

# MANITOBA

## *Mining Review*

**2014-2015**  
An Official Publication of the Manitoba Prospectors and Developers Association Inc.



### **HUDBAY'S LALOR PROJECT:** **Their next underground mine**

#### ***In this issue:***

**Gossan cashing in on frac sand**

**Supreme Court of Canada's decision could be a potential game changer for Manitoba mining industry**

**Manitoba set to capitalize on the potash industry**

**Snow Lake boasts 19 producing mines over the last 100 years**

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# MANITOBA Mining Review

An Official Publication of the Manitoba Prospectors and Developers Association Inc.

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# PRESIDENT'S MESSAGE

## TIM KULCHYSKI, MPDA PRESIDENT

**W**hat is a prospector? Anybody who is engaged in the initial exploration and work, or the development of mineral exploration, can be called a prospector. A prospector is not a geologist, but a geologist can be a prospector. Indeed, anybody from any walk of life who is looking for ore bodies can be called a prospector. Some do it for a living, while others do it as a hobby or on a casual basis. All that is required is a willingness to go into the field and do the necessary work.

Prospectors have different attitudes and approaches to their craft. Some, like me, will only stake claims for others, not for ourselves. We do the job and then we get paid. Others will stake claims for themselves and hold them in speculation. Still others will try to develop their own claims. And, then there are the prospectors who are close to geologists and map out areas of interest.

Developers are those individuals and companies (juniors) that take exploration from its initial stages towards it becoming a mine. They invest in geophysical surveys, drilling, line cutting, mapping, and all the other aspects needed to find a mine. Usually, they hire prospec-




tors to do the fieldwork, but under the direction of a geologist. Usually, they spend a lot of money for very little reward. They work hard, are under incredible stress and hope for some financial gain when all is said and done. They are the bridge between investors and prospectors and quite a few of them are investors too.

Prospectors and developers have different goals and different interests (prospectors would hate to see map staking,

and developers would like it), but their ultimate goal is to create a mine. Good for the economy, good for the province, and good for the country. They deal with apathetic governments, hostile environmentalists, a restless First Nations with growing aspirations to self-sufficiency, and a public that doesn't know and doesn't care. Prospectors and developers are not looking for handouts or support. What they need is a clear set of rules in which they can engage their chosen profession.

Speaking as a prospector, currently sharing a tent in the snow with three First Nations youths watching HBO, waiting for the weather to clear a bit so the helicopter can fly, there is nothing like working in the bush. As a trapper, I have lived free. As a prospector, I have a measure of that freedom. I don't understand you city people and I would guess you don't understand me, and what I do. Please try to remember – without mines there can be no civilization. ☐

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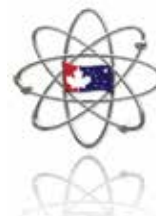
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# IN MEMORIAM

## JIM CAMPBELL –

### NOVEMBER 18, 1926 - OCTOBER 19, 2014

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The Manitoba mining industry has lost one of its long-standing prospectors and geologists, James (Jim) Willard Campbell.

Born in Winnipeg, Manitoba, Campbell – the oldest of four children – started prospecting at a young age. He worked for Kerr Addison for a number of years before becoming president of Gossan Resources Limited from 1980 until his retirement in 2003. He remained an honorary chairman until his death last month.

He is remembered by his wife Rachel and many family members, friends, and colleagues. □



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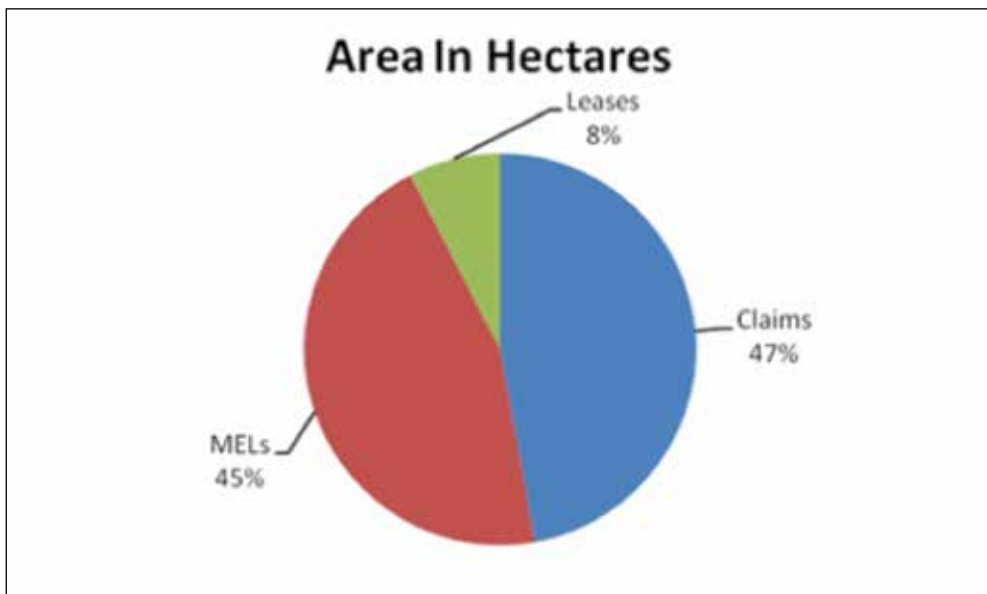
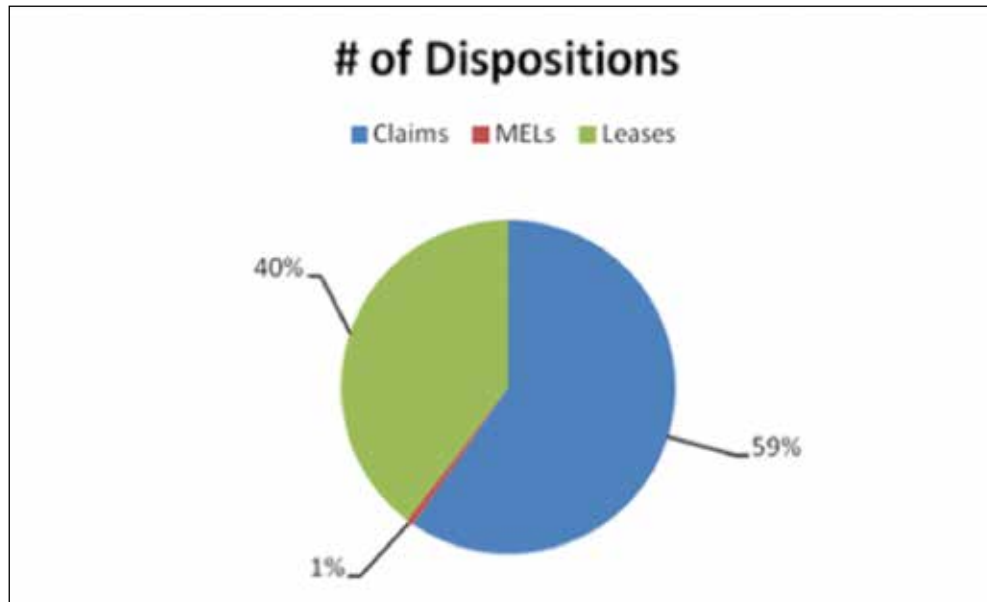
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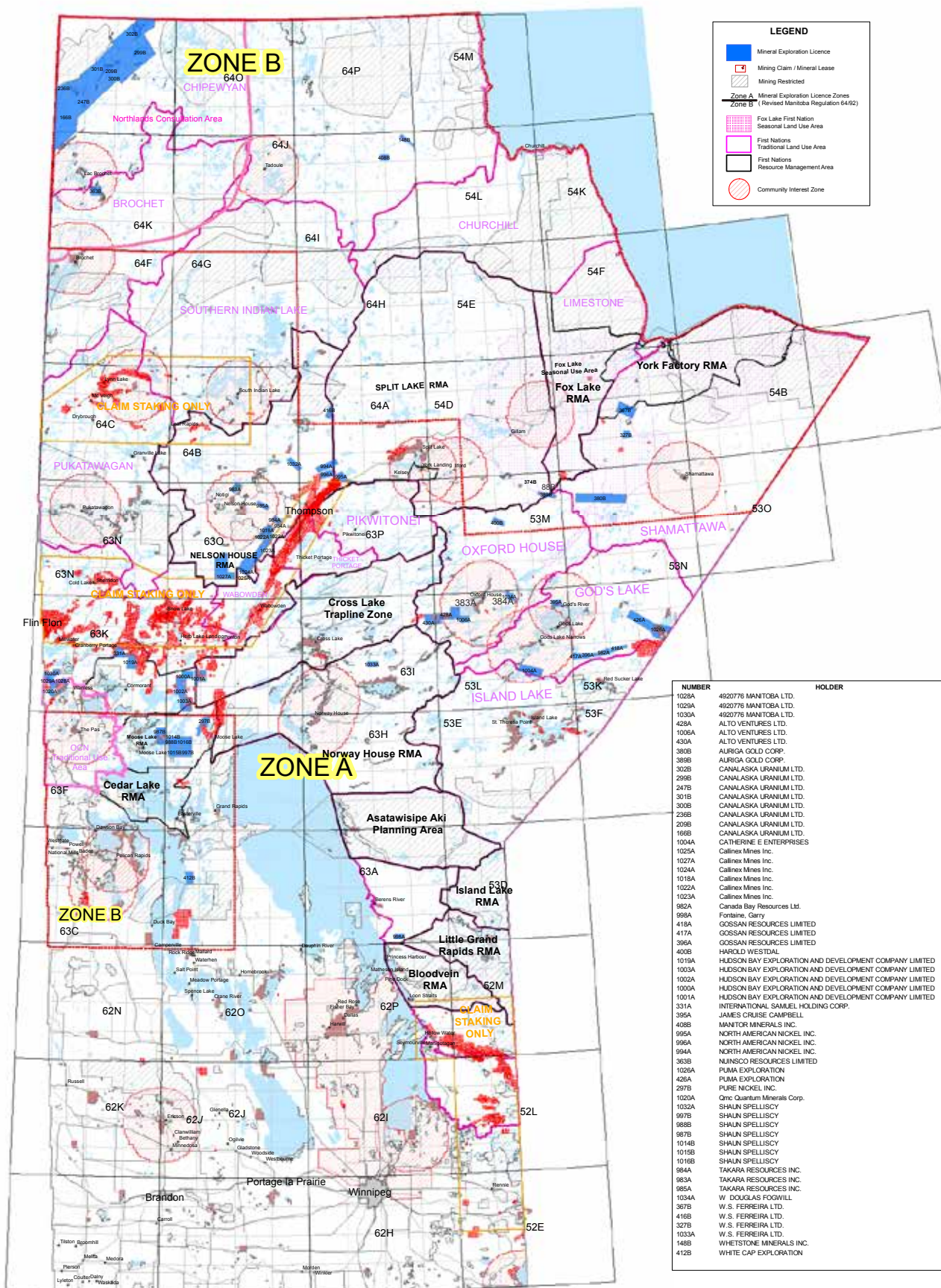
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<b>TOTAL</b>	<b>5,568</b>	<b>854,111</b>
MINERAL EXPLORATION LICENCES (MELs)		
<b>TOTAL</b>	<b>62</b>	<b>818,423</b>
LEASES		
<b>TOTAL</b>	<b>3,704</b>	<b>137,204</b>



Compiled By M. Fedak  
Revised August 2014

Map for illustrative purposes only.  
Contact Science, Technology, Energy and Mines for more detailed information.

## INDEX MAP 2A

### ACTIVE MINERAL EXPLORATION LICENCES





# MANITOBA 2014 EXPLORATION AND DEVELOPMENT HIGHLIGHTS

*Base and precious metals by Chris Beaumont-Smith, Minerals Policy and Business Development;  
Specialty/industrial minerals by Jim Bamburak, Manitoba Geological Survey, Manitoba Mineral Resources  
Current as of September 15, 2014*

**M**anitoba's mining and mineral exploration sector continues to contend with difficult equity markets and low commodity prices. These factors are contributing to significant declines in exploration expenditures and the deferral of development projects.

Exploration and deposit appraisal expenditures decreased in 2013 to \$57.7 million – a 45 per cent decrease from 2012. Difficult financial markets and persisting low commodity prices have created uncertainty in mineral investment markets. The result has been a reappraisal of exploration programs, which is expected to have a negative impact on exploration spending for 2014, projected to decline a further 10 per cent to an estimated \$51.8 million.

Despite these factors, the sector continues to experience significant growth in mineral production. The impact of current economic conditions on base and precious metal exploration expenditures is being offset by major capital investments in expansion and new mine construction. Once these projects are completed, Manitoba's mineral production is expected to increase significantly. The industry's exploration success in the recent commodity cycle during the peak of exploration spending demonstrates the province's considerable mineral potential, and the importance of maintaining a healthy level of ongoing exploration activities.

## BASE METALS

The continued period of low com-

modity prices has not prevented base metal producers from making significant capital expenditures. HudBay Minerals and Vale Canada are making major expenditures to ensure the health of base metal production going into the future.

Mineral development activities in Manitoba are highlighted by HudBay Minerals, which commissioned two new mines in the Snow Lake region. This is the culmination of a historic level of capital investment in HudBay's Manitoba operations. The commissioning of the Lalor and Reed mines reflects their exploration successes and replaces base metal production lost through the recent closures of the Trout Lake and Chisel North mines.

Construction of the polymetallic Lalor mine is largely complete with over \$400 million of the \$441 million project budget having been expended. The mine development is taking place on schedule and on budget. Lalor is poised to become HudBay's flagship mine with full production anticipated to reach 4,500 tonnes per day (tpd) over a 15-year projected mine life.

In concert with the achieving production at Lalor, HudBay has completed a \$9 million upgrade to their Snow Lake concentrator. The upgrade doubles its capacity to 2,700 tpd accommodating commercial production from the Lalor mine.

The Lalor deposit represents the largest pre-development volcanogenic massive sulphide (VMS) deposit discovered in the Flin Flon greenstone belt. The Lalor National Instrument (NI) 43-



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101-compliant Indicated base-metal resource stands at 13.3 million tonnes grading 8.87 per cent zinc, with an Inferred resource of 4.8 million tonnes grading 9.25 per cent zinc. The Gold Zone Inferred resource is 5.4 million tonnes, grading 4.7 grams per tonne (gpt) gold. Conceptual estimates indicate the potential for an additional 5.1 to 6.1 million tonnes, grading between 4.3 and 5.1 gpt gold for the Gold Zone. The estimates also indicate an additional 1.8 to 2.2 million tonnes grading 5.8 to 7.0 gpt gold, and 3.2 per cent to 4.0 per cent copper for the Copper-Gold Zone.

HudBay anticipates additional gold resources will be delineated with further exploration conducted from underground. The Copper-Gold Zone holds the greatest potential to add significant resources to the project. HudBay is embarking on the development of underground infrastructure in support of the exploration of the deeper gold and copper-gold zones.

HudBay's second new mine is the 70

per cent-owned Reed mine project (30 per cent VMS Ventures), located 80 kilometres south of Snow Lake. The Reed mine achieved commercial production in the second quarter of 2014. The Reed mine development was completed on schedule and under the \$71 million budget, with the budget surplus applied to underground development. The copper-gold mine will produce 1,300 tpd at full production, with the ore being trucked to Flin Flon for processing. The Reed Lake deposit contains a NI 43-101-compliant Indicated resource estimate of 2.5 million tonnes grading 4.55 per cent copper.

The completion of the Lalor and Reed mines will allow HudBay to increase base metal production in the near term and significantly increase precious metal production in the longer term with the eventual development of the gold and copper-gold zones at Lalor.

Exploration for VMS deposits continues despite poor copper and zinc prices. This exploration is largely focused on

the Flin Flon-Snow Lake greenstone belt. HudBay, the dominant property holder in the belt is focusing on the underground exploration of the deeper gold and copper-gold zones at the Lalor mine and surface and underground exploration in and around its 777 mine in Flin Flon. VMS Ventures, joint venture partner with HudBay Minerals at the Reed mine, continues exploring its large stable of grassroots projects in the Snow Lake region. HudBay's success at Lalor is encouraging Callinex Mines to explore its properties in the Chisel Basin, adjacent to HudBay's Lalor mine, and their properties adjacent to HudBay's 777 mine in Flin Flon.

South of Snow Lake, Rockcliff Resources Inc. is advancing the closely located Tower and Talbot properties north of Grand Rapids. Rockcliff has committed to earn a 70 per cent interest in the Tower project from joint venture partner Pure Nickel and has outlined two zones of copper-gold mineralization (T1 and T2). An initial NI 43-101 compliant-re-

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source estimate for the T1 zone contains 1.1 million Indicated tonnes grading 3.73 per cent copper, 1.05 per cent zinc and 0.55 gpt gold, and 1.3 million Indicated tonnes grading 2.0 per cent copper, 1.02 per cent zinc and 0.27 gpt gold.

A deep-penetrating electromagnetic (DPEM) geophysical survey outlined a large down-plunge continuation of the T1 zone and identified two other untested anomalies (T2 and T3). The first follow-up test drill hole of the T2 anomaly returned 2.77 per cent copper over 4.0 metres. The relationship between the two mineralized zones is not yet well understood. However, the T1 zone is characterized by mineral textures consistent with remobilization and a lack of associated hostrock alteration, whereas the T2 zone is hosted within a well-developed alteration envelope. A subsequent DPEM geophysical survey of the T1 deposit identified additional targets near the deposit. These are awaiting drill testing.

Rockcliff has added to its property portfolio in the southern Snow Lake region with the acquisition of the Talbot project from HudBay Minerals. Rockcliff has committed to earning 51 per cent in the project over a six-year period. The Talbot property is strategically located 35 kilometres west of the Tower property and contains a historic Inferred re-

source of 1,434,000 tonnes grading 3.4 per cent copper, 2.9 per cent zinc, 1.9 gpt gold and 58.4 gpt silver contained in three zones of disseminated to massive sulphide. Rockcliff believes the Tower and Talbot properties represent a critical mass of base metal resources, creating an excellent development opportunity.

Manitoba's other major base metal producer is nickel producer Vale Canada, with mining, milling and smelting operations located in Thompson. In response to weak nickel prices, Vale embarked on a challenge to improve all aspects of the Thompson operation to achieve \$100M in operational savings. The co-ordinated efforts of Vale employees, contractors and suppliers successfully reached the targeted savings, allowing Vale management to continue development activities at the Birchtree mine and keep the mine open.

Notwithstanding poor nickel markets, Vale is proceeding with feasibility studies of the Thompson Footwall Deep project. The Footwall Deep project contains 11 million tonnes of nickel mineralization forming a deep, north plunging continuation of the Thompson deposit. The internal assessment of the Thompson Deep project has been successful and the current appraisal of the project involves detailed design, planning and scheduling work. The assessment will be

conducted through 2015, and if successful, will result in the development of a new mine that will sustain the Thompson operation for up to 15 years.

Persistent low nickel prices have contributed to the continued suspension of mining operations at CaNickel Mining Ltd.'s (previously Crowflight Minerals Inc.) Bucko Lake mine near Wabowden. Production was suspended and the mine was placed on care and maintenance in June 2012. CaNickel continues to explore its large portfolio of properties in the Thompson Nickel Belt. It has successfully increased the Proven and Probable reserves at Bucko to 3.71 million tonnes of 1.45 per cent nickel. The company is also having considerable exploration success on the nearby M11A and Bowden Lake deposits.

Elsewhere in the Thompson Nickel Belt, Victory Nickel Inc. has deferred the development of their Minago nickel and frac sand mine. Victory received an Environment Act licence in 2011, authorizing the construction and operation of the Minago project north of Grand Rapids. However, it hasn't been successful in securing financing for the initial development stages of the nearly \$600 million mine. Therefore, the company is revising its development plans and focusing on potential frac sand production at Minago and new market development for frac sand. This change in focus reflects the commissioning of sister company Victory Silica Ltd.'s seven persons frac sand processing plant in Medicine Hat, Alberta and the development of a frac sand client base.

In southeastern Manitoba, Mustang Minerals Corp. continues exploration and development on its Makwa and Mayville deposits near Lac du Bonnet. Mustang released the results of a Preliminary Economic Assessment (PEA) outlining the co-development of the Makwa and Mayville deposits with processing infrastructure located at the Mayville site, 43 kilometres from Makwa. The PEA estimates capital costs at \$209 million and a pre-tax Internal Rate of Return of 17 per cent. Total Makwa and May-

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ville Indicated resources are estimated at 33.8 million tonnes grading 0.27 per cent nickel, 0.33 per cent copper, 0.6 gpt platinum and 0.19 gpt palladium.

Other nickel exploration projects include Corazon Mining Ltd.'s past-producing El mine in Lynn Lake and Victory Nickel's Mel project north of Thompson. Corazon is exploring the past-producing nickel mine originally operated by Sherritt Gordon Mines. Using advanced exploration techniques and technology, the companies have discovered new mineralization and expanded remaining resources at the Lynn Lake mine. Victory Nickel continues to advance the Mel project. It recently did a feasibility study on developing this small, but high-grade nickel deposit.

### PRECIOUS METALS

Volatility in gold markets and the general deterioration on precious metal prices have contributed to the persistence of challenging equity markets. This has negatively impacted precious metals exploration and development activities and has contributed to a major restructuring of Manitoba's only primary gold producer.

Declining operating margins at gold miner San Gold Corp. have resulted in a corporate and operational restructuring at its Rice Lake, 007 and Hinge mines in Bissett. From a corporate standpoint, San Gold is merging with Kerr Mines Inc., a Canadian mineral exploration and development company with gold properties in the Abitibi region and Arizona.

From an operational standpoint, the restructuring at Rice Lake involves the development of a new mine plan that better reflects the geometry of the Rice Lake orebodies leading to better grade control. The initial operation changes have had an immediate impact on mine head grades. Once fully implemented, the new mine plan will result in lower annual gold production, at levels management believes are sustainable and profitable, and allow San Gold to capitalize on their considerable exploration

success. Management is projecting annual gold production in the range of 50,000 to 55,000 ounces at cash costs between \$700 to \$800 per ounce of gold produced. The current resource base at Rice Lake is 55,000 ounces of gold grading 6.83 gpt in the Measured and Indicated category and 2,899,200 ounces of gold grading 6.24 gpt in the Inferred category.

The Rice Lake belt remains Manitoba's most active gold exploration camp, where efforts are dominated by junior explorers. Although financing remains

problematic, a number of exploration companies are active in the region. They include Bison Gold Resources Inc. on its past-producing central Manitoba property southeast of Bissett, Strikepoint Gold, Canada Bay Resources and Tudale Exploration.

The success of the redevelopment of the San Antonio mine by San Gold demonstrates the potential of past-producing gold mines to continue to yield impressive exploration results. To this end, a number of past-producing gold mines are the focus of renewed exploration ef-



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forts. Exploration of four past-producing mines in the Trans-Hudson Orogen are advancing towards feasibility studies and potential redevelopment.

