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Ontario

Ontario Geological Survey
Open File Report 6276

Report of Activities, 2011 Resident Geologist Program

Kirkland Lake Regional Resident Geologist Report: Sudbury District

2012

ONTARIO GEOLOGICAL SURVEY

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Kirkland Lake Regional Resident Geologist Report:
Sudbury District

by

D.G. Farrow, R.M. Alemany, P.J. Sangster, R.L. Debicki and A.C. Wilson

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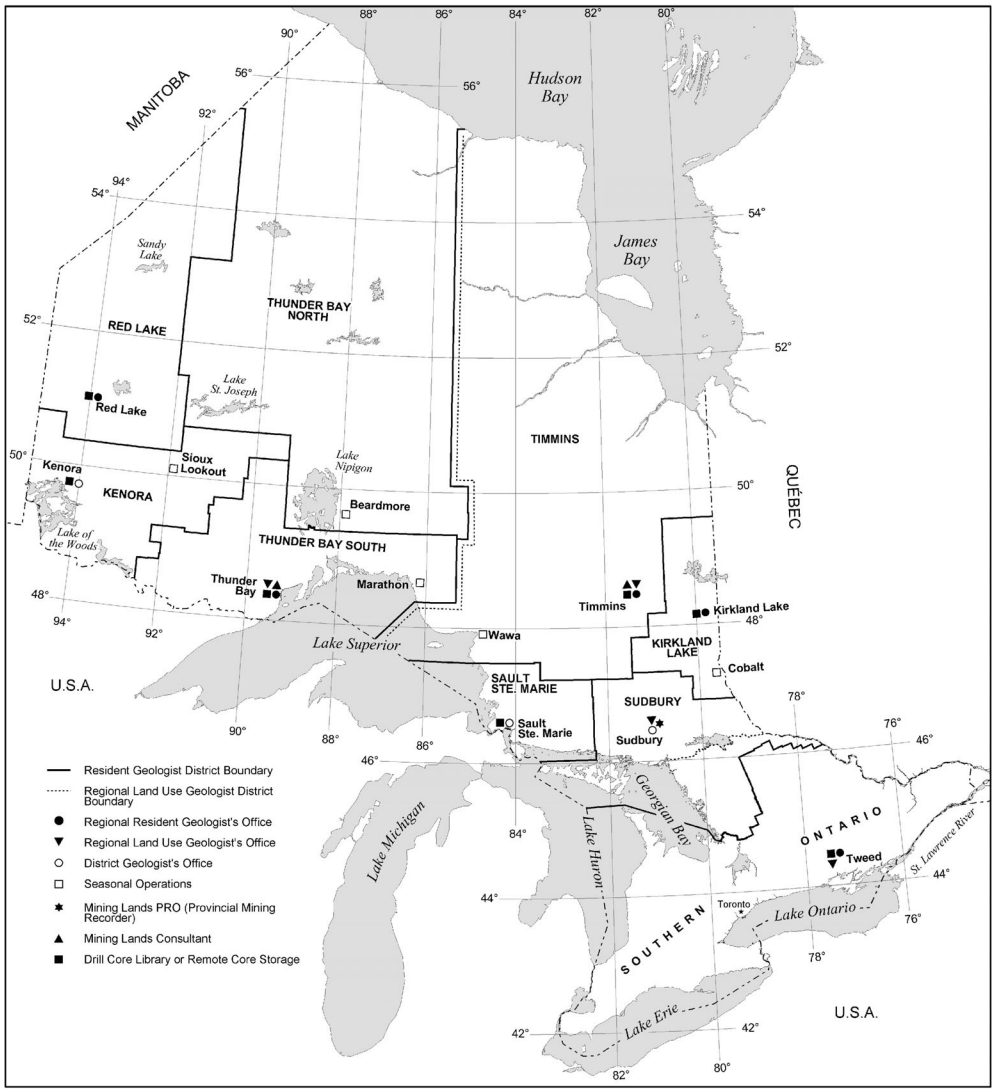

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Ontario

Ontario Geological Survey
Regional Resident Geologist Program

Kirkland Lake Regional Resident Geologist (Sudbury District)—2011

by

D.G. Farrow and R.M. Alemany
Contributing authors P.J. Sangster, R.L. Debicki and A.C. Wilson

2012

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INTRODUCTION

The Sudbury District Geologist Office administers to the judicial districts of Greater Sudbury, Manitoulin, Parry Sound, Muskoka, parts of Nipissing District and the County of Renfrew. The district encompasses approximately 45 000 km^2 and over 340 geographical townships. The Sudbury District Geologist Office is located on the campus of Laurentian University in the Willet Green Miller Centre, 3rd Floor, 933 Ramsey Lake Road, Sudbury P3E 6B5.

The Sudbury mining camp is one of the oldest and most active in the world, with nickel-copper mining operations related to the Sudbury Igneous Complex (SIC) providing the basis of economic activity in the Sudbury region. Since 1883, more than 1 billion tons of ore have been raised from Sudbury's deposits.

In general, the district is underlain, from north to south, by a diverse assemblage of Archean granitic, metavolcanic, mafic intrusive and gneissic rocks of the Superior Province; Paleoproterozoic mafic intrusive rocks, volcanic and sedimentary rocks of the Huronian Supergroup of the Southern Province; the Sudbury Igneous Complex and related mafic intrusive rocks; various lithologies within the Central Gneiss Complex of the Grenville Province and Paleozoic sedimentary rocks of the Michigan Basin.

Copper, precious metals and nickel continued to be the focus of exploration in the Sudbury mining camp in 2011, along with other base metals and industrial minerals. The global economy has shown signs of recovery, stimulating a moderate increase in exploration activity ranging from grass roots to advanced projects. Most notably, gold has received more attention than in recent years because of a steady rise in value. Despite reduced risk tolerance and the need for cost-effective spending, the Sudbury District continues to be an active area for minerals exploration. Claim-staking activities and exploration expenditures in 2011 are presented in Table 1.

Monetary values in this report are in Canadian dollars, unless otherwise stated. Ore reserve statistics mentioned in this report may not necessarily be National Instrument 43-101 (NI 43-101) compliant unless otherwise stated.

Table 1. Summary of claims recorded and assessment work credits in the Sudbury Mining Division, 2001–2011.

Year	Recorded Claim Units	Cancelled Claim Units	Active Claim Units	Total ($) Assessment Work
2011	3 077	2 258	20 143	9 662 626.00
2010	2 964	3 591	18 768	6 482 550.00
2009	1 445	8 053	19 203	7 179 712.00
2008	2 749	4 041	25 709	6 698 594.00
2007	8 870	2 589	26 448	6 855 097.00
2006	4 729	2 700	17 472	5 751 411.00
2005	3 980	4 595	18 019	9 574 778.00
2004	4 479	5 117	18 932	5 219 593.00
2003	2 801	6 519	16 691	5 249 246.00
2002	4 946	8 332	24 501	11 662 525.00
2001	8 501	3 531	27 444	4 326 222.00

MINING ACTIVITY

Nickel, Copper and Platinum Group Element Production

Global economic uncertainty continued to affect Sudbury area producers in 2011. Reduced market demand for nickel resulted in lower prices and higher inventories. Copper prices were also influenced negatively, but have displayed a more consistent recovery, as shown in the accompanying historical charts taken from Kitco.com (Figure 1). Nickel is beginning a steady recovery of its own as stock piles are falling, and demand is once again increasing.

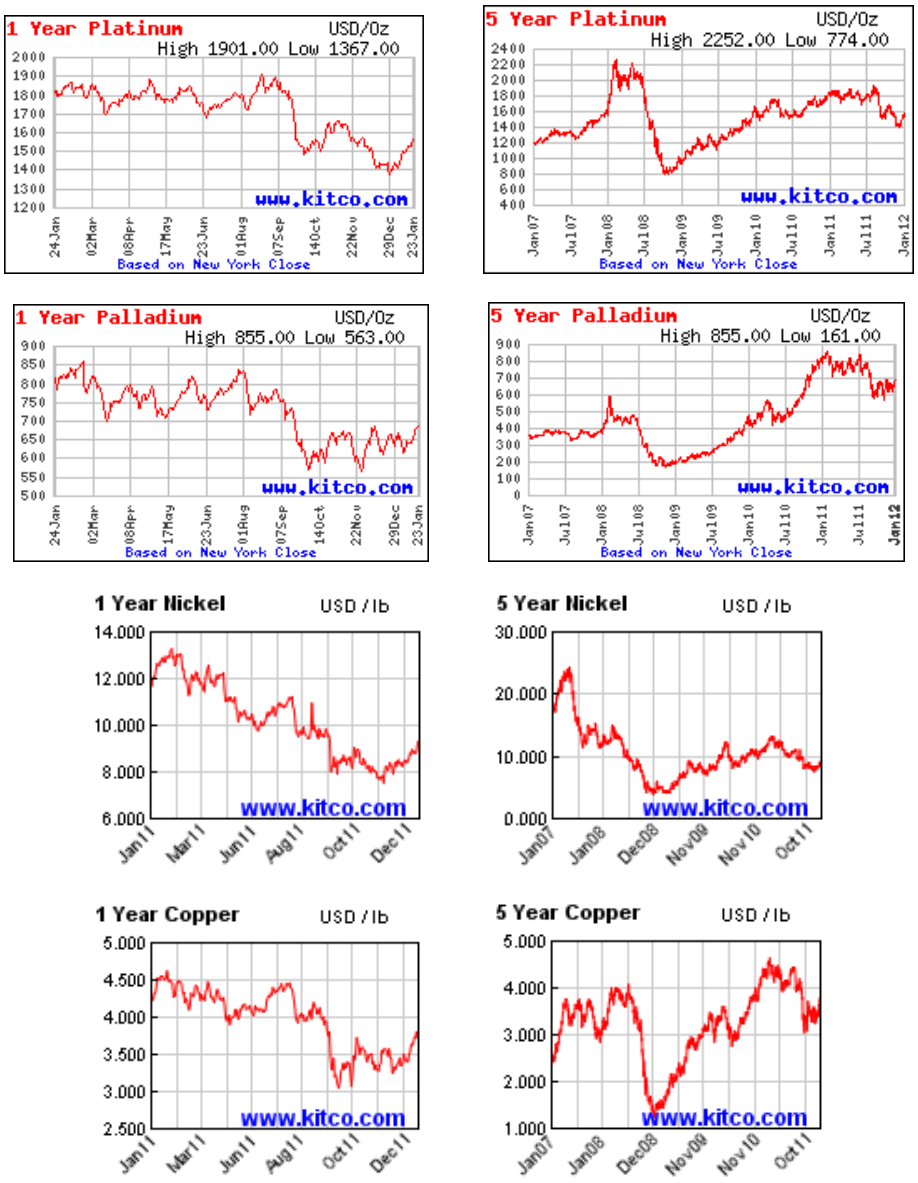

Figure 1. Five-year (2007–2011) and 1 year (2011) prices for platinum and palladium in USD/oz, and nickel and copper in USD/lb.

XSTRATA NICKEL

Xstrata Nickel is a division of Xstrata Canada Corp., which is wholly owned by Xstrata Plc of Zug Switzerland.

Xstrata Nickel operated 2 mines in the Sudbury area in 2011: Fraser–Strathcona in Levack Township, and the Nickel Rim South Mine in MacLennan Township (Figure 2). Xstrata Nickel also operated the Strathcona Mill in Levack Township, and a smelter complex in Falconbridge Township. Total production in 2011 from Xstrata Sudbury operations is shown in Table 2.

Table 2. Production from Xstrata Nickel Sudbury operations in 2011.

Ore mined:	1 493 005 tonnes	**Ore treated:**	1 833 997 tonnes
Nickel head grade:	1.46%	**Copper head grade:**	3.23%
Nickel in concentrate:	19 795 tonnes	**Nickel in matte:**	69 459 tonnes
Copper in concentrate:	49 887 tonnes	**Copper in matte:**	20 041 tonnes
Cobalt in concentrate:	473 tonnes	**Cobalt in matte:**	2209 tonnes

Strathcona Mill and Falconbridge Smelter

Ore is concentrated at Strathcona mill, located on the North Range of the Sudbury Igneous Complex (SIC) and having a throughput capacity of about 3 million tonnes per year. Copper concentrate is transported to Horne Smelter in Rouyn, Quebec, for smelting and refining. Roaster gas is treated in an adjacent plant to produce sulphuric acid, reducing sulphur emissions. The recovered sulphuric acid is sold as a by-product of the smelting process.

Nickel-copper concentrate is shipped to Xstrata's Falconbridge smelter for refining. The smelter produces matte containing nickel, copper, cobalt, platinum group and other precious metals. The Falconbridge smelter has the capacity to produce 130 000 tonnes of nickel matte per year, which is shipped to Nikkelverk Refinery in Norway for further processing.

During 2011, Fraser copper zone and Nickel Rim South were mined at full capacity, leading to a 28% increase in production from last year (*Xstrata Nickel*, press release, January 31, 2012).

Fraser–Strathcona Mine Complex

In 2010 Xstrata announced a partnership with Vale to extend the life of the Fraser Complex. The agreement will enable Xstrata to mine Vale's copper deposits that can be directly accessed through the Fraser infrastructure. Vale's Coleman Mine will receive added ventilation from Xstrata, allowing for increased productivity at the 170 ore body. The agreement set the foundation for extending the Fraser Complex life by an additional 5 years to 2025, as the Morgan project will begin development in early 2012 and achieve production in 2013.

Nickel Rim South Mine

Discovered in 2001, the high-grade, polymetallic Nickel Rim resource was found at depths of 1100 to 1700 m. The project is situated 9 km north of the Falconbridge smelter and has a 14.5 million tonne inferred resource grading 1.6% nickel, 3.1% copper, 0.03% cobalt, 1.7 g/t platinum, 1.9 g/t palladium, and 0.7 g/t gold. Of this, 7.6 million tonnes are hanging wall, massive nickel sulphide mineralization, while 6.9 million tonnes are footwall, copper and platinum group metal (PGM)-rich in nature. Revenue is 55% from nickel, 26% from copper and 19% from PGM. Underground diamond drilling has confirmed mineral location, thickness and grades to be consistent with expectations.

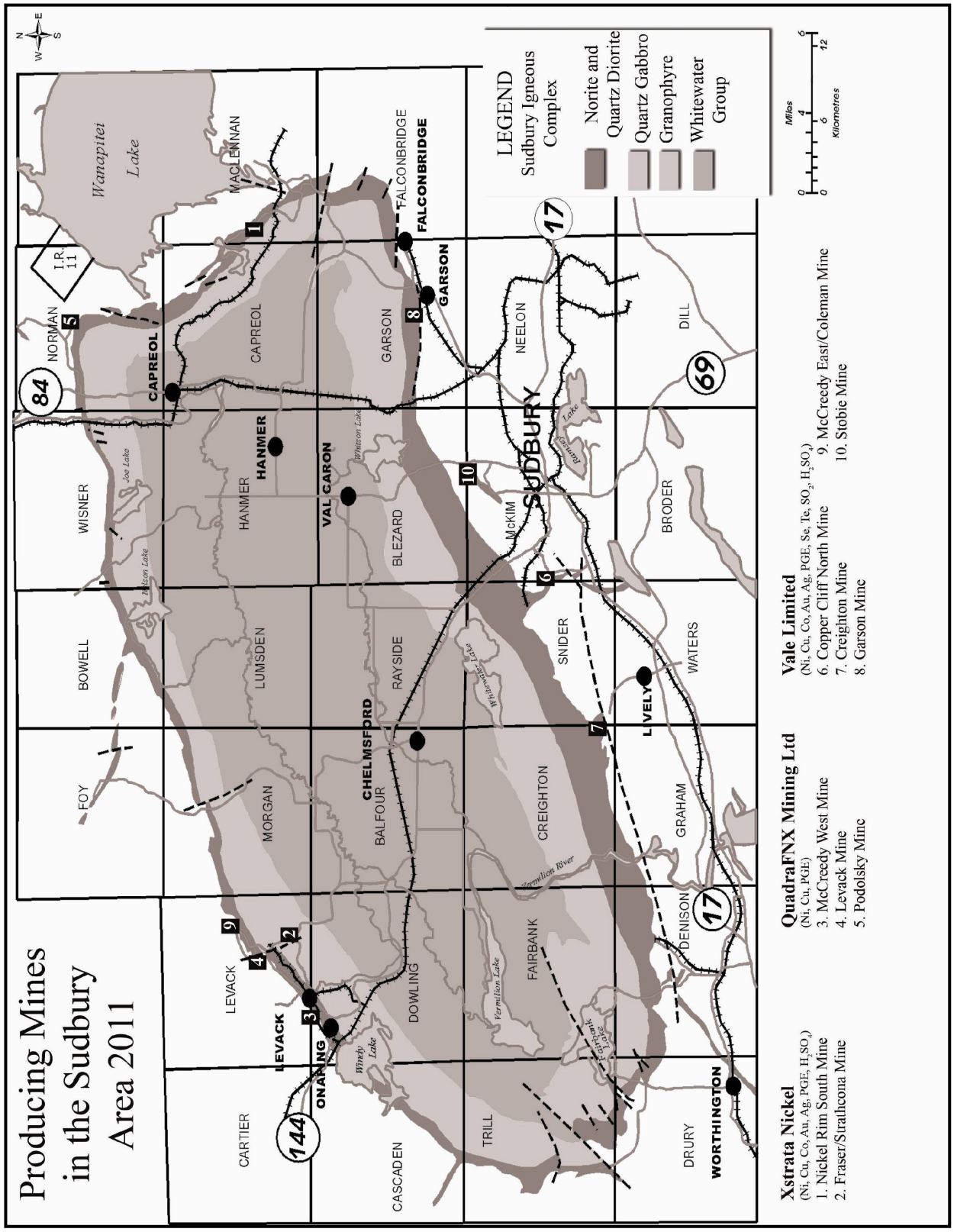

Figure 2. Producing mines in the Sudbury area 2011.

FIRST NICKEL INC.

Between 2006 and 2008, First Nickel mined about 9.4 million pounds of nickel and 6.1 million pounds of copper at Lockerby Mine. Located in the southwest corner of the Sudbury Basin, the mine had previously operated for 28 years and was seen as a low-risk brownfield project with reserves to provide a 6.5 year mine life with proven ore reserves down to the 7200-foot level.

With onset of the global financial crisis in 2008, the mine was put on care and maintenance. In 2009, the company completed a full feasibility study based on nickel prices at $9 per pound, with projected mine production based on 800 tonnes per day, or about 280 000 tonnes per year. The mine's reserves are 1.4 million tonnes of 2.23% nickel, 1.36% copper and 0.083% cobalt.

First Nickel commenced a $69.8 million project late in 2010 to restart the Lockerby Mine, aiming for commercial production by the end of 2012. The project was contingent on a $30 million loan from French and Australian banks earmarked for capital expansion to extend a ramp and upgrade surface and underground infrastructure. Projected yields from 2011 to 2016 are 52 million pounds of nickel, 34 million pounds of copper and 1 million pounds of cobalt. At full production, the operation will be staffed by about 120 employees.

Recommissioning consisted of ramp extension from the 6500- to the 7000-foot level, construction of an underground maintenance shop, improving backfill delivery and automation of ore handling systems, upgrades to the ventilation, conveyance and pumping systems and refurbishing some mobile equipment.

During 2011, all production, maintenance, clerical and technical workers were recalled, as well as unionized employees for mine support and maintenance services. Elements of the main Capital program began in the first quarter, when a lease agreement was reached to provide a fleet of four 42T haulage trucks, three 6-yard scoop trams, and one 2-boom electric hydraulic jumbo. The first of the trucks was delivered in March.

The company completed forward sales agreements for 15 million pounds of nickel and 12 million pounds of copper from Lockerby Mine to meet the conditions of the loan. The hedges were at an average price of $10.37 per pound of nickel and $4.11 per pound of copper, spread over the four-year life of the debt, and represent about 28% of the payable nickel and 34% of the copper to be produced from the current reserve at Lockerby.

Development work commenced at the Lockerby Mine in May 2011, and production and delivery of ore to Xstrata Nickel for processing was achieved in the third quarter. Production in September was 2203 tonnes. The mine was expected to produce an average of 400 tonnes per day during the fourth quarter, ramping up to annual commercial production of 10 million pounds of nickel and 7 million pounds of copper by mid 2012.

