	Schnieders, B.R., Scott, J.F., Smyk, M.C. and O'Brien, M.S.	Ontario Geological Survey, Open File Report 6112, 55p., 2003
Ignace Area High Density Regional Lake Sediment Geochemical Survey, Northwestern Ontario: Operation Treasure Hunt	Jackson, J.E.	Ontario Geological Survey, Open File Report 6106†, 174p., 2003
Preliminary Report of Field Descriptions and Contact Relationships of Lithological Units in the South Roby and Twilight Zones, Lac des Iles Deposit, Northwestern Ontario	Hinchey, J., Hattori, K.H. and Lavigne, M.J.	Ontario Geological Survey, Open File Report 6107, 16p., 2003
Savant Lake Area High Density Regional Lake Sediment and Water Geochemical Survey, Northwestern Ontario	Russell, D.F.	Ontario Geological Survey, Open File Report 6118†, 82p., 2003

Title	Author	Type and Year of Publication
Regional Modern Alluvium Sampling Survey of the Sault Ste. Marie–Espanola Corridor, Northeastern Ontario: Operation Treasure Hunt	Reid, J.L.	Ontario Geological Survey, Open File Report 6117†, 147p., 2003
Geochemistry and Metallogenesis of Komatiitic Rocks in the Abitibi Greenstone Belt, Ontario	Sproule, R.A., Lesher, C.M., Ayer, J.A. and Thurston, P.C.	Ontario Geological Survey, Open File Report 6073†, 119p., 2003
The Neoarchean Rice Lake Batholith and its Place in the Tectonomagmatic Evolution of the Swayze and Abitibi Granite-Greenstone Belts, Northeastern Ontario	Becker, J.K. and Benn, K.	Ontario Geological Survey, Open File Report 6105, 42p., 2003
Mapping and Structural Analysis in the Southwestern Sudbury Basin: Implications for Mineral Exploration	Dubois, A.J. and Benn, K.	Ontario Geological Survey, Open File Report 6109, 26p., 2003
Report of Activities 2002, 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., Farrow, D., Hope, P. and Koroschetz, A.M.	Ontario Geological Survey, Open File Report 6113, 84p., 2003
Report of Activities 2002, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Kirkland Lake and Sudbury Districts	Meyer, G., Cosec, M., Grabowski, G.P.B., Guindon, D.L., Beauchamp, S. and Chaloux, E.C.	Ontario Geological Survey, Open File Report 6114, 72p., 2003
*Report of Activities 2002, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report: Southeastern and Southwestern Districts, Mines and Minerals Information Centre and Petroleum Resources Centre	Sangster, P.J., McGuinty, W.J., Papertzian, V.C., Steele, K.G., Lee, C.R., Barua, M., Laidlaw, D.A. and Carter, T.R.	Ontario Geological Survey, Open File Report 6115, 118p., 2003
*Report of Activities 2002, Resident Geologist Program, Regional Land Use Geologist Report: Northwestern, Northeastern and Southern Ontario Regions	Debicki, R.L., Drost, A.P., Hinz, P., Rowell, D.J. and Yule, G.R.	Ontario Geological Survey, Open File Report 6116, 27p., 2003
Precambrian Geology Compilation Series–Longlac Sheet	Johns, G.W., McIlraith, S. and Stott, G.M.	Ontario Geological Survey, Map 2667, scale 1:250 000, 2003
Precambrian Geology Compilation Series–Hornepayne Sheet	Johns, G.W., and McIlraith, S.	Ontario Geological Survey, Map 2668, scale 1:250 000, 2003
Precambrian Geology, Cairo Township	Leblanc, G. and Berger, B.R.	Ontario Geological Survey, Preliminary Map P. 3522, scale 1:20 000, 2003
Precambrian Geology, Kawagama Lake Area	Lumbers, S.B. and Vertolli, V.M.	Ontario Geological Survey, Preliminary Map P. 3525, scale 1:50 000, 2003
Precambrian Geology, Wilberforce Area	Lumbers, S.B. and Vertolli, V.M.	Ontario Geological Survey, Preliminary Map P. 3526, scale 1:50 000, 2003
Geological Compilation of the Matachewan Area, Abitibi Greenstone Belt	Ayer, J.A., Trowell, N.F., Josey, S., Nevills, M. and Valade, L.	Ontario Geological Survey, Preliminary Map P. 3527', scale 1:100 000, 2003
Precambrian Geology, Deloro Township	Hall, L.A.F., MacDonald, C.A. and Dinel, E.R.	Ontario Geological Survey, Preliminary Map P. 3528, scale 1:20 000, 2003
Precambrian Geology of the Thunder Lake Area	Beakhouse, G.P. and Pigeon, L.	Ontario Geological Survey, Preliminary Map P. 3529, scale 1:20 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Residual Magnetic Field and Electromagnetic Anomalies, Nipigon Bay Area–Purchased Data	Ontario Geological Survey	Ontario Geological Survey, Map 60 104, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Nipigon Bay Area–Purchased Data	Ontario Geological Survey	Ontario Geological Survey, Map 60 105, scale 1:50 000, 2003