QMX Gold Corp. (formerly Alexis Minerals Corp.) is proceeding towards the conclusion of the sale of the former New Britannia mine in Snow Lake to Northern Sun Mining Corp. (formerly Liberty Mines Inc.). The \$20 million purchase paves the way to re-open the mine as Northern Sun attempts to finalize the purchase and secure the required \$50 million in pre-production financing. Northern Sun is committed to re-starting pre-production activities as soon as possible. If successful, the former New Britannia mine will produce between 80,000 and 90,000 ounces of gold per year. A 2010 feasibility study outlined a five-year mine life. Exploration efforts by QMX have added significantly to the resource base, and a revised life of mine estimate is pending.

The New Britannia mine produced 858,000 ounces of gold between 1995 and 2005, and 760,000 ounces of gold

between 1949 and 1958 as the Nor Acme mine. The current reserve estimate stands at 336,700 ounces of gold grading 4.43 gpt and total Inferred resources are estimated at 451,000 ounces of gold grading 4.04 gpt. Surface and underground infrastructure have been maintained since the closure of the New Britannia mine in 2002, making the potential re-starting of mine production possible.

The theme of re-opening past-producing gold mines is further demonstrated in Lynn Lake with the advanced exploration activities of Carlisle Goldfields Ltd. Carlisle has assembled a portfolio of past-producing gold properties previously operated by Blackhawk Mining. Carlisle has successfully explored the MacLellan, Burnt Timber and Farley Lake mine sites and adjoining properties to assemble a resource base of more than 4.8 million ounces. The flagship MacLellan mine property contains Measured and Indicated resources of 2.7 million ounces, and an Inferred resource of 2.1 million ounces. The bulk of this is amenable to open-pit mining.

Carlisle recently released a preliminary economic assessment (PEA). The PEA assessed the economics of the construction of a central processing facility drawing feed from the MacLellan and Farley Lake deposits, followed by satellite deposits under Carlisle's control in the region. The PEA determined the annual production of 145,000 ounces of gold from the MacLellan and Farley Lake mines over a 14-year mine life at cash costs of \$530 per ounce. Carlisle holds a significant land position in the Lynn Lake greenstone belt, including the past-producing BT mine. In advance of commissioning prefeasibility studies, Carlisle is undertaking a major drill program to upgrade the Farley Lake resource.

Efforts to re-opening the past-producing Puffy Lake mine near Sherridon by Minnova Corp. (previously Auriga Gold Corp.) are proceeding through final permitting in advance of the dewatering of the underground mine and the initiation of test mining. The recently released PEA

for the Maverick project outlined robust economics to resume production of 48,000 ounces of gold per year over an 11-year mine life at a cash cost of \$798 per ounce. The low capital costs of \$18 million and relatively short 18-month payback period further demonstrate the robust economics of the Maverick project. Current project resources support the processing of 2.5 million tonnes at a grade of 6.53 gpt for a total 483,000 ounces of gold over the mine life.

Other past-producing gold mines in the Trans-Hudson orogen that have been re-evaluated include Satori Resources' Tartan mine, east of Flin Flon and Callinex Mines' Gossan Hill project near Cranberry Portage, which hosts the past-producing Gurney mine.

A major locus of gold exploration in the Archean northern Superior Province, southeast of Thompson, is fuelled by the success of Mega Precious Metals Inc. at their Monument Bay project, north of Red Sucker Lake.

The Monument Bay project includes the Twin Lakes gold deposit within a large regional exploration property. The Twin Lakes deposit is the focus of a research project at the University of Manitoba to identify an association between gold and tungsten throughout the deposit. The close association led Mega to include tungsten in the resource estimate, significantly increasing the value proposition of the project. The revised resource estimate contains an open-pit-constrained Measured and Indicated resource of 2.9 million ounces of gold at 1.3 gpt, with an additional 700,000 ounces of Inferred resources grading 1.2 gpt. Mega is preparing a revised resources estimate that includes tungsten in advance of commissioning prefeasibility studies. Metallurgical testing confirms that the tungsten resource is recoverable, due to the close association of scheelite and gold in the mineral paragenesis. Mega believes the inclusion of tungsten in the resources is projected to add 30 per cent to the resource estimate.

Mega continues with an aggressive infill and exploration drill program at



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Twin Lakes. A significant component of the exploration program is the sampling and analysis of drill core generated by previous project operators. Mega plans to assess more than 40,000 metres of core in advance of a revised resource estimate that will include tungsten. To facilitate this process, Mega has established an on-site sample preparation and analytical facility. Mega also reported that the gold-tungsten association persists across the Monument Bay property, providing an important pathfinder for regional exploration and optimism for additional exploration success.

The success of the Monument Bay project points to the favourable geology of the northern Superior Province south-east of Thompson. This has attracted a number of junior gold explorers, including Puma Exploration, Gossan Resources Limited, Alto Ventures Ltd., Callinex Mines, Canada Bay Resources and QMC Quantum Minerals Corp. Most recently, Puma has significantly increased its property position in the Little Stull Lake area, adjacent to Mega's Monument Bay project.

The northern Superior Province in Manitoba represents the western strike-extension of proven, gold-producing geology in Ontario. It is viewed by explorers as an under-explored, accretionary terrane having the potential to host a number of gold deposits that form a regional camp.

## URANIUM AND SPECIALTY MINERALS

Uranium exploration activity has been rekindled in far northwest Manitoba. The region hosts Wollaston Domain rocks that exploration companies believe were overlain by Athabasca Basin sediments prior to glaciation extending from Saskatchewan into Manitoba. This represents the same geological environment near-surface in Manitoba that hosts a number of significant, basement-hosted uranium deposits in neighbouring Saskatchewan.

CanAlaska Uranium, Northern Uranium and East Resources currently hold

dispositions covering the known extent of the Wollaston Domain in northwest Manitoba. Northern Uranium has completed initial geochemical and geophysical surveys on their Northwest Manitoba project and is undertaking a major drill program to follow up on a number of significant anomalies. East Resources recently acquired their Kasmere project from CanAlaska and is planning an initial airborne geophysical survey in advance of an exploration program.

New to Manitoba exploration proj-

ects is the first graphite-focused project. Callinex Mines recently completed a 12-hole drill program at its Neuron project located west of Thompson. The geology of the project area is dominated by highly metamorphosed sedimentary rocks of the Paleoproterozoic Kisseynew Domain. The successful drilling program intercepted graphite in 10 of the 12 drill holes and returned intercepts up to 4.1 metres grading 60.38 per cent carbon within a larger 56.00 metre intersection grading 5.91 per cent carbon. □



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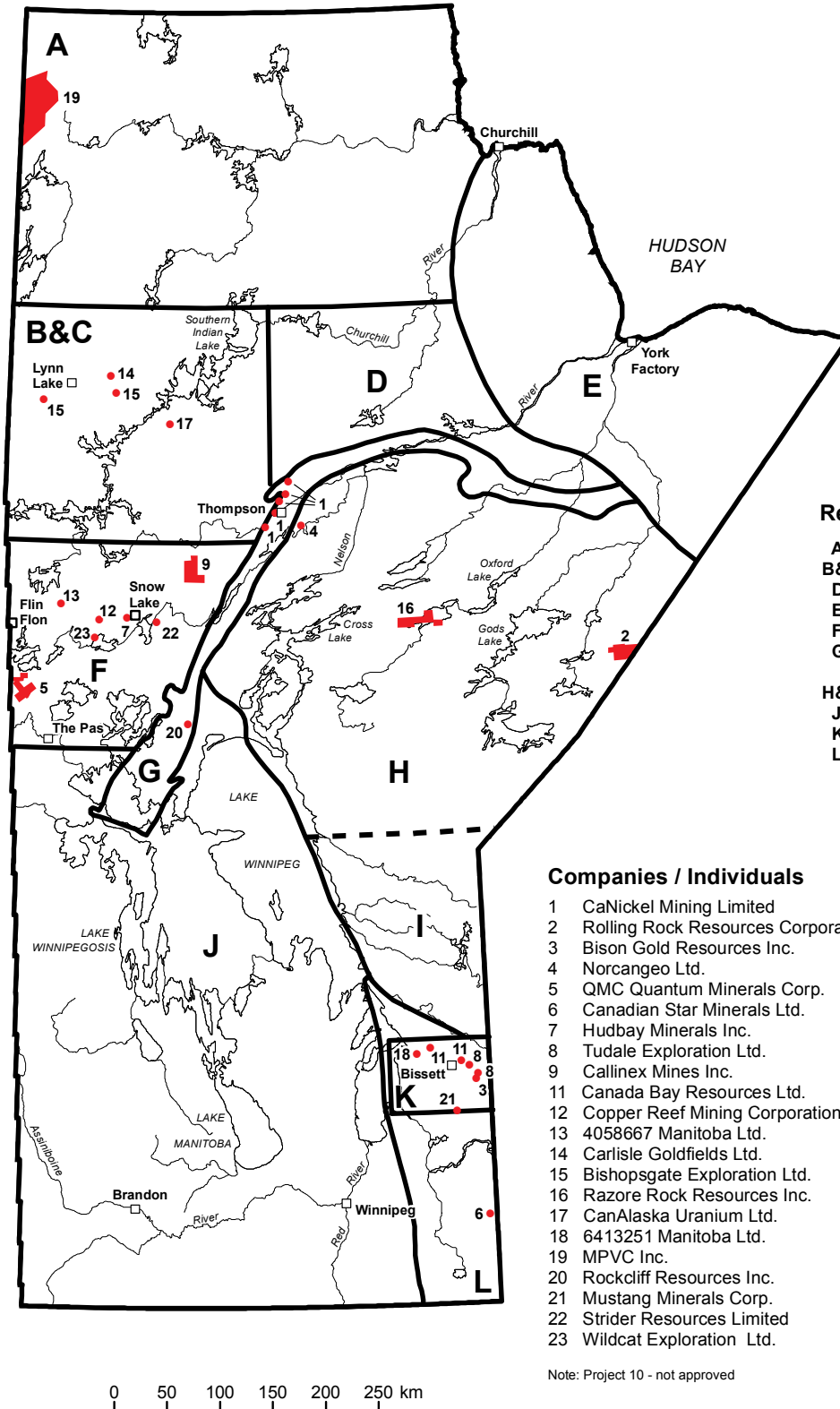


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# APPROVED MEAP PROJECTS

April 2014 MEAP Offering



## Regions

- A** Far North
- B&C** Lynn Lake/Leaf Rapids
- D** SE Trans-Hudson Orogen
- E** Hudson Bay Lowland
- F** Flin Flon/Snow Lake
- G** Thompson Nickel Belt  
- Superior Boundary Zone
- H&I** Northern Superior
- J** South Central Manitoba
- K** Bissett
- L** Southeastern Manitoba

## Companies / Individuals

- 1 CaNickel Mining Limited
- 2 Rolling Rock Resources Corporation
- 3 Bison Gold Resources Inc.
- 4 Norcangeo Ltd.
- 5 QMC Quantum Minerals Corp.
- 6 Canadian Star Minerals Ltd.
- 7 Hudbay Minerals Inc.
- 8 Tudale Exploration Ltd.
- 9 Callinex Mines Inc.
- 11 Canada Bay Resources Ltd.
- 12 Copper Reef Mining Corporation
- 13 4058667 Manitoba Ltd.
- 14 Carlisle Goldfields Ltd.
- 15 Bishopsgate Exploration Ltd.
- 16 Razor Rock Resources Inc.
- 17 CanAlaska Uranium Ltd.
- 18 6413251 Manitoba Ltd.
- 19 MPVC Inc.
- 20 Rockcliff Resources Inc.
- 21 Mustang Minerals Corp.
- 22 Strider Resources Limited
- 23 Wildcat Exploration Ltd.

## Project name

- Thompson Nickel Belt North
- Monument Bay
- Central Manitoba
- Bryce Bay/Thompson East
- Rocky-Nameau VMS Project
- West Hawk Lake
- Lalor /Chisel Lake
- Bissett Area Gold
- MEL 1027A
- Hannes Freeman and CBR Claims
- Northstar/Gold Rock
- Fay Lake
- Farley Lake
- Four Queens/Sarah Lake Prop.
- Oxford Lake
- Ruttan 2014
- Barb Claims
- Northwest Manitoba Uranium Project
- Tower Property
- Mayville-Makwa
- Wekusko
- Reed

Note: Project 10 - not approved





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# MANITOBA MINERAL SECTOR PROFILE

Current as of August 6, 2014

## SIZE:

The mining and petroleum industries make up the second-largest primary resource industry of Manitoba's economy. The 2013 value of mining and petroleum production totalled \$3.1 billion, comprising:

- Metallic minerals (\$1.11 billion or 35.8 per cent, with nickel accounting for 38.1 per cent, copper 20.7 per cent, gold 21.5 per cent, zinc 14.1 per cent, silver 2.1 per cent, and other metals 3.8 per cent of total value of metals)
- Industrial minerals (\$226.8 million or 7.3 per cent), and
- Petroleum (\$1.76 billion or 56.8 per cent).

In 2013, capital expenditures on mining and petroleum development totalled an estimated \$1.4 billion, and the industries accounted for approximately seven per cent of provincial GDP and about 8.7 per cent of total exports. Manitoba's mining and petroleum industries directly employ an average of 6,300 people annually.

## IN 2013, MANITOBA PRODUCED\*:

- 19.3 per cent of Canada's zinc
- 12.6 per cent of Canada's nickel

- Five per cent of Canada's copper
- Four per cent of Canada's gold
- 4.5 per cent of Canada's silver
- 100 per cent of Canada's cesium

*\*Silver, cobalt and platinum group metals are by-products of other mined metals or minerals; values are not available for cobalt and platinum group metals.*

## DOMINANT ACTIVITIES:

- Mining, smelting, refining of base and precious metals
- Mining/quarrying of industrial minerals
- Crude oil extraction

## STRUCTURE AND CONCENTRATION:

- There are approximately 40 companies active in mineral exploration and mining in Manitoba. Two mining companies employ approximately half of the workforce in this sector. Manitoba has eight producing mines, one operating smelter, and two refineries.
- There are about 11 major producers active in the industrial minerals sector in Manitoba.
- There are 39 companies that produce oil in Manitoba, rang-

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ing from large multinationals to small locally based producers. In 2013, 530 new wells were drilled, and in December 2013, Manitoba had 3,862 producing oil wells. Crude oil produced in Manitoba is shipped through the Enbridge pipeline system or Canadian National Railway to refiners in eastern Canada and the northeast and north-central areas of the United States.

## EXPLORATION AND DEVELOPMENT HIGHLIGHTS:

- In 2013, the value of production decreased 14 per cent for metals; increased by 9.9 per cent for petroleum; and increased 10 per cent for industrial minerals; total production value was \$3.1 billion, a 2.3 per cent decrease from 2012.
- Exploration expenditures totalled \$57.7 million for 2013, a 45 per cent decrease from 2012. Continuing instability in global economies and financial markets has created uncertainty in mineral investment, resulting in a reappraisal of exploration programs, and accordingly, is expected to negatively impact exploration spending intentions for 2014, which are estimated at \$51.8 million.
- Oil production in Manitoba has grown rapidly, increasing 381 per cent since 2004, and setting a new annual production record of 19.2 million barrels in 2012 valued at \$1.76 billion, a 9.9 per cent increase in the value over 2012. Oil companies invested \$1.3 billion in 2013.



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Contact: Nick Bodnar

## ADVANCED EXPLORATION PROJECTS:

- **Lalor Project (zinc-copper-gold)** 100 per cent HudBay Minerals, Inc.: A \$794 million development of a 4,500 tonne-per-day (tpd) underground mine and concentrator will increase production to 2,700 tpd with the commissioning of the main shaft in the second quarter of 2014. Full production, and the construction of a new 4,500 tpd concentrator has been delayed beyond 2015 due to poor commodity prices. The base-metal resource stands at over 18 million tonnes and the gold resource over 10 million tonnes. Exploration drilling of the deeper portions of the deposit continues from underground.
- **Snow Lake mine (gold)** 100 per cent Northern Sun Mining Corp. QMX Gold Corporation (formerly Alexis Minerals Corporation) recently sold the former New Britannia Mine to Northern Sun Mining (name changed from Liberty Mines Inc.). The \$20 million purchase will pave the way for the re-opening of the mine with the financial ability of Northern Sun Mining to assemble the required \$50 million of required pre-production financing. Once re-opened, the New Britannia mine will produce 80,000 to 90,000 ounces of gold per annum for at least five years and employ approximately 240 workers.
- **Monument Bay Project (gold)** 100 per cent Mega Precious Metals Inc. project is proceeding towards feasibility study. The recent inclusion of recoverable tungsten significantly



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improves the projects economics, gold resource approaching three million ounces. The conceptual mine 200,000 ounce per annum will be one of the largest gold mines in Manitoba once built. Mega Precious Metals and Pacific Road Resources announced that they have entered into an agreement pursuant to which Pacific Road has agreed to invest approximately US\$3.0 million in Mega. Pursuant to the terms of the definitive agreement, Pacific Road will have the right to invest three additional tranches for a total investment of up to US\$40 million as the company advances the Monument Bay Project.



- Lynn Lake project (gold) 100 per cent Carlisle Goldfields: Carlisle has completed a preliminary economic assessment (PEA) in advance of feasibility studies. The positive PEA assessed the economics of the construction of a central processing facility drawing feed from the MacLellan deposit. Carlisle has outlined an over 4.8 million ounce gold resource that will support a conceptual 100,000 to 200,000 ounces of gold per annum mine. This project will potentially make this project one of Manitoba's largest gold mines.

#### MINING OPERATIONS:

- As Vale transitions its Thompson operations to phase out smelting and refining by 2015, the company projects mining and milling to continue beyond 2027, and is reviewing mine development opportunities, specifically, the Thompson 1-D project which represents a potential investment



of more than \$1 billion.


- Reed Mine 70 per cent HudBay Minerals, Inc. / 30 per cent VMS Ventures Inc.: The project received environmental licensing in September 2013 allowing ramp-up to full production of approximately 1,300 tpd in the fourth quarter of 2013. A National Instrument 43-101-compliant resource announced April 1, 2011 outlines an indicated resource of 2.55 million tonnes of 4.52 per cent copper. The high-grade, near-surface copper deposit will be trucked to the Flin Flon concentrator.
- HudBay continues development of the Lalor mine in the Snow Lake region. HudBay estimates capital costs of the Lalor mine at \$794 million. The Lalor mine is scheduled to increase production to 2,700 tpd with the commissioning of the main shaft during the second quarter of 2014. In response to persistent low metal prices, HudBay has deferred the construction of the new \$325 million Lalor concentrator, opting to spend \$9.0 million to refurbish their existing Snow Lake concentrator. Current production from the 777, Lalor and Reed mines supports HudBay's Flin Flon metallurgical complex.
- San Gold Corporation continues to expand their mining operation at Bissett with ongoing exploration successes that will help the company attain their 2013 production target of between 95,000 and 105,000 ounces.
- CaNickel Mining Limited (formerly Crowflight Minerals


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Inc.) CaNickel put their Bucko Lake Nickel Project near Wabowden on care and maintenance in July 2012 due to weak nickel prices. The company continues to undertake exploration programs in the Thompson Nickel Belt.

#### SECTOR CAPABILITIES:

- Base and precious metals: copper, nickel, zinc, gold
- Industrial minerals: cesium, dolomite, gypsum, sodium chlorate, dimension stone, lime, crushed rock, sand and gravel aggregate
- Crude oil extraction

#### KEY PLAYERS:

- HudBay Minerals Inc.
- Vale
- San Gold Corporation

- CaNickel Mining Limited
- Tantalum Mining Corporation of Canada
- Tundra Oil & Gas Partnership
- EOG Resources Canada Inc.
- Penn West Exploration
- Canadian Natural Resources Limited
- Gillis Quarries Ltd.
- Cold Spring Granite (Canada) Ltd.
- ERCO Worldwide
- Certain Teed Gypsum Canada Inc.
- Graymont Western Canada Inc.
- Lafarge Canada Inc.
- Lehigh Inland Cement Limited
- Corex Resources Limited

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- Metal deposits in Manitoba's Precambrian Shield have been mined for decades. Ongoing development at Flin Flon will extend operations there until 2021 and at Snow Lake, the Lalor deposit is expected to support mining to 2030 and beyond. These developments will see mining activity in the Flin Flon–Snow Lake region extend over 100 years since the first mines were opened. Similarly, Vale's development projects are expected to extend mining operations until 2030 and beyond, about 750 years after initial production. In 2006, San Gold Corporation reopened the gold mine at Bissett, where the mining history of the region's mineral-rich Rice Lake gold belt dates back to 1911, and where ongoing exploration successes have enabled San Gold to expand production every year.
- Large areas of high mineral potential in remote regions of the province remain under-explored when compared with similar regions elsewhere in Canada. This represents a potential avenue for considerable growth in Manitoba's mineral sector and may provide significant employment opportunities for northern and aboriginal communities near new mineral exploration and development projects.
- Manitoba mineral resources with potential for future economic development include platinum-group

elements (platinum, palladium and rhodium), rare earth elements, uranium, titanium, vanadium, chromite, silica, diamonds and potash.

- Although oil has been produced in Manitoba for over 60 years, the province is still relatively underexplored. Production has been obtained from only a small part of the total sedimentary sequence present in the province. Horizontal drilling and multi-stage hydraulic fracturing are being used by companies to develop Manitoba's tight oil reservoirs.

#### **Business Strengths:**

- In addition to the province's rich mineral resources, Manitoba offers a number of business advantages that support mining and petroleum exploration and development including: a comprehensive geoscience knowledge-base; financial incentives; a transparent land-tenure system; competitive business costs; skilled labour; environmental stewardship balanced with industry needs; a high-quality transportation infrastructure; access to a sea port; and low-cost, reliable electricity.
- Recent initiatives to support mineral and petroleum exploration and development include:
  - Renewal of the Mineral Exploration Assistance Program for 2014/15. The program provides funding of \$3.0 million through one offering per year. Since 1995,

Manitoba has invested a total of \$29 million through its Mineral Exploration Assistance Program to support 786 exploration projects. These projects have generated \$252.4 million in company spending for exploration in the province.