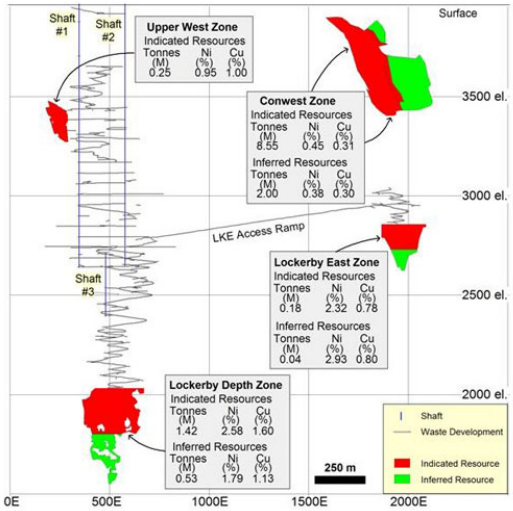

Figure 3. First Nickel Inc. mineral resources, Lockerby Mine area. Image *from* www.firstnickel.com (accessed February 2012).

QUADRA FNX MINING LIMITED

Quadra FNX Mining Ltd. operates 3 mines in Sudbury (Levack, McCreedy West and Podolsky) and holds various exploration properties, including the advanced exploration Victoria project. Quadra FNX employs about 500 people in Sudbury, with an annual payroll of $43 million. The company purchased about $120 million in goods and services in Sudbury in 2010, mostly in supplies and development contracts.

In 2011, all 3 Sudbury operations continued to produce at or above expectations.

Table 3. FNX Mining Company Inc. 2011 quarterly production.

	Q1	Q2	Q3	Q4	Total
Copper (million pounds)	15	19	17	16	67
Nickel (million pounds)	1	2	2	2	7
Pt+Pd+Au (ounces)	20 000	20 000	17 000	16 000	73 000

Levack Complex

The Morrison deposit workers continued to advance the rehabilitation of the #2 shaft in 2011, as well as the 3600-Level loading pocket and related infrastructure. The 5000-foot Craig shaft is connected to Quadra's Morrison deposit by an access drift on the 4000 Level, representing a second access point to operations, the first being a ramp from the Levack #2 shaft on the 2650 Level.

The estimated date for completion of #2 shaft rehabilitation was mid 2012, until Quadra FNX and Xstrata Nickel agreed to use the Craig mine shaft and underground infrastructure to further develop and operate the Levack Mine, including the Morrison deposit. This allowed the cessation of rehabilitation work on the Levack #2 shaft.

In January 2012, the lease agreement with Xstrata Nickel relating to the Craig shaft was completed and transition work began. The arrangement will provide access to the Craig shaft and mine infrastructure for the life of the Morrison deposit, hoisting up to 450 000 tonnes per year. The new plan offers accelerated underground access, improved operating flexibility, more underground infrastructure, ventilation and power distribution to the lower parts of the Morrison deposit and development of diamond-drill platforms to evaluate exploration targets proximal to the Morrison orebody.

The arrangement also enables Xstrata Nickel to retain operational integrity and productive capacity of the Craig infrastructure, which has been in a "care and maintenance" state since February 2009.

The Morrison deposit produced 38 million pounds of copper and 30 000 ounces of precious metals during 2011. Nickel production was higher than expected as a result of ore sourced from higher levels of the deposit.

Podolsky Mine

End of year production was unavailable at the time of writing, but Quadra expected 2011 production from Podolsky Mine to be close to 21 million pounds of payable copper, 20 to 25 thousand ounces of payable total precious metals (TPM) and about 1 million pounds of payable nickel. In 2011 increased focus was placed on exploration with the aim of expanding the existing resource and reserve base. Capital expenditures were primarily related to mobile equipment, mine infrastructure and additional development work.

McCreedy West Mine

During the second quarter, Quadra reached an agreement with Vale, whereby Vale waived its right to the high-magnesium oxide nickel ores from McCreedy West for a period of 3 years. After reaching an agreement with

Xstrata Nickel, mining of contact nickel ores recommenced to provide a bulk test sample to establish payability terms. In the third quarter, Quadra delivered 55 000 tonnes of contact nickel ore from McCreedy West to Xstrata, which was milled in August as a trial lot. Mining of nickel ore for delivery to Xstrata continued at McCreedy West during the fourth quarter. Quadra continues to mine this material and the 2012 business plan includes the mining and shipment of McCreedy West nickel ores, providing nickel prices are favourable. During the year, ore production from the PM zone and the 700 Complex footwall ore bodies improved over the same period in 2010 as a result of increases in grade and ore quantity mined.

Capital expenditures at McCreedy West are primarily related to mobile equipment, mine infrastructure and development work. An electromagnetic and optical sorting pilot plant has been commissioned on the McCreedy West site and an evaluation program was begun.

URSA MAJOR MINERALS INCORPORATED

URSA Major Minerals Inc. operated the Shakespeare nickel-copper mine 70 km west of Sudbury in Shakespeare Township in 2011. The company also holds 2 exploration properties in the Sudbury Division, the Porter–Baldwin property adjacent to the Shakespeare property and the Nickel Offsets project in Foy Township.

Shakespeare Mine

This is the second year of open pit mining operations at Shakespeare Mine, with truck haulage of ore to Xstrata Nickel's Strathcona mill in Sudbury for processing. URSA drew up an agreement with Xstrata to process ore from Shakespeare Mine at Strathcona mill for a 24-month period beginning in January 2010, and is currently in discussions to extend this agreement.

During the last quarter of 2010 and the first 3 quarters of 2011, URSA continued production at Shakespeare of about 1000 tonnes per day. In May, diamond drilling of 6055 m in 10 holes extended the orebody strike length to over 1.4 km and 600 m deep. The company planned borehole electromagnetic (EM) surveys to assess the potential for additional mineralization below identified resources.

During the year, the company implemented several site improvements at Shakespeare including construction to complete the sedimentation pond facility and pumping facilities for mine dewatering. Water treatment and monitoring was also carried out, as URSA continued surface and groundwater sampling as part of on-going site monitoring.

In the fourth quarter of 2010 (to February 2011):

URSA produced 69 947 tonnes ore with an average grade of 0.34% nickel, 0.40% copper, 0.02% cobalt, 0.36 g/t platinum, 0.39 g/t palladium, 0.19 g/t gold, and 2.25 g/t silver.

In the first quarter of 2011 (to May 2011):

URSA produced 41 917 tonnes of ore grading 0.332% nickel, 0.388% copper, 0.020% cobalt, 0.356 g/t platinum, 0.396 g/t palladium, 0.186 g/t gold and 2.267 g/t silver.

- gross revenue of $3 341 928
- operating profit of $324 031
- net loss of $387 303
- comprehensive loss of $367 303
- no ore shipped from March 15 to May 1 due to spring trucking restriction

In the second quarter of 2011 (to August 2011):

URSA delivered 32 825 tonnes of ore grading 0.306% nickel, 0.349% copper, 0.019% cobalt, 0.322 g/t platinum, 0.364 g/t palladium, 0.172 g/t gold and 1.888 g/t silver.

- gross revenue of $2 499 084
- operating loss of $151 778
- net loss of $1 159 646
- comprehensive loss of $1 168 396
- No ore shipped from March 15 to June 20 because of spring trucking restrictions

During the second quarter, URSA conducted percussion drilling in preparation for test mining on the Shakespeare East deposit.

In the third quarter of 2011 (to November 2011):

URSA delivered 55 609 tonnes of ore grading 0.299% nickel, 0.356% copper, 0.019% cobalt, 0.335 g/t platinum, 0.372 g/t palladium, 0.181 g/t gold and 2.060 g/t silver.

- gross revenue of $3 679 820
- operating loss of $218 159
- net loss of $353 544
- comprehensive loss of $363 544.

Five holes were diamond drilled vertically to depths of up to 127 m in the central portion of the planned Shakespeare East pit to confirm grade continuity and to provide additional geotechnical information. The drilling confirmed near-surface mineralization in the East Pit area that is significantly higher grade than the material being mined from the Shakespeare west pit. During 2011, URSA Major completed over 7000 m of drilling at the Shakespeare East deposit and an updated resource estimate is anticipated in early February 2012.

Highlights include 83.7 m grading 0.45% nickel, 0.53% copper, 0.024% cobalt and 1.15 g/t precious metals (PM) and 60.0 m grading 0.44% nickel, 0.54% copper, 0.025% cobalt and 1.26 g/t PM.

In December, operations at the Shakespeare Mine were limited to crushing existing broken ore, ore sampling and trucking operations because of reduced base metals prices. URSA planned to ship about 8000 tonnes of ore in December, with a plan to review resumption of mining operations in 2012 based on a revised mining plan and metal price outlook. Production costs are expected to increase as a result of higher fuel costs and increased waste rock removal. URSA has deferred the development of the East Pit in anticipation of stronger metal prices in the first half of 2012.

For the year ending December 31, 2011, URSA forecasted production of about 155 000 tonnes of ore at an average grade of 0.312% nickel, 0.364% copper, 0.020% cobalt, 0.345 g/t platinum, 0.380 g/t palladium and 0.193 g/t gold (plus silver equivalent).

Revenues from metal sales for 2011 were expected to be C$10.9 million, calculated using the following metal prices (quoted in US$): nickel $9.40 per pound, copper $3.83 per pound, cobalt $14.80 per pound, platinum $1706 per ounce, palladium $712 per ounce and gold $1684 per ounce. Metal prices reflect prices realized from February to November 2011 and prices forecast for December. The metal prices are lower than last year and significantly lower for the second half of 2011 than forecasted in March 2011.

In February 2012, URSA Major temporarily suspended operations at the Shakespeare nickel mine. The processing agreement with Xstrata expired in December 2011 and the company had not been able to conclude a new processing agreement for Shakespeare ore at the time of writing. The company is evaluating the best options for developing the Shakespeare project which is fully permitted for an onsite mill and related infrastructure.

Should production resume at Shakespeare, URSA Major will initiate development of the higher grade Shakespeare East deposit.

VALE LIMITED

Vale produces finished nickel in Sudbury at integrated mining, milling, smelting and refining operations. Sudbury facilities include 6 underground mines, the Clarabelle mill (rated capacity 45 000 tons per day), the Copper Cliff smelter, 4 refineries, 3 sulphuric acid plants, 1 liquid sulphur plant and 1 oxygen plant. Vale's Sudbury operations employ approximately 3900 people.

During 2011, Vale operated the following underground mines in Sudbury: Creighton, Garson, Copper Cliff North, Stobie, and McCreedy East–Coleman (*see* Figure 2), producing 81 588 tonnes of nickel, 90 290 tonnes of copper and 2678 tonnes of cobalt. The company estimates 2012 production at 94 000 tonnes of nickel, 81 815 tonnes of copper and 2579 tonnes of cobalt. Proven reserves at Sudbury total 59.8 million tonnes averaging 1.20% nickel, 1.51% copper and 0.04% cobalt.

Production Rates

Copper Cliff North Mine
Production rate 2826 tons/day
Opened 1886

Creighton Mine
Production rate 3142 tons/day
Opened 1902

Garson Mine
Production rate 2195 tons/day
Opened 1907–1986; reopened 1994

Coleman and McCreedy East Mine
Production rate 4604 tons/day
Opened 1992

Stobie Mine
Production rate 4801 tons/day
Opened 1886

A nickel intermediate product, nickel oxide, is shipped to Vale's nickel refinery in Clydach, Wales, for processing into finished nickel. Copper recovered from Sudbury nickel operations is customarily used to produce copper concentrate and copper anode. A lower purity refined copper (electro-won copper) is also produced. The company expects to increase production of copper concentrate and proportionately decrease production of copper anode over time as Sudbury operations are streamlined to separate nickel and copper production.

Significant quantities of platinum group metals (PGM), as well as gold and silver, are produced as by-products of nickel operations at Sudbury. Vale operates a precious metals upgrading facility at Port Colborne, Ontario, which produces PGM, gold and silver intermediate products.

During the second quarter, problems occurred with furnace #2 at the Copper Cliff smelter, causing the company to reschedule third quarter maintenance planned for both the Sudbury and Voisey's Bay operations into the second quarter. High-quality feed from Voisey's Bay was redirected to Sudbury to maximize production of high-grade products, which lessened the negative impact of the shutdown of furnace #2 on finished nickel output. The furnace was restarted near the end of the second quarter with an overall loss of 12 200 tonnes of finished nickel.

Energy requirements for production from Sudbury's sulphide ores are generally about one-fifth of the energy required to process lateritic ores. In addition, low-cost energy is available from Vale's local hydroelectric facilities, which supply about 16% of Sudbury operations electricity requirements. The power plants consist of 5 separate generating stations with a capacity of about 56 MW each.

TOTTEN MINE

Vale is working towards completing the Totten Mine near Worthington, the first new Vale (Inco) Sudbury mine in almost 40 years. Inco Limited had sunk 2 shafts at the mine in 1966, but discontinued the project in 1972 because of low metal prices. Vale has spent $360 million to date at Totten, and production was expected to begin in late 2011, but has been delayed until the end of 2013. Mine construction, including rehabilitating the existing shaft, building a new head frame and hoist house, developing a new shaft and sinking 2 fresh air raises, was faced with challenges during 2011: the existing shaft, some 40 years old, required more rehabilitation than expected, and there were geotechnical difficulties with some of the ventilation raises. With the delays have come cost escalations which have bumped the price tag from the original $360 million to a projected $759 million. The new mine has a projected life of 20 years and will eventually employ 130 people, sourced from existing Vale workers.

Other nickel mining expenditures and exploration in Sudbury include a re-evaluation of the previously suspended Copper Cliff Deep project targeting 126 million tonnes of ore in and around the community of Copper Cliff; Creighton Mine, where drilling has yielded results at depth with ore down to 3000 m; and the examination of low-grade, near-surface deposits and ongoing underground and surface exploration programs in the Sudbury Basin.

Vale is investing $200 million in a CORe (Challenging Ore Recovery) project that involves the creation of a new Clarabelle mill building in Copper Cliff that will boost metal recoveries by 3 to 4% and see a new flotation system implemented. The project is expected to be finished in 2012.

A feasibility study is in the final stages for a proposed $1.5 to $2 billion SO_2 emission reduction project at the Copper Cliff smelter. If the project receives approval, work would begin in 2012 and be completed in 2015. Sulphur-dioxide emissions would be reduced 80% to 30 to 40 kilotonnes a year, below the federal government guideline of 66 kilotonnes per year for 2015.

Exploration diamond drilling is underway in zones of high copper and precious metals including the Victor and Capre properties north east of Sudbury, reflecting a focus on both copper and nickel, from primarily nickel to respond to increasing global demand.

Vale is spending about $3.5 billion in total in the Sudbury area between now and 2015, factoring in the development of Totten Mine and the company's atmospheric emissions reduction program. Combined, mining studies and exploration expenditures in the Sudbury Basin represent an investment of more than $50 million in 2011. (*Sudbury Star*, news article, May 10, 2011; *Vale*, miningweekly.com, June 29, 2011; *Vale*, Q2-2011 production report, July 28, 2011; *Vale*, U.S. SEC Form 6-K 3Q11 Production Report, October 26, 2011; *Sudbury Star,* coverage, Sudbury Area Mining Supply & Service Association meeting, August 10, 2011; *Vale Limited,* press release, November 17, 2010 and *Sudbury Northern Life,* news article, December 29, 2011.)

Industrial Mineral Production

Industrial mineral production for a wide variety of commodities declined in the Sudbury District in 2011. Commodities produced include dolostone, silica, trap rock, flagstone, organic soil conditioner, and several varieties of coloured landscape stone and aggregate (Table 4 and Figure 4). Numerous companies and individuals extracted a considerable amount of sand and gravel for various purposes.

BIRKENDALE NATURAL STONE LIMITED

Birkendale Natural Stone operates a year round flagstone quarry on Highway 35 in Muskoka. They offer a large variety of stone from landscaping to masonry stone. This quarry was until recently a dormant quarry that has been revitalized for its unique pink granite (www.birkendale.com).

Table 4. Industrial mineral and dimension stone producers in the Sudbury District in 2011 (keyed to Figure 4).

No.	Township/Area	Company/Individual	Commodity
1	Badgeley Island	Unimin Canada Limited	Silica
2	Bigwood	Allstone Quarry Products Inc.	Landscape stone
3	Brunel	Newholm Aggregate Pit & Quarry	Veneer stone
4	Casimir	CanAmerican Granite Corp.	Blocks, veneer
5	Dawson	Lafarge Canada Limited	Dolomite
6	Finlayson	Fraser Quarry	Flagstone
7	Finlayson	McDonald Quarry	Flagstone
8	Finlayson	Boothby Quarry	Flagstone
9	Finlayson	Tasso Lake Stone	Flagstone
10	Franklin	Algonquin Stone	Flagstone
11	Franklin	Birkendale Natural Stone Limited	Flagstone
12	Franklin	Keystone Granite	Flagstone
13	Franklin	McFayden's Stone Quarry	Flagstone, masonry stone
14	Franklin	Van Dyk Natural Stone Supplies Inc.	Flagstone
15	Gibbons	Upper Canada Stone Company Ltd.	Landscape stone
16	Gordon, Aylmer	Canadian Colour Rock Inc.	Flagstone
17	McAuslan	Natur-Stone Corp.	Micastone dimension and landscaping stone
18	McAuslan, Jocko, LaSalle	Callander Industries Ltd.	Veneer stone
19	McDougall	Fowler Construction Company Limited	Flagstone
20	McDougall	Mill Lake Stone Quarry Limited	Flagstone
21	Medora, Humphrey, Watt	Brent Quarry	Flagstone
22	Perry	Cushman Stone and Gravel	Flagstone
23	Poitras	The Rock Centre	Landscape stone
24	Robinson	Colonial Brick & Stone Inc.	Flagstone
25	Ryerson	Ted Boyes and Sons Construction Limited	Flagstone
26	Ryerson	Trillium Stone Inc.	Flagstone, armour stone
27	Stephenson	Miller Aggregates	Landscape stone
28	Tofflemire	AMP (Agricultural Prospectors Inc)	Carbonatite
29	Wyse	Silicorp Inc.	Silica, dimension stone

BRENT QUARRIES

Brent Quarries have been in operation since 1989 and now offer over 40 products and services to their customers. Their product line varies from recycled asphalt to decorative stone. They operate 3 quarries in the Muskoka area, the largest being 300 acres in size (www.brentquarry.com).

CALLANDER INDUSTRIES LTD.

Callander Industries is a family owned operation just outside of North Bay. The quarry has been in operation since the late 1960s producing veneer and landscape boulders. They have recently entered into an agreement with Natur-stone Corporation to ship large blocks from their quarry to Italy for polishing and counter top production. In 2004 the company opened a new quarry to produce decorative flagstone (www.callanderindustries.com).

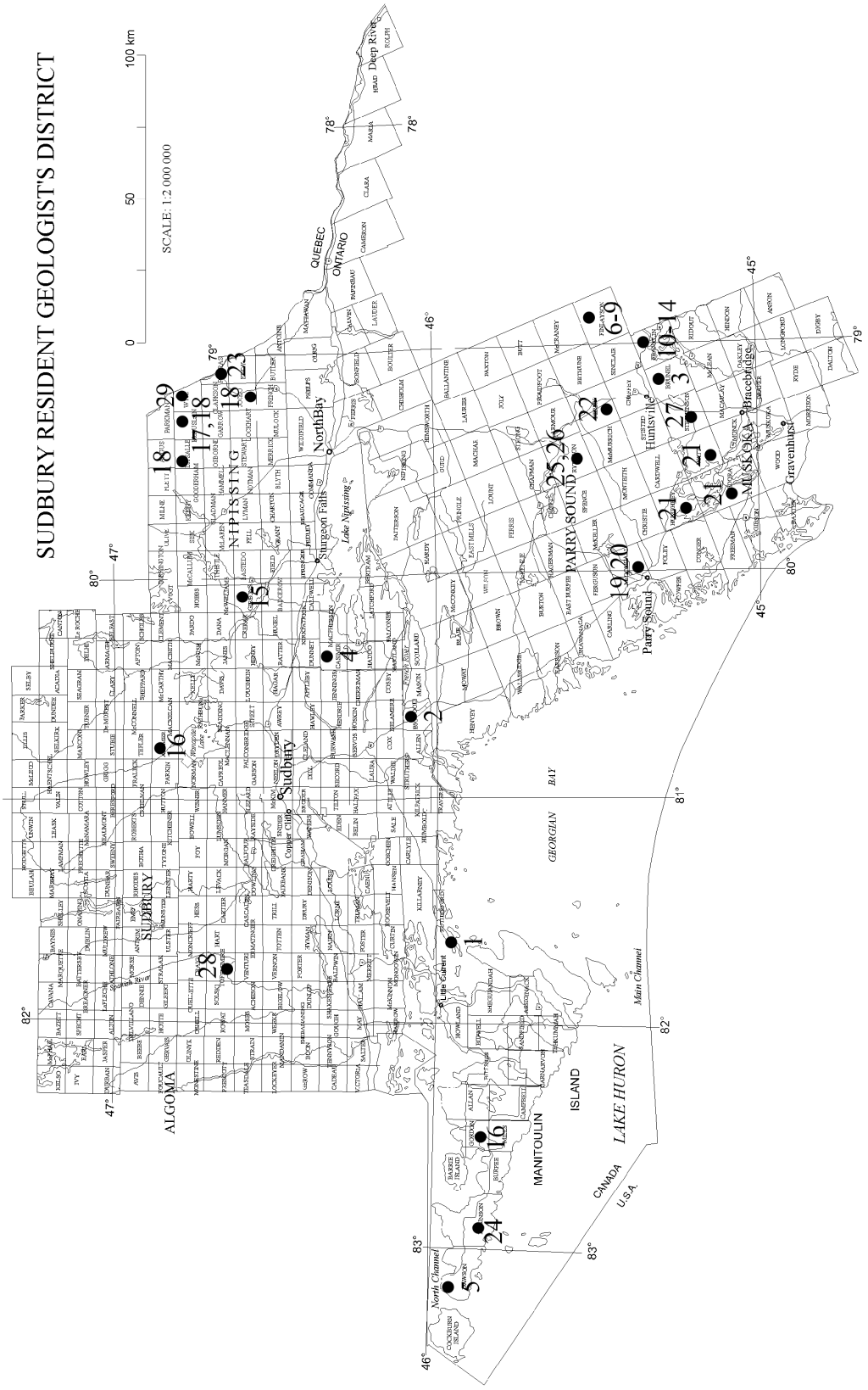

Figure 4. Industrial mineral and dimension stone producers in the Sudbury District in 2011 (keyed to Table 4).