Title	Author	Type and Year of Publication
Airborne Magnetic and Electromagnetic Surveys, EM Decay Constant and Electromagnetic Anomalies, Nipigon Bay Area–Purchased Data	Ontario Geological Survey	Ontario Geological Survey, Map 60 106, scale 1:50 000, 2003
Airborne Magnetic Survey, Residual Magnetic Field, Kenabeek - Latchford - Redwater Area–Purchased Data	Ontario Geological Survey	Ontario Geological Survey, Maps 60 125 - 60 127, scale 1:50 000, 2003
Airborne Magnetic Survey, Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Kenabeek - Latchford - Redwater Area–Purchased Data	Ontario Geological Survey	Ontario Geological Survey, Maps 60 128 - 60 130, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Residual Magnetic Field and Electromagnetic Anomalies, Kamiskotia Area	Ontario Geological Survey	Ontario Geological Survey, Maps 81 753 - 81 755, scale 1:20 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Residual Magnetic Field and Electromagnetic Anomalies, Kamiskotia Area	Ontario Geological Survey	Ontario Geological Survey, Map 81 756, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Kamiskotia Area	Ontario Geological Survey	Ontario Geological Survey, Map 81 757, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Apparent Conductance and Electromagnetic Anomalies, Kamiskotia Area	Ontario Geological Survey	Ontario Geological Survey, Map 81 758, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, EM Decay Constant and Electromagnetic Anomalies, Kamiskotia Area	Ontario Geological Survey	Ontario Geological Survey, Map 81 759, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Residual Magnetic Field and Electromagnetic Anomalies, Halliday Dome Area	Ontario Geological Survey	Ontario Geological Survey, Maps 81 760 - 81 763, scale 1:20 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Residual Magnetic Field and Electromagnetic Anomalies, Halliday Dome Area	Ontario Geological Survey	Ontario Geological Survey, Map 81 764, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Halliday Dome Area	Ontario Geological Survey	Ontario Geological Survey, Map 81 765, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Apparent Conductance and Electromagnetic Anomalies, Halliday Dome Area	Ontario Geological Survey	Ontario Geological Survey, Map 81 766, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, EM Decay Constant and Electromagnetic Anomalies, Halliday Dome Area	Ontario Geological Survey	Ontario Geological Survey, Map 81 767, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Residual Magnetic Field and Electromagnetic Anomalies, Kidd-Munro, Blake River Area	Ontario Geological Survey	Ontario Geological Survey, Maps 81 768 - 81 779, scale 1:20 000, 2003

Title	Author	Type and Year of Publication
Airborne Magnetic and Electromagnetic Surveys, Residual Magnetic Field and Electromagnetic Anomalies, Kidd-Munro, Blake River Area	Ontario Geological Survey	Ontario Geological Survey, Maps 81 780 - 81 781, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Shaded Image of the Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Kidd-Munro, Blake River Area	Ontario Geological Survey	Ontario Geological Survey, Maps 81 782 - 81 783, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, Apparent Conductance and Electromagnetic Anomalies, Kidd-Munro, Blake River Area	Ontario Geological Survey	Ontario Geological Survey, Maps 81 784 - 81 785, scale 1:50 000, 2003
Airborne Magnetic and Electromagnetic Surveys, EM Decay Constant and Electromagnetic Anomalies, Kidd-Munro, Blake River Area	Ontario Geological Survey	Ontario Geological Survey, Maps 81 786 - 81 787, scale 1:50 000, 2003
Airborne Magnetic Survey, Residual Magnetic Field, Albany - Atikameg - Attawapiskat Rivers Area–Purchased Data	Ontario Geological Survey	Ontario Geological Survey, Maps 60 107 - 60 115, scale 1:50 000, 2003
Airborne Magnetic Survey, Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Albany - Atikameg - Attawapiskat Rivers Area–Purchased Data	Ontario Geological Survey	Ontario Geological Survey, Maps 60 116 - 60 124, scale 1:50 000, 2003
Airborne Magnetic Survey, Residual Magnetic Field, Nagagami - Squirrel - Wakashi Rivers Area–Purchased Data	Ontario Geological Survey	Ontario Geological Survey, Maps 60 131 - 60 133, scale 1:50 000, 2003
Airborne Magnetic Survey, Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Nagagami - Squirrel - Wakashi Rivers Area–Purchased Data	Ontario Geological Survey	Ontario Geological Survey, Maps 60 134 - 60 136, scale 1:50 000, 2003
Airborne Magnetic Survey, Residual Magnetic Field, Attawapiskat Area–Purchased Data	Ontario Geological Survey	Ontario Geological Survey, Maps 60 206 - 60 243, scale 1:50 000, 2003
Airborne Magnetic Survey, Second Vertical Derivative of the Magnetic Field and Keating Coefficients, Attawapiskat Area–Purchased Data	Ontario Geological Survey	Ontario Geological Survey, Maps 60 244 - 60 281, scale 1:50 000, 2003
*Summary of Field Work and Other Activities 2003	Baker, C.L., Kelly, R.I., Parker, J.R., Ayer, J.A. and Easton, R.M.	Ontario Geological Survey, Open File Report 6120, 411p., 2003
Structural Analysis and Three-Dimensional Modelling of the Southwestern Sudbury Basin: Implications and Recommendations for Mineral Exploration	Dubois, A.J. and Benn, K.	Ontario Geological Survey, Open File Report 6121, 38p., 2003
Toward a New Metamorphic Framework for Gold Exploration in the Red Lake Greenstone Belt	Thompson, P.H.	Ontario Geological Survey, Open File Report 6122, 52p., 2003
Geology and Mineral Potential of the Paleoproterozoic River Valley Intrusion and Related Rocks, Grenville Province	Easton, R.M.	Ontario Geological Survey, Open File Report 6123, 172p., 2003
Precambrian Geology Compilation Series–Sault Ste. Marie-Blind River Map Sheet	Johns, G.W., McIlraith, S. and Muir, T.L.	Ontario Geological Survey, Map 2670, scale 1:250 000, 2003
Precambrian Geology, Upsala Area	Stone, D., Fell, M. and Metsaranta, R.	Ontario Geological Survey, Preliminary Map P. 3530, scale 1:50 000, 2003
Precambrian Geology, Shining Tree South Area	Johns, G.W.	Ontario Geological Survey, Preliminary Map P. 3531, scale 1:50 000, 2003