- The Manitoba Geoscience Advantage Program, which provides \$400,000 a year for three years to provide new geoscience information supporting mineral exploration in the province.
- The Manitoba Drilling Incentive Program, which provides incentives to explore and develop petroleum resources in the province, was revised and extended at the end of 2013 through to December 31, 2018.
- A progressive mining tax rate of 10, 15 or 17 per cent based on profits and other mining tax incentives making Manitoba among the most competitive mining tax regimes in Canada.
- A 30 per cent Mineral Exploration Tax Credit offers Manitoba taxpayers the most generous mineral exploration tax credit in the country.
- The online Integrated Mining and Quarrying System (iMaQs) streamlines the administration processes under Manitoba's mining legislation and allows companies to manage their mineral



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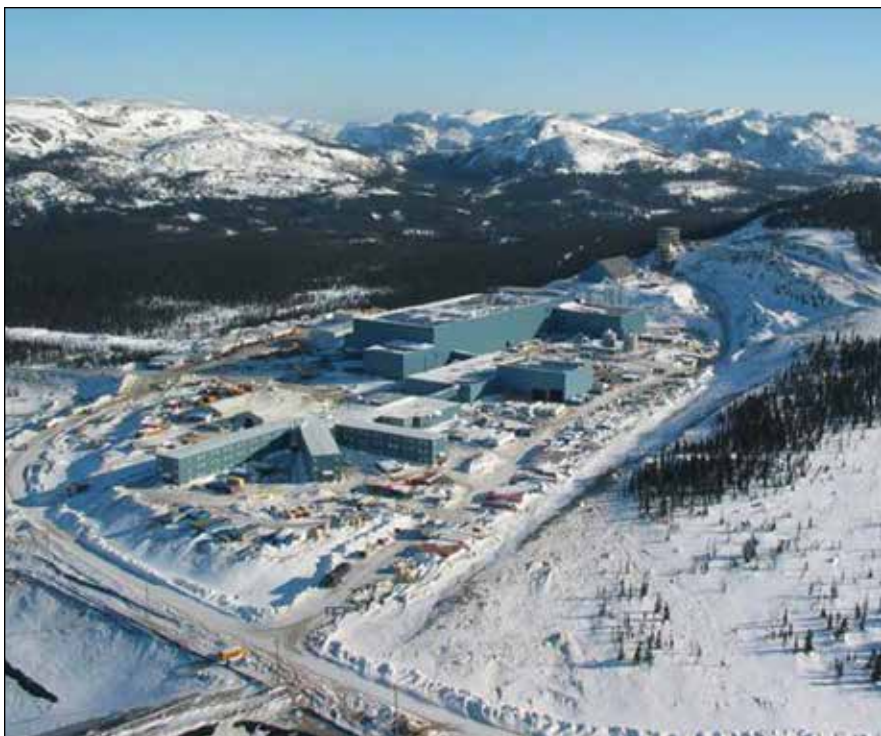




dispositions from anywhere in the world at any time.

- Online access to geoscientific and mineral tenure information on Manitoba's mineral and petroleum resources has been enhanced through the GIS Map Gallery.
- Opened in September 2012, the new Northern Manitoba Mining Academy located in Flin Flon and Thompson, established by the Manitoba government in collaboration with industry, educational institutions, and municipal and federal governments, includes state-of-the-art mining simulators, and will provide a regional hub for the development and administration of mining and geoscience training across the north.
- Through the Northern Essential-Skills Training Initiative, Manitoba continues to work with the Northern Manitoba Sector Council to deliver training initiatives to address skill shortages in the mining sector.
- More than \$160 million spent to date on the ongoing rehabilitation of orphaned and abandoned mine sites across the province.
- Manitoba has been recognized nationally and globally as one of the best places for mining and petroleum investment:
  - Manitoba's effective mining tax rate is ranked fourth in Canada according to the PricewaterhouseCoopers 2013 Canadian mining tax report.
  - In 2013, Manitoba ranked as the second best jurisdiction in Canada to invest in petroleum exploration and development, as rated by oil industry executives in the Fraser Institute's *Global Petroleum Survey*. For the previous four years, Manitoba ranked as the best (2009, 2010, 2012) or second-best (2011) nationally. □

Metal deposits in Manitoba's Precambrian Shield have been mined for decades. Ongoing development at Flin Flon will extend operations there until 2021 and at Snow Lake, the Lalor deposit is expected to support mining to 2030 and beyond.



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# DOUG FOGWILL

## THE OPTIMISTIC GAMBLER

By Ashlee Espenell



DOUG FOGWILL PROSPECTING IN CENTRAL NEWFOUNDLAND, 1964.

Prospectors are somewhat of an endangered species in Manitoba, particularly the independent ones.

"You have to be kind of crazy to be a prospector," admits W. Douglas Fogwill. "It's a gambler's business."

Fogwill has been "gambling" for

decades. He worked his way up from a boots-on-the-ground prospector to president of a TSE-listed company. His 58 years of experience in all phases of mineral exploration and development has seen him work with 11 mining companies and three provincial governments, and carry out fieldwork in four provinces.

For the last 20 years, Fogwill has been working as a consulting geologist, and a director and officer for the Manitoba Prospectors and Developers Association (MPDA). He offers services in mineral property research; property evaluation, acquisition and management; negotiation of option and joint venture agreements; geoscience reports and compilations; government and First Nations liaison; and technical and popular writing. Over the last 20 years, Fogwill's work has helped bring eight new companies and more than \$15 million in mineral investments into Manitoba. He was part of the teams that discovered a copper-nickel deposit in Labrador in 1960, a uranium deposit in Saskatchewan in 1979, and new gold mineralization in northern Manitoba in 1998.

He completed his BSc in Geology from Memorial University of Newfoundland in 1960 and did his post-graduate work at the London School of Economics, the Colorado School of Mines, and the University of Saskatchewan. In addition to the MPDA, Fogwill is also member of the Manitoba Association of Professional Engineers & Geoscientists, and a lifetime member of the Prospectors and Developers Association of Canada, as well as a former district vice-president of the Canadian Institute of Mining, Metallurgy and Petroleum (CIMM). He's published papers on geoscience, is an award-winning creative writer, and is also a de-



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FOGWILL STAKING CLAIMS IN NORTHERN MANITOBA, 1996.

voted husband, father, and grandfather.

He likes to joke that he's a rock doctor from the Rock. He may have geology in his blood, but that's not why he went into his field.

"I loved the woods, even as a kid. My friends and I would camp out for days, and my mother just got used to it," says Fogwill. "I really just wanted to do something that would let me go back into the bush again."

Fogwill estimates that one out of every 8,000 exploration prospecting projects eventually becomes a mine. Those odds may be steep, but prospectors are optimists at heart.

"Finding a mine is like finding buried treasure," says Fogwill. "It's brand new wealth. That kind of resource discovery can transform the status of a province from have-not to have, as we've seen happen in Newfoundland."

Fogwill acknowledges that it's a difficult time right now for mineral exploration in Manitoba, but he believes the

future is still bright, and that those in the industry will be able to work with stakeholders in government, environment, and First Nations communities to find ways to resolve those challenges. He's seen first-hand how new discoveries in Newfoundland and the Northwest Territories can revitalize the industry and turn the economy of a province around. He may be a gambler, but he's an optimistic one, and he knows not to fold too early.

"The industry keeps finding a way. The advancements we've made in technology and technique over the last 50 years have been significant," he says. "Most new discoveries are coming through geophysical and geochemical advancements and innovative geological interpretations."

The mining cycle of development, production and rehabilitation begins with the prospector's discovery, he says.

"We have good geology in Manitoba, and it's a very promising environment for new discoveries." □

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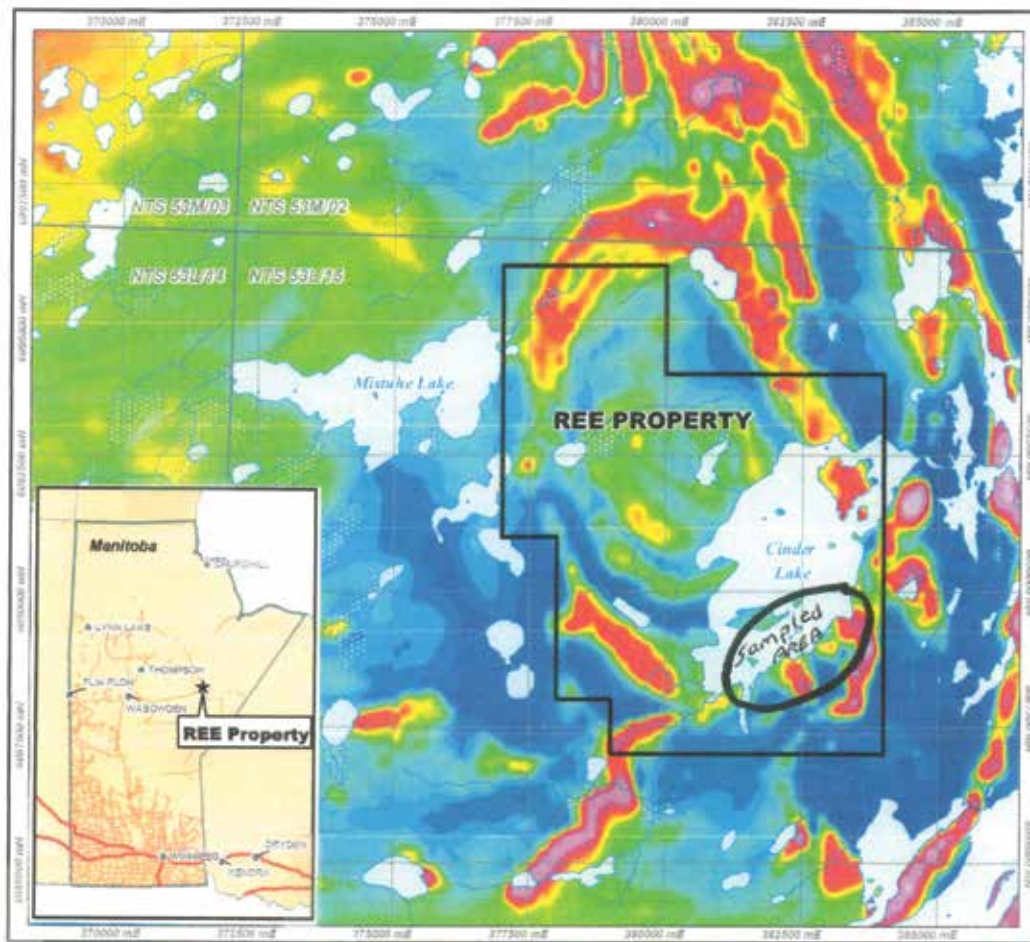
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# 2014 MANITOBA CINDER LAKE RARE EARTH PROPERTY

## BEST REE PROPERTY IN MANITOBA (GEOLOGY SIMILAR TO HUGE CHINA DEPOSITS)



### CINDER LAKE REE PROPERTY, MANITOBA, ALKALINE 'CARBONATITE' COMPLEX, 25 SQ. KM.

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*"...similar in size and geological setting to Maoniuping (China) huge REE producer and Mountain Pass REE deposit, California."*

2010, KRESSALL AND  
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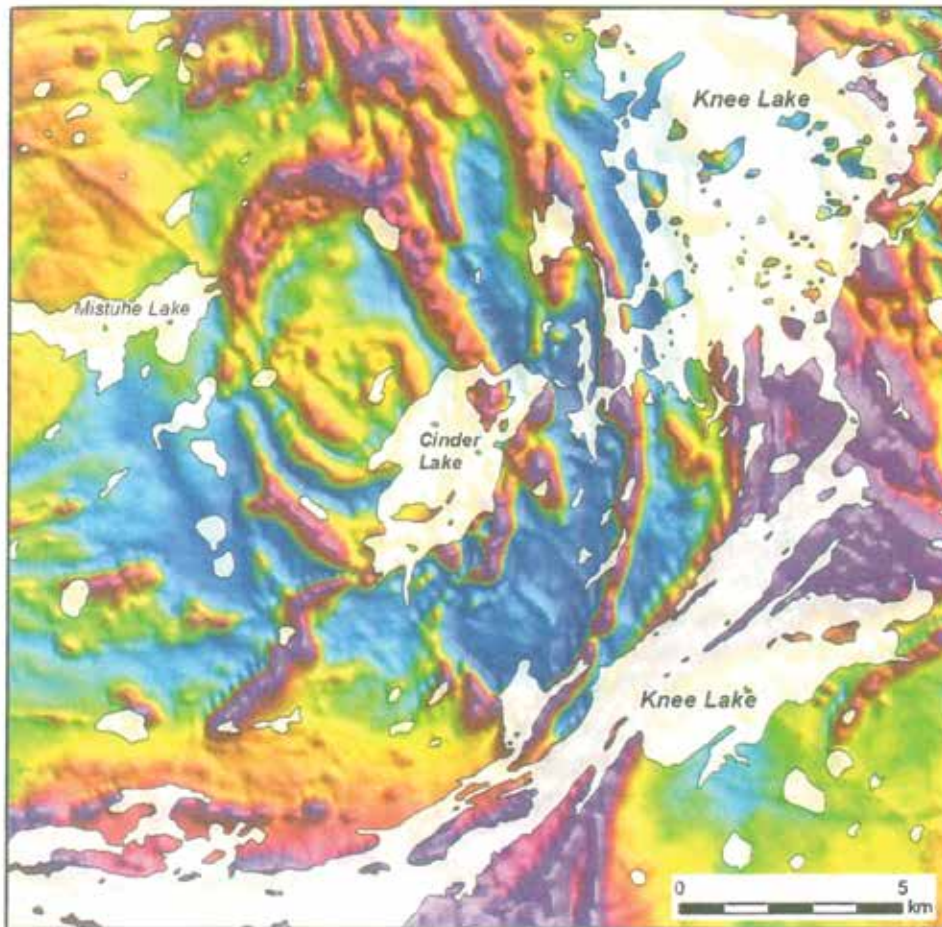
*"...exploration samples up to 2300 grams Lanthanum; 1300g Neodymium; 140g Samarium; 44.3g Europium."*

1993, INCO EXPLORATION  
(BASE METAL), KNEE LAKE, MANITOBA.

*"...sampling (short) program 2011 found high anomalies in REE at Cinder Lake, MB, in Rock, Soil and Vegetation – up to 890g Ce, 560g La, 480g Nd, 60g Sm, 18.8g Eu, 108g Pr, 35g Gd, 18.5 Dy, 10.5g Yb, 8.4g Er, 3.9g Tb, 3.4g Ho, 1g Tm. Rock, Soil (MMI) and Vegetation (alder twigs 'Alnus rugosus') proven effective for REE exploration in this low outcrop area. Recommend Prospecting / Sampling of entire property along with airborne Mag., EM and Radiometric Survey."*

M. FEDIKOW, 2012,  
PRIVATE COMPANY REPORT.



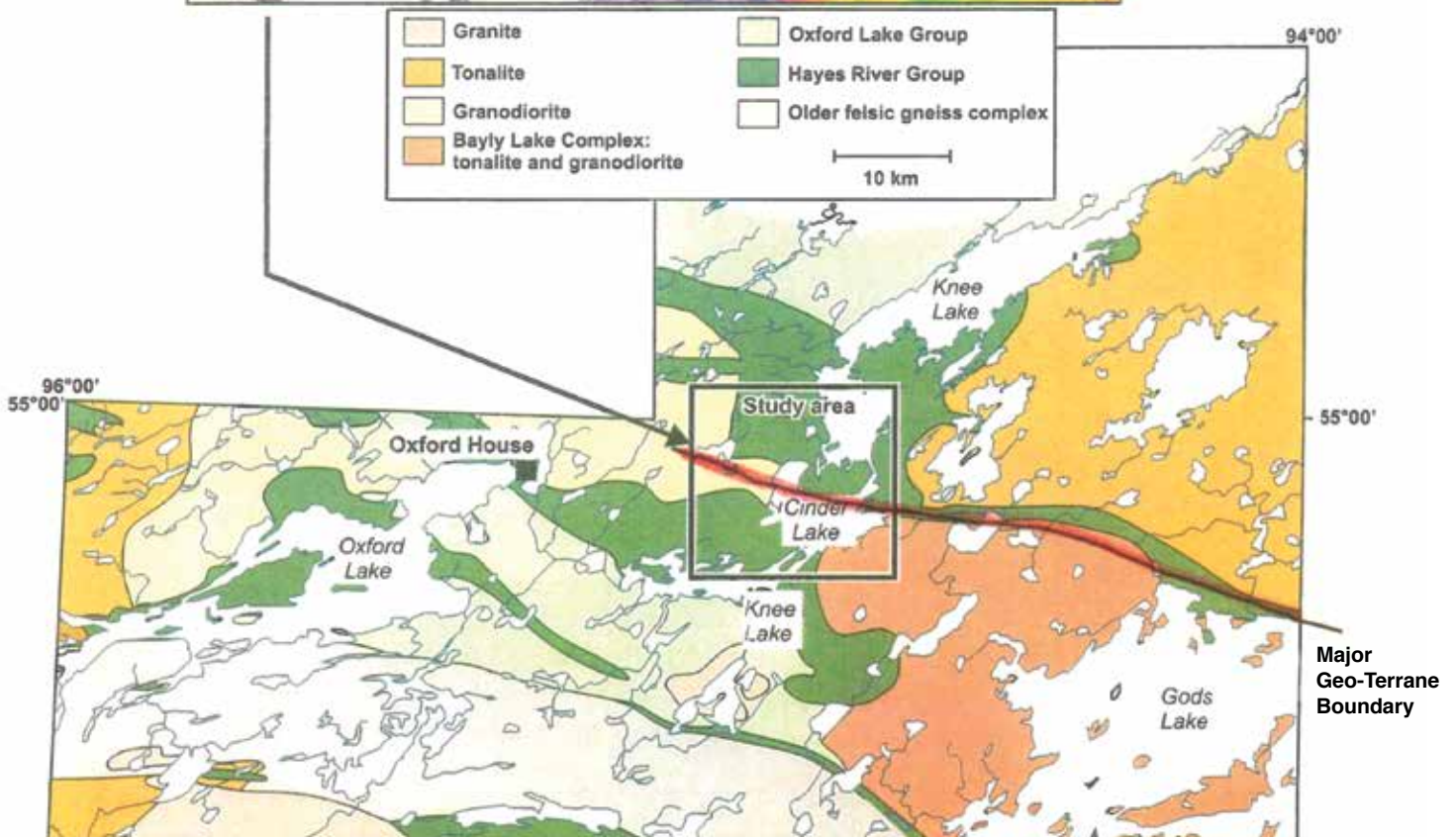


*"...Over the last 10 to 15 years, the world consumption of REEs has increased at 8% to 12% per annum, a trend that experts agree will continue and may increase."*

NATURAL RESOURCES CANADA, 2014

*"...Demand for certain REEs is projected to shoot up by as much as 2,600% by 2025."*

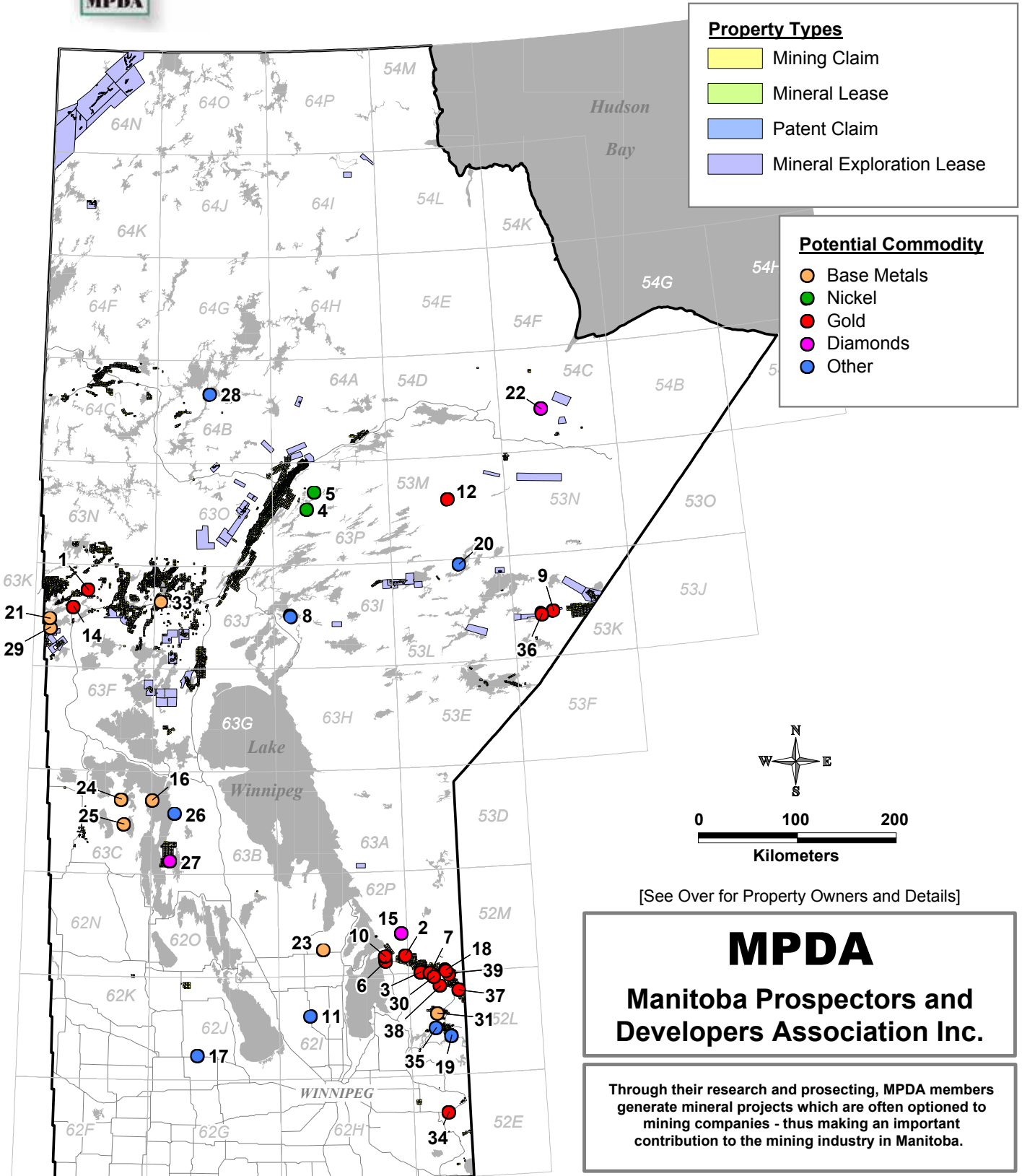
MASSACHUSETTS INSTITUTE



SIMPLIFIED GEOLOGY OF THE KNEE LAKE GREENSTONE BELT. INSET SHOWS REIDUAL TOTAL FIELD MAP OF THE CINDER LAKE AREA FROM THE AEROMAGNETIC SURVEY CONDUCTED BY DE BEERS CANADA (ASSESSMENT FILE 94883, MANITOBA INNOVATION, ENERGY AND MINES).