TRILLIUM STONE INC.

Trillium Stone specializes in the production of granitic gneiss for decorative purposes. They also produce large blocks that range from 200 pounds to 10 tons to be used as armour stone. With a quarry located north of Huntsville and the head office in Toronto, their products can be found in several dealers across Ontario. (www.trilliumstone.com).

THE ROCK CENTRE

The Rock Centre focuses on landscape products including decorative stone and speciality aggregates. With over 15 years of experience the Rock Centre now operates 6 quarries in northern Ontario. They also offer unique items like flower pots, stone inuksuks and have the ability to customize products with engraving (www.therockcentre.ca).

UNIMIN CANADA LIMITED—BADGLEY ISLAND SILICA

Unimin Canada Ltd. is the largest producer of silica in Ontario, with a capacity of about 500 000 tonnes per year. Lump quartzite from the company's Badgeley Island quarry (150 000 tonnes per year capacity) in northern Georgian Bay is shipped by lake vessel to Canadian and American destinations for the manufacture of ferrosilicon. Preliminary crushing and grinding at the quarry produces a finer material that is suitable for further processing to glass-grade silica sand and to silica flour for ceramic and other uses.

LAFARGE NORTH AMERICA INC.—MELDRUM BAY OPERATIONS

Lafarge Canada Incorporated extracts approximately 5 million tonnes of dolostone annually from its Meldrum Bay quarry in Dawson Township on the western end of Manitoulin Island. Massive Paleozoic dolostone is excavated in a single lift about 30 m high. The material is classified as 70% construction aggregate and 30% metallurgical grade flux. Lake freighters ship the material to markets in southern Ontario and the United States. The operation is the largest of its kind in Ontario. The company plans to expand the operation to 7 million tons annually.

ADVANCED EXPLORATION

Xstrata Nickel (Xstrata Canada Corp.)

ONAPING DEPTH PROJECT

In 1994, down-dip diamond drilling at the Craig–Onaping mines resulted in the discovery of the Onaping Depth deposits, comprising a contact-type deposit and a shallow footwall deposit. Feasibility and scoping studies were conducted from 1999–2007. Indicated resources were pegged at 14.6 million tonnes grading 2.52% nickel and 1.15% copper, with inferred resources of 1.2 million tonnes at 3.61% nickel and 1.21% copper. Development of headworks and a shaft were planned for 2009–2010, with mining to start in 2012 and to reach full production in 2018. At a capital cost of about $1 billion, the mine was expected to run beyond 2030. The Onaping Depth project was put on hold late in 2008 pending better market conditions for nickel (www.xstrata.com).

Wallbridge Mining Company Limited

BROKEN HAMMER

At the Broken Hammer copper-PGE project, Wallbridge Mining Company Limited completed a 30 000 tonne open-pit bulk sample followed by a 1600 m diamond-drilling program in 2011. The bulk sample was processed at Xstrata's Strathcona mill in Sudbury and resulted in a net smelter return of about $4 million and estimated net proceeds of about $2.6 million, or approximately $86 per tonne.

Results from Phase I diamond drilling at Broken Hammer are shown in Table 5 below:

Table 5. Results from Phase 1 drilling at Broken Hammer.

Drill Hole	From (m)	To (m)	L (m)*	TPM (g/t)	Pt (g/t)	Pd (g/t)	Au (g/t)	Cu (%)	Ni (%)
WIS-099	23.00	27.15	4.15	9.09	4.31	4.33	0.45	0.99	0.06
WIS-100	8.20	12.30	4.10	3.44	0.56	2.81	0.07	0.55	0.08
	22.80	24.20	1.40	2.37	1.47	0.78	0.13	0.16	0.03
WIS-101	8.70	9.05	0.35	3.39	1.77	1.22	0.40	0.18	0.03
WIS-103	2.40	7.00	4.60	5.39	3.02	1.98	0.39	1.01	0.09
WIS-107	26.12	29.70	3.58	1.73	0.84	0.63	0.26	0.05	0.01
WIS-108	15.95	19.30	3.35	2.51	0.29	1.43	0.79	1.35	0.19
	39.80	48.25	8.45	3.11	0.92	1.91	0.28	0.81	0.15
	55.75	57.25	1.50	1.45	0.68	0.63	0.14	0.11	0.01
WIS-109	17.35	21.35	4.00	1.61	0.64	0.79	0.18	0.25	0.05
	45.00	56.30	11.30	3.59	1.22	1.83	0.54	0.34	0.07
WIS-098	45.10	51.00	5.90	5.37	3.84	1.39	0.15	0.21	0.02
WIS-102	14.40	18.30	3.90	30.33	28.36	1.70	0.27	0.50	0.03
WIS-104	27.45	28.10	0.65	1.71	0.84	0.69	0.18	0.08	0.02
	43.15	49.30	6.15	1.17	0.56	0.46	0.15	0.20	0.02
WIS-105	10.00	11.00	1.00	8.64	4.58	3.67	0.39	0.36	0.03
WIS-110	1.10	11.55	10.45	1.93	0.41	1.37	0.16	1.01	0.09
	16.00	20.52	4.52	1.98	1.07	0.77	0.15	0.45	0.06
	24.13	25.10	0.97	3.75	0.73	2.23	0.79	0.34	0.02

*Lengths quoted are core lengths, not true widths.

Wallbridge also reported results of 16 Phase II drill holes extending Broken Hammer mineralization north, east and west of the earlier resource estimate. A total of 40 holes drilled since 2005 will be incorporated into the new resource estimate as part of pre-feasibility (PFS) and feasibility studies.

Highlights of recent drilling include:

- 8.73 m of 3.58 g/t TPM (1.99 g/t Pt + 1.32 g/t Pd + 0.27 g/t Au), 0.90% Cu, and 0.14% Ni
- 6.10 m of 5.86 g/t TPM (4.26 g/t Pt + 1.37 g/t Pd + 0.23 g/t Au), 0.35% Cu, and 0.06% Ni
- 5.05 m of 6.56 g/t TPM (4.34 g/t Pt + 1.94 g/t Pd + 0.28 g/t Au), 0.21% Cu, and 0.01% Ni
- 3.65 m of 5.28 g/t TPM (0.26 g/t Pt + 4.50 g/t Pd + 0.52 g/t Au), 0.71% Cu, and 0.24% Ni

The assays also include an intersection of 912 g/t platinum over 0.37 m in Hole WIS-116. This extremely high-grade intersection, attributed to large sperrylite crystals observed in the drill core, is not thought to be representative of the deposit, but does confirm the presence of local high-grade pockets similar to one found in the bulk sample pit.

Wallbridge has contracted 2 engineering companies to update the mineral resource estimate and complete studies for the development of Broken Hammer. Pre-feasibility and feasibility studies will be completed along with environmental and permitting requirements. A NI 43-101 compliant, inferred mineral resource was previously estimated at 251 000 t grading 3.80 g/t TPM (1.56 g/t Pd, 1.62 g/t Pt and 0.61 g/t Au), 1.00% Cu and 0.10% Ni. New information from the bulk sample and drilling will be used to update the mineral resource estimate and provide metal recoveries for use in the PFS. A production decision is expected in 2012.

On Wallbridge's 100% owned Wisner East property adjacent to the Broken Hammer property, Wallbridge will complete drilling to test a conductor within an anomalous breccia structure for copper-PGE mineralization.

FNX Mining Company Inc.

VICTORIA MINE PROPERTY

The Victoria Mine property is located 30 km west of downtown Sudbury near the town of Worthington. The mine operated from 1900 to 1923 and again from 1973 to 1978 under the former Inco.

The former FNX, which later merged with Quadra, acquired 5 old Sudbury mines from Inco in 2002, including the Victoria property, in hopes of making more finds through further exploration.

The Victoria deposit is hosted within a geological environment that is a hybrid between Sudbury Offset quartz diorite dike rock and re-crystallized Sudbury Breccia “Footwall” rock, with local transitions into sharp-walled country rock-hosting environments. This style of mineralization is characteristic of the Sudbury South Range Breccia Belt.

Since 2002, FNX spent about $69 million in exploration at Victoria and drilled more than 640 000 feet of diamond-drill core. Since 2007 exploratory pilot and wedge-cut holes have been instrumental in the discovery of mineralized zones that are now the focus of activity.

The Inferred Resource at Victoria was defined by 31 diamond-drill holes, 23 of which intersected the Zone 4 mineralized envelope. The bulk of the tonnage is contributed by the contiguous 12.0 million tonnes from Zone 4, with the balance contributed by the under-explored Zone 2 and the Mini, which is ultimately expected to connect to Zone 4.

Exploration focus at Victoria transitioned to step-out drilling of Zone 4 and the exploration for satellite orebodies that could affect the size of future production infrastructure. This exploration approach continued for the remainder of 2011.

In the fourth quarter of 2011, ongoing infill drilling increased the Inferred Resource tonnage to 14.5 million tonnes grading 2.5% Ni, 2.5% Cu and 7.6 g/t TPM. Borehole geophysical surveys identified extensions of EM conductance interpreted to be sulphide mineralization down-dip of the Zone 4 mineral envelope, and additional conductors have been identified several hundreds of meters to the west. Diamond drilling designed to test these conductive domains is planned to continue in 2012.

Quadra initiated evaluation of shaft sinking and underground development with internal conceptual and scoping studies, began a pre-feasibility study on advanced exploration, and commenced compilation of a closure plan to support advanced exploration development. Expansion of zones 2 and 4 would be achieved most efficiently with underground-based advanced exploration. Upgrading of the Inferred Mineral Resource to Indicated and ultimately to Mineral Reserve also requires an advanced exploration diamond-drilling program. Quadra completed engineering studies by the end of 2011.

An internal scoping study was initiated in the fourth quarter of 2010 to evaluate development options. Based on the results of this work the current base case “Conceptual Development Scenario” is to concurrently sink production and ventilation shafts that could support initial exploration as well as, ultimately, a 2500 to 4000 tonnes per day mining operation. This approach would allow access for definition drilling from the ventilation shaft as well as support production during the underground development stage.

Because of the cylindrical and steeply dipping shape of Zone 4, the deposit appears amenable to lower cost semi-bulk mining methods such as long-hole stoping. Including underground development, the capital costs are estimated to be about $750 million, over a seven-year development period.

Pre-development Activities: In 2011 Quadra FNX continued to advance permitting, First Nations consultations and discussions with other stakeholders in the project area. Discussions with Vale are ongoing with respect to processing

terms and the back-in right to the project. The timing of commencement of development will depend on these discussions. The company has also commenced engineering studies that will form part of a pre-feasibility study. The goal is to begin production in 2017.

Late in the year, Quadra FNX entered into an agreement with KGHM Polska Miedź S.A. in which KGHM has agreed to acquire all common shares and warrants of Quadra FNX. KGHM, which is listed on the Warsaw Stock Exchange with a market capitalization of approximately US$8 billion, is the world's 9th largest producer of copper and 3rd largest producer of silver. The total transaction value is approximately C$3.5 billion, inclusive of US$500 million of outstanding gross debt. KGHM has advised that it intends to finance the acquisition using cash on hand.

The arrangement will be subject, among other things, to the approval of at least 66⅔% of the votes cast at a special meeting of Quadra FNX shareholders and warrant holders. In addition, the arrangement will be subject to certain customary conditions, including court approval, relevant regulatory approvals and the absence of any material adverse change. The transaction is expected to close in the first quarter of 2012. (Quadra FNX Mining Ltd press releases, April 9, July 25, October 14, November 10, December 6, 2011, and January 12, 2012; Q2 Production Report, August 10, 2011; Technical Report, May 31, 2011 and *Sudbury Star* article, January 17, 2012.)

Northern Graphite Corporation

Northern Graphite Corporation (NGC) holds 100% interest in the Bissett Creek mining lease and surrounding claims located 1 7km from the Trans Canada Highway between Ottawa and North Bay.

The company concluded a 51-hole, 2927 m diamond-drilling program on the Bissett Creek graphite project begun in 2010. All holes intersected graphite mineralization, enlarging the deposit, which remains open along strike to the north and south, and down dip to the east.

The drill program was designed to upgrade existing indicated resources of 14.6 million tonnes grading 2.24% contained graphite (Cg) at a 1.5% cut-off and Inferred Resources of 18 million tonnes grading 2.21% Cg at a 1.5% cut-off, based on 8400 m of historical drilling in 242 holes.

The 2011 program data were included in an updated resource estimate completed as part of a pre-feasibility study, which was upgraded to a full Feasibility Study (FS).

The updated mineral resource for the deposit now totals 25.9 million tonnes grading 1.81% Cg in the Indicated category (470 300 tonnes of Cg) while Inferred Resources total 55 million tonnes grading 1.57% Cg (864 100 tonnes of Cg).

The FS and Mine closure plan are expected to be completed before the end of the first quarter of 2012, along with permitting. Upon closure plan approval, the Company will be in a position to initiate construction subject to positive results from the FS and the availability of financing.

During the year, a test pilot plant designed, built and operated by SGS Minerals Services processed a 130 tonne bulk sample of graphitic material from Bissett Creek using flotation alone, without chemical or thermal treatment. The test produced 5 final products having consistent flake size distribution and an overall carbon grade averaging 95% Cg. Fifty percent of the graphite concentrate produced was jumbo size, +48 mesh flake averaging 97.7% Cg. Pilot plant recoveries ranged from 90.5 to 94.4% at concentrate grades of 94.5% Cg or greater.

NGC also conducted successful tests in the production of graphene, a material formed from the delamination of large flake graphite. Tests administered by an independent agency indicated that graphene made from NGC's jumbo flake graphite is superior in terms of size, high electrical conductivity, low resistance and transparency. (Graphene was first isolated by scientists at the University of Manchester who won the Noble Prize for Physics in 2010 for this work. Graphene is transparent in infra-red and visible light, flexible, and stronger than steel. It conducts heat 10 times faster than copper and can carry 1000 times the density of electrical current of copper wire) (*Northern Graphite Corporation*, press releases, May 17, June 21, July 21, August 24, September 20 and 23, 2011; January 11, 2012).

Table 6. Exploration activity in the Sudbury District in 2011 (keyed to Figures 5, 6 and 7).

Abbreviations

ADIT ..... Driving adit
AEM ..... Airborne electromagnetic survey
AGRAD ..... Airborne gradiometric survey
AMAG ..... Airborne magnetic survey
ARAD ..... Airborne radiometric survey
ARES ..... Airborne resistivity survey
ASSAY ..... Rock analysis
AVLF ..... Airborne VLF-EM survey
BEEP ..... Beep Mat EM survey
BENEF ..... Beneficiation study
BIOL ..... Vegetation analysis
BORE ..... Boring, other than core
BULK ..... Bulk sampling
CAP ..... Capping of shafts, raises, etc.
COMP-ABGPHYS ..... Airborne geophysics compilation
COMP-DRILL ..... Drilling compilation
COMP-GCHEM ..... Geochemical compilation
COMP-GEOL ..... Geological compilation
COMP-GPHYS ..... Ground geophysics compilation
COMP-MISC ..... Miscellaneous compilation
DATA ..... Database data
DDRILL ..... Diamond drilling
DEWAT ..... Dewatering shafts, pits
DHGPHYS ..... Downhole geophysical
EM ..... Electromagnetic survey
ENVIRO ..... Environmental study
FENCE ..... Fencing of stopes, raises, pits
FILL ..... Filling of pits, trenches, etc.
GEOTECH ..... Geotechnical
GMAP / GEOL ..... Geological mapping
GRAD ..... Gradiometric survey
GRAV ..... Gravity survey
GSAMP ..... Geological sampling
H_2O ..... Water sample analysis
INDUS ..... Industrial mineral testing
IP ..... Induced polarization survey
KIM ..... Kimberlite indicator minerals
LC ..... Line cutting
LKSED ..... Lake sediment analysis
MAG ..... Magnetic survey
METAL ..... Metallurgical testing
MICRO ..... Microscopic study
MMI ..... Mobile Metal Ion^{SM} study
OBD ..... Overburden drilling
OPHYS ..... Other physical
OREHAB ..... Other rehabilitation
PDRILL ..... Percussion drilling
PHOTO ..... Airphoto and remote imagery
PITS ..... Digging pits
PMAN ..... Prospecting, manual work
PMECH ..... Prospecting, manual work
PRECUT ..... Recutting Claim Boundary Lines
PROSP ..... Prospecting, sampling
PSAMP ..... Prospecting, grab sampling
PSTRIP ..... Hand stripping
PTRENCH ..... Bedrock Trenching
RAD ..... Radiometric survey
RCD ..... Reverse circulation drilling
RECON ..... Regional reconnaissance
RES ..... Resistivity survey
SEIS ..... Seismic survey
SHAFT ..... Shaft sinking
SOIL ..... Humus and other horizons analyses
SP ..... Self potential survey
STRIP ..... Overburden stripping
STRSED ..... Stream sediment analyses
TRNCH ..... Bedrock trenching
TRVS ..... Traverse
VLF ..... Very low frequency EM survey

No.	Company Name	Township	Type of Work
1	1724084 Ontario Inc. (Red Rock Mining)	Neelon	ASSAY, PROSP
2	A Barry	Norman	PMECH, PROSP, PSTRIP, PTRENCH
3	J Brady	Dryden	PMAN, PROSP, PSTRIP
4	JD Exploration Inc.	McConkey	GEOL
5	N Newson	Afton	PRECUT
6	Pacific North West Capital Corp.	Janes	PSTRIP
7	T Loney	Davis	ASSAY, PROSP
8	T Loney	Street	PROSP
9	T Sheppard	Aylmer	OPHYS. PROSP
10	Tearlach Resources Ltd.	Tyrone	LC, VLF
11	Trelawney Mining and Exploration Inc.	Salter	PDRILL
12	Wallbridge Mining Company Ltd	Trill	DATA

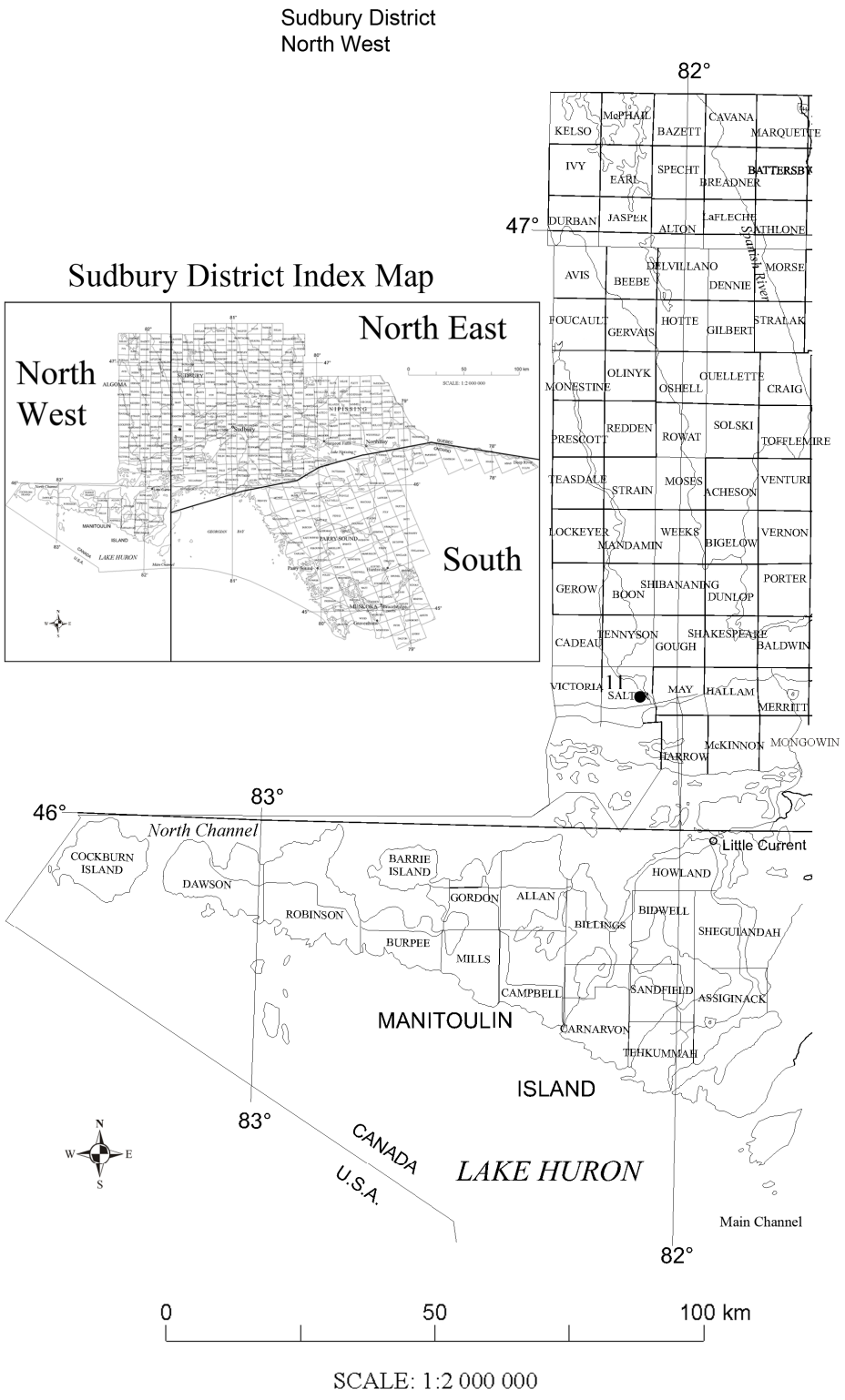

Figure 5. Exploration activity in the Sudbury District in 2011 (keyed to Table 6).