Title	Author	Type and Year of Publication
Precambrian Geology, Lac des Iles Area	Stone, D., Fell, M., Daley, A., Nielsen, P., Schnieders, B., Scott, J., and Wagner, D.	Ontario Geological Survey, Preliminary Map P. 3532, scale 1:50 000, 2003
Airborne Magnetic and Gamma-Ray Spectrometric Surveys, Ternary Radioelement Image, Fort Hope Area	Ontario Geological Survey	Ontario Geological Survey, Maps 82 332 - 82 351, scale 1:50 000, 2003

[3] *Also released in digital form.*
† Geochemical data / chemical analyses / appendices available in digital form.

Table 8. Reference publications received by the MMIC library in 2003.

Title	Author	Type and Year of Publication
Canadian Professional Engineering Practice and Ethics	Andrews, G.C. and Kemper, J.D.	Second Edition, Nelson Thomson Learning, Scarborough Ontario, 492p., 1999
Law for Professional Engineers Canadian and International Perspectives	Marston, D.L.	Third Edition, McGraw-Hill Ryerson Limited, Toronto, 354p., 1981
A Guide to Patents	Industry Canada	Booklet, Canadian Intellectual Property Office, 22p., 2002
A Guide to Industrial Designs	Industry Canada	Booklet, Canadian Intellectual Property Office, 22p., 2001
A Guide to Copyrights	Industry Canada	Booklet, Canadian Intellectual Property Office, 21p., 2002
A Guide to Trade-Marks	Industry Canada	Booklet, Canadian Intellectual Property Office, 22p., 2002
The Law and Business Administration in Canada	Smyth, J.E., Soberman, D.A. and Easson, A.J.	9th Edition, Prentice Hall, Toronto, 820p., 2001
Study Guide for The Law and Business Administration in Canada	Gilles LeVasseur, J.L.	Study Guide for 9th Edition, Prentice Hall, Toronto, 492p., 2001
Oak Ridges Moraine Conservation Plan	Ministry of Municipal Affairs and Housing	Conservation Plan, MMAH, Toronto, 82p., 2002
The New Gold Rush Canadian Gold Companies The Mines − The Men − The Dreams	Keane, F.	Tribute, Vol. I, Joh. Roth sel. Ww. GmbH, Munich Germany, 418p., 2002 (?)
Ontario Petroleum Institute. Annual Conference	Ontario Petroleum Institute	31st Annual Conference, Ontario Petroleum Institute, London Ontario, 1 vol., 1992
Ontario Petroleum Institute. Annual Conference	Ontario Petroleum Institute	32nd Annual Conference, Ontario Petroleum Institute, London Ontario, 1 vol., 1993
Ontario Petroleum Institute. Annual Conference	Ontario Petroleum Institute	33rd Annual Conference, Ontario Petroleum Institute, London Ontario, 1 vol., 1994
Ontario Petroleum Institute. Annual Conference	Ontario Petroleum Institute	34th Annual Conference, Ontario Petroleum Institute, London Ontario, 1 vol., 1995
Ontario Petroleum Institute. Annual Conference	Ontario Petroleum Institute	35th Annual Conference, Ontario Petroleum Institute, London Ontario, 1 vol., 1996
Ontario Petroleum Institute. Annual Conference	Ontario Petroleum Institute	36th Annual Conference, Ontario Petroleum Institute, London Ontario, 1 vol., 1997
Ontario Petroleum Institute. Annual Conference	Ontario Petroleum Institute	37th Annual Conference, Ontario Petroleum Institute, London Ontario, 1 vol., 1998
Ontario Petroleum Institute. Annual Conference	Ontario Petroleum Institute	38th Annual Conference, Ontario Petroleum Institute, London Ontario, 1 vol., 1999