# 2014 Manitoba Mineral Properties Owned by MPDA Members





# 2014 Manitoba Mineral Properties Owned by MPDA Members

## Property Owners and Details

Number	Owner	Potential	Contact
1	Callinex Mines Inc	Gossan-Au	info@callinex.ca
2	DLM Gold Ventures	Au	manitobagold@gmail.com
3	DLM Gold Ventures	Au	manitobagold@gmail.com
4	Garry Thorne	Ni, Cu, PGE, Au	norcangeo@shaw.ca
5	Garry Thorne	Ni, Cu, PGE	norcangeo@shaw.ca
6	Golden Pocket Resources	Au	info@goldenpocketresources.com
7	Golden Pocket Resources	Au	info@goldenpocketresources.com
8	Gossan Resources Limited	V, Ti	info@gossan.ca
9	Gossan Resources Limited	Au	info@gossan.ca
10	Gossan Resources Limited	Silica	info@gossan.ca
11	Gossan Resources Limited	Mg	info@gossan.ca
12	Harold Westdal	Au	hwestdal@mts.net
14	Kismet Minerals	Au	maryann@corporate-relations-services.com
15	Kenneth Klyne	Diamonds	i_zinc@hotmail.com
16	Klyne Exploration	Ni, MVT	i_zinc@hotmail.com
17	Stephen J. Lesavage	Fe	stevelesavage@mts.net
18	Stephen J. Lesavage	Au	stevelesavage@mts.net
19	W. D. Fogwil	Li, Ta, Ce	fogwill@mts.net
20	W. D. Fogwill	REE	fogwill@mts.net
21	W. D. Fogwill	Cu, Zn	fogwill@mts.net
22	W. S. Ferreira Ltd	Diamonds	wsferreira@shaw.ca
23	W. S. Ferreira Ltd	Cu, Zn	wsferreira@shaw.ca
24	White Cap Exploration	Ni, Cu, PGE, Zn	whitecapexplor@shaw.ca
25	White Cap Exploration	Ni, Cu, PGE, Zn	whitecapexplor@shaw.ca
26	White Cap Exploration	REE, Ni, Cu	whitecapexplor@shaw.ca
27	White Cap Exploration	Diamonds, REE, Zn	whitecapexplor@shaw.ca
28	Wildwood Geological Services	Li, Cs, Ta, Nb	rbezys@shaw.ca
29	William C. Hood	Zn, Pb	bhood@mts.net
30	William C. Hood	Au	bhood@mts.net
31	William C. Hood	Cu, Ni	bhood@mts.net
33	William C. Hood	Cu, Zn	bhood@mts.net
34	William C. Hood	Ta, Li	bhood@mts.net
35	Gossan Resources Limited	PGM, Ni, Cu	info@gossan.ca
36	W. D. Fogwil	Au	fogwill@mts.net
37	Norseman Exploration	Au	norseman@mymts.net
38	George Nykulaik	Au, Ag	gm55@yahoo.com
39	Les Barclay	Au	inchgallo@gmail.com



# 51<sup>ST</sup> ANNUAL WIUGC RETURNS TO WINNIPEG

## JANUARY 2<sup>ND</sup> TO 4<sup>TH</sup>, 2015



THE WIUGC PLANNING COMMITTEE. FROM LEFT TO RIGHT: SKYE KUSHNER, JESSICA LITKE, MATTHEW BRAUN, DEREK DRAYSON, COLLEEN HANASYK, MAXWELL DAY, JOHANNA FERGUSON, AND AARON DESILETS.

The Western Inter-University Geosciences Conference (WIUGC) is an annual student-run conference that rotates between universities across Western Canada, hosted this year by students from the Department of Geological Sciences at the University of Manitoba. The conference is a three-day event, taking place from January 2nd to 4th, 2015 at the Delta Hotel in Winnipeg, Manitoba. About 150 to 200 students are expected to attend the conference.

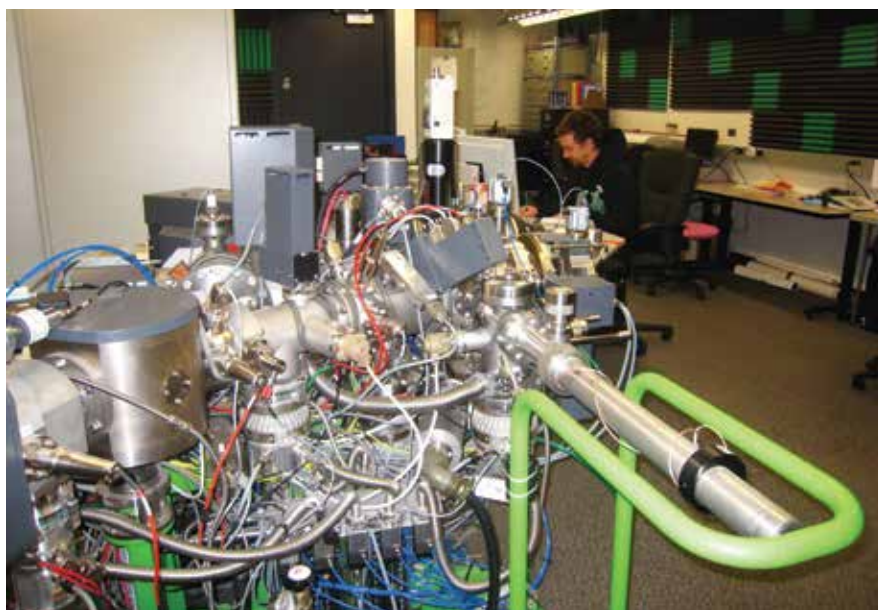
This conference is an important opportunity for students to network with each other and industry professionals, to learn about developments in a broad range of areas in the geosciences, and to present their research in the geosciences. The conference will include technical talks, poster presentations, an industry fair, field trips, an awards banquet, and social events. We are pleased to announce that Dr. Scott Jobin-Bevans, co-founder of Caracle Creek International

Consulting Inc. and former president of the Prospectors and Developers Association of Canada, will be our keynote speaker at the awards banquet held on Sunday, January 4th.

Last year's conference was held in

Calgary, Alberta with 200 registrants from across Western Canada. Students attended the event from the University of British Columbia, University of Victoria, Okanagan College, University of Calgary, University of Alberta, Mount Royal University, University of Regina, University of Saskatoon, University of Manitoba, and Queen's University. This year we hope to also include attendees from Brandon University and Lakehead University.

This year's conference in Winnipeg will kick off with a "Rockbreaker" on Friday, January 2nd at Tavern United Downtown (345 Graham Avenue) providing students with the opportunity to meet and greet their peers. Saturday, January 3rd will include field trips, an inter-university competition, and an industry fair and poster presentations. The conference will wrap up on Sunday, January 4th with technical talks, the Canadian Society of Exploration Geophysicists (CSEG) Challenge Bowl regional qualifier, and a banquet featuring a keynote



THE SECONDARY ION MASS SPECTROMETER (SIMS) LOCATED IN THE UNIVERSITY OF MANITOBA'S GEOSCIENCE LAB FACILITIES.



BRUCE THE MOSASAUR – THE LARGEST DISPLAYED MOSASAUR IN THE WORLD AT THE CANADIAN FOSSIL DISCOVERY CENTRE IN MORDEN, MANITOBA.

speaker, awards, and prizes. These events provide an opportunity by students, for students to improve their communication and presentation skills, to network and meet industry professionals, and to increase their knowledge and showcase their research.

Student attendees will have the option to choose from four field trips. The first

is a tour of the Canadian Fossil Discovery Centre in Morden, Manitoba, which is home to Canada's largest collection of marine reptile fossils, including the world's largest displayed Mosasaur. The second option includes a tour of the Manitoba Geological Survey's (MGS) Core Storage Facility, where students will be given a tutorial on preparing samples for assay and thin section. On the third trip option, students will be guided through the Manitoba Legislative Building focusing on the engineering and geology of the building. The final trip will take place at the University of Manitoba where students will be guided through the geoscience lab facilities, including the argon-argon mass spectrometer, the secondary ion mass spectrometer, and the Sea-Ice Environmental Research (SERF) facilities.

As an entirely student-run organization, the WIUGC requires student volunteers to make this event happen. Planning this event increases students' leadership skills, organizational skills, and time-managing skills. This year's

planning committee comprises a group of geology and geophysics students from the University of Manitoba and includes: **Matthew Braun** – president, **Derek Drayson** - vice-president, **Aaron Desilets** – administrator, **Jessica Litke** – treasurer, **Johanna Ferguson** - head social coordinator, **Skye Kushner** - social coordinator, **Maxwell Day** - social coordinator, and **Colleen Hanasyk** – recruitment.

This important academic event could not be made possible without industry sponsorship. The industry fair and technical talks are a great way for potential employees to network and get to know your company. If you are interested in supporting the 51st annual WIUGC please email Jessica Litke at [umlitkej@myumanitoba.ca](mailto:umlitkej@myumanitoba.ca) before December 1st, 2014.

*For information on student registration, how to submit technical talk abstracts, and updates to our itinerary, please visit our website at [www.WIUGC2015.com](http://www.WIUGC2015.com).*

*See you in January! ☐*



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# RECENT DISCOVERY ADDS TO WILDCAT EXPLORATION'S BASE METAL APPEAL



VP EXPLORATION TOM LEWIS INSPECTS OUTCROP AT SHONIA ZONE, MCVICAR LAKE GOLD PROJECT.

With the discovery of high-grade zinc-lead-copper-silver mineralization in the Bathurst, N.B. mining camp, the Wildcat-Doe Run Canadian Exploration Alliance, of which Wildcat Exploration Ltd. [WEL-TSXV] is manager, has created new excitement in an established area. In recent years, Wildcat has moved beyond its roots in the Rice Lake gold camp. By expanding into the Uchi sub-province in Ontario for gold, partnering with Anglo American in the Thompson Nickel Belt and forming an alliance with Doe Run Canadian Exploration ULC to investigate base metal targets in Atlantic Canada, the company has opened itself to several opportunities.

Wildcat is led by John Knowles, CEO, and Tom Lewis, VP of Exploration. Knowles, a former CFO of Hudbay Minerals, is currently a director of Hudbay and gold developer Roxgold Inc. Lewis

has led exploration teams in many of Canada's major gold and base metal camps with Placer Dome, Hudbay and Anglo American.

The company's capital structure resembles a startup, with only 7.8 million shares outstanding, but it has the property portfolio of a much more advanced company.

## THE WILDCAT-DOE RUN CANADIAN EXPLORATION ALLIANCE

### ISLAND LAKE (ZINC-LEAD-COPPER-SILVER)

The alliance is a unique vehicle formed by Doe Run Canadian Exploration ULC ("Doe Run"), a British Columbia-registered company, and Wildcat. Doe Run is contributing broad exploration and mining expertise, while Wildcat's team brings complementary Canadian exploration, operational, and regulatory know-how.



WILDCAT GEOLOGIST EILIDH LEWIS INSPECTING TUFF HORIZON, REED LAKE, MAN. PROPERTY.

Under the agreement, Doe Run funds Alliance work programs, which are managed by Wildcat. Doe Run owns the alliance properties and Wildcat may acquire up to a 30 per cent interest in alliance properties prior to completion of feasibility studies. The alliance is currently exploring on the Island Lake property, located approximately four kilometres southeast of the former Heath Steele zinc mine in New Brunswick.

In August 2014, the first hole of the current year's diamond drill program, DDH IL-2014-001, intersected massive sulphide mineralization, which included 7.6 metres (6.2 metres true width) of 2.38 per cent Zn, 0.55 per cent Pb, 0.11 per cent Cu, and 19.1 g/t Ag on the northeast portion of the Railroad Zone. On September 3, 2014, Wildcat announced that DDH IL-2014-003, a step-out 70 metres northeast from the initial hole, intersected 9.0 metres (7.8 metres true width) of 14.51 per cent Zn, 5.86 per cent Pb, 0.67 per cent Cu and 139.9 g/t Ag, as well as 3.0 metres (2.6 metres true width) of 6.57 per cent Zn, 2.78 per cent Pb, 0.46 per cent Cu and 68.1 g/t Ag. As a result of the encouraging results announced in September, the 2014 drill



program was expanded from 2,500 metres to 4,500 metres. Further assays were pending at the time of writing.

## MANITOBA BASE METALS

### REED LAKE (COPPER-ZINC)

Wildcat's Reed Lake base metal prospect in west-central Manitoba is located between the Reed copper mine to the south and the Rail copper-zinc deposit immediately to the north. Some 35 kilometres further north is the new Lalor zinc-copper-gold mine. These are all located in the eastern part of the Flin Flon-Snow Lake greenstone belt, in which more than 30 mines have operated over the past 80 years.

On the Reed Lake property, Wildcat's geologists discovered shear-hosted copper mineralization grading 1.58 per cent copper hosted in Flin Flon volcanic rocks. In 2011, the company contracted a VTEM airborne survey, which identified three conductive targets with associated magnetic responses. Prospecting and mapping in the vicinity of the conductors identified favourable geology for Volcano genetic Massive Sulphide (VMS) mineralization, including rusty, quartz phryic felsic volcanics. Wildcat plans to carry out a diamond drill program on the targets in winter 2014/15.



SUPPLY AIRCRAFT AT WILDCAT'S REED LAKE, MAN. PROPERTY.

### BURNTWOOD (NICKEL-GOLD)

The Thompson Nickel Belt trends northeasterly through the city of Thompson and has been a prolific source of nickel over the past 50 years. Wildcat is earning a 100 per cent interest in the Burntwood nickel project located 55 kilometres southwest of Thompson, Manitoba, from senior producer Anglo American plc. Drilling for nickel in 2011, Wildcat's DDH TB-2011-002 intersected 152 g/t gold over one metre along a major northeast trending rock contact. Further drilling is planned for both gold and nickel targets.

## THE UCHI SUBPROVINCE

### UCHI TARGETS AND THE MCVICAR PROPERTY (GOLD)

In 2013, Wildcat sold most of its Rice Lake area gold properties to the San Gold Corporation, receiving cash, shares of San Gold, and other consideration. Utilizing their knowledge of Uchi rocks in Rice Lake, Wildcat's geologists identified and ranked several targets to the east, in Ontario, for possible acquisition. They staked one of the highest-ranked properties, at McVicar Lake, about 80 kilometres west of Pickle Lake, Ontario.

Gold mineralization at McVicar is concentrated in four main zones. Gold assays from the property include intersections of 5.7 g/t across 7.1 metres and 14.3 g/t across 14.6 metres. The property holds potential for high-grade, vein-type mineralization similar to the former Golden Patricia mine, as well as potential for bulk gold associated with intrusive rocks. Targets are ready for drill testing.

From its roots in Manitoba, and with a lean corporate structure, Wildcat has built a suite of exciting exploration projects in established camps. Its exposure to opportunities on several fronts makes Wildcat a company to watch. □



WILDCAT VP TOM LEWIS AND CEO JOHN KNOWLES INSPECT ISLAND LAKE, NB DRILL CORE.

# HUDBAY'S LALOR PROJECT: HUDBAY'S NEXT MAJOR UNDERGROUND MINE

*By Robert Winton*



No two mining projects are alike, but many in the mining industry would agree that the mining business is a long-dated proposition. It takes many years to discover projects and it takes even longer to develop and build a fully producing mine. When you consider that the Lalor mine was only discovered in 2007 and has been in production since 2012, its story is that much more incredible.

With an anticipated 15 years of high-volume, low-cost production, Lalor is expected to become Hudbay's next major underground mine. The mine is located in the Chisel Basin of the Flin Flon Greenstone Belt (FFGB), a prolific zinc-copper-gold region in northern Manitoba. It was discovered using an innovative adaptation of electromagnetic geophysical surveys to penetrate deep below the FFGB. Intense exploration identified separate and distinct zinc, gold, and copper-gold zones since Lalor was first discovered. Based on current data, Lalor is estimated to hold the second-largest metal deposit ever discovered in the FFGB.

In 2009, Hudbay began construction of a three-kilometre ramp from their Chisel North mine to the Lalor deposit. Completion of the ramp was a major accomplishment, allowing Hudbay to begin underground diamond drilling

from the 810-metre level. This helped delineate the first ore production zone and allowed for development of the detailed mine plan and sequencing. The next year, they committed to advancing Lalor to full production. By mid-2012, they had completed the ventilation shaft, which enabled them to start mining and generate cash flow a mere five years after the initial Lalor discovery. The timing coincided with the closure of the Chisel North mine so as to provide a continuous source of zinc feed for their concentrator and zinc plant, as well as the necessary personnel.

Since beginning construction, the Lalor project team has delivered milestone after milestone while remaining on schedule, on budget, and maintaining an excellent safety record. Commissioning of the main production shaft was completed in the summer of 2014 and will enable them to discontinue the use of the ventilation shaft for hoisting ore. They will continue to process Lalor ore at the recently refurbished Snow Lake concentrator at a rate of 2,700 tonnes per day, doubling its previous capacity.

The excellent performance by their Lalor project team has put them in a position to initiate drilling of the copper/gold zone from underground for the first time later this year. This will be approximately one year ahead of sched-

ule and will allow them to restart an exploration story following three years of building the Lalor mine and gaining the necessary access for deeper exploration. When the underground drill program at Lalor begins, they expect it to be the first of a multi-year underground drilling program that they believe will add additional resources to this already large and growing deposit.

The Lalor mine was not Hudbay's only success story in Northern Manitoba this past year. Hudbay's 70 per cent owned Reed mine, roughly midway between Flin Flon and the Lalor site, achieved commercial production, ahead of guidance, having operated at an average of 792 tonnes per day in the first quarter of 2014. Similar to Lalor, the Reed project team delivered milestone after milestone, while maintaining an excellent safety record. Reed's two-year construction program was accomplished without a single lost-time accident.

Lalor is a key component of Hudbay's growth strategy, focusing on low-cost and long-life assets in politically stable jurisdictions. Lalor, along with Hudbay's Constancia project in Peru and Rosemont project in Arizona, comprise one of the best growth profiles in the mid-tier base metals sector. □

# Producing a Bright Future



- Having completed the construction of Lalor and achieved commercial production at the Reed mine, we are seeing another wave of growth beginning in northern Manitoba.

Hudbay is a Canadian integrated mining company with a vision to become a top-tier operator of long-life, low-cost mines in the Americas.

**TSX/NYSE: HBM**

[hudbayminerals.com](http://hudbayminerals.com)

**HUDBAY**



# GOSSAN CASHING IN ON FRAC SAND



**G**ossan Resources holds a broadly diversified portfolio of mineral properties, hosting gold, platinum group and base metals, as well as the specialty and minor metals – vanadium, titanium, chromium, tantalum and lithium. Gossan also holds a large deposit of high-purity magnesium-rich dolomite and will participate in a high-purity silica frac sand deposit through an equity ownership, future cash property payments, and a significant production royalty. All of the properties are located in Manitoba and northwestern Ontario.

A recent major accomplishment was the sale of the Manigotagan Silica Frac Sand Project to Claim Post Resources in June of 2013. Gossan has been seeking a joint-venture partner or a purchaser for the project since completing a marketing study in late 2010. Claim Post also holds the adjacent property at Seymourville and a consolidation of the two properties should improve the viability of a frac sand operation. Gossan now holds an equity stake in Claim Post and will receive further property payments of \$780,000 over the next eight months, as

well as a significant royalty interest on future production of \$1 per tonne of frac sand. Demand for frac sand from the oil and gas industry is strong as the technology of drilling multi-fraced horizontal oil and gas wells utilizes large amounts of frac sand. Demand for frac sand is expected to grow for the foreseeable future.

Over the past two years, magnesium prices declined materially, reducing the potential cost savings and return on investment of the company's initiative to develop a new thermal production process and this development has ceased. Gossan continues to assess other economic uses for the Inwood high-purity dolomite and to seek new competitive high-efficiency magnesium production processes. Magnesium should play a major role in light-weighting autos and throughout the transport sector in order to improve fuel efficiency and reduce GHG emissions.

The company has a wholly owned nickel-PGM resource on the Bird River Sill that was developed with our former joint-venture partners – Stillwater Mining and Marathon PGM – who incurred

over \$4.7 million of exploration and acquisition expenditures at the project over the past few years. An initial low-grade in-situ resource has been estimated for the Page Block and Ore Fault deposits containing nickel, copper, zinc, silver, gold and PGMs. Management believes higher nickel prices and consolidation of the adjacent deposits on the Bird River Sill are required to improve the economics in order to proceed to development. Hybrid vehicles currently use nickel-metal-hydride batteries and PGE's are a fundamental component to catalytic converters which limit auto emissions.

In Manitoba, there remain considerable challenges in the consultation and engagement process with First Nations groups. Despite our efforts, we have made limited progress in advancing Gossan's Pipestone and Sharpe Lake Projects.

Gossan holds a 50 per cent interest in a large low-grade vanadium and titanium deposit at Pipestone Lake, with its equal partner, the Cross Lake First Nation. Vanadium is principally used in the iron and steel industry to provide additional strength in products such as rebar. However, vanadium in various forms has a number of unique attributes pertaining to an electrical charge. Research is well underway to use these attributes



DRILLING, MAY 2008.

in two large tanks of solutions that have the capacity to accept and release a substantial electrical charge at great speed. This particular re-dox technology would be utilized for large-scale grid storage of electricity. The efficiency and utilization

of renewable energies and transmission lines would be greatly enhanced by grid scale electricity storage. Commercial adoption of this technology would provide a new use for vanadium and provide a steady and large increase

in demand which would allow for new entrants of primary vanadium producers into the market. Vanadium is also likely to see a substantial increase in demand for use in lithium-based batteries, including batteries for the e-vehicle market and portable electronic devices.

Gossan trades on the TSX Venture Exchange under the symbol GSS and on the Frankfurt-Freiverkehr & the Xetra Exchanges under the symbol GSR - WKN 904435. As of October 2014, Gossan has 33.2 million common shares outstanding.


Gossan holds a commodity-diverse property portfolio well positioned to meet the increasing demand for high technology and environmentally beneficial mineral resource applications, including electric vehicles and battery storage.

The company's current strategy is to husband its cash resources, ensure long-term tenure of its deposits and key exploration ground while also evaluating new financeable projects. □

COMMODITY DIVERSE EXPLORATION
GREEN ENERGY DEMAND







**GOSSAN IS ENGAGED IN COMMODITY DIVERSE EXPLORATION AND DEVELOPMENT FOCUSED ON GREEN ENERGY DEMAND**

TSX.V **GSS** | Freiverkehr & Xetra **GSR - WKN 904435**

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 Tel: (204) 943 1990  
[info@gossan.ca](mailto:info@gossan.ca)  
[www.gossan.ca](http://www.gossan.ca)



# A GOLDEN OPPORTUNITY GARNER LAKE PROJECT

The Garner Lake project is located in the historic Rice Lake gold camp 150 kilometres northeast of Winnipeg. The property is 35 kilometres southeast of Bissett and is accessed by boat, winter road, and trails. Six claims cover the 1,164 hectare property just three kilometres south of the former Gunner & Solo-Oro Grande mines that produced 104,000 ounces of gold combined.

This under explored area is host to one of the most geologically complex parts of the Rice Lake Belt with transecting north-south shear zones cutting east-west formations of volcanic, sedimentary and intrusive rocks. Recent discoveries

include a high-grade sample 153 grams per ton gold (5.4 oz/ton) in veins west of Garner Lake.

Hosted in the centre of the Beresford Lake shear zone, numerous gold showings were mapped along a 500-metre mineralized structure open on strike at both ends. Gold occurs in association with sulphides in grey quartz-carbonate veins within an envelope of chlorite, sericite, and ankerite alteration.