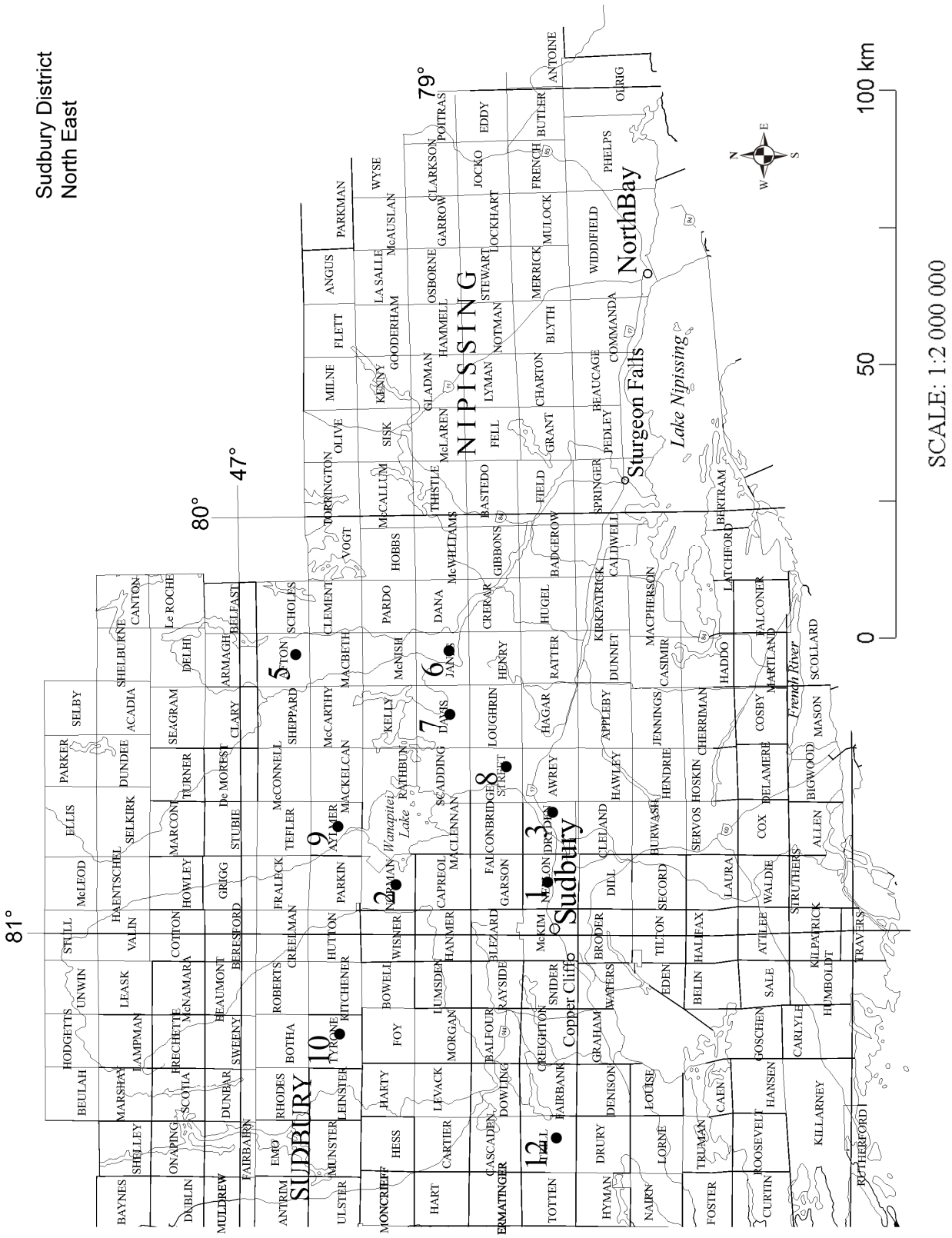

Figure 6. Exploration activity in the Sudbury District in 2011 (keyed to Table 6).

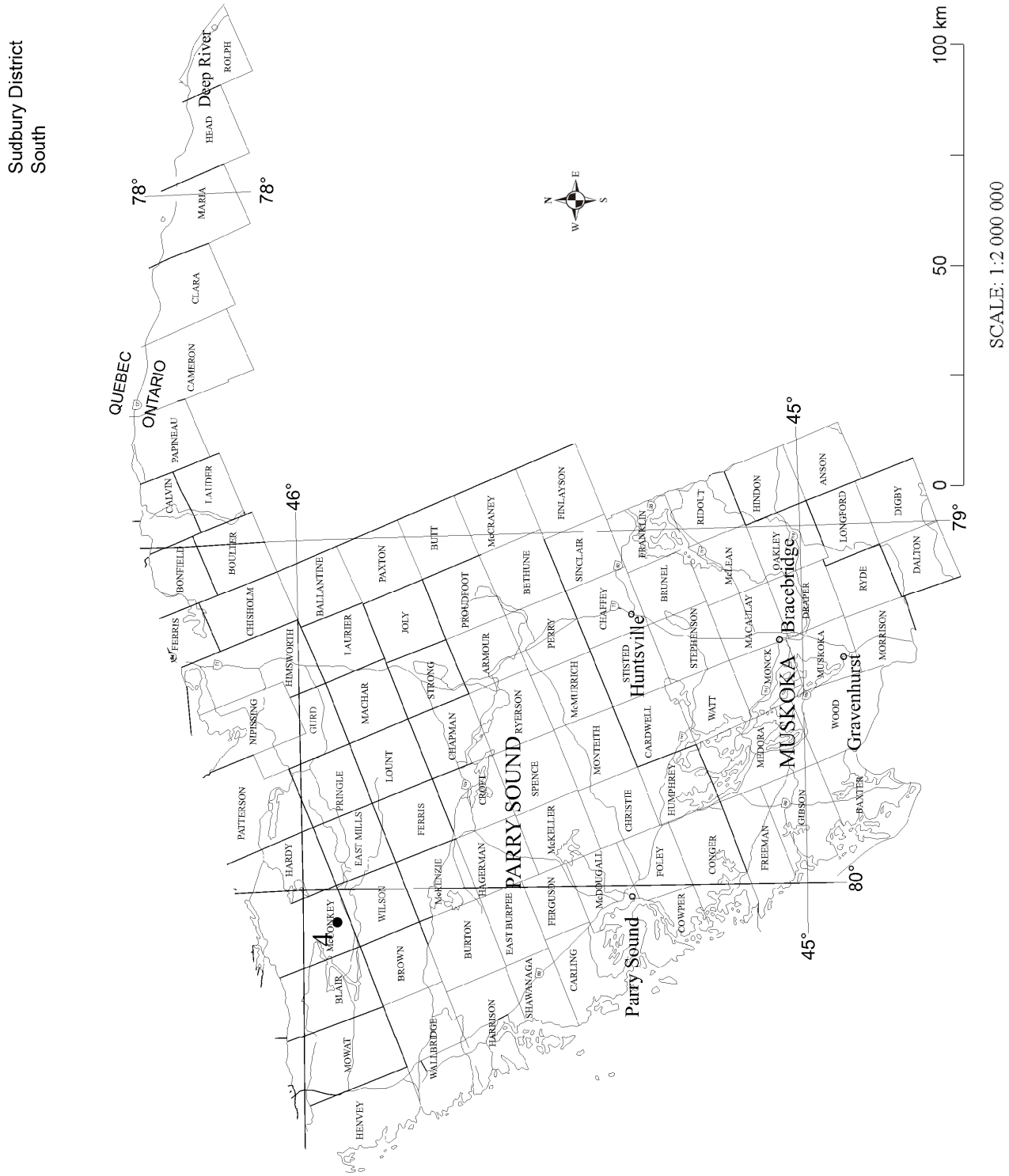

Figure 7. Exploration activity in the Sudbury District in 2011 (keyed to Table 6).

Table 7. Assessment files received for the Sudbury District in 2011 (keyed to Figure 8, 9 and 10).

Abbreviations

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KIM ..... Kimberlite indicator minerals
LC ..... Line cutting
LKSED ..... Lake sediment analysis
MAG ..... Magnetic survey
METAL ..... Metallurgical testing
MICRO ..... Microscopic study
MMI ..... Mobile Metal Ion^{SM} study
MSTRIP ..... Mechanical stripping
OBD ..... Overburden drilling
OPHYS ..... Other physical
OREHAB ..... Other rehabilitation
PDRILL ..... Percussion drilling
PHOTO ..... Air photo and remote imagery
PMAN ..... Prospecting, manual work
PMECH ..... Prospecting, mechanical work
PITS ..... Digging pits
PRECUT ..... Recutting Claim Boundary Lines
PROSP ..... Prospecting, sampling
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RAD ..... Radiometric survey
RCD ..... Reverse circulation drilling
RECON ..... Regional reconnaissance
RES ..... Resistivity survey
SEIS ..... Seismic survey
SHAFT ..... Shaft sinking
SOIL ..... Humus & other horizons analyses
SP ..... Self potential survey
STRIP ..... Overburden stripping
STRSED ..... Stream sediment analyses
TRNCH ..... Bedrock trenching
TRVS ..... Traverse
VLF ..... Very low frequency EM survey

No.	Township	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
1	Afton	Teck Resources Limited/Ressources	2009	EM,IP,LC,MAG	2.47970	Afton-SP020
2	Afton	Teck Enerpulus Corporation	2010–2011	DHGEO	2.48393	Afton-SP021
3	Afton	N Newson	2011	PRECUT	2.49192	Afton-SP022
4	Angus	Randsburg International Gold Corp.	2010	GEOL, LC. MAG	2.46789	Angus-SP006
5	Aylmer	T Sheppard	2011	OPHYS, PROSP	2.48946	Aylmer-SP023
6	Aylmer	T Sheppard	2009	PMAN	2.45865	Aylmer-SP012
7	Aylmer	T Sheppard	2010	ASSAY, PMAN	2.45847	Aylmer-SP013
8	Aylmer	T Sheppard	2010	PMAN, PSAMP	2.45848	Aylmer-SP014
9	Aylmer	T Sheppard	2010	EM, MAG	2.46299	Aylmer-SP015
10	Aylmer	T Sheppard	2010	PROSP	2.45863	Aylmer-SP016

No.	Township	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
11	Aylmer	T Sheppard	2009	PROSP	2.45869	Aylmer-SP017
12	Aylmer	T Sheppard	2009	GEOPHYSP, VLF-EM	2.44234	Aylmer-SP018
13	Aylmer	T Sheppard	2010	STRIP, ASSAY	2.45845	Aylmer-SP019
14	Aylmer	T Sheppard	2010	ASSAY, PMAN	2.47734	Aylmer-SP020
15	Aylmer	T Sheppard	2010–2011	GEOL	2.47732	Aylmer-SP021
16	Aylmer	T Sheppard	2010–2011	GEOL, PROSP	2.47724	Aylmer-SP022
17	Blezard	Vale Canada Ltd	2010–2011	ASSAY, PDRILL	2.49377	Blezard-SP006
18	Boon	Mustang Minerals Corp	2010	AEM, AMAG	2.46401	Boon-SP028
19	Boon	Mustang Minerals Corp.	2009	DHGEO, PDRILL	2.46261	Boon-SP029
20	Boon	Mustang Minerals Corp.	2010	AEM, AMAG	2.48825	Boon-SP030
21	Botha	Votorantim Minerals Inc.	2010	AEM, AMAG	2.44894	Botha-SP012
22	Botha	D Beilhartz	2010	ASSAY, GEOL, PROSP	2.47877	Botha-SP013
23	Bowell	Xstrata Canada Corp.	2009–2011	AGRAD	2.49200	Bowell-SP020
24	Cascaden	Wallbridge Mining Company Ltd	2009–2010	ASSAY, GEOL	2.44480	Cascaden-SP016
25	Cascaden	Wallbridge Mining Company Ltd	2010–2011	ASSAY,GEOL,PMECH,PROSP	2.48049	Cascaden-SP017
26	Clement	Goldtrain Resources Inc.	2010	AEM	2.44058	Clement-SP012
27	Clement	A Leblanc	2010	PDRILL	2.44793	Clement-SP014
28	Clement	Goldtrain Resources Inc.	2010	ASSAY, GEOL	2.46008	Clement-SP015
29	Clement	Goldtrain Resources Inc.	2010	DATA, PSTRIP, AEM	2.44452	Clement-SP016
30	Davis	Z Smellie	2010	STRIP, GMAP, SAMP	2.44560	Davis-SP085
31	Davis	Pacific North West Capital Corp	2010	PROSP, TRVS, SAMP	2.45401	Davis-SP086
32	Davis	J Bradley	2010–2011	ASSAY, PMAN	2.47297	Davis-SP087
33	Davis	J Brady	2010	ASSAY, PSTRIP	2.46979	Davis-SP088
34	Davis	J Brady	2010	ASSAY, GEOL, PMAN, PROSP	2.47638	Davis-SP089
35	Davis	Pacific North West Capital Corp	2010	IP, LC, MAG	2.47327	Davis-SP090
36	Davis	T Loney	2011	ASSAY, PROSP	2.49229	Davis-SP091
37	Dieppe	G Salo	2009–2011	ASSAY, PROSP, GEOL, PSTRIP, PMAN, PTRNCH, PMECH	2.47646	Dieppe-SP021
38	Dryden	T Fielding	2009–2010	PROSP	2.46112	Dryden-SP020
39	Dryden	J Brady	2011	PMAN, PROSP, PSTRIP	2.48346	Dryden-SP021
40	Eden	R Komarechka	2010	PROSP, TRVS	2.46101	Eden-SP015
41	Eden	R Komarechka	2010–2011	DHGEO, IP, LC	2.47510	Eden-SP016

No.	Township	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
42	Eden	G R Salo	2010–2011	ASSAY PDRILL	2.48736	Eden-SP017
43	Ermatinger	Champion Bear Resources Ltd,	2010–2011	ASSAY, GEOL	2.48158	Ermatinger-SP022
44	Falconbridge	Wallbridge Mining Company Ltd	2011–2010	ASSAY, MICRO, PROSP	2.47274	Falconbridge-SP044
45	Flaconbridge	Wallbridge Mining Company Ltd	2010	ASSAY, GEOL	2.46145	Falconbridge-SP043
46	Foster	K Naples	2010	ASSAY, PMAN	2.45068	Foster-SP026
47	Foster	K Naples	2010–2011	ASSAY PMAN	2.48400	Foster-SP027
48	Foucault	A Robertson	2010	PRECUT	2.46919	Foucault-Sp007
49	Foy	United Reef Ltd	2009	ASSAY, ENVIRO, PDRILL	2.44619	Foy-SP033
50	Foy	United Reef Ltd	2009	DHGEO	2.44849	Foy-SP034
51	Foy	Wallbridge Mining Company Ltd	2009–2011	ASSAY,PMAN,DHGEO, GEOL,PDRILL	2.48161	Foy-SP035
52	Foy	Wallbridge Mining Company Ltd	2009–2011	ASSAY,PMAN,GEOL, PSTRIP,MICRO,PDRILL	2.47511	Foy-SP036
53	Fraleck	J Brady	2010–2011	PMAN, PMECH	2.48118	Fraleck-SP013
54	Graham	Wallbridge Mining Company Ltd	2009–2010	ASSAY. GCHMET, GEOL, MICRO, PDRILL	2.47211	Graham-SP015
55	Graham	Wallbridge Mining Company, Xstrata Canada Corporation	2010	AMAG, AVLF	2.47588	Graham-SP016
56	Graham	Xstrata Canada Corp.	2010	ASSAY, GCHEM, GEOL, PROSP	2.49079	Graham-SP017
57	Harty	Wallbridge Mining Company Ltd	2010	GEOL, GMAP	2.46463	Harty-SP023
58	Harty	Wallbridge Mining Company Ltd	2009	ASSAY, PDRILL	2.44921	Harty-SP024
59	Harty	Wallbridge Mining Company Ltd.	2009	MAG	2.43821	Harty-SP025
60	Harty	Pele Mountain Resources Inc.	2007–2010	ASSAY, PDRILL	2.43955	Harty-SP026
61	Harty	Wallbridge Mining Company Ltd.	2010–2011	ASSAY, GEOL	2.48338	Harty-SP027
62	Hess	Crowflight Minerals Inc	2008–2009	ASSAY, GEOL, PDRILL, VLF	2.43914	Hess-SP051
63	Hess	Wallbridge Mining Company Ltd.	2010–2011	LC, EM, MAG	2.48837	Hess-SP052
64	Hyman	J. Brady	2010	GEOL, OTHER, PMECH, PROSP	2.46332	Hyman-SP022
65	Hyman	J. Brady	2010	ASSAY	2.47175	Hyman-SP023
66	Janes	Pacific North West Capital Corp.	2007–2010	PDRILL	2.44055	Janes-SP035
67	Janes	Pacific North West Capital Corp.	2011	PSTRIP	2.48557	Janes-SP036
68	Mackelcan	Flag Resources (1985) Limited	2010–2011	PDRILL	2.47624	Mackelcan-SP042
69	MacLennan	Wallbridge Mining Company Ltd	2010	ASSAY, GEOL	2.46253	MacLennan-SP039
70	May	Salmay Resources Inc	2008–2010	PDRILL	2.45521	May-SP010