Title	Author	Type and Year of Publication
Ontario Petroleum Institute. Annual Conference	Ontario Petroleum Institute	39th Annual Conference, Ontario Petroleum Institute, London Ontario, 1 vol., 2000
Ontario Petroleum Institute. Annual Conference	Ontario Petroleum Institute	40th Annual Conference, Ontario Petroleum Institute, London Ontario, 1 vol., 2001
Ontario Petroleum Institute. Annual Conference	Ontario Petroleum Institute	41st Annual Conference, Ontario Petroleum Institute, London Ontario, 1 vol., 2002
Platinum 2003	Kendall, T.	Platinum Report, Johnson Matthey Public Ltd. Company, London England, 52p., 2003
The Professional Geoscientist's Act, 2000: Regulations and By-Laws	Association of Professional Geoscientists of Ontario	APGO Document, 1 Volume, Toronto, 2001
2003/04 CAMESE Compendium of Canadian Mining Suppliers	Baird, J.G. (Man Dir)	The Canadian Association of Mining Equipment and Services for Export, Markham Ontario, 170p., 2003
Canadian Mines Handbook 2003-04	Giancola, D. (ed.)	Business InfoGroup, Toronto, 768p., 2003
Platinum 2003 Interim Review	Kendall, T.	Platinum Report, Johnson Matthey Public Ltd. Company, London England, 28p., 2003

Table 9. Publications of particular reference to southwest Ontario received by MMIC in 2003.

Title	Author	Type and Year of Publication
The Salina Group: salt solution and the Algonquin Arch: reservoir porosity, salt caverns and industrial minerals	Smith, L.	Ontario Petroleum Institute, 31st Annual Conference 1992, 20p.
Lithofacies and stratigraphic relationships of the Bass Islands Formation, Onondaga Escarpment, Niagara Peninsula	Haynes, S.	Ontario Petroleum Institute, 31st Annual Conference 1992, 18p.
Reservoir development in the middle Devonian of southwestern Ontario	Hamilton, D. and Coniglio, M.	Ontario Petroleum Institute, 31st Annual Conference 1992, 20p.
Paleozoic and Mesozoic geology of Ontario	Johnson, M.D., Armstrong, D.K., Sanford, B.V., Telford, P.G. and Rutka, M.A.	Ontario Petroleum Institute, 31st Annual Conference 1992, 26p.
Oil and gas accumulations and basement structures in southern Ontario	Carter, T.R., Travail, R.A. and Easton, R.M.	Ontario Petroleum Institute, 32nd Annual Conference 1993, 27p.
The sedimentology of the Lower Silurian Whirlpool Sandstone: in outcrop and subsurface, Southern Ontario	Cheel, R.J., Rutka, M.A. and Middleton, G.V.	Ontario Petroleum Institute, 33rd Annual Conference 1994, 19p.
Braces ancient and modern, Cayuga series	Haynes, S.J.	Ontario Petroleum Institute, 33rd Annual Conference 1994, 15p.
Hydrocarbon storage in geological formations of Ontario	Manocha, J. and Carter, T.	Ontario Petroleum Institute, 33rd Annual Conference 1994, 30p.
Sinkholes-a trapping mechanism for oil and gas in the Ordovician of Kent and Essex Counties, Ontario	Cochrane, R.O.	Ontario Petroleum Institute, 35th Annual Conference 1996, 24p.
Environmental impact of historical oilfield properties and practices, Ontario	O'Shea, K.J., Fairbanks, C.O. and O'Shea, H.J.	Ontario Petroleum Institute, 35th Annual Conference 1996, 5p.
The Ordovician of south-central Ontario: highlights of Ontario Geological Survey regional mapping project	Armstrong, D.K.	Ontario Petroleum Institute, 36th Annual Conference 1997, 5p.

Title	Author	Type and Year of Publication
Dolomitization in the Guelph Formation, Southwestern Ontario	Zheng, Q. and Coniglio, M.	Ontario Petroleum Institute, 36th Annual Conference 1997, 31p.
Sedimentology and stratigraphy of the Lower Silurian Grimsby Formation, in subsurface, Lake Erie and southwestern Ontario	Benincasa, A.J. and Cheel, R.J.	Ontario Petroleum Institute, 36th Annual Conference 1997, 22p.
Sedimentology of storm-generated shell beds from Verulam Formation (Ordovician) at Lakefield and Gamesbridge Quarries, Southern Ontario, Canada	McFarland, S., Cheel, R.J. and Westrop, S.R.	Ontario Petroleum Institute, 36th Annual Conference 1997, 22p.
A study of Rochester Pools, Southwestern Ontario, Canada	Wu, J.	Ontario Petroleum Institute, 37th Annual Conference 1998, 16p.
25 years of operating experience in petrochemical storage caverns	Harwood, J. and Manocha, J.	Ontario Petroleum Institute, 37th Annual Conference 1998, 10p.
Precambrian basement control of Paleozoic fault patterns: a preliminary assessment	Morris, B., Boyce, J., Eyles, C. and Markham, K.	Ontario Petroleum Institute, 37th Annual Conference 1998, 11p.
Vertical and lateral evaporitic facies changes within the Salina Formation	Haynes, S.	Ontario Petroleum Institute, 38th Annual Conference 1999, 15p.
The timing and mechanics of emplacement and removal of salt, in and around Pinnacle Reefs in South-Western Ontario; the Enniskillen 28 Reef Model	Bruce Bailey, S.M.	Ontario Petroleum Institute, 38th Annual Conference 1999, 31p.
The extremely complicated, “Simple” pinnacle reef reservoirs of Ontario	Bruce Bailey, S.M.	Ontario Petroleum Institute, 39th Annual Conference 2000, 33p.
Building a Responsive Industry Association in Ontario	Hochu, C.	Ontario Petroleum Institute, 39th Annual Conference 2000, 16p.
The practical geological realities of finding oil and gas reservoirs and water disposal zones in the Cambrian sediments of S.W. Ontario	Bruce Bailey, S.M.	Ontario Petroleum Institute, 40th Annual Conference 2001, 25p.
Technologies for storage development	Johnston, H.P.	Ontario Petroleum Institute, 40th Annual Conference 2001, 10p.
Digital well data for Ontario-a progress report	Carter, T.	Ontario Petroleum Institute, 40th Annual Conference 2001, 32p.
The geological implications of some 3-D “Fishnet” seismic images of Guelph pinnacle reefs in Ontario: a different perspective on their growth, destruction and complexity	Bruce Bailey, S.M.	Ontario Petroleum Institute, 41st Annual Conference 2002, 45p.
“Minerals Industries of Southwest Ontario – Mines, Quarries, Brine Fields and Wells”	Steele, K. and Carter, T.	Field Trip, CIM Toronto Branch, Ontario Ministry of Northern Development and Mines, Toronto, 30p., 2003