Underlying the east end of the property is the layered Garner Lake ultramafic intrusion. The gold-bearing Portage vein is hosted in sedimentary rocks near the faulted south contact of the Garner Lake sill. Grab samples from the Portage vein

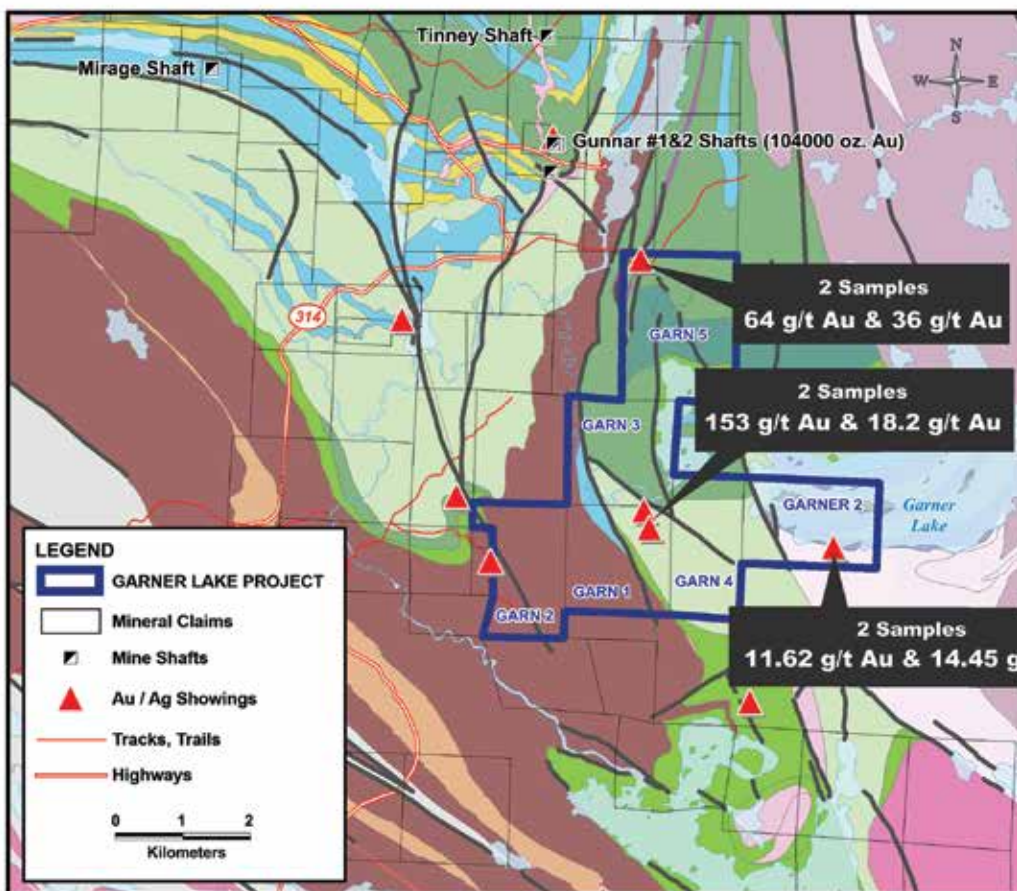
have yielded up to 11.62 g/t gold and 14.45 g/t silver. Anomalous nickel, copper and PGE values suggest potential for reef-type mineralization within the Garner intrusion as well.

Further work, such as stripping, soil sampling, IP surveys, and drilling are recommended to pursue mineralization along the strike length and width of these significant high-grade veins.

*A joint-venture partner is being sought for the Garner Lake Project.*

*If interested, contact Dave Meek at [norseman@mymts.net](mailto:norseman@mymts.net), or Bill Hood at [bhood@mymts.net](mailto:bhood@mymts.net). □*

## Garner Lake Project - Bissett, Manitoba



### Geology Legend

- Biocite gneiss, migmatite; local calcisilicate
- Hornblende-biotite gneiss; local amphibolite, migmatite
- Quartz monzonite-monzodiorite; locally megacrystic
- Granodiorite
- Tonalite; minor trondhjemite, quartz diorite
- Gabbro; locally layered melagabbro-leucogabbro
- Metapyroxenite
- Metaperidotite (mainly serpentine)
- Wacke-mudstone
- Volcanic sandstone, siltstone; minor conglomerate
- Polymictic conglomerate; minor sandstone
- Iron formation; magnetite facies, minor sulphide
- Rhyodolite; includes rhyolite, dacite
- Andesite to dacite; flows, tuff, breccia
- Basalt/local metabasite, gabbro
- Komatiite/komatiitic basalt
- Manigotagan Fault
- Faults

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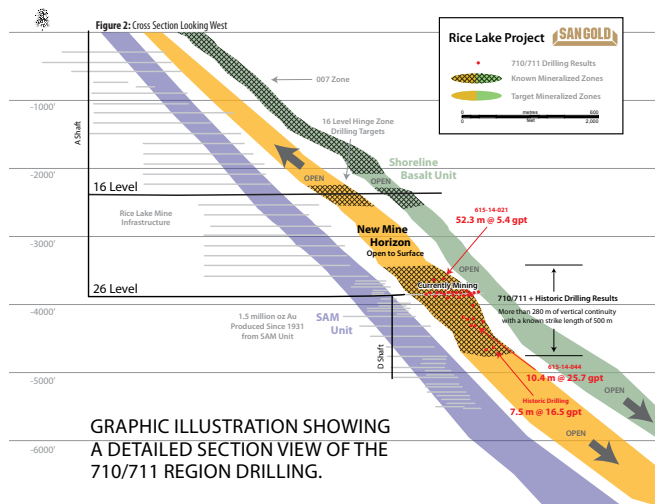
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# SAN GOLD DRILLS NEW MINE HORIZON ADJACENT TO RICE LAKE MINE RETURNS 10.4 METRES GRADING 25.7 G/T AU



San Gold Corporation (TSX: SGR) (OTCQX: SGRCF) has identified a new and parallel mining horizon located immediately to the north of the Rice Lake Mine, one of the company's most significant geological steps forward since the discovery of the Shoreline Basalt mining unit in 2008.

Until the discovery of the Shoreline Basalt deposits, geologists at the Rice Lake Mine assumed all gold mineralization occurred within the main San Antonio Mine (SAM) unit. Then in mid-2013, an exploration program was initiated to test beyond the eastern extent of the Rice Lake Mine workings, approximately 1,250 metres below surface. The program was targeting the projected extensions of the 007, one of the Shoreline Basalt deposits, and soon discovered the 710 and 711 veins.

Additional drilling and preliminary development work, however, combined with a separate structural analysis being carried out to incorporate all historic drill data obtained from within the company's mineral lease, soon determined that these lenses were not in fact within the Shoreline Basalt and were instead associated with an entirely new mining horizon located in the region between the SAM and Shoreline Basalt.

After further drilling, the 710/711 veins now have a combined strike length of more than 500 metres, extend approximately 150 metres vertically, and remain open along strike and up and down dip.

Highlight results from this drilling program include 10.4 metres of core length grading 25.7 grams gold per tonne (Hole 615-14-044), 52.3 metres grading 5.4 grams gold per tonne (Hole 615-14-021), and 6.4 metres grading 18.5 grams gold per tonne (Hole 615-14-010).

The veins are located 100 to 200 metres north of, and in the immediate hanging wall of the Rice Lake mine and are currently being accessed and developed from 26 Level, which is the mine's

Hole Number	Zone	From (m)	To (m)	Core Length (m)	Grade (g/t Au)
615-14-021	711	128.9	181.2	52.3	5.4
including		128.9	132.7	3.8	13.8

Hole Number	Zone	From (m)	To (m)	Core Length (m)	Grade (g/t Au)
including		154.4	158.6	4.2	18.0
including		170.1	173.6	3.5	16.7
615-14-020	711	125.4	131.5	6.1	4.8
including		130.5	131.5	1.0	17.4
615-14-027	711	168.8	170.4	1.6	6.9
and		188.2	193.1	4.9	3.5
and		205.1	208.6	3.6	5.0

Hole Number	Zone	From (m)	To (m)	Core Length (m)	Grade (g/t Au)
614-14-028	711 Extension	5.6	8.2	2.6	24.8
614-14-032	711 Extension	19.8	21.2	1.4	15.9
614-14-033	711 Extension	2.3	3.0	0.7	23.0
615-14-023	711 Extension	232.1	243.8	11.7	4.8
including		233.5	235.0	1.5	12.2
and		240.2	242.6	2.4	12.0
615-14-033	711 Extension	289.7	295.8	6.1	6.1
615-14-038	710	98.1	100.3	2.2	9.8
	710 FW	242.8	245.2	2.4	12.7
615-14-043	710	124.2	128.7	4.6	29.3
615-14-044	710	137.2	147.6	10.4	25.7
including		137.2	140.7	3.5	54.2
615-14-052	710	86.7	92.3	5.3	5.9
615-14-010	710	119.9	126.3	6.4	18.5
including		121.4	122.8	1.4	50.1
and	FW Zone	155.8	158.6	2.9	7.2
615-14-009	710	113.1	113.7	0.6	26.3
and		119.0	121.9	2.8	8.1
and		125.4	128.3	2.9	7.7
and		131.1	133.4	2.3	24.6

Notes: Assay values are capped at 102.8 g/t Au (3 oz per ton Au).  
Based on the available data, true widths are indeterminate given the variable orientation geometry of the gold mineralization, and as such, is reported as core lengths only.

main tramming level.

Perhaps more importantly, the pattern of veins emerging within this new mine horizon is very similar in terms of size, geometry and grade to the original Rice Lake Mine and also to the 007 and other deposits in the Shoreline Basalt.

As a result, this discovery raises the potential that the pattern of gold mineralization discovered in the 710/711 veins may be replicated to surface and to depth along this new horizon.

There may also be additional mineralization further in the hanging wall of this new unit along the projected extension of the Shoreline Basalt Unit.

"The new 710/711 mining area under development not only holds tremendous exploration appeal as early indications point to a repeat of the Rice Lake deposit, it also has immediate practical value given the number of accessible high-grade stopes which are expected to improve our mining flexibility and lower our total mining costs," said Greg Gibson, San Gold's chief executive officer.

The table shown provides recent highlights of this drilling. □

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# SUPREME COURT OF CANADA DECISION: POTENTIAL GAME CHANGER FOR MANITOBA MINING INDUSTRY

*By Melanie Franner*



RAVINA BAINS, ASSOCIATE DIRECTOR FOR THE CENTRE FOR ABORIGINAL POLICY STUDIES AT THE FRASER INSTITUTE.

The June 2014 ruling by the Supreme Court of Canada that recognizes aboriginal title to more than 1,700 square kilometres of land in British Columbia marks the first time that such title has been granted on specific lands outside of an Indian reserve. Already, the ripple effects are being felt throughout British Columbia and beyond.

"The recent Supreme Court of Canada decision in *Tsilhqot'in Nation vs. British Columbia* has been described as a game changer, a historic decision, and precedent setting – and rightfully so," states Ravina Bains, associate director, Centre for Aboriginal Policy Studies at the Fraser Institute.

As a result of the judgment, adds

Bains, any economic development on land where aboriginal title has been recognized will now require the consent of the First Nation that holds that title. The Crown can push through development without this consent only if it is able to demonstrate a compelling and substantial public purpose for the proposed activity. In such cases, governments will have to be the advocates for third-party projects, not the project proponents themselves.

## MINDFUL IN MANITOBA

According to Manitoba Aboriginal and Northern Affairs, there are currently nine Treaty Land Entitlement (TLE) agreements in place throughout the province. These TLEs cover 29 Entitlement First Nations (EFNs) for a total of 1.43 million acres of land (Crown and acquisition).

"The recent court decision demonstrates the complexity of matters related to resource development and aboriginal and treaty rights, and we expect the issue will continue to evolve," states a Manitoba government spokesperson. "The Manitoba government has taken various steps to ensure First Nations have a key leadership role in resource development within their traditional Manitoba territories."

One of these steps, in regard to mining in particular, was the creation of the Mining Advisory Council. The council was created in November 2013 in order to ensure that First Nations benefit from resource development. It allows for First

Nation leadership to have a key role on the council, joining industry representatives and the Government of Manitoba.

The council will enable those First Nations who want to participate to be "partners", sharing the benefits of resource development, such as training opportunities, jobs, revenue sharing and a range of social and economic benefits to First Nations communities.

The council builds on other government education, training and aboriginal business development initiatives, including: the \$4.6 million Northern Manitoba Mining Academy in Flin Flon, a professional training and research facility with state-of-the-art mining simulators and geology labs; over \$13 million in orphaned and abandoned mine-site rehabilitation projects to First Nation contractors and business owners; and the Mineral Resources Training Program, a partnership between government, industry, and Manitoba Keewatinow Ojibwamun communities that provides pre-employment training in prospecting, exploration, mining and environmental management.

Manitoba has seven mines that produce 100 per cent of Canada's cesium, 13.1 per cent of Canada's nickel, 12.9 per cent of Canada's zinc, 7.3 per cent of Canada's copper, 5.4 per cent of Canada's gold, and 5.2 per cent of Canada's silver.

"The Manitoba mining industry, including industrial minerals, is a \$1.35 billion-a-year industry," states Ed Huebert, executive vice-president, Mining

Association of Manitoba Inc. "Of that, about \$1.1 billion is metals."

According to Huebert, the province's mineral industry accounts for about 5,000 jobs in total.

Huebert applauds Manitoba's Mineral Resources Minister Dave Chomiak for his proactive work in developing partnerships with First Nations, and specifically with the creation of the Mining Advisory Council.

"Manitoba is different from British Columbia in that there are a lot of land treaties in place here," continues Huebert. "Aside from that, the minister has been a champion of building relationships. The Mining Advisory Council has nine aboriginal leaders at the table. Industry has five representatives. It provides a great forum to talk through a variety of subjects and to see how we can walk in each other's shoes and provide a better understanding of both First Nation and industry perspectives on mining."

Huebert accedes that the aboriginal land title issue is a serious one, but is confident that it can prove positive for all parties involved.

"We have to work together to resolve issues," he states. "And this is obviously an important issue that will require everyone's co-operation."

### THE RIPPLE EFFECT

Although the Supreme Court of Canada's ruling grants First Nation land title to land within British Columbia, it could have the potential to affect Manitoba's resource industry as well.

"Manitoba First Nations could use the aboriginal title test outlined in the Tsilhqot'in decision to advance their claim to parcels of Crown land that may have mineral deposits," says Bains.

Already, the ripple effect is being felt in British Columbia.

"Some communities have already cited the judgment as justification to oppose economic development in traditional territories," says Bains. "For example, following the release of the Supreme Court of Canada judgment, the Gitksan First Nation in B.C. issued eviction no-

tices to CN Rail, forestry companies and sports fishermen operating on their traditional territory, and the Neskonlith Indian Band cited the Tsilhqot'in decision in their eviction notice to Imperial Metals."

But only about a month after its "game-changing" decision, the Supreme Court of Canada ruled in favour of the Ontario government's right to permit industrial logging on First Nation traditional lands. The difference? Grassy Narrows had a treaty with the government.

"The position of First Nations throughout the numbered treaties (1-11) is that the treaties represent a 'sharing of the lands', and not land ceded as the Crown claims," stated Regional Chief Bill Traverse, Aboriginal First Nations, Manitoba. "This position has been universal since the day the treaties were signed."

Although Regional Chief Traverse is pleased with the Supreme Court of Canada's decision in regards to the Tsilhqot'in, he concedes that there are

other cases, such as the Grassy Narrows one, that aren't as positive. In the end, he adds, the decisions don't matter one way or the other.

"In summary, our position is that all lands in Manitoba are covered by our numbered treaties and we still maintain our treaties to all lands and resources in this province, no matter what the government of Canada or the Supreme Court says," he states.

If nothing else, the recent Supreme Court of Canada's decision in regards to the Tsilhqot'in has raised awareness of a long-standing issue that warrants further attention.

"This decision will make it more challenging for government to keep First Nations at the land claim and treaty negotiation tables," concludes The Fraser Institute's Bains. "This decision provides a clear test on what constitutes aboriginal title; therefore, many First Nations may turn to the courts rather than governments to gain recognition of aboriginal rights." □

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# MINE SAFETY:

## COOPERATION, UNION INVOLVEMENT

## KEY TO WORKING SAFE

By Gloria Taylor



DOUG KORMAN, DIVISIONAL CO-CHAIR FOR SAFETY, HEALTH AND THE ENVIRONMENT FOR THE UNITED STEELWORKERS UNION, LOCAL 6166.

**T**he Manitoba Workplace Safety and Health Act and the Manitoba Mines Regulations help protect

workers from risks to their safety, and protect workers from ill health caused by their working conditions. They also serve to promote workers' rights.

While the act forms the foundation of the system to protect workers, it falls to all stakeholders to do their part in ensuring safety, says Doug Korman, divisional co-chair for Safety, Health and the Environment for the United Steelworkers Union, Local 6166, representing some workers at the Vale INCO mine in Thompson.

"Under the act, there are duties of employers, supervisors and workers. So everyone has some skin in the game and responsibilities. Workers have to take reasonable care to protect their safety and health, along with others while at work," says Korman.

Do all recommended devices and wear all articles of clothing and personal protective equipment designated and provided by the employer, he advises. At all times, cooperation is paramount, and it is necessary, where such a committee

exists, to consult and co-operate with the workplace safety and health committee on all health and safety issues. In some cases, the designated go-to person may be an appointed worker safety and health representative.

"Safety is everybody's responsibility, and the system only works as well as the workers' commitment to make it work," says Korman.

### WORKERS' RIGHTS

Workers have four basic rights. They are:

- 1) The right to be part of the process of identifying and resolving workplace health and safety concerns.
- 2) The right to know about safety and health hazards in their workplace.
- 3) The right to participate in safety and health activities at their workplace.
- 4) The right to refuse unsafe work, and to work without being subject to discriminatory action.

Probably the strongest piece of legislation to protect all workers is the right

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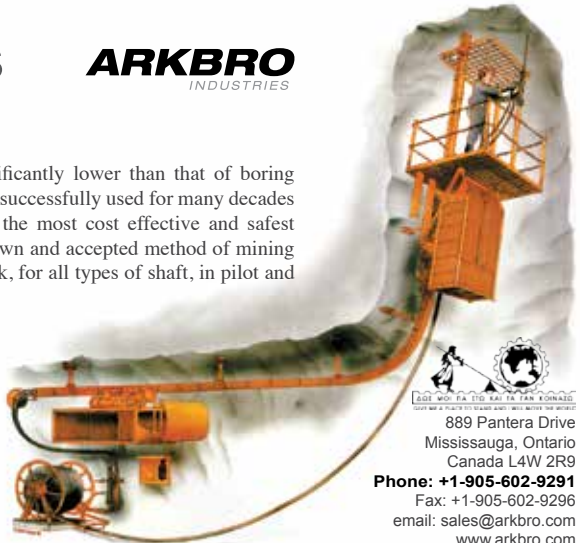
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to refuse dangerous work, says Korman. A worker may refuse to work or do particular work at a workplace if he or she believes on reasonable grounds that the work constitutes a danger to his or her safety or health, or to the safety and health of another worker or person.

As in all walks of life, there are people with many different personalities in the mine environment, and while some are upfront and vocal about their concerns, there are some who would rather just go to work, collect a paycheque and go home. Some workers may feel too intimidated to utilize their rights, but with a strong union presence and understanding the consequence of breaking the law, more and more workers are standing up for themselves.

"I truly believe we know and understand the Manitoba Safety and Health Act much better today than in the past. The days of expecting to get hurt at work, or thinking it might be a condition of employment, are shrinking. The thrust to change the culture at work will keep workers safe, healthier, companies productive, and make our workplaces a much better place to work for all that come in the future."

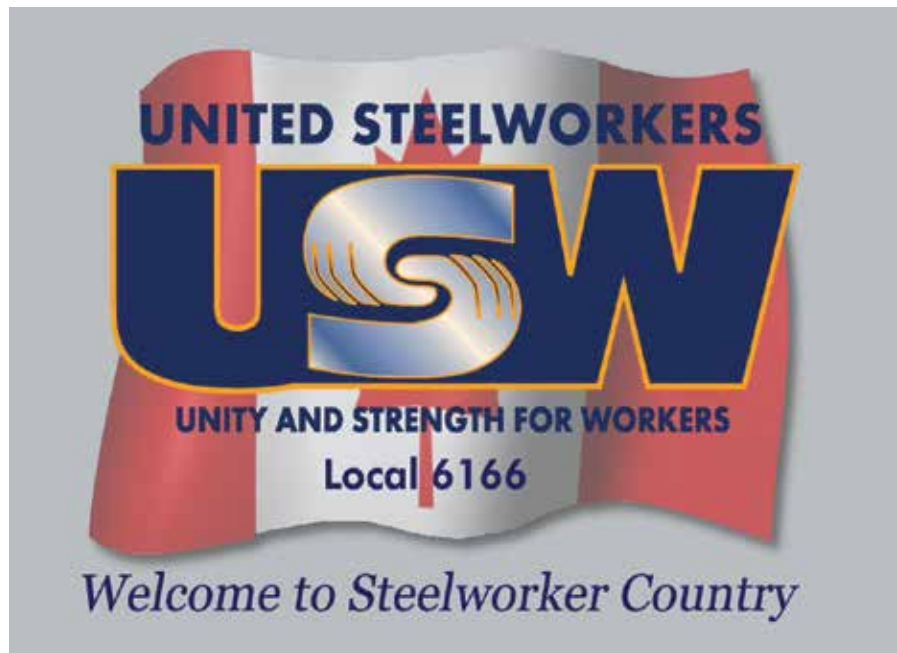
Are mines safer today? Yes, says Korman, who notes there are still long-term concerns.

"I do know that workers are still getting hurt, workers are still getting killed, occupational disease is still the white elephant in the room. The understanding that I will protect myself today from getting hurt, but ignore the long-term effects of exposure from hazardous substances is something we must get a better understanding of."

In the end, unions continue to play a vital role in keeping all workers safe, says Korman.

"We continue to raise awareness, educate our members and activists, work closely with government agencies and mines inspectors. We attempt to build relationships with our counterparts to do the right thing, stand up and push back when we must, and be reasonable in our approach." □

"I truly believe we know and understand the Manitoba Safety and Health Act much better today than in the past. The days of expecting to get hurt at work, or thinking it might be a condition of employment, are shrinking."



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# MOVE OVER SASKATCHEWAN: MANITOBA SET TO CAPITALIZE ON POTASH INDUSTRY

*By Melanie Franner*

In 2012, the Saskatchewan potash industry contributed \$761 million in provincial taxes, royalties and municipal taxes, according to the Saskatchewan Mining Association and Saskatchewan Potash Producers Association. The province produces more than 90 per cent of the country's potash production and more than 30 per cent of the world's supply.

And Manitoba is now in a position to bring similar benefits to its own economy.

"The development of a conventional potash mine in western Manitoba has been promoted over the past 30 years, in large part because of the huge economic impacts potash mines generate," explains John Fox, vice-president, Manitoba Potash Corp. (MPC). "We anticipate there would be significant regional economic benefits to western Manitoba from the development of a conventional potash mine."

## THEN AND NOW

As Fox mentions, Manitoba has been involved in potash exploration since 1986, when the MPC (solely owned by the Manitoba government) was established as a joint venture, with Manitoba as a minority partner. The interest lay in the Russell-McAuley potash deposit, a 2,247-square kilometre deposit in the southwestern area of the province that runs along the border of Saskatchewan and its very prosperous potash deposits.

MPC estimates that the Russell-McAuley deposit has the potential to be a 40-year conventional potash mining operation that will yield approximately two million tonnes of potash per year – although it cautions that a review of existing data and exploration work are needed before any certainties can be made.