No.	Township	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
71	McAuslan	McLaren's Bay Mica Stone Quarries Inc	2010	PRECUT	2.46380	McAuslan-SP018
72	McConkey	JD Exploration Inc.	2011	GEOL	2.49081	McConkey-SP023
73	McKinnon	R. Aviles	2010	ASSAY, PROSP	2.45839	McKinnon-SP022
74	Morgan	Wallbridge Mining Company Ltd	2010	ASSAY, GEOL,PMAN	2.47179	Morgan-SP009
75	Nairn	W Leduc	2010	MAG, VLF	2.46798	Nairn-SP013
76	Nairn	Sino Minerals Corp	2009	ASSAY, MAG, PSTRIP	2.46658	Nairn-SP014
77	Nairn	W Leduc	2010	MAG	2.44356	Nairn-SP015
78	Neelon	Rainbow Concrete Industries Ltd.	2010	ASSAY, PMECH	2.46260	Neelon-SP020
79	Neelon	1724084 Ontario Inc. (Red Rock Mining)	2011	ASSAY, PROSP	2.49517	Neelon-SP021
80	Norman	J Brady	2010	ASSAY, GCHEM, GEOL, PROSP, PSTRIP	2.47222	Norman-SP068
81	Norman	Walbridge Mining Company Ltd	2008–2009	ASSAY, DHGEP, MICRO, PDRILL, PROSP	2.47009	Norman-SP069
82	Norman	A Barry	2011	PMECH, PROSP, PSTRIP, PTRENCH	2.48561	Norman-SP070
83	Olive	Drive-By Exploration Inc	2008–2009	PROSP	2.45844	Olive-SP001
84	Olive	Drive-By Exploration Inc.	2010	MAG	2.49000	Olive-SP002
85	Pardo	Endurance Gold Corp	2009–2010	IP	2.45833	Pardo-SP015
86	Pardo	Mount Logan Resources Ltd.	2010	ASSAY, GEOL, LC, PDRILL	2.45793	Pardo-SP016
87	Pardo	Endurance Gold Corp	2009–2010	GCHEM	2.46614	Pardo-SP017
88	Pardo	Mount Logan Resources	2009–2010	ASSAY,GEOL	2.44088	Pardo-SP018
89	Parkin	J Brady	2010	ASSAY, GEOL, PMAN, PROSP	2.47727	Parkin-SP018
90	Porter	Falcon Ventures International Inc.	2009–2010	ASSAY, PROSP, PSTRIP, RAD	2.43901	Porter-SP022
91	Rathbun	Flag Resources (1985) Ltd.	2009–2010	PDRILL	2.45505	Rathbun-SP063
92	Salter	Trelawney Mining and Exploration Inc.	2005–2010	ASSAY, PDRILL	2.46520	Salter-SP009
93	Salter	Trelawney Mining and Exploration Inc.	2011	PDRILL	2.49556	Salter-SP010
94	Scadding	Currie Rose Resources Inc.	2009–2010	ASSAY. PDRILL	2.45358	Scadding-SP065
95	Scadding	Currie Rose Resources Inc.	2009	PDRILL	2.45350	Scadding-SP066
96	Scadding	Pacific North West Capitol Corp	2010	ARAD, MAG, VLF	2.45173	Scadding-SP067

No.	Township	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
97	Scadding	T Loney	2010	IP, LC, MAG	2.47333	Scadding-SP068
98	Scadding	T Loney	2010	IP, LC	2.47328	Scadding-SP069
99	Scadding	Trueclaim Exploration Inc.	2009–2010	Other	2.45331	Scadding-SP070
100	Scadding	T Loney	2010	PROSP	2.48747	Scadding-SP071
101	Scadding	Trueclaim Exploration Inc.	2010	PROSP	2.48661	Scadding-SP073
102	Scadding	Trueclaim Exploration Inc	2009–2011	ASSAY, GCHEM, GCHMET, PDRILL, PMAN, PROSP, PSTRIP	2.49225	Scadding-SP074
103	Scholes	The Temagami Iron Corp.	2009	AMAG, AVLF, GRAV, LC	2.43565	Scholes-SP016
104	Scholes	The Temagami Iron Corp.	2010–2011	PDRILL	2.47981	Scholes-SP017
105	Shakespeare	P G Blue	2010	ASSAY, PMAN	2.45510	Shakespeare-SP045
106	Shakespeare	Ursa Major Minerals Inc.	2010	DHGEO	2.47512	Shakespeare-SP046
107	Shakespeare	P G Blue	2010–2011	GCHMET	2.47787	Shakespeare-SP047
108	Sinclair	Ralph Vernon Stewart	2010	GEOL, PSTRIP	2.47622	Sinclair-SP002
109	Street	Trueclaim Exploration Inc.	2010	PROSP	2.48729	Street-SP037
110	Street	Trueclaim Exploration Inc.	2010	PSTRIP, GEOL	2.48618	Street-SP038
111	Street	T Loney	2010	PROSP	2.48660	Street-SP039
112	Street	T Loney	2011	PROSP	2.49330	Street-SP040
113	Trill	Wallbridge Mining Company Ltd	2011	DATA	2.48342	Trill-SP008
114	Trill	Wallbridge Mining Company Ltd.	2010–2011	AGRAD	2.47435	Trill-SP009
115	Tyrone	D Beilharts	2010	GEOL	2.46404	Tyrone-SP014
116	Tyrone	Tearlach Resources Ltd.	2010	ASSAY, PROSP, PSTRIP	2.45995	Tyrone-SP015
117	Tyrone	Tearlach Resources Ltd.	2010	ASSAY, PROSP	2.46952	Tyrone-SP016
118	Tyrone	Tearlach Resources Limited	2009	ASSAY,PROSP	2.44892	Tyrone-SP017
119	Tyrone	Tearlach Resources Ltd.	2011	LC, VLF	2.49115	Tyrone-SP018
120	Venturi	Agricultural Mineral Prospectors Inc.	2005–2010	INDUS	2.46495	Venturi-SP014
121	Waters	Wallbridge Mining Company Ltd.	2008–2010	ASSAY, PDRILL, DHGEO, GEOL, MICRO	2.47674	Waters-SP023
122	Waters	M Kosovsky	2008–2010	ASSAY, MICRO	2.44576	Waters-SP023

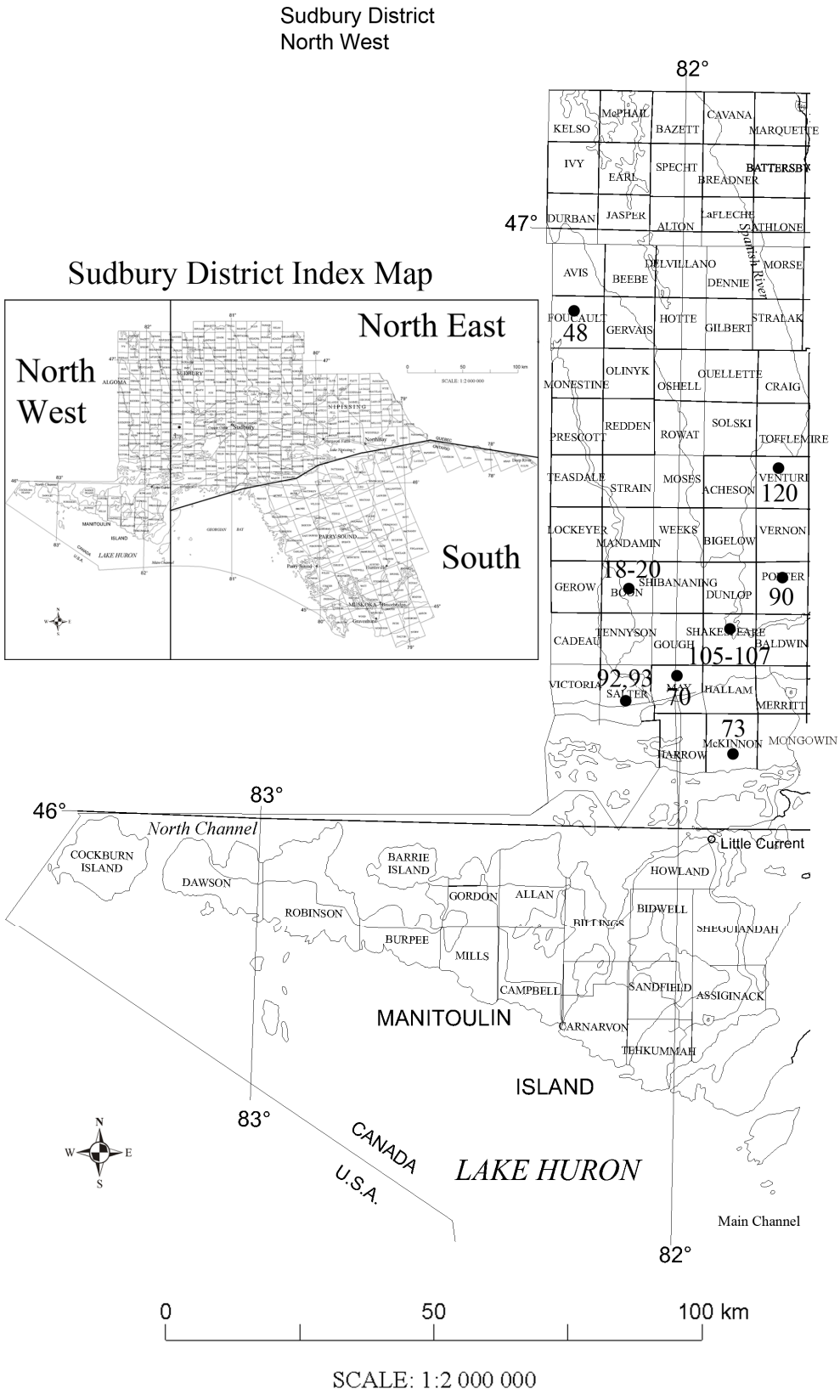

Figure 8. Assessment files received in the Sudbury District in 2011 (keyed to Table 7).

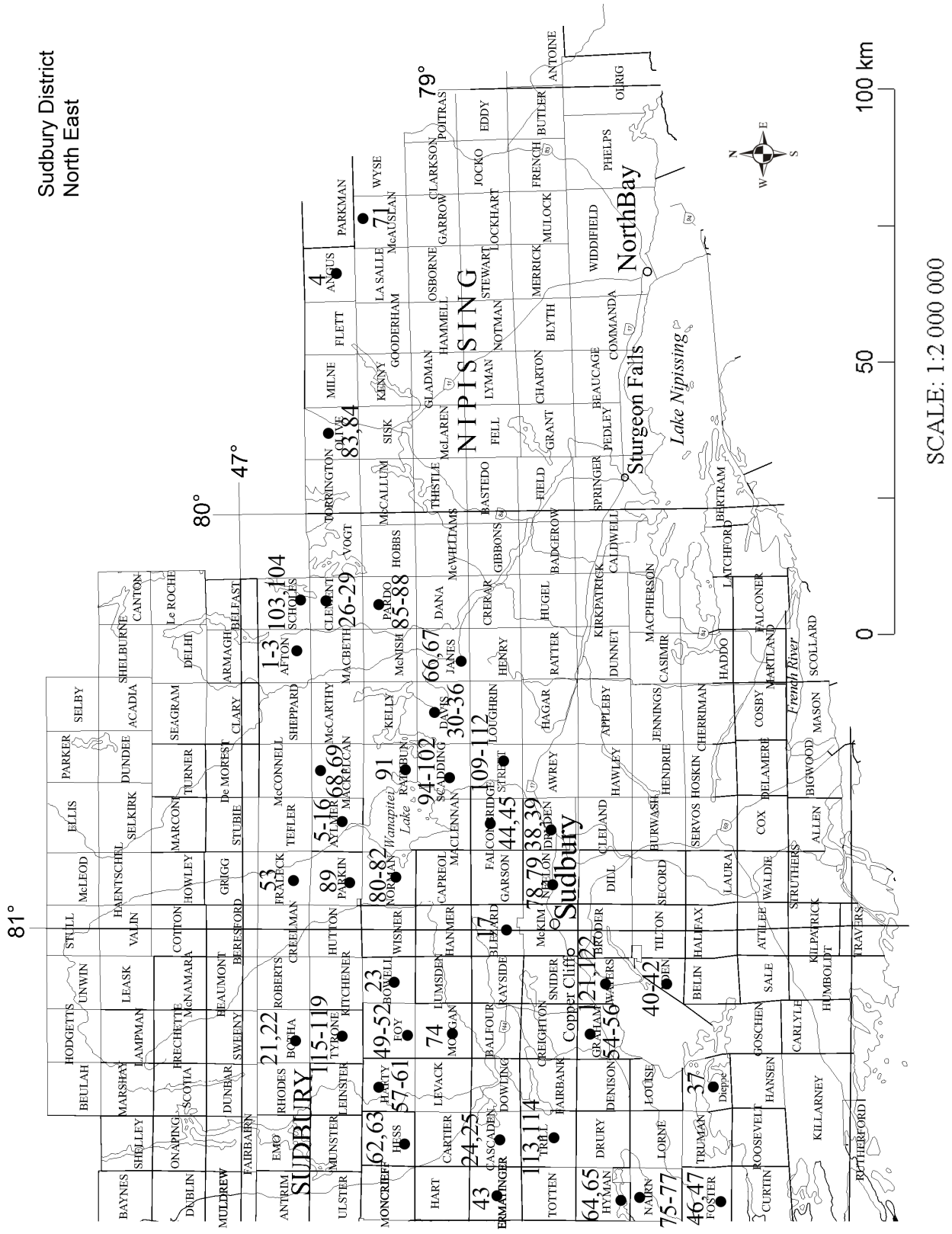

Figure 9. Assessment files received in the Sudbury District in 2011 (keyed to Table 7).

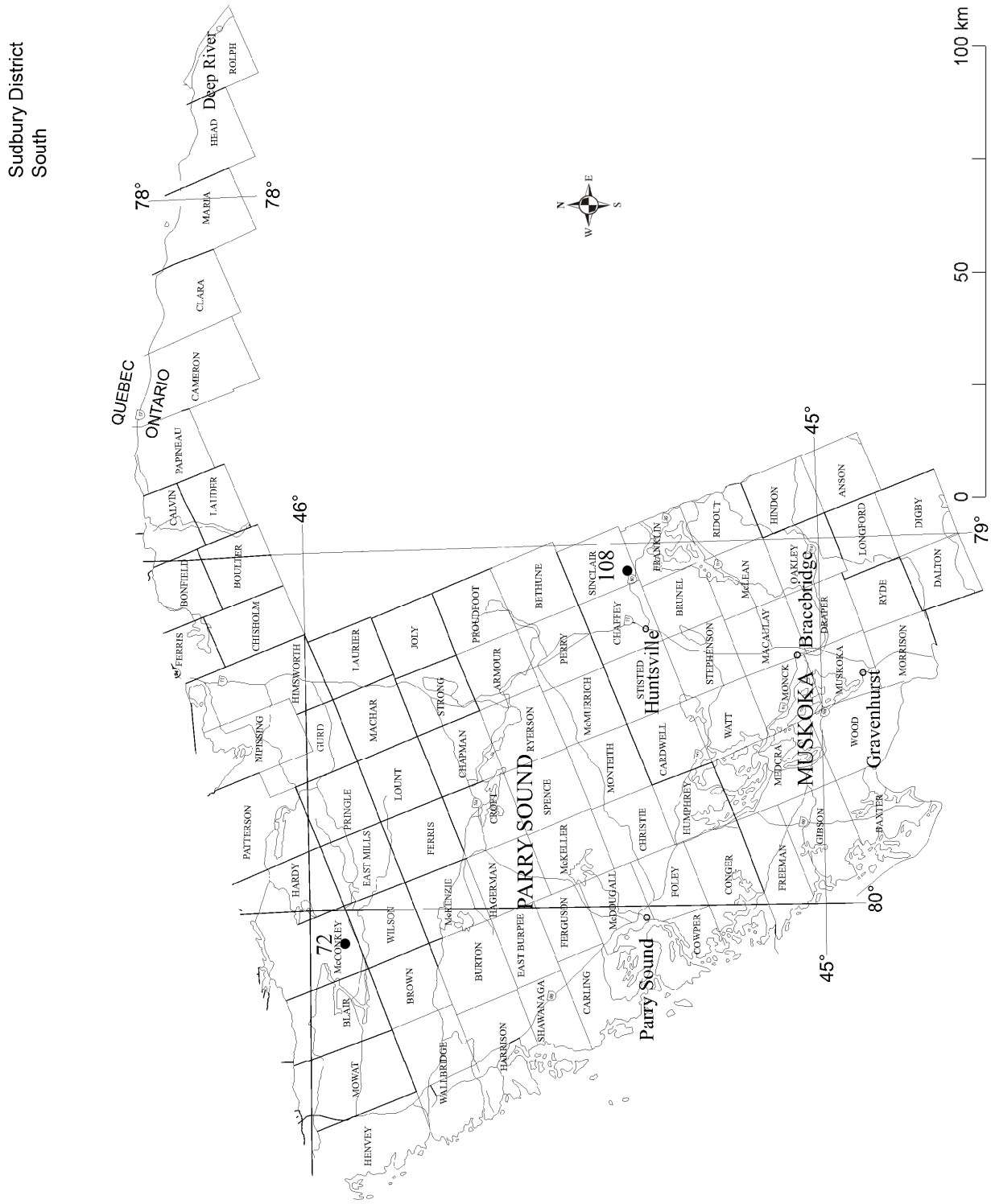

Figure 10. Assessment files received in the Sudbury District in 2011 (keyed to Table 7).

Table 8. Mineral deposits not being mined in the Sudbury District in 2011.

Abbreviations

AF ..... Assessment Files
AR ..... Annual Report
CAMH ..... *Canadian & American Mines Handbook*
CMH ..... *Canadian Mines Handbook*
GR ..... Geological Report
MDC ..... Mineral Deposit Circular [No.15–]
[*formerly* Mineral Resources Circular, No.1-14]
MDIR ..... Mineral Deposit Inventory record
MLS ..... Mining Lands, Sudbury
NM ..... *The Northern Miner*
OFR ..... Open File Report
PC ..... Personal Communication

Deposit Name (MDI No.)	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References*	Status
Angus deposit (MDIR 31L14SW00014)	Ti, Fe	141 000 000 tons @ 34.58% Fe, 15.64% TiO_2 to 1000 ft deep	Randsburg International Gold Corp.	AF Angus Tp.	Active
Bissett Creek deposit (MDIR 31L01SE00002)	flake graphite	26 038 000 tons @ 1.86% flake graphite; 4 744 000 tons @ 2.99% graphite	Industrial Minerals Inc.	AF Maria Tp.	Active
Brazeau prospect (MDIR 31L02NE0010)	Va, Ti, Fe, (garnet)	110 000 tons @ 0.76% V_2O_3, 7.9% TiO_2, 35.2% Fe for 2 lenses to 100 ft.; 950 000 tons for 6 lenses to 100 ft.		MDC 11	Inactive
Burwash Lake prospect (MDIR 41P02SW00006)	Fe	15 possible pit areas outlined containing indicated or inferred reserves of 450 000 tons per vertical feet, aver. 20.7 % Fe. 100 million tons estimated. Preliminary concentration tests – concentrate grading 68.2% Fe, 5.0% SiO_2 with recovery of 93%		MDC 11	Inactive
Butler (Crocan Lake) prospect (MDIR 31L11SE00012)	Kyanite	50 Mt @ 13-17% kyanite	Kyanite Mining Corp.	AF Butler Tp.	Inactive
Butler Vermiculite deposit (MDIR 31L11SE00003)	Vermiculite	"A" zone: 144 000 tons @ 50-90% vermiculite	Hedman Res. Ltd.	n/a	Inactive
Cummings Lake prospect (MDIR 41I16NE00036)	Fe	327.9 Mt @ 26.9% soluble Fe total	D. Laronde	MDC 11	Inactive, underground exploration and bulk sampling
Errington/ Vermilion Mines (MDIR 41I11SW00006)	Zn, Cu, Pb	4.4 Mt @ 1.33% Cu, 1% Pb, 4% Zn; 9 Mt @ 1.14% Cu, 1% Pb, 3.8% Zn (drilling by Xstrata Nickel has increased these figures)	Xstrata Nickel	MDC 12	Inactive, past producer
Falcon Gold (MDIR 41I10SE00003)	Au	Estimate 60 000 tons @ 0.23 oz/ton Au	Kinross Gold Corp.	E. Stringer, prospector, PC 1995	Inactive
Fostung (Texas) (MDIR 41I04NE00036)	W, Mo	F33-10 zone, 100 000 t/vertical m @ 0.214% WO_4 with 81 200 t/vertical m @ 0.23% WO_4 and 0.016 % MoS_2	Breakwater Resources Ltd.	Ginn and Beecham (1984)	Active, extensive work by Sulpetro Minerals Limited in late 1970s, early 1980s

Deposit Name (MDI No.)	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References*	Status
Geneva Lake Mine (MDIR 41I13SE00002)	Cu, Pb, Zn (Ag, Au)	170 000 tons @ 11% Zn. (Small production: 80 588 tons high-grade ore)	D. Beilhartz	Properties with Mineral Inventories, Ontario, Canada, February 1996	Inactive, past-producer 1940s
Parkin Calcite (MDIR 41I15SW00041)	$CaCO_3$	147 460 probable and possible tons of "good, fair and poor" calcite	J. Brady	AF Parkin-SP025	Inactive
Spanish River Mine (MDIR 41I05SW00014)	Cu, PGE	Estimate 0.9 Mt @ 0.5% Cu + PGM	D&H Consulting Services Inc.	AF	Inactive, past-producer 1969–70. 14 500 T stockpile on surface
Stralak deposit (MDIR 41I13SE00044)	Zn, Cu, Pb (Ag)	800 000 tons @ 4% Zn, 0.3% Cu, 0.5% Pb, 2.0 oz/ton Ag	Stralak Resources Inc.	AF	Inactive, last active 1993, diamond drilling
Wikwemikong (MDIR 41H13SE00012)	dolomite	Undetermined, but possibly significant	Wikwemikong Unceded Indian Reserve	n/a	Inactive, some widely spaced diamond-drill holes. Feasibility and several reports

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

EXPLORATION ACTIVITY

Mineral exploration in the Sudbury District has rebounded from the lows of 2009 with better metal prices. One hundred twenty-two reports of work were filed for assessment credit in the Sudbury District in 2011 (Table 6 and Figures 5 to 7, Table 7 and Figures 8 to 10), showing a slight improvement over last year's number of filings. Many of the junior mining companies have found new financing and have resumed projects.