RECOMMENDATIONS FOR EXPLORATION

In addition to the recommendation for exploration presented below, the recommendations for high-quality crushed stone aggregate for the Greater Toronto Area (GTA) market, high-purity limestone and dolostone and Queenston Formation shale outlined in *Report of Activities 2002* (Sangster et al. 2003) remain valid. Likewise, recommendations for investigation of Eramosa dimension and landscape stone, and Gull River limestone dimension and landscape stone, outlined in *Report of Activities 2001* (Steele and Barua 2002), and "Access to Great Lakes Markets", "Multiple Commodities" and Sylvania Formation silica sand, outlined in *Report of Activities 2000* (Steele 2001), continue to be valid. The selection of mineral deposits not being mined in the Southwest Ontario District presented in Table 10 are also viable exploration targets.

Table 10. Mineral deposits not being mined in the Southwest Ontario District in 2003.

Abbreviations

AF ..... Assessment Files	MLS ..... Mining Lands, Sudbury
CMH ..... Canadian Mines Handbook	MR ..... Mining Recorder
GR ..... Geological Report	NM ..... The Northern Miner
MDC ..... Mineral Deposit Circular	OFR ..... Open File Report
MDIR ..... Mineral Deposit Inventory Record	PC ..... Personal Communication

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 by 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 by 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 by 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 by 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 by 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

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Tobermory prospect (41H/04NE)	Dolomite	60 by 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 do not follow the required disclosure for reserves and resources as outlined in National Instrument 43-101 and are historic figures generated by past workers.

Oil, Gas and Salt Resources Library

The Oil, Gas and Salt Resources Library (OGSRL), 669 Exeter Rd., London, Ontario, is a resource centre for the study of the subsurface geology, petroleum, salt and underground hydrocarbon storage resources of Ontario.

The Library houses cutting samples from over 13 000 wells, core from nearly 1000 wells, and file information on over 20 000 wells. The files include details on well history, construction, location, stratigraphy, oil, gas, and water-bearing intervals. Included in well records are also geophysical logs, core analyses and chemical analyses of subsurface fluid samples.

All companies that drill wells licensed under the Oil, Gas and Salt Resources Act are required to collect cutting samples of bedrock from the entire length of the drill hole at 3 metre intervals, and deliver these samples to the Library. Any core recovered from a well is required to be submitted to the Library within one year. Well operators are required to submit copies of all reports, geophysical logs, analyses, etc. to the Ministry of Natural Resources. Copies of all reports are available at the Library for public study after the confidentiality period expires (www.ogsrlibrary.com, T. Carter, MNR, personal communication, December 2003).

Although this collection is an invaluable resource to the petroleum industry, it also provides an often overlooked tool for mineral exploration in southwestern Ontario. Examination and analysis of material on file with the OGSRL could provide an effective window into the subsurface geology of southwestern Ontario where drilling has been done. Zinc mineralization and kimberlitic intrusions are possible targets which could be identified using these data.

OGS ACTIVITIES AND RESEARCH BY OTHERS

The Ontario Geological Survey (OGS) Sedimentary Geoscience Section conducted 6 projects or initiatives in the Southwest Ontario District in 2003. A complete summary of each project is available in the OGS 2003 Summary of Field Work, Open File Report 6120 (Baker et al. 2003).

OGS Sedimentary Geoscience program staff continued working on the production of Aggregate Resource Inventory Papers (ARIP) for Huron, Grey and Renfrew counties, and the Regional Municipality of York. These papers define and evaluate aggregate potential within the study areas used by the construction industry and for land use planning.

In 2003, the OGS Sedimentary Geoscience staff completed the GIS-based seamless surficial geology map of southern Ontario for the Land Information Ontario (LIO) digital information system. A. Bajc continued the three-dimensional mapping project of the subsurface Waterloo region and the Oro moraine to generate a 3-D geologic model for hydrogeologic modelling. OGS staff also conducted a subsurface mapping project of the Barrie aea, and initiated a thin drift cover characterization project in southern Ontario. A program was begun by OGS Sedimentary Geoscience staff to map and document the groundwater resources in southern Ontario in Groundwater Resource Inventory Papers (GRIP). Presently, there are 5 different Conservation Authorities where GRIP completion is underway, including Essex, Long Point, Grand River, Central Lake Ontario, and Conservation Authorities Moraine Coalition.