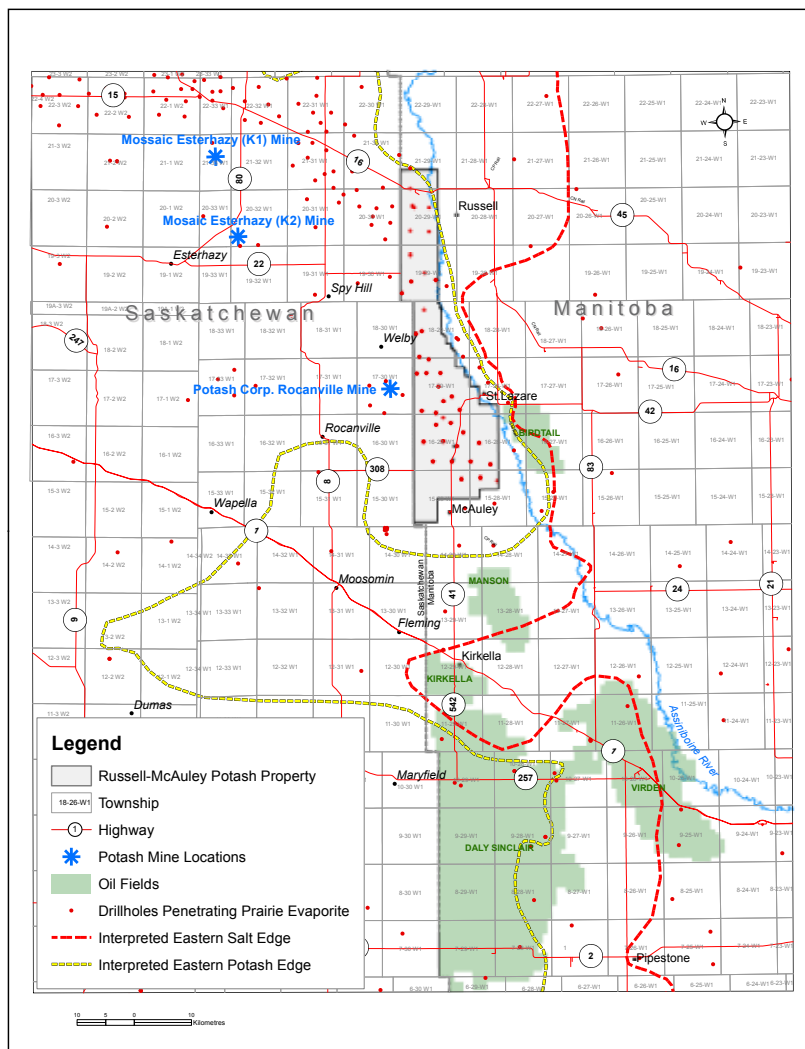
So what's changed between 1986 and 2014? Well, for one thing, the price of potash has recently taken a downturn. For another, the previous MPC partners have expressed no interest in moving the project forward.

Under terms of the MPC co-management agreement, MPC had first rights of refusal. When the other partners opted out, MPC acquired their outstanding rights, and as a result, has become the sole owner of the Russell-McAuley project as of July 2014.

"Manitoba believes the potash in western Manitoba is viable with the consolidation of the conventionally minable potash resources," states Fox. "We believe the economies of scale provided with this opportunity will facilitate mine development."

## AND THE FUN BEGINS

In the coming weeks, MPC will approach an international short list of



Manitoba Potash Corporation (MPC)  
Manitoba-Saskatchewan Prairie Evaporite Edges



potential developers to seek out expressions of interest on the Russell-McAuley deposit.

"The reaction has been very positive in that we have already received a significant number of unsolicited approaches from the potash and fertilizer industry," states Fox. "Manitoba will be conducting an open and transparent process to sell MPC, consistent with the sale of other Crown assets. Accordingly, Manitoba will launch a campaign in the very near future to seek expressions of interest for potential developers."

The province views the fact that potash prices have taken a bit of a downturn as an advantage.

"We believe this is a good time for a project of this scale to come to market and we also believe it will garner interest from shrewd investors," says Fox. "The timeline for development and first production is also long enough to position this project in more favourable economic conditions."

Ed Huebert, executive vice-president, Mining Association of Manitoba Inc., sees the recent activity as a good sign for Manitoba and its economy.

"This is good news for the province," he states. "The area looks like it has a high-grade potash deposit."

Huebert is quick to add that the challenge for Manitoba and potential developers is the recent decline in potash prices.

"There are two ways to look at it," he says. "Potash prices spiked at \$870 a tonne in 2009. Now they are down to around \$280. Is this the right time for someone to buy into a project that has a long-term vision? On the other hand, if prices go back up to \$870 a tonne, the cost of the project could increase dramatically. Ultimately, it's going to come down to the strategic vision and commitment of a potential developer. And from the information out there, the deposit is both a respectable size and of a high-grade."

MPC admits that the road ahead may not always be smooth.

"As with any large mining project, there may be technical challenges bringing this project into production," says Fox. "However, we have structured plans

that will further facilitate development. And, I think the interest we've received to date supports our opinion that this project is viable. As well, Manitoba has an engaged, supportive government and policies that will have a direct and positive financial impact on the development of a conventional potash mine. These include: various tax and operating advantages; the lowest electricity costs in North America; a well-developed transportation infrastructure; and skilled labour and training-assistance programs."

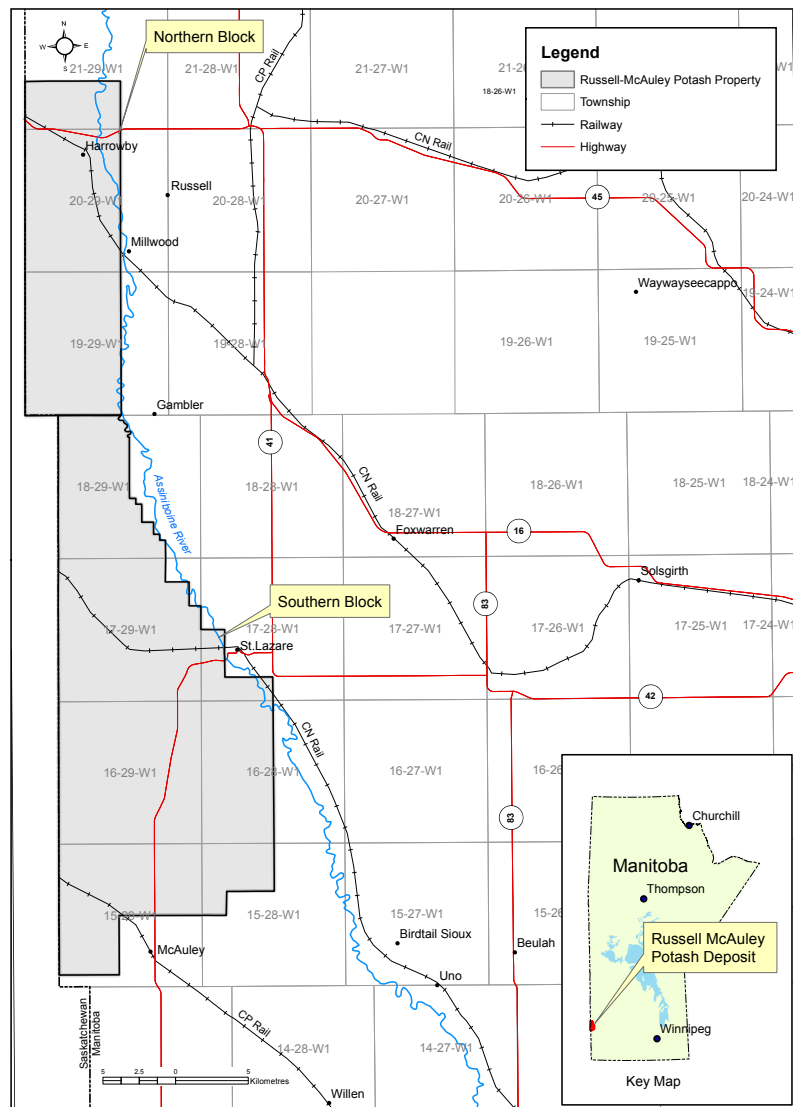
## TOWARDS A POTASH-RICH FUTURE

With more than an estimated one billion tonnes of potash lying between 800 metres and one kilometre below the surface, the MPC is currently the sole owner

of what could prove to be a very rich and profitable deposit. And, with suggestions of a deposit that is comparable in both quality and mining conditions to its sister deposits in neighbouring Saskatchewan, the situation seems to only get better.

True, declining potash prices may dampen the mood somewhat. But, as Fox has said, the Russell-McAuley deposit may prove to be an enticing option for a shrewd investor. The forecast will be easier to predict in the coming weeks, when MPC actively seeks out expressions of interest from potential developers.

In the meantime, it's just a matter of waiting. And, although time has not proven to be a friend to the Russell-McAuley project in the past, it may just prove to be the deciding factor to its future. □



Manitoba Potash Corporation (MPC) Property Location





# MINING – THE DOMINANT FORCE IN BISSETT'S COMMUNITY HISTORY

*By Leonard Melman*



**M**any investors and management personnel tend to analyze mining in terms of the fundamentals of mine development, such as dimensions of ore bodies; analysis of ore grades; estimations of metallurgy; construction of mining production facilities, and so forth. However, there is an entirely different side to the industry and that is the enormous impact mining can have on the human experience in general and community development in particular.

One of the areas where this concept has been most vividly portrayed through the past century is the community of Bissett, located about 250 kilometres north-east of Winnipeg in southeast Manitoba. Truly, development of the community of

Bissett has been driven by developments within the larger international scene.

In fact, through Bissett's historic connection with gold mining, the community could be said to be reflective of the great international military, social, and economic events of the 20th century and into the present one as well.

Until the early part of the 20th century, the area in which present-day Bissett is located was a scenic, hard-to-reach region with minimal population and was virtually devoid of any development. That all began to change with the filing of an initial report by the Geological Survey of Canada in 1900 which suggested the area in the Canadian Shield east of Lake Winnipeg might have the potential for gold discoveries. This was followed

by the initial Rice Lake area claim filed by E. A. Pelletier and Arthur Quesnel in 1911.

Upon filing this claim, a mini gold rush developed in the region and additional discoveries were made, leading to the filing of the San Antonio claim in 1919 and the eventual creation of the San Antonio Gold Mine, which ultimately made millions in profits for its various owners – and to the development of the Town of Bissett.

Despite difficulties caused by the town's remoteness and lack of infrastructure, the San Antonio Mine was built and brought into operation in 1931 – and the town flourished with its population rising from close to nil in the 1920s to about 1,200 during the height



of mining operations in the 1940s and 1950s. A solid community infrastructure developed with a bank, bakery, pharmacy, hotel, church, school, and hospital.

The San Antonio Mine operated as a hugely profitable enterprise from 1931 through 1968 thanks to two circumstances which lasted for more than three decades. In the first place, costs of operation remained low thanks to the Depression and the advance of mechanical efficiencies. In the second place, the Roosevelt Administration of 1933 fixed the price of gold at a generous US\$35 from 1933 onward. The combination of high relative gold prices and low costs resulted in continuous operations for 37 years and the eventual production of almost 1.2 million ounces of gold.

However, the world intervened in the form of rising international inflation, which drove mining costs higher while the price of gold remained fixed, and the San Antonio mine became a losing proposition, eventually closing in 1968. With the closure of the mine, the town of Bissett virtually collapsed with the population plunging from over 1,000 to less than 200, and all buildings, which could be torn down and re-assembled elsewhere, simply vanished, leaving only a skeleton of a village.

This move from prosperity to depres-

sion was only the first in a series of ups and downs, which affected the community. By the late 1970's, the price of gold began to soar with the advent of runaway inflation combined with military confrontation between the USA and the USSR; rapidly rising government debt levels and the Iranian hostage situation, eventually reaching over US\$800 by January 1980. A joint venture between Brinco Mining and "New Forty Four" took over San Antonio, rebuilt the mill which had been destroyed in an earlier fire, and began to process easily accessible ore bodies. Unfortunately, the price of gold collapsed in the late 1980, and the mine shut down once again in 1983.

Rea Gold then acquired the mine in 1989 and eventually spent huge sums improving mine shafts, exploring new possible resources down to and below 5,000 feet under the surface and improving the all-important hoist systems. Rea fully expected to enter profitable production, but the price of gold declined once again in the 1990s and Rea eventually filed bankruptcy. The San Antonio Mine was taken over by South Africa's Harmony Gold – who eventually sold the mine to San Gold Corp.

Thanks to the next gold boom of 2003 to 2011, area mining activity once again entered a period of solid growth which continues to the present with San enlarging their mill capacity while actively mining areas near Bissett, eventually employing approximately 400 people – with most of them living in area camps and communities since Bissett's population has remained below 200 for many years. In addition, several other companies have recently initiated exploration and development work.

Despite efforts to promote tourism, camping and hunting, there remains little question that mining remains a dominant force regarding Bissett's future, and the area's population remains hopeful that this most recent burst of activity can be sustained and Bissett might once again return to its past glory days. □





# THE LITTLE TOWN THAT COULD

## THE 55<sup>TH</sup> PARALLEL BOASTS

### 19 PRODUCING MINES OVER

### THE LAST 100 YEARS

*By Jillian Mitchell*



**A**t the heart of Northern Manitoba rests the town of Snow Lake, a quaint, unassuming community of 800, known for its friendly folk, breathtaking scenery, and pristine lakes. Its claim to fame, however, is as one of the region's most prolific mining powerhouses, with 19 mines (small and very large), producing metals such as silver, gold, copper, and zinc.

#### **FROM HUMBLE BEGINNINGS**

The town of Snow Lake was established in 1947 for the development/mining of the Nor-Acme Gold Mine, with claims recorded as early as May 12, 1925 by Christopher "Chris" Richard Parres, a WWI veteran. The region's story, however, earnestly begins in 1914.

Geological Survey of Canada geolo-

gists J.B. Tyrell (1896) and Wm. McInnes (1913) explored the Wekusko Lake area, and their reports attracted prospectors. The first discovery of gold was made by Richard Woosey and M. J. Hackett, who staked the Kiski-Wekusko gold claims in 1914.

J.A. Campbell, Robert Hassett, and Frank Moore, among others, staked a large part of what was to become the region's first major gold-bearing vein, the Rex M.C. (later renamed the Laguna [Rex] Mine), on the shores of Wekusko Lake (known locally as Herb Lake). In 1916, the Makeever Brothers took over unregistered interest in the property, and the sinking of two shafts began. The gold rush had started, and many more prospects were discovered in the next three years.

The Rex/Laguna later became the region's largest producer with the longest mine-life, despite the fact that production was not continuous. (The mill finally closed in December 1939 – for a mine-life of 20 years). Add to that, the Rex Mine was the first mine in Manitoba to have a mill installed and one of the first gold producers in the province to use the amalgamation process (uses mercury to capture the gold particles) as part of the gold recovery. The Rex Mine was the second gold producer in Manitoba; Ballast/Moosehorn was the first.

The Rex discovery brought attention to the region, and a rush of people flocked to the area in hopes of finding gold. Between 600 to 700 people lived along the Wekusko east shore line (1937), most of whom lived in the Herb Lake settlement, and at the nearby Rex Mine.

The situation in the Snow Lake region only got better. Claims were staked as early as fall 1921 on the north shore of Snow Lake proper, when J. P. Gordon (later of Sherritt Gordon Mines) recorded the Net, Mountain, and Mint claims. In 1924, aboriginal prospector/trapper Gaspard Richard recorded the Minnie claim on the north shore of Snow Lake. Despite these particular claims eventually lapsing, they were the beginning of interest in Snow Lake gold.

The story of the town of Snow Lake, on the other hand, unofficially begins in 1927, with prospector C.R. Parres' gold claims on the future site that would become the Nor-Acme Mine, developed by the Howe Sound Company.

One can rarely talk about the mines



REX MINE, CIRCA 1918.

without remembering some of the great prospectors that affected history through their hard work. Here are just a few: Katherine (Kate) Rice, Dick Woosey, Mike J. Hackett, J.A. Campbell, Chris Parres, Lew Parres, Walter Johnson, the Kobars, and Gaspard Richard, among many others.

## HERE TO STAY

Invariably, the story of Snow Lake is anything but straightforward. The gold boom came with worry of a subsequent bust. Many feared that the town of Snow Lake would inevitably follow suit of its

short-lived predecessor Herb Town, a once-thriving mining town on Wekusko Lake that was abandoned due to mine closure.

"The original community that supported the gold mines on Herb Lake was named Herb Town and it has vanished into the bush," says Paul Hawman, chairman of the Snow Lake Mining Museum. "It spent a few decades as a ghost town, then was reclaimed by people looking for materials and finally by the bush itself."

In 1949, Howe Sound Co. began producing gold at the Nor-Acme Gold Mine and poured their first bar of gold in April of that year. In 1958, the mine closed due to low gold prices, and that reignited fears that the town of Snow Lake would become a ghost town. That same year, however, brought Hudson Bay Mining & Smelting Co. (HBM&S) to Snow Lake, because of their recent base metal discoveries. HBM&S purchased a number of Howe Sound's assets, thus solidifying

the town's future as here to stay.

Often when one mine closes, other discoveries are ready to produce. In the 1960s, HBM&S started production at the Chisel Lake Mine (1960), Stall Lake Mine (1964), Osborne Lake Mine (1968), Anderson Lake Mine (1970), Ghost/Lost (1972), for a continuing total of 12 mines. The Nor-Acme/Britannia Mine headframe was subsequently moved to Chisel Lake and was soon again producing ore. And thus, the town of Snow Lake was ready to enter a new base-metal era.

Hudson Bay Mining and Smelting Co. (HBM&S) operated several mines in the Snow Lake Region from 1960 to 1994, and when the last of the HBM&S mines shut down, it left no operating mines in the Snow Lake area. As a result, crews were transferred to the Flin Flon mines.

In 1995, the Nor-Acme Gold Mine reopened by TVX Gold under the name New Britannia Mine, with various owners such as High River, Inco Gold, TVX

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Gold, and Kinross. The New Britannia Mine operated for 10 years (1995 to 2005). In 1995, HBM&S opened a new mine, the Photo Lake mine, and the crews returned from Flin Flon.

Currently, the Snow Lake Region boasts a flurry of mining activity. Hudson Bay Mining and Smelting Co., which was renamed HudBay Minerals (HBM), entered partnership with VMS Ventures Inc. (formerly Rare Earth Metals Corp.) to develop the Reed Mine, a site with an anticipated reserve of 2.16 million tonnes of high-grade copper ore.

Opened in 2011, HudBay's Lalor Mine near Chisel Lake is the most recent discovery in the region and is believed to hold the second-largest metal deposit (zinc, copper and gold) and the largest pre-development deposit discovered in the Flin Flon-Snow Lake region.

The New Britannia Mine was purchased by QMX Resources, and renamed the Snow Lake Mine, which had previously closed in 2005. QMX is in sale negotiations with Northern Sun Mining, and they are currently evaluating the mine for possible reopening.

In total, the Snow Lake Region has 19 past producers over the last 100 years. Today, there are two active producing

mines in the Snow Lake Region, and several other companies are currently active in exploration in the area, including HudBay Minerals, Dunlop Explorations, and QMX.

"Well, pure and simple, Snow Lake would not be here at all if it were not for mining," says Hawman. "It is purely a mining town. As a typical mining town, we've had our roller coaster ups and downs caused by mine closures and openings, and we are presently in the midst of another 'boom' with the opening of the Lalor Mine."

## THE TIMES ARE A-CHANGIN'

For Peter Dunlop of Manitoba-based Dunlop Explorations, 2014 is a year to be celebrated.

"2014 marks a significant milestone in the history of what later came to be known as the Snow Lake Mineral Region," he says. "It is the 100th anniversary of the first gold discovery in the area."

And of course, over the years, industry practices have changed dramatically – just ask the folks at the Snow Lake Mining Museum. The Snow Lake Mining Museum serves as a testament to the importance of mining in the Snow Lake community. Founded in 1996, and gain-

ing "star attraction" status in 2006, its mandate is to preserve and present the exploration, mining equipment, mineral displays, and the mining way of life that opened up the north. More generally, the 4,000-square-foot museum is a reflection of life in Snow Lake and northern resource communities, and boasts examples of 100 years' worth of industrial evolution, pictures, and history.

"Mining has evolved from hard, back-breaking manual labour to highly automated, mechanized mining," explains Hawman. "The first mines had very little regard for safety – other than 'don't fall down a hole, don't blow yourself up and look out for loose rock.'"

Back then, working conditions were poor by today's standards – poor lighting, small headings, and poor ventilation. Lighting, for example, went from carbide lamps (open flame) to Edison batteries, then wheat lamps, and finally to bright LED cap lamps.

A day's production has also increased ten-fold. Where broken muck was moved with one- or four-tonne rail cars, it is now moved by up to 60-tonne articulated diesel trucks, and rather than loading by shovel, Eimco or chutes, broken muck is now loaded with 10-yard scooptrams, where one operator can move as much in one hour as a man could move in an entire day. In addition, today's mines are trackless (now rubber-wheeled) with drilling, loading, and mucking done with automated large-scale mobile equipment.

Technology affects every aspect of mining from the equipment used to the environment underground. Additionally, the size of mines have increased exponentially with improved ventilation, and mine safety plays a very important roll on every shift. Mine safety is now a culture where it is discussed at the start of every shift, and checked on throughout the shift. Every new worker undergoes orientation and training on every aspect of every job that he/she does.

Though the industry has evolved



MINING MUSEUM.



LALOR MINE.

much in 100 years, one thing remains constant – the dedication of its people.

"We are a wonderful, small, remote community on the shores of a modest lake nestled into the bush – a real gem in the wilderness," says Hawman. "Come visit Snow Lake, and our mining museum; you will not be disappointed – this is my invitation to everyone."

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# THE PAS – A NORTHERN TRANSPORTATION HUB



The Pas, known as the “gateway to the north”, is a northern community located 630 kilometres north of Winnipeg. It is the 10th largest community in the province with over 5,000 residents and over 10,000 people located within a 50-kilometre radius of the community.

The Pas is a key trading centre for the region, providing key services to the surrounding area. With a trading zone of over 30,000 people, it has afforded

the community with many services. One of three major hospital complexes and health service centres in the north is located in The Pas. This community is home to the University College of the North, as well as a kindergarten to Grade 12 school system. The Pas has a diverse commercial sector that can provide the same amenities as those found in a larger urban environment. The community, which has been a centre for the north for over 100 years, boasts a diverse

local economy, which includes agriculture, forestry, commercial services, and tourism.

The Pas is called the “gateway to the north” due to its unique geographical location as being one of the main communities encountered while travelling into Northern Manitoba. The community is a part of a larger transportation network making it an ideal location for any business or industry that requires easy access to multiple or complex transportation systems.

**Road:** The Pas has both key north-south and east-west road connections. The community is situated on Highway 10, one of the province’s key north-south roadways. This highway is also connected to a 24-hour customs port with the United States. The east-west connection is via Highway 283, creating a northern interprovincial road connection that extends to Edmonton.

**Rail:** The Pas is situated directly on the only rail line that connects to the Port of Churchill. The three rail lines of CN, Hudson Bay Rail and Keewatin Rail Company all intersect within The Pas. With its connection to the Port of Churchill, The Pas provides even greater access to global markets and distribution, an attribute that only a few communities can offer.