As in previous years, nickel, copper and platinum group metals were the main commodities sought, with interest also shown in other base metals along with gold, silver, cobalt, uranium and diamonds. Mineral deposits that were not being mined in the Sudbury District in 2011 are listed in Table 8.

With the steady rise in the price of gold from a low of $US1362 per ounce in January to $US1535 per ounce in late December, there was strong interest in yellow metal prospects in the district. A high price of $US1900 per ounce was reached in September for gold. Nine exploration projects were focused on gold in the Sudbury District during 2011.

The search for industrial minerals focused on garnet, silica, kyanite, graphite, dimension stone, agricultural calcium phosphate, mica, trap rock and other potential aggregate resources.

In addition to grass-roots prospecting and major mining company projects, several junior mining companies explored wholly owned, optioned or joint-ventured properties. Many of these efforts occurred within or near the prolific Sudbury Intrusive Complex (SIC) contact sublayer or in associated quartz diorite offset dikes outside the SIC, either radiating from or concentric to the contact sublayer. Exploration associated with Nipissing diabase dikes, Archean greenstone belts and metasedimentary rocks of the Paleoproterozoic Huronian Supergroup were also explored.

Cascadero Copper Corp.

Cascadero Copper Corp. holds 3 exploration properties in the Sudbury District: Jovan, Powerline and Marble Mountain.

The Jovan copper gold prospect comprises 29 contiguous claim units about 30 km north east of Sudbury in Davis Township. The property is within a belt of past gold producers that extends some 120 km from northeast of the Sudbury Basin to Espanola in the southwest. In 2011 Cascadero conducted induced polarization (IP) resistivity and magnetic surveys on the western part of the claim block.

The company commissioned a Technical Report on the Jovan property from Matrix GeoTechnologies Ltd., detailing the geophysical report and integrating Mobile Metal Ion^{SM} (MMI) geochemical data collected by a previous operator. Expenditures to date total about C$230 000, which includes due diligence, geochemistry, geology, mapping, sampling, geophysics and related reports. Cascadero is planning a program of up to 4000 m of diamond drilling.

The Powerline gold project was acquired in 2011 through the optioning of 31 contiguous claim units in 4 blocks in Street and Scadding townships east of Sudbury. The agreement includes an exploration commitment over a four-year term. The company is planning a property-scale soil geochemical survey, an IP, resistivity, and magnetic ground survey and, if warranted, diamond drilling. The focus of exploration will be gold in albitized, silicified, carbonatized and chloritized breccia.

In January 2011, Cascadero optioned 66 contiguous claim units northeast of Sudbury in Parkin Township, comprising the Marble Mountain gold prospect. The property is a high-sulphide gold prospect, with grab samples returning gold values in pyritic sedimentary rocks with relatively low silver and base metal values. Silicification is the dominant alteration, with silicified and carbonatized sedimentary units yielding the highest grade gold assays (*Cascadero Copper Corp*., press releases, October 25, December 8, 2011, and January 10, 2012).

Ginguro Exploration Inc.

Ginguro Exploration Inc. holds 3 mineral properties northeast of Sudbury: Grigg/Stobie, Four Corners and Pardo. Grigg/Stobie is a 68 km^2 property 55 km northeast of Sudbury. Four Corners is a 59 km^2 property 70 km northeast of Sudbury, and Pardo is 65 km northeast of Sudbury, where Ginguro owns a 100% interest in 87.5 km^2 of staked claims with an option to earn up to 70% in a further 33 km^2 of staked claims in a joint venture agreement with Endurance Gold Corp.

The Pardo project is the most advanced and is the first confirmed paleoplacer gold deposit in Ontario. Geological work and diamond drilling in 2010 identified a gold-bearing, channelized conglomerate reef approximately 400 m wide by 3600 m long.

During 2011 Ginguro completed a diamond-drilling program to test reef-style gold mineralization that encompassed all 3 properties. Drilling on the Four Corners and Grigg/Stobie properties was completed in the second quarter, with assays returning only moderately anomalous gold content.

In the third quarter, Ginguro resumed drilling on the Pardo property, where several widely spaced step-out holes extending more than 4 km along a defined paleochannel were drilled to help identify the delta area of the paleoplacer host rocks. The company drilled 4264 m in 22 holes at Pardo, intersecting several gold-bearing quartz pebble horizons. These intersections lend credence to the theory that the paleoplacer at Pardo has size characteristics similar to other important producing gold paleoplacers.

- Hole PD 11-01 intersected gold-bearing quartz pebble conglomerate between 229 to 233 m downhole grading 2.35 g/t over 0.37 m and 2.14 g/t over 0.53 m. This intersection occurs 10 km from the gold bearing conglomerates defined by trenching almost due north of PD11-01.
- Hole PD11-06, 2 km west and 3.6 km north of PD11-01 returned multiple intervals over a 42.33 m section, including up to 17.7 g/t over 5 cm and 8.7 g/t over 6 cm. This style of mineralization is thought to represent the distal portion of a gold paleoplacer deposit.

During the field season, Ginguro staked an additional 3714 acres of mining claims, effectively doubling the volume of Mississaugi Formation target rocks at Pardo. The company plans to invest about $2 million at Pardo in 2012.

A map illustrating the Pardo property, geology and drill hole locations is available at the company's website: www.ginguro.com/index.html (*Ginguro Exploration Inc*. press releases, January 17, April 28, November 14, 2011, January 9, 2012; and MD&A report, September 30, 2011).

Gold Finder Explorations Ltd.

Gold Finder Explorations Ltd. holds the former Golden Rose Mine property in Afton and Scholes townships 65 km northeast of Sudbury, comprising 15 mining leases and 33 mining claims.

The company completed downhole induced polarization and resistivity surveys before and during Phase 2 and 3 diamond-drilling programs consisting of 2829 m in 9 holes.

Best intersections included 5.10 m assaying 15.62 g/t gold, and 2.60 m assaying 70.05 g/t gold including 0.30 m of 543.0 g/t gold. Lengths do not represent true widths.

Gold Finder acquired through staking an additional claim block covering part of a separate iron formation exposed at surface and striking onto the claims currently held. Historical IP survey data identify untested chargeability and resistivity anomalies thought to represent sulphide mineralization associated with the iron formation. A winter diamond-drilling program is planned in early 2012 (*Gold Finder Explorations*, press releases, January 13, May 19, June 08, 2011).

GoldTrain Resources Inc

GoldTrain Resources Inc. completed diamond-drilling programs at properties northeast of Sudbury in 2011. The 1200 m program was split between the Manitou property, 227 claim units in Clement Township, and the Chiniguchi River property, 120 claim units in Janes Township.

Five diamond-drill holes totalling 565 m were completed on the Manitou property to follow up on 3 EM conductors identified from an airborne survey, and 600 m of drilling was done on the Janes property to test chargeability anomalies identified from a previous down hole IP survey. Assay results were not published at the time of writing (*GoldTrain Resources Inc*., press release, November 2, 2011).

North American Nickel

North American Nickel Inc. holds 4 exploration properties in the Sudbury mining district. The Halcyon and Post Creek projects are located outside the northeastern end of the SIC, while the Woods Creek and Bell Lake projects are situated outside the southeast end of the SIC. During 2011, exploration work was completed at Woods Creek and Post Creek.

WOODS CREEK PROPERTY

The Woods Creek property is located in Hyman Township about 50 km west of Sudbury. During 2011, the company conducted grass roots exploration including beep mat EM surveying and grab and chip sampling of pyrrhotite and chalcopyrite mineralization. Assays returned values of 3.03% copper, 1.32% nickel, 0.10% cobalt, >10 g/t silver and 585 ppb TPM (gold + platinum + palladium).

POST CREEK

The Post Creek project, 35 km east of Sudbury in Norman and Parkin townships, lies along the northeast extension of the Whistle Offset Dike structure.

Previous exploration included shallow EM and magnetic surveys, stripping, washing, chip sampling, analysis and detailed geologic mapping. In June 2011 a quartz diorite (QD) dike was discovered on the north part of the property in Norman Township. Outcrop stripping and power washing exposed the QD over a distance of 120 m in a sinuous, irregular north-south trend, attaining widths of between 2 to 12 m. Where the dike is irregular in shape, lithology appears to comprise a mixture of mafic volcanic rocks, greywacke and quartzite. Mineralization in the dike includes 1 to 2% disseminated pyrrhotite and chalcopyrite.

October 2011 saw the completion of a 1500 m diamond-drilling program in targeting modeled plates derived from a deep-looking ground EM (InfiniTEM) survey. Seven drill holes were completed for a total of 1532 m.

The drill program and associated borehole Pulse EM surveys evaluated about 25% of the known CJ Breccia Belt to a depth of 300 m. Anomalous platinum (0.39 g/t) and palladium (0.40 g/t) over core intervals of 0.5 m were recognized in assays from low sulphur sulphide mineralization. Prospecting and geological mapping will be continued in the spring of 2012.

Press releases and further information may be viewed in the company website: northamericannickel.com (*North American Nickel Inc.,* press releases, January 10, June 2, 16, 22 and 29, October 18 and December 14, 2011).

Pacific North West Capital Corporation

Pacific North West Capital Corp. (PFN) purchased the 50% ownership held in joint venture by Anglo Platinum Limited in the River Valley PGM project in Dana and Pardo townships. The deal gave PFN a 100% interest in the project, and Anglo a 12% interest in PFN.

Work to date at River Valley suggests the best potential for economic PGM-copper-nickel sulphide mineralization is within mineralized breccia occurring within about 20 m of the intrusive contact with Archean gneisses. This contact zone extends over a 9 km strike length, holds the current defined resource and was the main target of 2011 exploration.

Early in the year, PFN initiated a $5 million, multiphase exploration program on the River Valley property. Project goals include developing a three dimensional (3D) Common Earth Model, proving sufficient reserves to establish a multimillion tonne open pit PGM bulk mineable project, drilling to test new targets and update the NI 43-101 resource estimate during the first quarter of 2012.

PFN also plans to document the full suite of five-element PGE concentrations in the mineralization at River Valley.

Phase I exploration began with enhancement of earlier induced polarization (IP) survey data using 3D technology to identify mineralized targets along the 9 km prospective strike length of the deposit. Work was focused on step-out drilling to expand mineralization at Dana North, infill drilling to convert inferred resources to measured and indicated categories, and drill testing of new targets generated from the 3D IP survey.

Diamond drilling totaling 15 000 m in 53 holes was completed during 2011, along with 130 km of 3D IP surveying covering about 6.5 km of strike length along the breccia contact and internal portions of the intrusive. Results indicated that mineralization is continuous along strike and to depth. Assay results to date define a higher grade mineralized zone 5 to 55 m in true thickness extending to at least 250 m in depth.

Samples of the core were analyzed for platinum (Pt), palladium (Pd), rhodium (Rh), Gold (Au), Nickel (Ni) and Copper (Cu). Assays from the first 4 holes included 1.1 g/t 3E over 50 m; 1.3 g/t 3E over 65 m; 1.8 g/t over 65 m; and 2.8 g/t 3E over 34 m, respectively (where 3E = Pt + Pd + Au). Significant rhodium was intersected in the first 11 holes of Phase I diamond drilling.

Data from this drilling were combined with those from approximately 111 000 m in 590 holes drilled previously up to 2005, and delivered to Wardrop Engineering for a mineral resource update to be completed in the first quarter of 2012.

PFN plans to complete a Preliminary Economic Assessment early in 2013 and begin a Pre-Feasibility study mid 2014.

In addition to the geophysics and diamond drilling program, a detailed geochemical study of PGE mineralization in the River Valley intrusion was completed. In all, 336 samples were submitted for nickel sulphide collection fire assay analysis of Pt, Pd, Ir, Rh, Ru, and Au concentrations. Rh assay results confirm geochemical survey data indicating Rh concentrations are equivalent to approximately 10% of Pt grades. PFN plans to include Rh in the next resource estimate calculation.

PFN also staked 132 mining claims over 58 000 acres adjacent to the River Valley project in 2011. The new claim group is in Davis, Henry, Janes, Loughgrin, Pardo, Dana, Hobbs and McWilliams townships. The property covers 2 intrusive igneous rock groups that host platinum group metals (PGM) mineralization. A third party compilation report will be followed by a recommended work program and budget for the new project.

Current NI 43-101 Compliant Mineral Resources for River Valley:

- **Measured**: 7.99 million tonnes grading 1.33 g/t Pd, 0.44 g/t Pt, 0.08 g/t Au, 0.12% Cu and 0.02% Ni using a cut-off grade of 1.00 g/t Pd + Pt.
- **Indicated**: 11.31 million tonnes grading 1.08 g/t Pd, 0.36 g/t Pt,0.07 g/t Au, 0.10% Cu and 0.02% Ni using a cut-off grade of 1.00 g/t Pd + Pt.
- **Inferred**: 0.88 million tones grading 1.36 g/t Pd, 0.47 g/t Pt, 0.07 g/t Au, 0.10% Cu and 0.02% Ni using a cut-off grade of 1.00 g/t Pd + Pt

(*Pacific North West Capital Corp.* press releases, January 31, February 21, March 1, April 7 and 20, May 17 and 31, June 22, July 6 and 26, August 4 and 16, September 15 and 27, October 13 and 27, December 8th, 2011; January 10, 2012).

Rare Earth Metals Inc.

Rare Earth Metals Inc. holds the 1350 ha Lavergne Rare Earth property in Springer Township 80 km east of Sudbury. During 2011, exploration work included diamond drilling, mineralogy analyses and airborne geophysical surveys.

Two zones of REE mineralization, the east and west zones, are located within heavily carbonatized, hematized, and brecciated intrusive granitoid rock with pyrite and fluorite mineralization.

Diamond drilling:

Seven holes totalling 1200 m were diamond drilled on the property as an initial test to confirm and expand historic drilling results indicating zones of rare earth element (REE) mineralization. This drilling is the first exploration on the property since 1969.

- Five holes tested the West Zone over a strike length of 300 m and intersected up to 1.65% Total Rare Earth Oxides (TREO) over 90.2 m.
- Two holes tested the East Zone, intersecting 1.60% TREO over 28.8 m within a larger zone which assayed 1.10% TREO over 57 m.

Grab samples from both zones were analyzed for REE-bearing minerals:

- REE mineralization identified as synchysite [Ca(Ce, La, Nd, Y)(CO_3)2F, calcium cerium lanthanum neodymium yttrium carbonate fluoride], a REE-fluoro-carbonate mineral, typically prismatic, fine to coarse grained (up to 300 microns)
- The synchysite contains approximately 16.9 wt % CaO, 13.9 wt % La_2O_3; 24.3 wt % Ce_2O_3; 2.2 wt % Pr_2O_3; 7.4 wt % Nd_2O_3 - hence light REE enriched

- Synchysite distribution is heterogeneous and associated mainly, but not entirely, with fluorite, barite and iron-oxide/hydroxides

The company also completed a 960 line-km helicopter-borne radiometric and magnetic survey over the property. Follow-up exploration to evaluate anomalies is in progress.

Initial results defined an REE system with low Th and U values. Mineralogy reports indicate that the host mineral, synchysite, is relatively simple to concentrate. Additional drill testing is planned during 2012 to establish the geometry and continuity of the zones and help establish if the East and West Zones are connected and part of a larger system.

In January 2012, a minimum 2500 m follow-up diamond-drilling program was initiated at the project to expand the size of the REE zones, to test for areas of higher grades, and to move the project forward to a NI 43-101 compliant resource.

Bench metallurgical testing on samples from the 2011 drilling confirm synchysite as a monomineralic source of the REE mineralization. Attempts to concentrate synchysite during testing were successful through the use of magnetic and gravity techniques. Additional metallurgical test-work will be completed in 2012 focusing on a flotation process for concentrating the synchysite, and a NI 43-101 compliant resource estimate for the Lavergne–Springer prospect is planned to be available by third quarter of 2012 (*Rare Earth Metals Inc*., press releases, June 28, July 6, October 24, 2011; January 17, 2012).

Sunrise Resources Plc

Sunrise Resources Plc holds, under option, 23 contiguous claims 20 km southwest of Sudbury. The Long Lake Gold property has been assembled over a number of years and was recently expanded to include the past-producing Long Lake gold mine. The claims also include a potential 10 km extension to the producing Copper Cliff offset dike system prospective for nickel-copper-platinum group metals.

During 2011 the property was evaluated for gold and also nickel sulphide mineralization in 2 separate areas. At the former mine site, work included reprocessing of geophysical data, drilling of anomalies and along-strike extensions of previously mined mineralization. A Phase I diamond-drilling program in April consisted of 2 holes. Phase II drilling comprised about 1000 m of drilling in 9 holes. Results did not meet expectations, suggesting that the extent of near-surface mineralization is limited. Down-dip continuation of the mineralized pipe is still considered a valid target.

Re-sampling of historic core from the nearby E1 prospect confirmed high-grade intersections in 1970s drilling (5.7 m grading 27.5 g/t gold) and 1980s drilling (4.1 m grading 14.8 g/t gold); however, current drilling did not demonstrate the continuity of high-grade mineralization suggested by earlier geophysical work. The best intersection was 1 m assaying 1.2 g/t gold.

While gold has been the prime target at Long Lake, the eastern half of the claims covers a potential 10 km extension to the Copper Cliff offset dike system. One nickel target has been drill tested on this part of the claim block and further work is deemed justified. Future exploration will be broadened eastward to evaluate nickel-copper-PGM targets over projected extensions to the Copper Cliff dike system. (*Sunrise Resources Plc,* press releases, February 10, March 21, April 27, June 14, July 5, September 13, December 15, 2011.)

Transition Metals Corp.

Transition Metals Corp. optioned the Doherty Lake project in 2011. The property consists of 4 unpatented mining claims in central Demorest Township, about 65 km northeast of Capreol. Transition will incur work expenditures of $48 000 over a period of 3 years. The property hosts an occurrence of gold-silver-copper-lead mineralization associated with folded quartz carbonate veining exposed at surface near the lower contact of a Nipissing gabbro intrusion on the eastern shore of Doherty Lake. Grab samples collected in 2010 returned values of up to 9.2 g/t gold and 75 g/t silver. The size and grade of mineralization associated with this occurrence was investigated by a 500 m diamond-drilling program in the fall. Assays were not available at the time of writing. (*Transition Metals Corp*., report, IPO item, July 25, press release, September 8, and personal communication, February 4, 2011.)

Trueclaim Exploration Inc.

Trueclaim Exploration Inc. holds about 17 000 ha, either directly or under option, at the Scadding Gold property in the East Wahnapitae area 40 km northeast of Sudbury, comprising the original Scadding Mine site and outlying properties.

The property is predominantly underlain by early Proterozoic-age sediments of the Huronian Supergroup, specifically the Serpent, Espanola and Bruce Formations of the Quirke Lake Group, which have been intruded by early Proterozoic-age (Nipissing) gabbro and diabase. Gold mineralization occurs in hydrothermal breccia (1700 Ma) comprising coarse fragments of the Serpent Formation with abundant chlorite and greater than 5% iron sulphide.

There are 5 known gold-bearing zones in the vicinity of the Scadding Mine site; the North Zone, South Zone, Central Zone, New Zone and the East-West Pit. All of the zones other than the Central zone were drilled by Trueclaim between the autumn of 2009 and the present. The Central Zone was mined underground in the 1980s, and poor documentation has made it difficult to drill without intersecting underground workings. Environmental studies are underway in preparation for a permit to de-water the workings.

Trueclaim began an 8000 m Phase 2 diamond-drilling program at Scadding to infill areas of limited previous drilling, define continuity of mineralization and to populate a database suitable for NI 43-101 compliant inferred resource. A previous 2000 m drilling program completed in December 2010 included 635 m drilled in 5 holes.

The Phase 2 program consisted of oriented diamond drilling exploring the South, New, North and East-West Pit zones during the summer, with 40 holes completed. Study and modelling of contact and chloritic unit orientation revealed the same orientation of mineralization throughout, with a regional trend of 320°. Several sets of parallel auriferous banding were delineated in the North Zone.