In March, 2003, Geoscape Toronto, an educational, non-technical poster highlighting the geology and land-use issues in the Greater Toronto Area, was officially released. The poster was a collaborative effort between PDAC Mining Matters, the Ontario Geological Survey, Natural Resources Canada, and the Geological Survey of Canada.

ACKNOWLEDGEMENTS

The authors would like to thank all mineral producers across southwest Ontario who provided access to their operations or supplied information throughout 2003. Strong communication links between stakeholder groups and government ministries is essential to effective program delivery and ultimately improves the delivery of government services. Previous work by K. Steele, W.J. McGuinty, C.R. Lee and M. Barua upon which this report was based is also gratefully acknowledged. Contributions from P. Sangster and C. Papertzian are also acknowledged.

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Steele, K.G. 2001. Southern Ontario Regional Resident Geologist (Southwest Ontario District)–2000; *in* Report of Activities 2000, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report; Ontario Geological Survey, Open File Report 6052.

Steele, K.G. and Barua, M. 2002. Southern Ontario Regional Resident Geologist (Southwest Ontario District)–2001; *in* Report of Activities 2001, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report; Ontario Geological Survey, Open File Report 6084.

Ontario

Ontario Geological Survey
Resident Geologist Program

Petroleum Resources Centre–2003

by

T.R. Carter

2004

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Petroleum Resources Centre–2003

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PETROLEUM RESOURCES CENTRE–2003
Oil and Gas Exploration and Development Activity in Ontario in 2003

T.R. Carter

Subsurface Geologist, Petroleum Resources Centre, Ministry of Natural Resources, London

INTRODUCTION

Petroleum resources drilling activity in Ontario continued at the relatively low levels experienced in 2002. Oil prices were strong throughout the year due to supply concerns related to the Iraq conflict and low inventory levels of refined petroleum products in the United States. Although natural gas prices did not reach the record highs of 2002 due to healthy inventories of natural gas in storage reservoirs and normal winter temperatures, they remained at levels appreciably higher than long-term averages.

Despite high commodity prices, preliminary figures compiled from Marcus Terminals indicate oil production totaled 180 000 cubic metres in 2003, compared to 214 000 cubic metres the previous year. The decrease is primarily due to a reduced exploration focus on Ordovician oil-bearing stratigraphy. Figures for natural gas were not available at the time of writing, however, production is expected to have declined due to fewer wells having been drilled into offshore Lake Erie reservoirs that supply most of Ontario's gas production.

EXPLORATION ACTIVITY

A total of 117 licences to drill and operate new wells were issued by the Ministry of Natural Resources in 2003, compared to 105 in 2002. An additional 18 licences were issued for plugging orphaned wells and 4 existing wells were licensed for private use. At the time of writing, drilling is reported to have been completed at 87 wells, 33 of which were drilled as exploratory wells, 49 as development wells, and 5 as service wells. Horizontal drilling accounted for 13 of the 87 wells drilled in 2003. The 2003 exploratory drilling resulted in 23 wells reported as gas producers (Table 1, Figure 1) with an additional 3 wells reported as potential gas wells. Development drilling was very successful, with 7 wells reported to be oil producers, 19 as gas producers, 8 as private gas wells and 1 well completed for production of both oil and natural gas. Drilling on an additional 14 wells was suspended pending further testing. Successful oil wells were completed in Ordovician and Devonian stratigraphic targets, while well completions in Silurian sandstone reservoirs in Norfolk, Haldimand and Elgin counties dominated the gas-producing wells.

Talisman Energy Inc. was the most active exploration company in Ontario's petroleum industry in 2003, with 21 wells drilled. Echo Energy Inc. drilled 16 wells, Pifher Resources Inc. completed drilling at 8 wells, and Greentree Gas & Oil drilled 6 wells, almost exclusively in the Silurian sandstone reservoirs in Norfolk and eastern Elgin counties. Talisman focussed its efforts on Ordovician oil-bearing stratigraphy and on natural gas pools in Silurian reef and sandstone targets beneath the waters of Lake Erie.

Cambrian Play: Three wells were drilled to test Cambrian targets for oil and natural gas potential in 2003. Greentree Gas & Oil reported that GGOL Huron #1 Aldborough 4-C-VII was completed as a gas producer in a new pool discovery. The two other Cambrian tests were drilled by Cameron Petroleum Inc. in or near the Gobles oil and gas pool and were suspended at the time of writing.

Ordovician Play: Drilling was reported to be complete at 4 exploratory wells and 4 development wells testing Ordovician targets in 2003. TLM No.1 (Horiz #1) Gosfield South 4-G-II was reported to be completed as an oil

producer in a new pool discovery. Two exploratory wells were plugged and abandoned with no indication of hydrocarbons and 1 well was suspended pending further evaluation.

The Ordovician development drilling resulted in 3 new oil producers with 1 well still under evaluation. Successful oil wells were completed in the Romney 5-15-I, Mersea 3-4-IV and Lake Erie Romney 194-TRS pools.

Silurian Carbonate Play: There were 4 exploratory tests of Silurian Guelph Formation reef and/or Salina Formation structural trap targets in 2003. All 4 wells were plugged and abandoned.