**Air:** The Pas has two airports with two main air carriers. The community’s main airport is located north of town at Clearwater Lake. This former United States Air Force base holds unique infrastructure advantages, such as a 5,900-by-150-foot asphalt runway, a 24-hour self-fueling card-lock system, and de-icing and ground power services. This airport has direct flights to Winnipeg, Flin Flon, and Thompson, with connecting flights to Churchill and Rankin Inlet

- Diverse economy
- Transportation capacity
- Growing community
- Educated workforce

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## INFRASTRUCTURE FUNDING ANNOUNCEMENT

During the spring of 2014, the Manitoba Government announced its continued support for this transportation capacity by allocating funding for the upgrading of Highway 283. Minister Steve Ashton made this announcement during the Hudson Bay Route Association Convention when many Manitoba and Saskatchewan communities met to discuss the best way to strengthen the transpor-

tation linkages to the Port of Churchill.

## THE PAS HUB FORUM

The Pas transportation capacity was discussed at the 2014 Pas Hub Forum. The Manitoba Minister of Agriculture and the president of the Manitoba Chamber of Commerce, as well as key industry stakeholders, such as Omnitrac, Calm Air, and Huidbay Mines discussed the impact that the ability for improved modes of transportation to

the Port of Churchill would have on the Manitoba economy. A main component of the forum was discussion regarding the potential The Pas has to move products, such as grain, from Saskatchewan to overseas markets via the Port of Churchill. As greater focus is being placed on export as a means for economic growth, transportation capacity and assets will play a great role in growing the province. □



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# THOMPSON – MOVING FORWARD



**I**n 2010, the announcement of an impending closure of smelting and refining operations at Thompson's Vale complex may have seemed the start

of a downward trend for the town. No longer would it boast a fully integrated mining complex, and a workforce adjustment was inevitable. Four years



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later, the picture has changed and the community is moving forward again, with optimism not all based on nickel.

Following the 2010 announcement, several factors came into play to change the city's outlook. A massive expansion of the University College of the North complex was to begin, the City and Vale had negotiated a significant investment in infrastructure, the city was in the process of expanding its boundaries, and a new economic planning initiative was announced by the City and Vale – the Thompson Economic Diversification Working Group (TEDWG).

Over the next two years, an extensive consultation within Thompson and with its neighbouring communities led to a re-focus for the community. While recognizing its mining past, present, and future, Thompson has also embraced its position as the regional service centre for north central and northeastern Manitoba, as well as points north. The TEDWG process, funded by Vale, addressed all aspects of regional services, both social and commercial, and action plans were created in five areas – education and training, housing, justice, local and regional identity (branding), and economic development. In addition, the region was assisted in developing the Thompson and Region Infrastructure Plan (TRIP), which is being used by the communities and the government to plan infrastructure priorities.

The economic partners in the area have created a joint consultation group, Thompson and Area Round Table (TART), which will meet to revisit mutual economic opportunities on a regular basis.

Since the completion of the planning process, things have been moving forward. Thompson has added to its land inventory and has developed a new framework for promoting development. Its development agency has been re-tasked to be more involved in land promotion with city staff. The harsh cold of the 2014 winter may have been a downer to the general population, but it saw a significant amount of

testing by winter weather testers from three continents. Glacier – the jet-engine testing facility has announced a significant investment leading to year-round endurance testing. In addition, the UCN campus was completed and opened with much celebration this summer.

A local group continues to promote tourism and research opportunities based on Thompson as the Wolf Capital of Canada – with major investment

underway to create a study centre. Vale continues to explore the viability of pursuing resources at greater depth in the T1d complex. It recently announced the ratification of a five-year labour agreement.

Thompson has a sound future moving forward.

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# LYNN LAKE – LIVING LARGE IN THE NORTH



**T**he town of Lynn Lake has a population of approximately 670 people, and is situated in the northwest region of Manitoba, 1,071 kilometres northwest of Winnipeg.

The town was established in the 1950's when an older mining town, Sheridan, Man., was moved wholesale over 270 kilometres of frozen muskeg and lakes. The tractor train odyssey took three years, and the only access to Lynn Lake was by air until the early 1970's when a road was completed. The first residents were people who formed a community based on the true spirit of early mining towns – mutual

cooperation and interdependence. Their exploits are celebrated in the town's mining museum.

The stunning area where the town is located offers a spectacular opportunity for anyone who enjoys the great outdoors, including two provincial parks within 20 minutes of the community. The rolling eskers and outcrops of rock from the Precambrian Shield offer excellent hiking, off-roading, and snowmobiling opportunities, and the area is filled with an abundance of northern plant and animal life. Of course, such an abundance of wildlife means that there are plenty of creatures waiting for the



avid sportsman. Lynn Lake bills itself as the "Sportfishing Capital of Manitoba", and there isn't a better time to haul a big jackfish out of the water than the local chamber of commerce's annual fishing derby with a \$10,000 first-place prize.

Lynn Lake isn't merely a wilderness stop. The town offers modern amenities, such as high-speed Internet, and provides many important services to the region. Lynn Lake has a well-funded K-12 school, RCMP detachment, hospital, airport, arena, churches, a post office, and a public library. The town has a strong local business community, including restaurants, several hotels and other rental properties, service stations, general contractors, and grocery, general, and hardware stores. There are also a number of lodges, guides, and other outdoor recreational services in the area.

The town is very excited by the excellent work being done by Carlisle Goldfields and Wellgreen Platinum, and is looking forward to the establishment of a strong mining presence in the region once again. With suitable infrastructure in place, including cheap hydroelectric power, rail, air, and road transport, water and wastewater treatment, and a decent inventory of residential properties, Lynn Lake is well positioned to support mining and exploration activities in the region. □

# A PLACE TO CALL HOME

## THE TOWN OF SNOW LAKE, A GATEWAY TO OPPORTUNITY



Grand openings are too few in the mineral industry and are always a cause for celebration; two in one day within a time frame of a 45-minute drive is relatively unheard of.

Hudbay Minerals officially opened two mines near the town of Snow Lake, Manitoba recently. Hudbay executives are exuberant that the Lalor Mine has gone from drill hole to mill hole in just seven short years. The Reed Lake Mine, which is a significantly smaller copper deposit, provides a noteworthy industrial venture for the community as well. Both mines were created, and will function, within environmentally friendly boundaries. Hudbay has committed to a working lifespan of these mines at a minimum of 22 years, but street talk suggests 40 years is a more logical number. (Street talk among those who have worked the industry for years is usually pretty accurate.) This year is definitely a monumental year in the history of mining in Northern Manitoba.

It is coincidental that this year marks the centennial for the Manitoba Gold Rush, which began in 1914. The soldier

prospector, Richard 'Dick' Woosey, who partnered with Canadian "mine of famer" Kathleen Creighton Starr Rice, discovered the first gold in the Snow Lake area in that year. Since that time, 20 mines have produced\*. It is easy to understand that the addition of two new mine sites in one year breathe new

vitality and energy into this picturesque community. It is like new beginnings, and the community anticipates a combination of old values and new 21st century working and living conditions

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LALOR HEADFRAME.

of the lake by the same name, the proud citizens of the community enjoy a quiet, yet contemporary lifestyle. Those who live in the town feel they have the best of two worlds. Per capita, Snow Lakers are the highest-paid wage earners in Manitoba. Snow Lake also

boasts the lowest crime rate per capita of any area in Manitoba. Given the quiet beauty and comfortable down-home lifestyle, coupled with the financial resources to travel to larger centres for a shopping/leisure experience, create a lifestyle that is hard to trump. In 2011, the town commissioned a sustainable development strategy in order to accommodate the influx of new homes and families expected to make Snow Lake their home. Snow Lake offers healthcare facilities that generally require a wait time of one day or less in order to see a doctor (in non-emergent situations). The medical establishment offers excellent homecare services, utilized primarily by senior citizens who have chosen to retire within the community. Education, from nursery through Grade 12 is provided. Daycare is available for children of working parents, or children just wishing to socialize with other kids. There are immense opportunities for entrepreneurs, with lots of home-based businesses, which are encouraged. A recently formed chamber of commerce is a welcome addition to the business community. The Second Glance, a thrift store, shows the spirit of reusing/recycling that is integral to today's environment. Sporting activities are a given, with long hours of daylight

appropriate to the first-class golf course at the edge of town. Long winter hours are ideal for curling enthusiasts who have access to a rink featuring five sheets of well-maintained ice. The town of Snow Lake also provides an airport used by mineral companies, air ambulance, tourists, and other charters.

Hudbay is the major employer in Snow Lake. At present, they have a temporary contractor camp set up at the edge of town, which provides room and board on days when they are working. It is intended that new and/or existing homes will take the place of this arrangement within the foreseeable future.

Hudbay made a declaration in 2013, which addressed issues that provide a healthy community.

This declaration states, in part, the following:

- (1) Our goals are to build constructive relationships, understand and address community concerns and contribute to quality of life. We do this through community advisory groups, joint-development committees, community meetings, open houses, site tours, school presentations and participation in community-organized events.
- (2) We formalized our community grievance process in 2013 to help identify, address, and monitor complaints more rigorously.
- (3) In Manitoba, we are an established part of the Flin Flon and Snow Lake communities and engage regularly with them.
- (4) We need to be in regular contact with the communities in our direct area of influence to build trust and address concerns early.
- (5) We make efforts to support local suppliers and purchase goods and services from qualified, cost-competitive vendors and contractors from the surrounding area. These are generally opportunities for local business in areas of construction, maintenance, transportation, and catering.



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Such an effort by any company would in fact produce a healthy community!

A part of addressing community concerns is the aging infrastructure within the town. The original dominant mining company, Hudson Bay Mining and Smelting was responsible for water/sewer pipes, which were intended to provide for the expected years of mining activity in the area. It is no secret that the mines and; therefore, the town have far surpassed this timeline. (Snow Lake

will be celebrating its 70th anniversary in 2017). It is expected that the new Hudbay will be active in the process of installing new water/sewer lines, which will be adequate to maintain the required standards for the ensuing 40 years. The town, with two million dollars from Hudbay, has spent nine million dollars to install a new wastewater treatment plant. This will sustain the expected influx of people moving into the community.

Snow Lake is at a key point in its history, with Lalor's official opening and upgrades to the Snow Lake Mill and Concentrator, a total of over \$440 million being invested. Now in 2014, Canadian mining and exploration companies recognize that their social licence to operate depends on local communities. Snow Lake looks forward to working with Hudbay Minerals for the next 40 years for the businesses and citizens who live and work in the town.

On a visit to Snow Lake, one would

immediately capture the beauty of the town and area, as well as the down-home friendliness of the townsfolk. An individual seeking employment would certainly have an opportunity to provide a living of abundance. (Check the backyards of the townsfolk and you will see play toys most everywhere, such as fishing boats, speed boats, pontoon boats, seadoos, skidoos, and quads to mention a few.) Retirees are finding this town a place to call home, whether they have lived and worked in the community, or are coming here specifically to live out their golden years. Snow Lake is a small town with a big industry and the ability to make it all work.

*\*Producing mines since 1914, in no particular order, are: Chisel, Chisel North, Chisel pit, Photo, Rod, Ghost/lost, Dickstone, Anderson, Osborne, Stall, Jack Nutt, Ferguson, Ferro, Bingo, Rex Laguna, Spruce Point, Britannia, New Britannia, Reed and Lalor. □*

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# MINING FINANCE AND POWER OF FLOW

*By Andrew MacSkimming, Pitblado Law*

**F**low-through share (FTS) programs are an innovative finance mechanism for miners in Canada that are defined as a "principal business corporation" (a PBC). In this context, a PBC is generally a corporation whose principal business is exploration, mining, or mineral processing.

In essence, a miner that does not have enough net taxable income to use all of its exploration and development expenditures as deductions can pass on some of those to investors. The miner enters into share subscriptions for new common shares based on commitments to incur certain exploration and development expenses over a certain period. The shares have the usual attributes of common shares such that the investor

can lose their investment despite the tax benefits.

The company then renounces certain expenditures that qualify as Canadian Exploration Expense (CEE) and Canadian Development Expense (CDE) to the investor. The company loses the right to claim those deductions and the investor is treated as though the investor had incurred the expenses. CEE gets put into a pool for tax purposes, but is essentially a 100 per cent deduction in the current year, whereas CDE (which is treated in the same way) is generally deducted at 30 per cent.

The federal government also gives individual (non-corporate) investors a Mineral Exploration Tax Credit (METC) of 15 per cent of certain CEE expenses,

popularly known as the "super flow-through" share program. The credit applies to preliminary mining exploration activities carried out at or above-ground level for base, precious, or certain other minerals. The exploration activities can include prospecting, geological, geophysical and geochemical surveys, drilling (rotary, diamond, percussion, or other methods) and certain specified sampling activities. It excludes, among other things, underground exploration and bringing a mine into production.

In some cases, exploration activities may qualify for CEE (including CEE that can be passed on), but not for the METC (or provincial programs tied to the METC). Tracking and accurately classifying expenses is therefore critical.

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This "super flow-through" share program has been renewed by the federal government on an annual basis, most recently in the 2014 federal budget. It goes without saying that a permanent program would provide a more stable basis for long-term investment to spur mining exploration and mining organizations are working actively to achieve that goal.

For CEE, that also qualifies for the federal METC, Manitoba provides a very generous tax credit to individual investors, as the Manitoba METC is at 30 per cent. However, using provincial tax credits, in combination with the METC reduces the amount of expenses that can be used with the METC, as well as the amount of CEE that can be deducted.

The first holder of the FTSs is entitled to claim the deductions and generally not any subsequent buyer of the shares. It is therefore necessary to structure FTS transactions so that the intended user of the tax deductions is the first holder of the shares. Additional tax benefits and flexibility may be achieved through the

In essence, a miner that does not have enough net taxable income to use all of its exploration and development expenditures as deductions can pass on some of those to investors.

careful structuring of a donation of the FTSs to a registered charity.

Successful use of FTS programs by Manitoba miners requires two key elements. First, the overall share transaction must be structured carefully. Second, there is the granular task of ensuring that the expenses the parties in a FTS transaction expect will produce tax benefits that are planned, incurred and renounced in a way that will meet the expectations of the federal and provincial tax authorities. To achieve all of this and to ensure compliance with all applicable mining, tax and securities laws, it is essential to

have the right finance, tax and legal advisors.

#### **About Andrew MacSkimming:**

*Andrew is a lawyer at Pitblado Law in Winnipeg, Man. He has extensive experience working with natural resources (including mining and petroleum), energy, environmental, land development and business clients. Andrew has acted comprehensively for the needs of companies, shareholders, lenders and business principals. Learn more about how Andrew can help you at [www.pitblado.com](http://www.pitblado.com). □*



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# SETTING THE STANDARD

## HOW NATIONAL OCCUPATIONAL STANDARDS ARE CHANGING THE HR LANDSCAPE IN CANADA'S MINING INDUSTRY

*By Lindsay Forcellini,  
Mining Industry Human Resources Council (MiHR)*

As mining employers and contractors look toward skills and training to grow the potential pool of available talent in many key occupations, National Occupational Standards (NOS) are at the forefront of the discussion – both in Canada and internationally.

NOS provide a detailed inventory of the skills, knowledge, and competencies required to perform specific jobs safely and productively. They are tools developed by industry and widely used by employers, trainers, and job seekers, and they play a key role in managing the HR impacts of the mining cycle and helping to mitigate the skills shortage.

If we look at the industry's hiring

needs over the next decade, despite the current market conditions, the mining skills shortage is forecast at 120,000 workers, with a significant portion of this being worker replacement due to retirement.

Occupational standards provide a common, industry-defined lexicon for articulating the skills required to fill the myriad of vacant positions, and subsequently support training departments and institutions in developing effective programs to teach people how to perform these jobs and to meet the needs of industry. In addition, during a downturn, NOS enable workers to demonstrate their transferable skills as they transition to new roles, and as op-

erations ramp back up, they are an excellent hiring tool and baseline for training skills gap analysis.

### **MINING NOS: WHAT'S AVAILABLE NOW?**

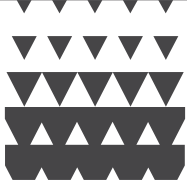
The Mining Industry Human Resources Council (MiHR) has led the collaborative development of four NOS by committees of industry subject matter experts (job incumbents, managers, and trainers). NOS were validated by a broader group of industry representatives. Currently, NOS are available for:

- Underground miner
- Surface miner
- Minerals processing operator
- Diamond driller

In January 2014, MiHR received funding from Employment and Social Development Canada (ESDC) through its Sectoral Initiatives Program (SIP) to update the current suite of NOS and develop three new standards. Following industry consultation, the following occupations were identified for development: frontline supervisor, hoist operator, and industry trainer. These new NOS will be published in 2016.

### **NOS: THE BENEFITS AND APPLICATIONS**

NOS are tools to help individuals, employers, and training providers to improve workforce performance. They create a common understanding among



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# NOS NATIONAL OCCUPATIONAL STANDARDS

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[www.miningcertification.ca](http://www.miningcertification.ca)



[certification@mihr.ca](mailto:certification@mihr.ca)



(613) 270-9696

MiHR is currently exploring industry demand for the development of new National Occupational Standards. Existing Standards will also be reviewed and updated to ensure they remain relevant and current and continue to meet the needs of industry.



employers, trainers, employees, and job seekers of the skills and knowledge required to consistently work safely, efficiently and effectively in the occupation. NOS offer a framework for formal training and workplace skills development. They also support skill transferability and mobility. Using NOS as a benchmark, companies can build on these common best practice guidelines to create workforce planning and development strategies to establish a highly skilled labour force.

One of the widest applications of the NOS is MiHR's Canadian Mining Certification Program (CMCP). NOS form the foundation of the program, which is now certified close to 1,000 workers from across the country as surface miners, underground miners, diamond drillers and minerals processing operators. In addition to supporting personnel certification, NOS are used in a variety of industries in Canada and around the world to:

- facilitate recruitment and expedite

hiring processes by informing job descriptions and providing the basis for job applicants;

- inform training program development and assess third-party training providers;
- identify career paths to support employee retention;
- evaluate and determine the qualifications of potential employees, including internationally trained workers;
- facilitate bridging programs, such as occupation-specific English as a Second Language (ESL) training curriculum for internationally trained workers;
- establish performance criteria and develop training plans; and,
- support succession planning by identifying the critical competencies of experienced workers transitioning out of the industry and identifying the training and experience required for junior workers to assume more senior positions.

## INTERNATIONAL INTEREST

Canada's NOS are garnering international attention amongst global mining employers and Canadian companies operating abroad. MiHR has received inquiries from across the globe from countries such as the United States of America, Ghana, Turkey, Indonesia, Peru, Colombia, South Korea, Chile, and Kazakhstan. Some nations are referencing the standards for research and comparison, or as a model to develop their own NOS, while others are interested in certifying their workers against the Canadian standard. This global interest points to a growing commitment to standardized skills and training, the safety and productivity of mine sites, and the development of a highly skilled mining workforce.

For more information, or to request NOS, visit [www.miningcertification.ca](http://www.miningcertification.ca), or email [certification@mihr.ca](mailto:certification@mihr.ca). □



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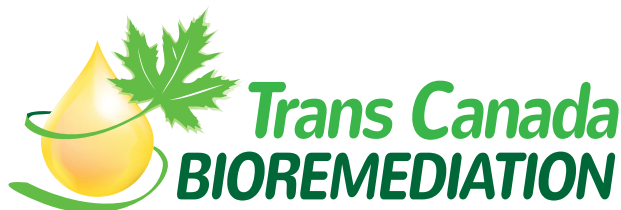
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# IT'S A MAN'S AND WOMAN'S WORLD

By Jillian Mitchell

**A**s a young girl growing up in Stonewall, Manitoba, Kim Proctor harboured an unyielding passion for the province's rich geological landscape.

"I loved collecting rocks, and I just remember that I was always intrigued by mining," says Proctor, a 26-year veteran with Canadian mining company HudBay Minerals Inc. "I always knew I wanted to work in mining. No one was going to change my mind."

Proctor realized her childhood dream in 1986 when she graduated from Brandon University's geology department. Not long after, the fresh-out-of-school geologist made her move to Red Lake, Ontario.

Two years later, she returned home to her beloved Manitoba to work for Manitoba-based HudBay Minerals Inc. (formerly Hudson Bay Mining & Smelting Co.). In her 26 years at HudBay, the proud mother-of-two was promoted to 11 different positions within the company – including exploration geologist, underground geologist, mineral resource analyst, long-range planner, geostatistical specialist, and superintendent of Mines Technical Services – and has worked underground in eight of the company's mines. Since 2009, she has held the position of Lalor project manager, the second-largest metal deposit in the Snow Lake-Flin Flon Greenstone Belt.

All told, Proctor attributes her career successes to her all-in attitude.

"The key is just do your job and don't give anybody an excuse as to why you shouldn't have the job or be given opportunities," she says. "When you first enter a job, whether you're a man or a woman, there's always a learning period where you've got to prove that you were the right person hired for the job. Once you [get over the hurdle], people will appreciate you're the right person – and everything else will be smooth sailing."

## A FEMALE IN INDUSTRY

Proctor's experience as a female in a predominantly male industry has been, as she says, mainly positive. In fact, she fondly remembers being mentored by select senior male co-workers during her

early days working underground at the Namew Lake Mine in the Flin Flon/Snow Lake district.

"[In those days] women were not 'supposed' to be underground. I was considered an omen by some of the miners," she recalls. "But then there was a group who were very, very supportive of me – but they did have questions, like why I wanted to be underground."

Somewhere along her 26 years, however, things started to change gradually. Proctor invariably began to experience workplace discrimination based on her gender. "In some ways I think there is a lot of cultural learning that needs to take place," she says, noting a scenario where as the only female in a meeting of 10 men she was met with sexist assumptions. "I don't understand that; it's not something I experienced in the '80s. It's actually a more uncomfortable situation than what I did experience back in the '80s."

## WOMEN IN MINING

Upon the encouragement of fellow industry veteran MaryAnn Mihychuk, Proctor began to rekindle her relationship with industry through Women in Mining (WIM), an organization that promotes and helps advance women in the mining and minerals sector.

Though Proctor had her initial reservations about the group, she eventually attended an event in 2010 and admittedly hasn't looked back since.

"I was under the impression that it would be all women, but it was a group of people – 50 per cent males, 50 per cent females," she says of that first WIM event. "The percentage of males in the room was almost refreshing. There were no sexual barriers there."

That initial experience with WIM – where she rediscovered a support akin to that of her early days in industry – prompted the long-time HudBay employee to become a regular participant, even adopting the role of presenter at a 2011 luncheon.

"It's nice to have that support group, to know that there's someone there you can talk to," she says, emphasizing the value

of the group's networking opportunities. "Women in Mining brings social awareness that there is a very experienced, technically capable group of people who just happen to be women. It's really an untapped resource."

## INDUSTRY STATS

As WIM Canada founding director Mihychuk reports, female enrollment in the Canada's engineering and post-secondary mineral and resource programs has declined in recent years.

"We're in an unprecedented exploration industry downturn. Women are the last in and the first out," cites Mihychuk, who serves as the current chair of WIM Manitoba.

In certain sectors, Mihychuk reports "excessively low" numbers – a two per cent female to male ratio at the board table in the mineral sector, up to last year.

Mihychuk attributes the aforementioned decline to workplace discrimination and to the advancements in technologies that have subsequently reduced the need for workers.

"The number of jobs has reduced and the competition is fierce," she says. "Women have a challenge because they don't necessarily have the same length of experience in mine management or senior executive positions."