In August, Trueclaim completed field mapping and sampling on the auriferous Tecumseh property 8 km northeast of the Scadding gold property. At Tecumseh, historical trenching in an area measuring about 450 by 300 m exposed an area in which parallel quartz veins, hosted in Nipissing diabase, trend east-west, dip to the south and average about 10 cm in width. A total of 28 quartz veins were sampled from 14 historic trenches. In September, Trueclaim received a permit to take a 1000-tonne bulk sample from the Tecumseh property, after encouraging results were received from a channel sampling program in August. (*Trueclaim Exploration Inc*., press releases, January 18, March 4, May 16, July 19, August 16, September 8 and 29, 2011.)

URSA Major Minerals Incorporated

Ursa Major completed surface EM surveys on the Nickel Offsets property in the first quarter of 2011, and planned a five-hole, 2500 m diamond-drilling program with further bore-hole EM surveys after 3D modelling of 2010 drilling and geophysical data (*URSA Major Minerals Inc.*, press releases, February 10, March 14, April 25, June 8, July 14, July 20, September 14, December 13, December 14, 2011; February 3, 2012).

Wallbridge Mining Company Limited

Wallbridge has 48 exploration to pre-feasibility stage mineral projects in the Sudbury area. These include 12 joint ventures (JV) with partners, including Impala Platinum Holdings Limited, Lonmin Plc, Xstrata Nickel and a number of junior mining companies.

On the North Range of the Sudbury Igneous Complex (SIC), 2011 mapping and sampling identified copper, nickel, platinum and palladium mineralization within inclusion-bearing quartz diorite of the Hess Offset dike and extended the known dike structure over an additional strike length of 9 km. Wallbridge now controls over 37 km of this structure across several properties. Over 1000 km of airborne geophysics and 80 line km of deep penetrating ground geophysics were completed on the Hess Offset dike this season, and 1500 m of diamond drilling tested targets during the remainder of 2011.

On the East Range of the SIC, about 2000 m of diamond drilling was completed during 2011 to follow-up platinum, palladium and gold mineralization discovered previously by Wallbridge at Amy Lake on its 60% owned Frost Lake property, a JV with Xstrata Nickel.

Also on the East Range, 400 m of drilling was completed on the Skynner Lake property being explored through the Sudbury Camp Joint Venture (SCJV) with Lonmin Plc. This tested a conductive target within a Sudbury breccia structure that has been mapped extending outwards from the adjacent Podolsky Mine. The conductor was identified by a deep-penetrating InfiniTEM EM survey completed on the property in the spring. The SCJV has a 2011 exploration budget of $1.25 million.

The Parkin Offset property north of Capreol is being explored through a JV with Impala Platinum Holdings Limited. The JV covers 9.4 km of the Parkin Offset dike and the option package includes the Milnet Mine property owned 100% by Wallbridge, a southern block of claims held 98.5% by Wallbridge and 1.5% by Xstrata Nickel, and 2 blocks of claims on either side of the Milnet property subject to an option and JV agreement between Wallbridge and Champion Bear Resources.

A $1.6 million, 5000 m diamond-drilling program was begun in 2011 to extend mineralization at the Milnet 1500 Zone and to test targets on other parts of the Parkin Offset property package. A 2700 m drilling program tested EM conductors on the up-plunge projection of the Milnet 1500 Zone beneath the past producing mine. Three holes totalling 2543 m tested both shallow and deeper geophysical targets generated from 2009 exploration. Disseminated sulphide mineralization was intersected in 1 hole and anomalous gold values were returned over 18 m including an individual assay returning 44.01 g/t gold over 1.40 m. Other assay results include 8.0 m grading 4.32 g/t TPM (total precious metals = Pt + Pd + Au), 4.11% nickel and 0.60% copper as well as 13.5 m grading 0.64 g/t TPM, 0.43% nickel, and 0.43% copper. Drilling confirmed a minimum 140 m strike length for the Milnet 1500 Zone. True widths were not determined.

FROST LAKE PROPERTY

The Frost Lake project is being explored through a JV with Xstrata Nickel. Wallbridge is operator and holds a 58% interest. The Amy Lake PGE Zone is in the same Sudbury breccia structure as the Capre deposits on the adjacent Vale–Lonmin Plc property, as well as at Vale's Victor Deep deposit and in ore zones at Xstrata Nickel's Nickel Rim South Mine. This structure extends across the Frost Lake and Skynner Lake properties of Wallbridge.

Drilling at the Amy Lake PGE Zone in late 2010 yielded platinum, palladium and gold results that led to a new structural model and identified several high-priority drill targets. An exploration budget of $750 000 for 2011 was approved, including about 2500 m of diamond drilling to extend the zone and test similar targets in the area. A 47.5 line-km, deep-penetrating EM survey was completed early in the year over the 7 km length of this structure.

HESS OFFSET DIKE

The Hess Offset Dike was mapped in detail over 18 km last summer in joint ventures with Champion Bear Resources Ltd. and Pele Mountain Resources. Mapping in 2011 extended the dike to over 29 km into an area where no exploration has been recorded. An 82.5 line-km, deep-penetrating EM survey and an airborne EM and magnetic survey were completed in 2011, followed by drill testing of conductive nickel-copper-PGE sulphide targets along the dike.

Wallbridge acquired 2 new claim groups through purchase and staking and now controls 35 km of the Hess Offset dike. One claim group was staked over the defined extension of the Hess Offset dike, while another was acquired from Xstrata Nickel covering an interpreted extension of the Hess Offset.

Outlook for 2012:

Wallbridge has budgeted for over 15 000 m of drilling in the Sudbury area in 2012, and will complete pre-feasibility and feasibility studies on the open pit Broken Hammer project, with permitting and a production decision expected in 2012.

On the Wallbridge–Impala Parkin Offset JV, drilling in 2012 is planned to follow-up recent high-grade drilling results at the Milnet 1500 Zone.

The Wallbridge–Lonmin SCJV has a 2012 budget of $1.25 million and planned work includes over 3000 m of diamond drilling, geophysics and field work to test for footwall and offset style PGE, copper and nickel deposits on the Skynner Lake, Foy, Windy Lake, Cascaden, Trill, Trill West and Creighton South properties.

Recent work on Wallbridge's North Range properties has discovered 46.5 new km of offset dikes, including 4 new offset dikes totalling 17.5 km in length and a 29 km extension to the Hess Offset dike. With the recent discoveries, Wallbridge now controls over half of these structures in Sudbury, most of which have never been explored. Wallbridge is currently evaluating opportunities to fund further field work, geophysics and about 3050 m of diamond drilling on the North Range in 2012. (*Wallbridge Mining Company Ltd*., press releases, January 5 and 20, February 3, March 3, March 24, April 28, May 16, June 28, July 21, September 21, October 14, October 19, November 22 and 30, 2011; January 8, 2012.)

DISTRICT GEOLOGIST OFFICE STAFF ACTIVITIES

In 2011 the Sudbury office was staffed by M. Cosec, P.Geo., District Geologist; D. Farrow, P.Geo, District Geological Assistant; and R.M Alemany, Geological Assistant. Summer Experience Program students S. Denomme and S. Trotter assisted in the office and in the field.

Approximately 400 client requests were handled by Sudbury District Geologist office staff in 2011, including consultation and research assistance. Prospectors, mining company personnel and members of the general public were served.

Six quarry visits and 1 operating mine visit were made during the year, along with 6 property visits.

A field trip covering the South Range of the Sudbury Basin and Copper Cliff Offset Dike mineralization was given to a representative of the Canadian Ecology Centre in Mattawa, and was repeated on 2 other occasions for interested parties. A field trip of the Sudbury Structure and ore deposits was provided to graduate students and senior undergraduate students from the Department of Earth Sciences, University of Western Ontario, and a field trip of the Sudbury Basin was organized for visiting Chinese government officials and students of the Canadian Ecology Centre.

D. Farrow and R.M. Alemany attended the Northeastern Ontario Mines and Minerals Symposium in Timmins, as well as the Ontario Exploration and Geoscience Symposium in Sudbury.

As Co-Chair of the Willet Green Miller Centre Joint Health and Safety Committee, D. Farrow participated in workplace safety inspections and committee meetings and attended Industrial Accident Prevention Association (IAPA) local networking sessions, hosting 1 session. He also attended the annual Partners in Prevention Health and Safety convention in Sudbury and the annual Partners in Prevention Health and Safety Conference and Trade Show in Mississauga.

D. Farrow acted as proctor for Professional Practice and Ethics Examinations held in Sudbury on behalf of the Association of Professional Geoscientists of Ontario on 3 occasions during the year.

Office staff attended talks and presentations from various local organizations such as the Sudbury Prospectors and Developers Association, Sudbury Geological Discussion Group and the Laurentian University Faculty of Geology, as part of continuing professional development.

The Sudbury District Geology Office provides free, short-term loans of a Beep-Mat, metal detector, UV lamps, a scintillometer and a proton magnetometer to qualified explorationists. Binocular and polarizing microscopes are available for in-office use.

The office is located within the John B. Gammon Geoscience ("Mines") Library, 3rd Floor, Willet Green Miller Centre, Laurentian University, 933 Ramsey Lake Road, Sudbury, ON, P3E 6B5. D. Farrow can be reached at 705-670-5741; R. Alemany, at 705-670-5733.

A summary of activities of the Sudbury Regional Resident Geologist Office in 2010 is provided in Table 9.

Table 9. Summary of activities of the Sudbury Regional Resident Geologist Office in 2011.

Activity	Number
Office visits	421
First Nations/Metis Meetings	10
Properties visited	6
Field trips attended	7
Field trips given	5
Talks given	3
Assessment files and donations processed	122

PROPERTY EXAMINATIONS

In 2011, a total of 6 property visits were conducted by Sudbury District Office staff (Table 10 and Figure 11).

Table 10. Property visits conducted by the Sudbury District Geologist Office in 2011 (keyed to Figure 11).

No.	Property or Occurrence	Township	Commodity
1	Springer Ree	Springer	REE
2	Mohawk Garnet	Street	Garnet
3	Broken Hammer	Wisner	Nickel-Copper-PGE
4	Tallifer Quarry	Afton	Dimension Stone
5	Fielding	Waters	Nickel-Copper-PGE
6	Wahnapitae Complex*	Dryden	Base Metals + PGE

*Property visited more than once.

The Wanapitei Complex

The Wanapitei Complex (Figure 12), 13 km southeast of Sudbury, is elliptical in plan view (6 by 2.5 km) with the northwest edge 400 m southeast of the Grenville Front. The complex is divided into 3 sections, each separated by a covered interval. The large northwest section consists of folded injection breccia, passing to the northeast into metagabbro, where the top faces northwest. The southeast section consists of olivine norite and hornblende norite with the top facing southeast. Olivine grains display corona texture. The northeast sector also consists of norite except it grades eastward into metanorite and breccia; the top faces east. The latter 2 sections contain 17 exposures of sulphide mineralization (pyrrhotite, chalcopyrite, pentlandite and pyrite), all hosted by norite. Exploration began in the late 1940's and is on-going today. The complex was intruded by 2 episodes of felsic dikes, 2 episodes of mafic dikes, late pegmatite dikes and has undergone local folding and shearing. The complex may have been emplaced at the present site in the solid state with possible independent tilting of the sections.

The authors accompanied D. Rousell to the site for an update on a study to determine the geological history of the body and the enclosing country rocks. Four samples of different rock types are in the process of zircon U/Pb dating at Laurentian University

The following paper has been submitted for presentation at the Institute on Lake Superior Geology, Thunder Bay, Ontario, May 16 to 19, 2012: The Tectonometamorphic, Magmatic and Mineralization History of the Wanapitei Complex, Grenville Front, Ontario; by R.M. Easton, D.H. Rousell, J.A. Petrus, D.K. Tinkham, M.G. and Napoli.

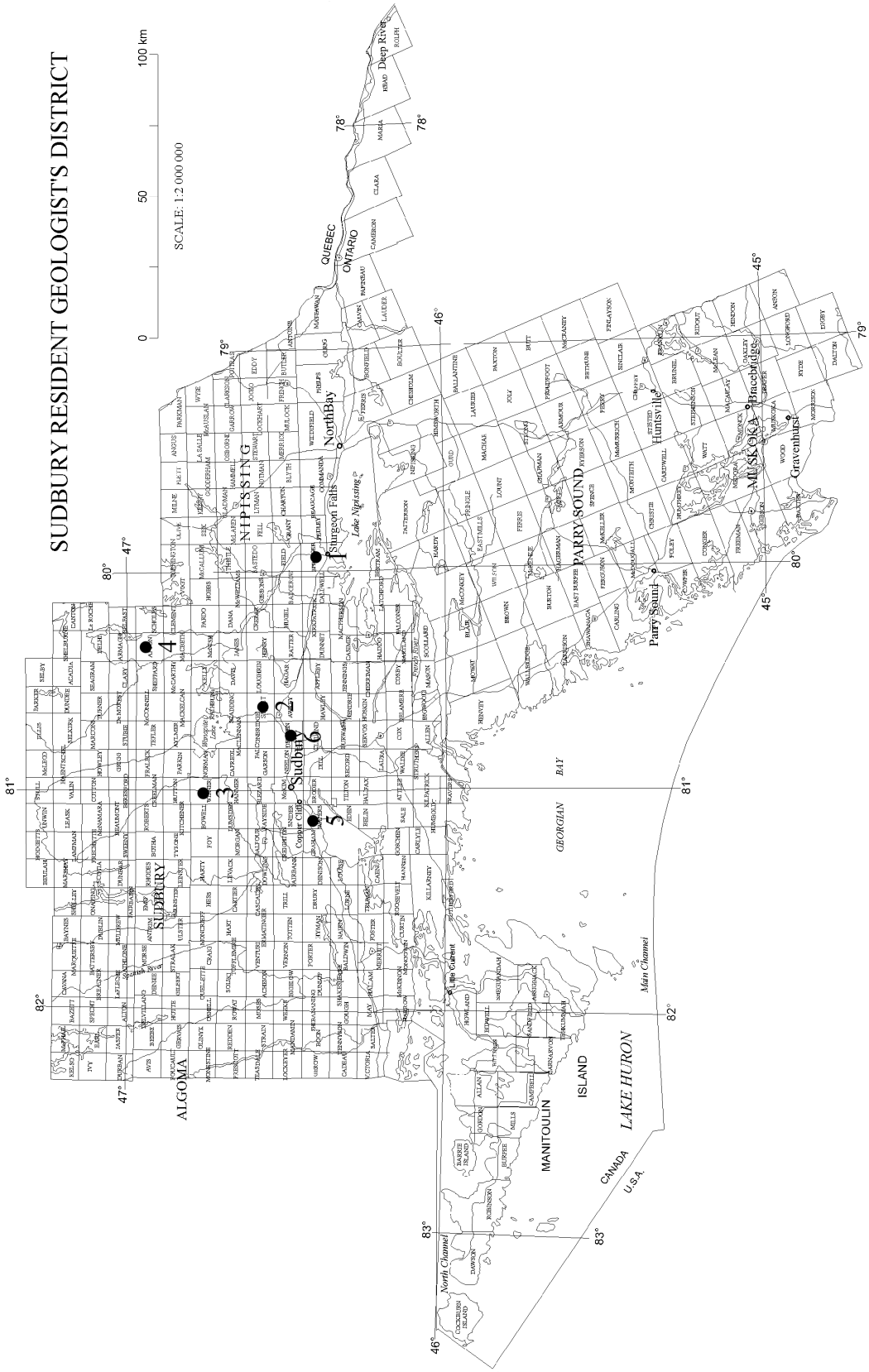

Figure 11. Property visits conducted by Sudbury District office staff in 2011 (keyed to Table 14).

Figure 12. Looking northeast from the centre of the Wanapitei Complex.

Nephco Nepheline Syenite Prospect, Bigwood Township

On Thursday October 13, 2011, P.J. Sangster joined the property owner, C.M. Woodruff, and J.C. Ireland, Senior Manager, Resident Geologist Program on a visit to the Nephco Nepheline Syenite prospect in northwestern Bigwood Township (Figure 13). The visit was made at the request of the property holder and as part of an ongoing project to examine nepheline syenite deposits in Ontario.

The company reports that the property hosts 50 million tons of proven and probable nepheline syenite ore. The ore body is on the surface in a band of low-lying parallel ridges that extends over a strike length of 5 km. A twenty-acre site, designated to be mined initially, contains 10 million tons of ore proven by 3100 feet of detailed diamond drilling. In 2001, Nephco completed bulk sampling on Claim S574886 at the southern end of the Rutter body in Concession IV, Lot 10 Bigwood Township. It was this part of the prospect that was visited.

The remainder of the deposit is estimated to contain 40 million tons of ore based on 700 feet of wide-spaced diamond drilling and surface exploration. These resource figures are non NI 43-101 compliant.

LOCATION AND ACCESS

The property comprises 15 leased mining claims (243 ha) and an additional 65 ha of patented land in concessions IV through VI, part lots 10, 11, and 12 in northwestern Bigwood Township. The site is located 60 km south of Sudbury, Ontario, 1.5 km west of Highway 69. Easy access to the site is via Highway 69 north from the community of Bigwood, 4.2 km to Gauthier Road, on the west side of the highway. Gauthier Road is followed approximately 1 km to Gauthier farm and continues south along the Lot 10 – Lot 11 boundary line to the sample site on Leased Claim No. 574886.

Figure 13. Nephco Nepheline Syenite prospect, Bigwood Township, 2011, showing 2001 bulk sample site.

GEOLOGY

The French River alkaline syenite intrusion dominates the geology of Bigwood Township extending for the entire length of the township from Rutter Pond in the north to just beyond the French River in the south. Structures associated with the intrusion are clearly visible on satellite imagery of the area.

The pink alkalic syenite encloses 2 lenticular bodies of nepheline syenite and is intrusive into the regional granitic terrain. Hewitt (1961) provides a detailed description of the geology of the bodies.

The northern nepheline syenite body, known as the Rutter Nepheline deposit, is exposed over an area of approximately 5000 by 500 m. It outcrops in a series of low glaciated ridges in low swampy terrain. The rock is coarse-grained, gneissic to massive and contains numerous small pegmatite segregations. In composition, it is approximately 40% white albite, 30% dark pink nepheline, 20% light pink microcline and less than 10% hornblende. Minor zircon, magnetite and aegirine were also noted.

EXPLORATION HISTORY

The following summary is taken from *GeologyOntario* online Assessment File Research Imaging (AFRI) database, http://www.geologyontario.mndm.gov.on.ca/:

- 1981: Steep Rock Resources Inc. completed diamond drilling totalling 1600 feet in 7 holes on claims located on Concession IV, Lots 10 and 11, Bigwood Township.
- 1982: Steep Rock Resources Inc. completed diamond drilling totalling 705 feet in 6 holes on claims located on Concessions V and VI, Lot 12, Bigwood Township.
- 1985: Steep Rock Resources Inc. completed diamond drilling totalling 700 feet in 3 holes on claims located on Concession VI, Lot 12, Bigwood Township.
- 1990: 15 mining claims brought to lease by Nephco.

Table 11. Comparison of raw nepheline syenite and beneficiated products at French River, Ontario.

Sample	SiO^2	Al^2O^3	Fe^2O^3	Fe^2O	TiO^2	CaO	MgO	MnO	Na^2O	K^2O	P^2O^5	LOI
French River Raw %	56.35	20.31	2.66	4.09	0.16	1.69	0.11	0.18	8.31	4.86	0.04	1.36
French River Beneficiated %	62.2	22.0	0.08	-	0.01	0.33	0.08	0.00	10.2	4.45	0.03	0.74
Rutter Raw %	59.03	21.81	2.34	1.34	0.03	0.53	0.06	0.03	10.78	4.36	0.02	0.15
Rutter Beneficiated %	61.7	22.2	0.18	-	0.01	0.44	0.07	0.00	10.5	4.42	0.02	0.59

Sources: Raw compositions (Hewitt 1961); product compositions (Guillett 1994).

Between 1980 and 1985, Steep Rock Resources Inc. completed detailed studies of the Rutter and French River nepheline syenite bodies including laboratory beneficiation testing of split diamond-drill cores. Dry magnetic separation and floatation testing were compared with the optimum results achieved by dry magnetic separation. Product recoveries were about 70% for the Rutter body vs. 55% for the French River body (Guillett 1994). Table 11 shows typical analyses for both the raw nepheline and beneficiated product from testing each of the deposits.

In 2001, Nephco completing testing of nepheline syenite collected from a bulk sampling program as a follow-up to the Steep Rock Resources diamond-drill testing of the deposits.

Following testing, the company concluded that Bigwood nepheline syenite is resistant to acid attack because the nephelite mineral portion of the Bigwood rock contains an inhibiting element.