There were 15 development tests of Silurian Guelph–Salina formation targets in 2003. Eight wells were drilled on offshore targets in Lake Erie by Talisman Energy Inc. to develop natural gas reservoirs in the Morpeth and Silver Creek platform reefs. Four of these wells were completed for production of natural gas and the remaining 4 wells were plugged and abandoned. In onshore activity, Cameron Petroleum Inc. drilled 1 well for production of natural gas in the Otter Creek East pool. R.G. Bryant Associates re-drilled an existing well in the Euphemia 8-18-IV pool for production of oil and natural gas and RHR Resources deepened an existing well in the Sombra 4-16-IX gas pool.

Silurian Sandstone Play: The interest in Silurian sandstone targets continued in 2003, as higher natural gas prices improved the economics of this basin-centred tight gas play. A total of 23 exploratory and 25 development wells tested Lower Silurian sandstone targets in 2003. Twenty-two of the exploratory wells were reported to be gas producers or potential gas producers in exploratory extensions of known gas pools in Bayham, Houghton and Aldborough townships.

Thirteen of the development wells were reported as gas producers or potential gas producers. Successful gas wells were drilled in 6 different pools: Hemlock, Bayham, Houghton, Houghton 5-8-ENR, Aldborough 1-21-IV and the Lake Erie-Maitland pool. Eight other wells were completed as private gas wells in parts of the Lincoln, Welland and Haldimand gas fields.

Devonian Play: One exploratory and 3 development wells were drilled to test Devonian stratigraphy targets. Greentree Gas & Oil completed 3 development wells as oil producers in the Aldborough 7-D-VII pool. The exploratory well was plugged and abandoned.

RECOMMENDATIONS FOR EXPLORATION

Ordovician reservoirs are still the focus of exploration directed at the discovery or development of oil reservoirs. Exploration for new pools within Ordovician stratigraphy has declined in the past 2 years with the focus being more on extension or development drilling within 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 the current rate of oil production is to be maintained. Most of the wells drilled in this exploration play utilize horizontal drilling technology.

There still remains considerable untested natural gas potential in Lake Erie and parts of the onshore portions of the Niagara peninsula. If natural gas prices remain high, the economics for all the gas plays in Ontario will be greatly enhanced, particularly for those that target onshore and offshore Lower Silurian sandstone reservoirs and offshore platform reef environments in Lake Erie. 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. Silurian pinnacle and incipient reefs in Lambton County are also potential gas reservoirs and have the additional advantage of potential conversion to natural gas storage.

A paper presented by Bruce Bailey at the 2002 annual conference of the Ontario Petroleum Institute proposed that the productive sandstone reservoir of the Innerkip gas pool is correlative with the middle Ordovician Shadow Lake Formation and not the upper Cambrian as previously believed. This has significant implications for exploration for similar reservoirs as the prospective area would cover the entire crest of the Algonquin Arch. The Arthur gas pool occurs on the crest of the arch 60 km north of Innerkip and may be another example of this pool type.

Table 1. Successful exploratory wells drilled in southwestern Ontario in 2003. See Figure 1 for well locations.

Well #	Well Name	Results	Target	TD	Latitude	Longitude	TD Date
1	GGOL Huron #1, Aldborough 4 - C - VII	GP - CAP	CAM	1241.0	42.54595194	-81.73039611	2003-01-14
2	Wise, Aldborough 2 - 21 - VII	GP - ACT	CLI	541.0	42.62899111	-81.61647750	2003-07-22
3	REC #17, Aldborough 8 - 24 - IV	GP - CAP	CLI	544.6	42.63661222	-81.61080528	2003-08-18
4	Pifher 13, Houghton 5 - 14 - WNR	GP - POT	CLI	412.2	42.70806389	-80.71313889	2003-02-18
5	Pifher 14, Houghton 6 - 16 - WNR	GP - POT	CLI	411.5	42.72161944	-80.71278056	2003-02-10
6	Pifher 17, Houghton 2 - 5 - LRCN	GP - CAP	CLI	439.0	42.61559167	-80.68898889	2003-08-20
7	Pifher 19, Houghton 4 - 137 - STR	GP - CAP	CLI	407.0	42.74836389	-80.71576111	2003-09-26
8	GGOL #55, Houghton 5 - 137 - NTR	GP - POT	CLI	448.5	42.76275194	-80.71615194	2003-06-10
9	Echo 25, Bayham 3 - 27 - V	GP - POT	CLI	419.1	42.70868611	-80.72635833	2003-03-12
10	Echo 26, Bayham 5 - 23 - V	GP - POT	CLI	418.2	42.70906944	-80.74632222	2003-03-14
11	Echo 27, Bayham 11 - 130 - STR	GP - POT	CLI	411.5	42.73998611	-80.75062500	2003-03-20
12	Echo 28, Bayham 5 - 20 - V	GP - CAP	CLI	418.2	42.71243611	-80.76010278	2003-04-12
13	Echo 30, Bayham 5 - 11 - V	GP - CAP	CLI	415.0	42.72399167	-80.80708333	2003-07-07
14	Echo 31, Bayham 5 - 11 - IV	GP - CAP	CLI	427.6	42.70561111	-80.80762222	2003-05-24
15	Echo 34, Bayham 9 - 133 - STR	GP - CAP	CLI	413.0	42.74061944	-80.73516667	2003-08-28
16	Echo 32, Bayham 3 - 9 - IV	GP - CAP	CLI	417.0	42.71250833	-80.81657222	2003-09-29
17	Echo 33, Bayham 10 - 18 - SG	GP - POT	CLI	417.9	42.72870556	-80.77037500	2003-06-16
18	Echo 36, Bayham 3 - 11 - III	GP - CAP	CLI	425.2	42.69187500	-80.80741667	2003-06-12
19	Echo 35, Bayham 3 - 4 - I	GP - CAP	CLI	435.6	42.66284722	-80.84152500	2003-06-13
20	Echo 37, Bayham 8 - 135 - STR	GP - CAP	CLI	408.1	42.73967500	-80.72464722	2003-09-29
21	Echo 38, Bayham 18 - 119 - STR	GP - CAP	CLI	422.0	42.73731667	-80.80443611	2003-12-06
22	Echo 39, Bayham 17 - 121 - STR	GP - CAP	CLI	421.0	42.73787222	-80.79532222	2003-09-02
23	Echo 40, Bayham 12 - 125 - STR	GP - CAP	CLI	415.0	42.74263333	-80.77439722	2003-09-26

Explanation of abbreviations:

ACT - active

CAM - Cambrian

CAP - capped

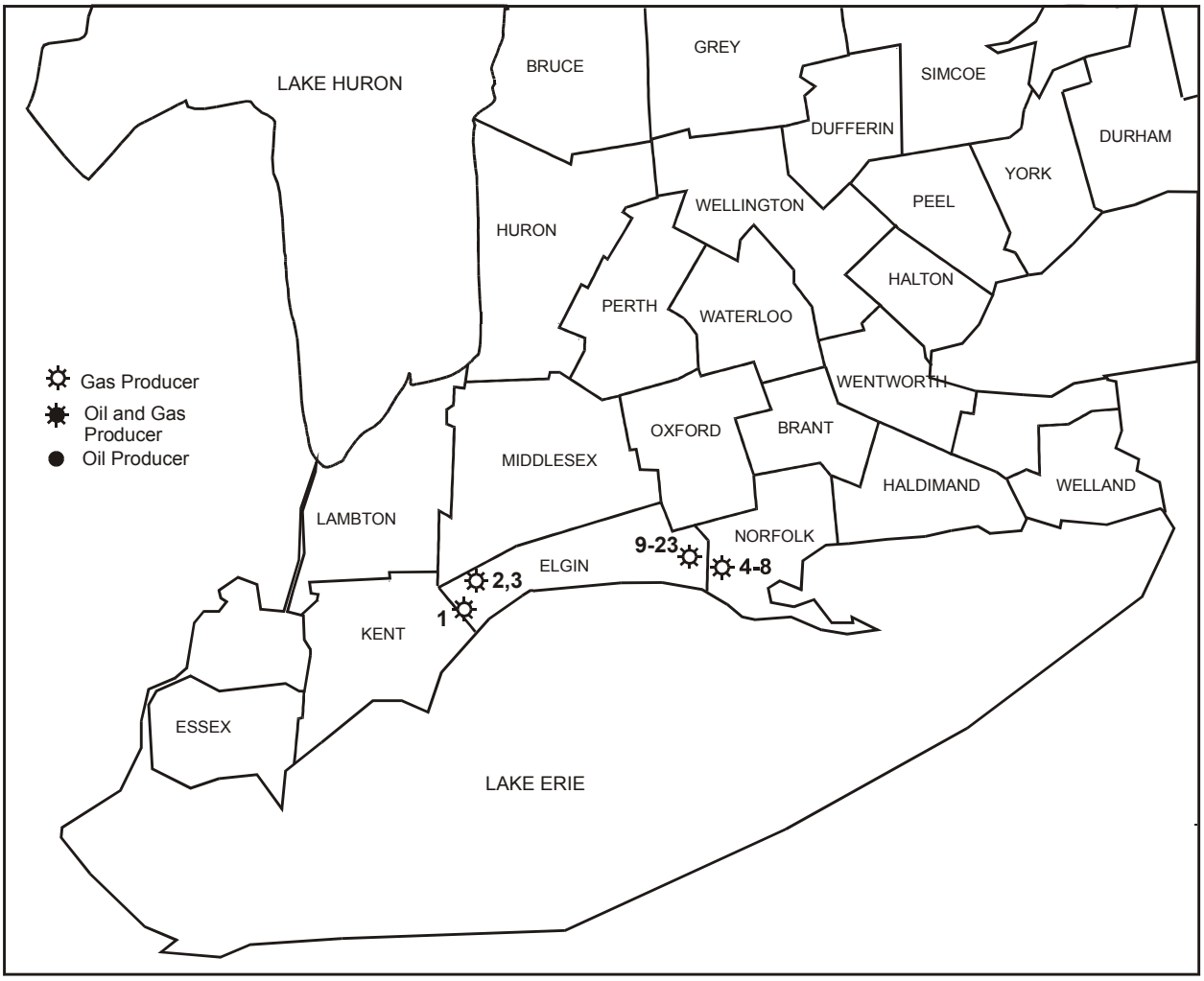
CLI - Clinton-Cataract

GP - gas producer

POT - potential

TD - total depth

Figure 1. Successful exploratory wells completed in southwestern Ontario in 2003.



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.

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