To produce nepheline syenite suitable for market applications, the ore is crushed and ground to sand size, then treated on magnetic separators to remove iron-bearing accessory minerals. The Bigwood nepheline syenite ore was found to contain in the order of 0.3% zircon, which reduces the whiteness of the ground product and causes grey colour in the fused material. Removal of the zircon improves the colour of the beneficiated product.

The company believes that there are 3 potential markets for ore from this deposit including as a source for alumina in glass; as a flux for ceramic white wares and as a mineral extender in pigments and fillers.

More study is required to determine if removal of zircon will result in material that is acceptable for glass. Bigwood nepheline syenite has been approved as a ceramic flux by 2 independent laboratories and a ceramic tile producer.

Nephco reports that the nephelite mineral in the Bigwood nepheline syenite is uniquely resistant to breakdown in acidic conditions. The stability of Bigwood nepheline syenite could lead to further applications as a paint extender or functional filler in plastics.

Samples collected from the bulk sample site during the property visit, on examination under shortwave ultraviolet light, were found to contain numerous crystals of both brown and colourless modified pyramidal zircons. The crystals are up to 4 mm in length, fluoresce a brilliant yellow-orange and appear to be segregated within the nepheline syenite. Since 2001, the price for both standard and premium grades of zircon has risen tenfold. There could be a potential market for zircon recovered from the beneficiation of nepheline syenite ore.

The company is currently seeking opportunities for sale, joint venture or option of the property.

OGS ACTIVITIES AND RESEARCH BY OTHERS

The geology of the Sudbury Structure, which includes the Sudbury Igneous Complex and its mineral deposits, attracts research interest worldwide, even after nearly 130 years of commercial production and countless treatises. Some projects of interest underway in 2011 are noted below.

Laurentian University PhD students are completing the following projects in the Sudbury area (thesis supervisors are indicated in square brackets):

- Taus Jørgensen, BSc, MSc (Copenhagen), Evolution of the Sudbury Igneous Complex contact metamorphic aureole and controls on anatexis. [Tinkham / co-supervised by Lesher]
- John Hechler, BSc Hons (Ottawa), MSc (Laurentian), Biogeochemical weathering of acid generating tailings—Canadian and Russian examples. [Spiers / Schindler / Caron / Burnham]
- Joshua Mukwakwami, BSc, M.Phil. (Zimbabwe), Deformation and mobilization of Ni-Cu-PGE mineralization in the Garson Mine, Sudbury, Ontario. [Lesher / Lafrance]
- Oladele Olaniyan, BSc Geology (UNAD, Nigeria), MSc Geoinformatics (ITC, Netherlands), Qualitative and quantitative geophysical investigation of Sudbury structure. [Smith/ Morris]
- Joe Petrus, BSc Hons Physics (Waterloo), MSc Physics (Queen's), Mineralogical, chemical and isotopic evolution in impact bombarded rocks and minerals. [Kamber]
- Craig Stewart**,** BSc Hons, MSc Applied Science (Saint Mary's University) Assessment and characterization of alteration in the footwall and granophyre of the Sudbury Igneous Complex. [Kontak]

Laurentian University MSc students are completing the following projects in the Sudbury area:

- Lindsay Bygnes, BSc (Brock), A comparative study of mineralized and unmineralized breccias along the Whistle offset dyke in the North Range of the Sudbury impact structure. [Lafrance / McDonald]
- Rachel Gammel, BSc Hons. (Saskatchewan), Mineralogy and geochemistry of As-Rich Ni-Cu-(PGE) mineralization at the Garson Mine, Sudbury, Ontario.
- Ladan Karimi Sharif, The radio imaging method and its application to the Sudbury area.
- Galen McNamara, BSc (Laurentian), Pb isotopic variations in the Sudbury Igneous Complex. [Kamber]
- Nathalie M. Mantha, BSc (Laurentian) Interaction between atmospheric components and mineral surfaces on rocks of the Greater Sudbury area. [Schindler]
- Edward Nelles, BSc (British Columbia), Genesis of transitional Cu-PGE-rich footwall mineralization in the Levack deposit, Sudbury. [Lesher]
- Dana Willson, BSc Hons. (Laurentian),Vertical speciation and distribution of arsenic in the Sudbury smelters footprint [Spiers]

Selected recent publications focused on areas within the Sudbury District are listed in Table 12. In addition, the Sudbury District Geologist Office receives copies of the *Canadian Mining Journal*, *The Northern Miner*, *Nickel*, *The Canadian & American Mines Handbook* and the Prospectors and Developers Association of Canada's *In Brief*.

Table 12. Publications received by the Sudbury District Geologist Office in 2011.

Title	Author	Type and Year of Publication
Report of Activities 2010, Resident Geologist Program, Red Lake Regional Resident Geologist Report: Red Lake and Kenora Districts	Lichtblau, A., Ravnaas, C., Storey, C.C., Bongfeldt, J., McDonald, S., Lockwood, H.C., Bennett N.A., Jeffries T.	Ontario Geological Survey, Open File Report 6261, 88p., 2010
Report of Activities 2010, Resident Geologist Program, Thunder Bay North Regional Resident Geologist Report: Thunder Bay North District	Smyk, M.C., White, G.D., Lockwood, H.C. and Bennett N.A.	Ontario Geological Survey, Open File Report 6262, 47p., 2011
Report of Activities 2010, Resident Geologist Program, Thunder Bay South Regional Resident Geologist Report: Thunder Bay South District	Scott, J.F., Campbell, D.A., Lockwood, H.C., Bennett N.A., Brunelle, M.R. and Pelaia, R.	Ontario Geological Survey, Open File Report 6263, 60p., 2011
Report of Activities 2010, Resident Geologist Program, Timmins Regional Resident Geologist Report: Timmins and Sault Ste. Marie Districts	Atkinson, B.T., Bousquet, P., Pace, A., Burnett S., Butorac, S., Draper, D.M., Metsaranta D.-A., and Wilson, A.C.	Ontario Geological Survey, Open File Report 6264, 127p., 2011

Title	Author	Type and Year of Publication
Report of Activities 2010, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Kirkland Lake District	Guindon, D.L., Grabowski, G.P.B., Wilson, A.C., Metsaranta D.-A., and Greenfield M.J.	Ontario Geological Survey, Open File Report 6265, 48p., 2011
Report of Activities 2010, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Sudbury District	Cosec, M., Farrow, D., Alemany R.M., Sangster P.J., Debicki R.L., Metsaranta D.-A., and Wilson A.C.	Ontario Geological Survey, Open File Report 6266, 43p., 2011
Report of Activities 2010, Resident Geologist Program, Southern Ontario Regional Resident Geologist Report: Southeastern and Southwestern Ontario Districts, Mines and Minerals Information Centre, and Petroleum Resources Centre	Sangster, P.J., LeBaron, P.S., Laidlaw, D.A., Wilson A.C., Carter, T.R. and Fortner, L.	Ontario Geological Survey, Open File Report 6267, 65p., 2011

MINERAL DEPOSIT COMPILATION GEOLOGISTS—PROVINCIAL ACTIVITIES

The Mineral Deposit Compilation geologists (MDCG) investigate and document mineral deposits and occurrences across the province. Through field visits, comprehensive literature research and personal research, they work with regional and district Resident Geologist Program staff to ensure that the Mineral Deposit Inventory (MDI) database is regularly updated. Regular updates are required to ensure that the Ministry of Northern Development and Mines is using the most up-to-date information in making land-use planning and policy decisions. A.C. Wilson is the northeastern Ontario MDCG. N.A. Bennett was the northwestern Ontario MDCG until mid 2011.

In December 2011, an updated version of the MDI was released. In addition to being made available through the MNDM web site, through *GeologyOntario* and OGS Earth, the entire digital data set is also on CD as "Mineral Deposit Inventory—2011". All three have search capabilities.

In mid 2011, a new administrative layer was incorporated into the MDI database. This change was implemented in order to maintain consistency with the administrative layer (townships and areas) used by the Mining Lands Section (Mineral Development and Lands Branch, MNDM). As a result, a significant number of pre-existing records were revised to include a new township or area name. Significant contributors to the database in 2011 included J. Bongfeldt (Kenora), D.L. Guindon (Kirkland Lake), A. McKee (Red Lake), A. Pace (Sault Ste Marie), N.A. Bennett (Thunder Bay North and South), R.M. Cundari (Thunder Bay North) and P. Bousquet (Timmins).

Total contributions to the MDI database in 2011 included 2267 updated records, 519 records deleted and 390 new records. A breakdown of the provincial records revised by office is provided in Table 13.

Table 13. Mineral Deposit Inventory records revision in 2011.

Resident or District Office	Updates	Deletions	New
Kenora	175	2	99
Kirkland Lake	89		10
Red Lake	59		7
Sault Ste Marie	46	1	1
Southeastern Ontario	863	414	20
Southwestern Ontario	6	0	0
Sudbury	217	98	8
Thunder Bay North	214	1	66
Thunder Bay South	389	2	110
Timmins	209	1	69
Total	2267	519	390

The MDI database is a dynamic compilation of over 19 000 records describing most of the known mineral occurrences in Ontario. It is an important reference tool for explorationists interested in exploring and acquiring mining properties in Ontario. When used in conjunction with other spatial databases generated by the Ontario Geological Survey, it provides additional tools for making mineral discoveries in Ontario.

REGIONAL LAND USE GEOLOGIST ACTIVITIES

Land Use Planning Activities

The northeast Regional Land Use Geologist, based in Timmins, coordinates input into land use planning activities in the Sault Ste. Marie, Timmins and Kirkland Lake Resident Geologist districts and the part of the Sudbury District that is north of the French River. This report includes information about activities in all of these districts.

From the beginning of 2011 until late September, when she left to take up a new job with the Ministry of Northern Development and Mines' Mineral Development and Lands Branch, the position was staffed by Dawn-Ann Metsaranta, P.Geo. From that time until the end of the year, essential job duties were shared between Hugh Lockwood, P.Geo, northwest Regional Land Use Geologist, Debbie Laidlaw, P.Geo, southern Regional Land Use Geologist, and Ruth Debicki, P.Geo, Land Use Policy and Planning Coordinator, with support from other staff members in the Timmins Regional Office.

The objectives of the position are to

- effectively represent mineral-related values in the context of competing interests for land use;
- optimize the land base available for mineral exploration and development; and
- raise awareness within the mineral sector of the implications of legislation and regulations other than the *Mining Act* on their activities.

The competing interests for land use vary from place to place across the province, but most have the potential to restrict the availability of land, access to it, and /or the activities on it. In 2011, the northeast Regional Land Use Geologist dealt with a variety of land use planning issues throughout the Northeast Region.

CROWN LANDS

The Ministry of Northern Development and Mines (MNDM) engages with the Ministry of Natural Resources (MNR) when Crown land use planning initiatives may affect provincial mineral interests. Such activities include Forest Management Planning, Far North Land Use Planning, and other work related to managing Crown land.

Forest Management Planning

The forest management planning process involves consideration of a wide range of values on forestry activities, including mineral values, and the relevance of legislation other than the *Crown Forest Sustainability Act*, including the *Mining Act*.

The northeast Regional Land Use Geologist provides input into the development of forest management plans, including

- the distribution of areas of high mineral potential, so that forestry planners are aware of areas where there may be pressures from the mineral sector for access for exploration;
- the locations of existing mining claims and leases, so that exploration workings such as grid lines are not inadvertently damaged or destroyed by forestry activities;
- information regarding current exploration and development activities in the area;
- the location of mining-related hazards, so that forestry workers are not put at risk; and

- the socio-economic impact of mineral exploration and mining in the forest management unit, so that its importance can be considered in the context of other sectors such as tourism that may be active within the forest management unit.

In 2011, there were no forest management units in the northeast region requiring input of this sort, due to the implementation of changes to the forest management planning process. In the past, forest management plans have been for five-year periods, with planning for each five-year term beginning 2 years before its implementation. Plan terms have recently been increased from 5 to 10 years, with 2 five-year phases, beginning with plans implemented in 2007.

The Regional Land Use Geologist assisted with forest management planning in 2011 by working with the Mining Lands Consultant to provide addresses for claimholders in several forest management units so that the claimholders could be contacted with regard to the annual work schedules in the areas of their claims.

Provincial Parks and Conservation Reserves

The Regional Land Use Geologist responded to requests from MNR to resume work on disentangling 2 of the Ontario's Living Legacy candidate protected areas that covered areas of pre-existing mining claims and leases. Some claims in a site identified as F1506, near White Lake Provincial Park, had been allowed to lapse and work was done to help prepare them to be officially added to the park. In addition, work was done on a site identified as F175, in the Wolf Lake area northeast of Sudbury. The proposed solution was posted on the Environmental Registry on June 1 for a 47-day public review period. Environmental nongovernmental organizations are campaigning against adopting the proposed solution, and no decision about it has been announced to date.

Crown Land Use Atlas Harmonization Project

MNR has engaged members of the public to help it update the policies for Crown land in the Wawa District. This initiative is called the Crown Land Use Atlas Harmonization Project. It was begun in 2006, but revisited in 2011 after public opposition to policy proposals posted on the Environmental Registry as outcomes of the earlier work.

The northwest Regional Land Use Geologist attended meetings with the group and with MNR staff to provide input with regard to MNDM interests, and to highlight the potential effects that the proposed land use policies might have on mineral sector interests and activities in the area. She also worked to ensure that MNR had contact information for all holders of mining claims and leases in the area, so that the claimholders and leaseholders could be included in the public consultation process with regard to proposed new policies for activities on Crown land in the area.

Withdrawal Orders

The northeast Regional Land Use Geologist reviewed a number of Section 35 (*Mining Act*) requests for withdrawal orders in 2011. Some applications were for surface rights only, some were for mining rights only, and some were for both surface and mining rights. Such requests are made for a wide range of reasons, including

- developing waste disposal sites and sewage lagoons;
- selling Crown land for cottage lots;
- enabling land exchanges;
- supporting First Nations land claim / treaty entitlement negotiations;
- allowing hydroelectric and other infrastructure developments;
- facilitating Ministry of Transportation review of aggregate potential in support of highway maintenance; and
- assessing applications under Section 35.1 of the *Mining Act* for the withdrawal of Crown-owned mining rights in Northern Ontario, where the surface rights are privately held.

After review, 10 applications were recommended for approval; 1 was recommended for approval with conditions; and 2 were not recommended for withdrawal because of the presence of provincially significant mineral potential or the presence of mining claims or leases.

MUNICIPAL/PRIVATE LANDS

MNDM supports planning for municipal and private land by providing input into the Planning Service led by the Ministry of Municipal Affairs and Housing (MMAH). MNDM input includes

- supplying data with regard to mineral potential, mining claims and leases, exploration and mining activity and mining-related hazards to planning authorities, planning consultants and MMAH in support of the new municipal Official Plans, Official Plan Amendments, Zoning By-laws, and Consents (lot severances);
- reviewing land use policies proposed in municipal planning documents and providing comments on those policies to MMAH "One-Window" planners for consolidation with feedback from other ministries; and
- supporting the development of municipal policies and guidelines, and working to enhance the availability of data to support wise planning decisions.

Municipal Planning

The Provincial Policy Statement (PPS), which guides municipal planning in Ontario, is issued under the provisions of the Planning Act. The PPS was last modified in 2005. A compulsory five-year review of the PPS was initiated in 2010 to ensure that it is up to date and meets current environmental standards, ensures human health and safety, and protects Ontario's cultural and natural heritage. The northeast Regional Land Use Geologist's assistance with the PPS review in 2011 included reviewing 10 existing Official Plans and commenting on how well they comply with the requirements of the Provincial Policy Statement. This work is helping to guide the revision of the Provincial Policy Statement.

In 2011, the northeast Regional Land Use Geologist provided direct support for municipal planning in her region by supplying background information in support of new Official Plans for the communities of Tarbutt and Tarbut Additional, Nairn and Hyman, Kirkland Lake, Greater Sudbury, Sault Saint Marie, Temagami, and Huron Shores; providing site-specific information with regard to mineral potential, mineral occurrences and mining-related hazards in a number of municipalities; and reviewing and commenting on the policies in 9 draft Official Plans, 1 Official Plan amendment, 16 Zoning Bylaw amendments, and 8 Consents. Note that Consents are only reviewed for areas such as unorganized territory where the province has not delegated the decision-making authority to a municipality.

In 2011, technical information on mining-related hazards was provided with regard to sites in Timiskaming, Timmins, and Kirkland Lake, with the assistance of MNDM's Mineral Development and Lands Branch. Such information is of particular importance where proposed municipal developments are in or close to areas where mining activity has gone on in the past and there is a risk that the proposed developments may put people or property at risk.

Exemptions from Mining Tax

Section 189(1) of the *Mining Act* now allows for owners of patented mining rights to apply for exemption from paying mining tax on the land. Key factors that are considered when applications are reviewed are whether or not the lands are being used for mining-related purposes, and whether or not there would be third party interest in using the lands for mining related purposes (e.g., the surrounding lands are staked and being explored or the sites in question have provincially significant mineral potential). The northeast Regional Land Use Geologist reviewed approximately 30 such applications in 2011 and provided comments to MNDM's Mining Lands Section to be consolidated with other information for the Minister's consideration and decision.

FIRST NATIONS

The northeast Regional Land Use Geologist provides information in support of First Nation interests in land use planning in a number of different ways. In 2011, she provided feedback to 2 tribal councils with regard to their requests about land use planning on private and Crown land. She also provided input with regard to applications to have Aboriginal cultural heritage sites withdrawn from staking. It is anticipated that input will be provided in 2012 and beyond with regard to Far North land use planning initiatives in northeast Ontario.

OTHER

The northeast Regional Land Use Geologist also participated in other initiatives in 2011, as outlined below.

Class Environmental Assessments

Class environmental assessments (Class EAs) are documents that set out streamlined environmental assessment processes. They apply to routine projects that have predictable and manageable environmental effects. There are currently 10 Class EAs in effect in Ontario with regard to initiatives, including the development of new infrastructure such as dams, transmission lines, pipelines, highway corridors, commuter rail stations and bus terminals, and sewer and water facilities; the establishment of new parks and conservation reserves; forest management plans; and Crown land dispositions.

The northeast Regional Land Use geologist provided input with regard to mineral potential, known mineral occurrences, mining land tenure, and mining-related hazards for 10 Class EA initiatives in northeastern Ontario in 2011. The Class EA initiatives were related to projects including several new hydroelectric developments, a number of transmission line developments, and a proposal for a wind farm.

Data Committee

MNR and MMAH jointly host an interministerial committee that is working to identify and implement ways of making more data more readily available to support land use planning, and especially municipal planning, in Ontario. The northeast Regional Land Use Geologist was MNDM's representative on the committee until her departure, when the southern Regional Land Use Geologist became the MNDM representative on the committee.

Northern Ontario Heritage Fund Corporation Applications

The Northern Ontario Heritage Fund Corporation (NOHFC) was established as a Crown agency in 1988, with a mandate to promote and stimulate economic development by providing financial assistance to projects of merit across Northern Ontario. From time to time, NOHFC circulates applications to staff of MNDM for review and comment.

During 2011, the northeast Regional Land Use Geologist was asked to review and comment on 2 applications. One was for a major waterfront development in an area where there are historic tailings deposits. She recommended that the tailings be sampled for deleterious elements such as arsenic before they are disturbed by the proposed development. She also noted that Section 164(3) of the *Mining Act* prohibits any disturbance of a mining-related hazard without the prior approval of the Minister of Northern Development and Mines, if the site has been rehabilitated in accordance with the *Mining Act*. The other was for waterfront upgrades near a former mine site in another community to accommodate larger crowds at local events. There were no concerns with regard to the second application.

Northeast Ontario Mines and Minerals Symposium

The northeast Regional Land Use Geologist was a member of the planning committee for the 2011 Northeast Ontario Mines and Minerals Symposium, held in Timmins. She was in charge of registration, including ordering delegate bags, etc., and ensuring that all delegates' registrations were processed correctly.

Roads and Road Access

Although the Regional Land Use Geologist commonly receives requests from mineral sector clients with regard to using forestry roads in support of mineral exploration activities, she received 2 exceptional requests related to roads and road access in 2011.

One was an application to close a section of a private road because members of the public were using the road to trespass on private property. Given that the road is one means of accessing an area of mining lands and 2 developed prospects with reserves, the proposed closure was of concern to MNDM. A review of the situation coupled with a site inspection done by the Sault Ste. Marie District Geologist found, however, that there was an acceptable alternate route to the areas of mining lands and mineralization. This information was conveyed to the government representatives responsible for making a decision on the application to close the road.

The other was a request from a company working on upgrading Highway 66 in the Kirkland Lake area. The company wisely decided to find out if there were any mining-related hazards in the area of the upgrades that they should take into consideration. In fact, there were no hazards in the area.

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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 9**	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 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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