It is Mihychuk's hope that WIM will continue to provide a support network for women in industry, while simultaneously educating industry about the "highly skilled and passionate professionals working in the exploration and extraction industry," who just happen to be female.

"We've got committed, well-trained, interested, and qualified people that are anxious to work in the mineral sector," she concludes. "It is beneficial to change the industry's perception [of women in industry], and perhaps companies will realize we've got experienced and knowledgeable [women] willing and able to do the job and bring extra value." □

# UNDER COVER PROFESSIONALS

## MANITOBA'S DIAMOND SHELTERS HAS PROVEN ITSELF TO BE A GEM AMONG PORTABLE STRUCTURES THANKS TO SOLID DESIGNS THAT DELIVER

*By Kelly Gray*



EXTERIOR DIAMOND SHELTER, WHITEMOUTH.

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Diamond Shelters is part of Dueck's Mechanical Inc., a family business offering mechanical and welding services, dimensional steel, as well as parts and hardware sourcing. The team at Diamond Shelters has designed and manu-

factured fabric-covered steel structures since 1989 from their facility in Whitemouth, Manitoba. Today, the company continues to offer a range of value-laden building solutions that have made them industry leaders.

Fired by an entrepreneurial zeal, Dueck got his start at age 20 when he opened a shop that offered farm machinery repair. "One thing led to another and we could see that our activities could be expanded," he says. With an established reputation for quality standards, reliability and top-flight welding and design skills, Dueck's Mechanical

launched Diamond Shelters.

This culture of quality is everywhere at Dueck's several-thousand-square-foot manufacturing facility about an hour east of Winnipeg, where 15 to 17 skilled workers fabricate using a full range of equipment, such as brakes and shears and a CNC plasma table for precision cuts. The shelters are available in 15- to 160-foot widths, using either welded truss supports or single-hoop design, and at lengths determined by customers. Attention to detail is important – each weld is thoroughly reviewed for strength and smoothness, and each





LAVERN INSIDE A DIAMOND SHELTER.

piece of the shelter is unique. Every weld is smooth, and metal sections are built using a W47.1 welding standard to give customers the very best, meaning there's no duct-taping of welds to prevent polyethylene skin punctures. And each building is constructed to CAN/CSA-A660, a requirement for manufacturers of engineered structures under the National Building Code of Canada.

These shelters provide many advantages over more traditional metal building systems, says Dueck, primarily the cost. A fabric-covered steel building is considerably less expensive because it uses less steel, meaning prices can be as much as half what one would pay for a standard metal-clad Quonset or storage facility. Less steel also means a warmer shelter thanks to the sun's ability to reach through the skin to warm interiors. A fabric-covered shelter also goes up faster, typically requires only basic tools to erect, and many smaller footprint single-hoop and welded truss shelters can be erected by just two people. (As building size increases, so too does the complexity and weight of each component and Dueck suggests structures wider than 60 feet be built by experienced contractors.)

Materials also distinguish Diamond Shelters from their competition. According to Dueck, shelters are manufactured using the highest-quality domestic steel. Because their steel is produced in North America, it offers very consistent yield and tensile strengths. "All of the major components of a Diamond Shelter – the rafter chords, rafter webbing, purlins and cross-bracing – are made of hollow structural round tubing. The diameter and wall thickness of each component are selected so that the component will withstand the stresses placed on it," he says. When it comes to the fabric cover, durability is key. To get the best, Dueck has sourced heavy-duty polyethylene from a manufacturer in Truro, Nova Scotia, where it is woven into sheets and rolled. Strong, weather-resistant seams are created in Manitoba by Dueck's brother, who operates a shop with all the specialized equipment necessary to create world-class coverings with 10 years of pro-rated warranty.

Diamond Shelters are multi-purpose, and Dueck says they're fielding calls not just from Canada and the U.S., but from as far away as Europe, the Middle East, and Africa. Behind the calls is a recog-

nition of quality by professionals in the mining, transport and agricultural sectors, as well as manufacturers, local governments and even private individuals with needs to house things like recreation vehicles or even an outdoor pool.

"The use for these buildings is determined by imagination. The sky is the limit for how they can be used. Need to cover your pool? We have a solution. Need to keep commodities out of the elements? Look to us for shelters that keep rail cars dry and mining tailings in place," he says, noting that they're seeing Diamond Shelters used at outdoor food markets, where they keep sun and rain off food stalls and customers. They are being used in portable scenarios when cover is required, such as late-season concrete pouring or cold-weather drilling, where crews need to stay warm.

"What we sell is a durable, cost-effective, flexible alternative that delivers performance to those seeking coverage," says Dueck. "Nothing leaves our shop until we see that it meets the standards we've built over 25 years. At Diamond Shelters, your need is where we start. Where we finish is with complete customer satisfaction." □



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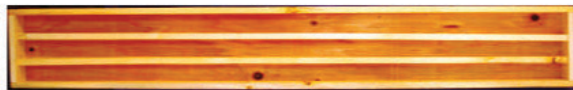
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tinues to provide value-added services for its membership.

Our industry has changed the way it views accident prevention, no longer relying on trends to predict future accidents. More emphasis is placed on hazard identification and risk mitigation. As such, Lost Time Accidents (LTAs) are the lowest they have been since we began recording statistics five decades ago. The true champions of this accomplishment are those men and women that work safely every shift, with the spirit of continuous improvement as their primary driver. Although we are encouraged by this record, and have worked tirelessly to get to where we are, we always remember those workers and family members who have suffered loss.

We continue to demonstrate our commitment to health and safety. We do so by providing compliance and risk-management training, timely advice on health and safety, and hosting conferences to discuss issues related to mine emergency management. We have also developed reasonable and practical laws to provide sound guidelines for the workplace; performed research and development work (an important factor necessary to optimize emergency preparedness, planning and response) and have worked to visualize future hazards and reduce their risk factors. Manitoba's mining industry is the only industry to have its own regulation where employers, workers, and government representatives cooperate to ensure that legislation is current and that our regulation meets the intent of being reasonable and responsible.

In addition, Manitoba's mining industry holds the Manitoba Provincial Mine Rescue Competition each year. These competitions, which have been held for over 50 years, test the completeness of our emergency response plans and competencies of our response personnel; essential in continuing to provide the same high level of rescue services across the province. Many volunteers and family members are dedicated to mine rescue and help make this test of our emer-

Our industry has changed the way it views accident prevention, no longer relying on trends to predict future accidents. More emphasis is placed on hazard identification and risk mitigation.

gency response capability a success year after year.

The importance of mine rescue competitions was further enhanced by Justice Richards, the commissioner in charge of the Westray mine public inquiry.

In 1992, the Westray mine exploded, taking the lives of 26 miners. Justice Richards made 74 recommendations, four of which included:

- Every mine operator should have a well-defined emergency response plan complete with a comprehensive procedures manual;
- Rescue and emergency response and test equipment should be standardized;
- Mutual assistance protocols should be established within the community and nearby; and,
- Mine rescue competitions, which provide a valuable training incentive for miners, should be continued.

We continue to act on these recom-

mendations. As of today, Manitoba has 176 trained mine rescue heroes. Each year, these heroes, part of the participating mine rescue teams, compete against each other and are judged on first aid, fire fighting, obstacle, and recovery and practical skills. Technicians also compete for the Technician Award, an award given to the individual who demonstrates the highest level of proficiency in preparing the breathing apparatus rescue personnel use in emergency situations.

As leaders in the field of mining health and safety, we work to continuously improve and implement leading-edge accident prevention actions and programs while interfacing to positively impact legislation and regulations.

We will not be satisfied until every mine worker who leaves work each day arrives home safely to their family, and is only affected by the natural passage of time. □

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# MINING PHOTOGRAPHER BRACES ELEMENTS TO *Get The Shot*

PHOTOS COPYRIGHT OF ARCHBOULD PHOTOGRAPHY.

By Melanie Franner

Whether it means kayaking, snowmobiling or coming into a site by chopper, Archbould Photography founder Cathie Archbould is one person who always gets her shot. Her commitment to traversing great distances, partaking in unusual transportation, and pretty much doing whatever it takes to get on site is one of the features that has helped set her apart from other ordinary photographers – and one that has helped es-

tablish her as the premier on-location photographer for mining companies all across Canada's great north.

## TESTING THE WATERS

"I was always interested in photography," explains Archbould. "I took my first photography course in high school. It was the one thing that I always stuck with, the one thing that was consistent for me."

After high school, Archbould attained

a bachelor of applied arts at Ryerson University in Toronto. She debated about returning to her native Victoria, but opted to stay in Toronto and get a job.

"I was working at the *Toronto Star*," she recalls. "It was the early 1990's and there was a real downturn in the economy. A lot of media jobs were let go."

Luckily for Archbould, a small newspaper in Whitehorse was looking for a photographer to fill the newly created position at the *Yukon News*. She applied,

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got the job and moved up north.

"I had a huge student loan to pay off so I needed a job," she says, adding that she was young enough to be adventurous about where that job could be.

That sense of adventure has never left. And although Archbould did eventually move back to Toronto, she lasted only about six weeks.

"I went back up to the Yukon," she says. "I just couldn't live in Toronto anymore."

All the while, Archbould continued to build her freelance business, with clients like the Associated Press. Her photos graced the front covers of several media outlets over the years, including *The Canadian Press*, *The Vancouver Sun* and the *Globe and Mail* – to name but a few.



### GOING IT ALONE

In 2000, Archbould left the newspaper (by now, she had been working for the Yukon's daily for a number of years). She started Archbould Photography and found immediate clients in the government and tourism industry.

And then things changed.

"I got a call from a client I had worked with in the past who offered me a job to go into a mine site and do some still photography of the First Nations people who were working at the mine," recalls Archbould. "It was a good job that re-

quired me to drive about three and a half hours north to get to the site. I decided to take the assignment."

And the rest, as they say, is history.

"Once I had that in my portfolio, it just opened up the door to all sorts of companies," says Archbould. "My name


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went through the mining industry like wildfire and mining photography became my forté."

Today, mining photography represents between one-quarter and one-third of Archbould's business. It's a mainstay of what she does and who she has become.

And part of who she has become is her key ability to make an immediate connection to the places and people she shoots. Archbould's easy manner and natural curiosity have helped her excel in a way that nurtures a better connection to the subject.

"A lot of the people who I photograph aren't necessarily at ease with facing the camera," explains Archbould. "I often have to rely upon my instincts to get them to relax. It can be by talking about the site, the business, or even about where they are from, how long they have been in the north, and why they like it in the Yukon. The goal is to set them at ease so I can get that perfect shot."

### ALL IN A DAY'S WORK

On average, Archbould's photo shoots take anywhere from one to three days on site, nevermind how long it takes her to get there.

"Last week, I was trying to get to the exploration site of what is going to be Canada's largest open pit mine," she explains. "The pilot spent two hours trying to fly in pockets of visibility to get to the camp before finally giving up. I was



chopped in to take the shots this week instead."

Archbould jokes that over the last 14 years, she has spent a lot of time in small aircrafts or helicopters – not to mention dark, underground spaces.

"A lot of my work means going underground," she adds. "There was one location where I had to descend 19 storeys underground in a very tiny elevator."

Luckily, Archbould isn't claustrophobic – or frightened of flying – or frightened of just about anything.

Two years ago last October, Archbould was travelling to a location shoot – this time by the traditional method of an all-wheel vehicle – when she hit a bad spot.

"I had left Whitehorse pretty early in the morning so that I could get to the site before the roads became dicey," she

explains. "But the roads were pretty bad so I turned around and decided to add some weight to the truck and put on new snow tires before making another attempt the next morning."

The 300 pounds of sand in the back of the truck and the new snow tires made a huge difference and Archbould was able to get to her destination, which was about a two and a half-hour drive north of the city.

"I was at the mine for two days and took plenty of shots," she says. "After spending the night, I headed out very early in the morning so that I get on the road before it started freezing. I was about an hour into the drive – and already thinking about what I was going to make for dinner – when I hit some black ice. I went into a spin and rolled the truck twice before ending up in the ditch."

Luckily, she was unharmed.

"Even though I was in shock, I still managed to grab all my gear and equipment and pile it up by the side of the road," states Archbould. "When another vehicle eventually came by, the driver helped me load everything in his vehicle. He drove me into the next small community, where we discovered that I had glass in my hair and eyes. There was a bit of damage to me and the equipment but I was very, very lucky."

**THROUGH WATER,  
SNOW, OR SAND**





Another interesting location shoot required that Archbould be up-to-date on her paddling skills.

"There was one client that required me to go on a 10-day canoe trip to reach the camp site," she explains. "I have also travelled by ATV, which was kind of cool."

Archbould is also willing to stand in the heat for hours on end, alongside many whining corgis no less. This particular shoot, although not mining related, saw her covering the Queen at the Victoria Commonwealth Games.

"I had been shooting her for days and got some pretty bland expressions for my efforts," notes Archbould. "But when the Queen drove through the long line of corgis, her face lit up. It was an expression of pure glee."

And an expression that Archbould managed to capture forever – and one that resonates with own self.

"I feel fortunate every day to be doing what I'm doing," states Archbould. "I love what I do, and to be able to do it

here in the Yukon especially, is extremely satisfying."

And although Archbould gets plenty of adventure during her work days, she is not one to sit around aimlessly on the few days she gets off.

"When I'm not working, which is happening less and less often, I do a lot of fishing, canoeing, and sea kayaking," she enthuses. "I also like to cross-country ski and snowmobile."

And with that, Archbould is off preparing for her next adventure. She is booked solid for the next 14 days, is toying with the idea of taking a couple of days off after that before plunging back into a full work load that will take her right through to the end of September.

It may be a thankless job for many – but somebody has to do it. And Cathie Archbould, thankfully, is more than happy – and grateful – to be that somebody. □



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# A WHOLE 'LOTTA HEART

## MINING FAMILY MATTERS

### STRENGTHENING INDUSTRY

### FAMILIES IN CANADA & AUSTRALIA

*By Jillian Mitchell*



**T**he kitchen, it's been said, is the heart of the home. And for Australian mining moms Alicia Ranford and Lainie Anderson, the heart of their home is also the heart of their online business, Mining Family Matters.

"We still officially work from my kitchen table," chuckles Ranford, a former nurse turned entrepreneur. "When we first started, it was almost like a hobby and we didn't know how it would fly. We've seen real changes in the nearly five years we've been operating, which is just fantastic."

Ranford's family is well familiar with the fly-in fly-out (FIFO) lifestyle – in fact, they have moved six times in the space of a decade. Six years ago, however, at her kitchen table in Adelaide, Australia, the mother-of-two recalls hitting a hurdle with the FIFO lifestyle.

"My daughter especially was just not cool with her dad leaving, so I went

looking for resources to help my children and there was just nothing available anywhere," Ranford recalls. "From there, I started thinking about the ins and outs

of mining life and surely there were people all over Australia having the same issue."

Friend and journalist, Anderson, was quick to jump on board with Ranford's vision of creating an online support network for industry families; soon, more of her friends began to follow suit. Before long, the Mining Family Matters website encompassed a whole array of supportive content – expert relationship and parenting advice, free psychologist services, lifestyle columns and articles about mining workers and families, and professional career advice and tips.

Today, over 16,000 visitors view the site each month. Add to that, the duo has sold more than 100,000 copies of their Australian survival guides for families in mining and resources.

"The response has been absolutely phenomenal," says Anderson, co-





founder of Mining Family Matters. "The biggest thing is that families love knowing they're not alone, that it's absolutely normal to have a few ups and downs when you've got one of you flying or driving in and out to work."

Most recently, the team has expanded into Canada with [www.miningfm.ca](http://www.miningfm.ca) and *The Working Away Guide*, the Canadian

equivalent to *The Survival Guide for Mining Families*. Anderson cites the expansion into Canada as a natural progression. "The Canadian mining industry is very similar to Australia's. If we could help all of these families in Australia, we could help Canadian families as well," she says.

Eventually, the duo would like to help U.S. families too, bringing Mining Family Matters to three countries.

"It's bigger than we ever imagined," says Ranford. "We started out as two moms who wanted to help some people, and it has just grown and grown."

Anderson echoes Ranford's sentiments. "It's really exciting for both of us," she says, "especially the heartfelt emails we get from the people the website has helped." □



## TOP FIVE TIPS FOR MINING FAMILIES

*There are many practical things families can do at home to connect to their loved ones while they are away. Additionally, there are countless practical things families can do to best connect when together at last. Here are the Mining Family Matters co-founders' top five favourite tips.*

**1) Life is not a competition; you're both exhausted.** "It's pivotal to not think my day's worse than yours. Everybody is tired," says Ranford. "Instead, focus on the positives and try and tell your partner what you like and appreciate about them, particularly if you're tired and you can tend to focus on the things that frustrate you."

**2) Communicate with your partner** – especially about the little things. Couples in the FIFO lifestyle tend to exude better communication skills than most, particularly regarding the day to day. Yet it is equally important to communicate emotions and grievances as they come up, says Anderson. "Couples have to be really honest about how they're feeling and what's going on in their lives," she says. "Especially about the little things. Something's it's hard to listen and really hear the things that are bothering each other, but there are really practical things you can do to fix them."

**3) Talk feelings with your children.** Anderson stresses the importance of encouraging children to share their feelings about the FIFO lifestyle. "Sit them down, ask them why they're sad, listen to them," she says, "and then say something like, 'Mommy's missing Daddy as well. How about we do something that cheers us up?'" Activities that come well-recommended by the mining mom include drawing a picture for the FIFO parent, or writing a list of things to talk about with that parent during the next phone call.

**4) Build in transition time.** Ranford's husband initially found it difficult to transition from work life to home life. "We're all like puppy dogs vying for his attention," she admits. "He would get home and as much as he was excited to see us, he would need a little bit of space, a couple of hours, after which he would be back on board. "Even though it was hard for me to hear, I could accept that and we made a change. It works really well for us. And I get some time to myself too – he makes me breakfast in bed."

**5) Make the most of time together at home.** As Ranford shares, there are pros to the FIFO family life. "When we had very small children and my husband was working a Monday-to-Friday job, we really didn't have much family time," she recalls. "When he did a fly-in fly-out job, he would get a good extended block of time home and he would be able to do things with the kids that he wasn't able to do when he was working Monday to Friday. He could be involved in some of the day to day, which certainly eased the pressure on me."



# GLOBAL MINERAL INDUSTRY TO CONVERGE ON TORONTO FOR EXPLORATION AND MINING'S LARGEST ANNUAL CONVENTION



## 2015

WHERE THE  
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The Prospectors & Developers Association of Canada's (PDAC) International Convention, Trade Show & Investors Exchange is set to once again take place in downtown Toronto from March 1 – 4, 2015. The PDAC convention is the industry's largest annual event that provides a world of opportunities for attendees to learn about the latest trends, technologies, and personalities shaping the mineral exploration and mining sector.

The convention attracts investors, analysts, mining executives, geologists, prospectors, and government delegations from all over the world. In 2014, more than 25,000 people attended the convention for the fourth consecutive year.

"Canada leads all global countries in mineral exploration spending, and since Toronto is the global capital of mining finance it makes sense that we host the industry's most important networking and educational event here," says PDAC president Rod Thomas. "We're looking forward to another banner year for the PDAC convention."

Over the past 83 years, the PDAC convention has grown exponentially, and

this year is no exception, as PDAC 2015 will be extending into the North Building of the MTCC to host additional exhibit space, as well as the Core Shack. Entrance to Trade Show North will be complimentary during the inaugural year, and show hours have been extended to ensure attendees can cover both the North and South buildings of the MTCC.

The PDAC 2015 convention will feature a series of topical short courses, workshops, and technical sessions designed to showcase the challenges and trends facing our industry. New additions include a session on Plan Nord, a course on the geology of copper, and a keynote session that explores the role of retail investors in the junior mining sector.

"The convention is designed to help the sector find the creative answers it needs to meet the challenges it faces," says Thomas. "Programming reflects economic and industry trends, and aims to provide networking and educational opportunities to encourage a healthy mineral exploration industry."

### PDAC 2015 convention highlights:

- Technical program featuring 19 sessions by industry experts
- Trade show featuring over 500 exhibitors promoting technology, products, and services
- Investors Exchange featuring over 540 exhibitors – free and open to the public
- Prospectors Tent featuring maps, samples and claim results of independent prospectors
- Core Shack featuring more than 60 of the latest mineral discoveries from around the world
- Corporate Social Responsibility (CSR) event series
- Aboriginal program including the Aboriginal Forum and the Skookum Jim Award
- Student program, including the student-industry networking luncheon and the student-industry forum
- Topical short courses and workshops
- Popular ticketed events including luncheons, the awards evening and the gala

PDAC is a national association representing the mineral exploration and development industry. The PDAC has more than 10,000 individual and corporate members, and encourages the highest standards of technical, environmental, safety and social practices in Canada and around the world.

*Early registration deadline is February 6, 2015. For more information about the convention, or to register, visit [www.pdac.ca/convention](http://www.pdac.ca/convention). □*



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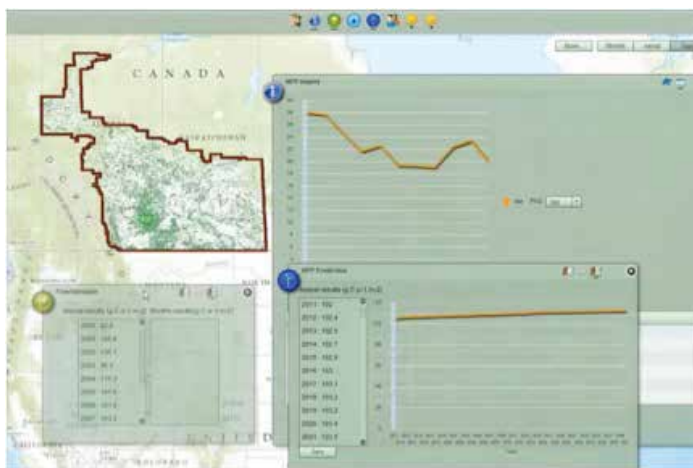


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# SEEING THE BIG PICTURE: USING REMOTE SENSING FOR RECLAMATION MONITORING



WEB-BASED MANAGEMENT TOOL SHOWING HEALTH OVER TIME AND PREDICTED PLANT GROWTH.

Although it is often viewed as one of the last stages of a mines operations, reclamation activities are planned and execution has begun long before ground is broken. Often, stakeholders, including governments, communities and oversight groups, consider reclamation activities a barometer for the overall environmental impact of a project. Because of this scrutiny, accurate monitoring and reporting on the progress of reclamation activities is an

important link between the developer and these stakeholders.

But environmental and social responsibilities aren't the only issues at stake for reclamation activities. Like most aspects of the industry, there is a huge financial stake in reclamation monitoring. The Alberta Government reports that there are currently over \$912 million in reclamation security bonds held from the oil sands alone. Given the importance of all of these issues, it becomes clear that ac-

curate, easy-to-understand information is essential to reclamation monitoring.

But getting the big picture of the environmental health of a project area can be very difficult. Often, plant and soil tests are carried out as part of an environmental assessment. However, spot tests are not indicative of an entire area, and on large projects there can be a significant difference in health across a project's footprint.

But as technology progresses, so does

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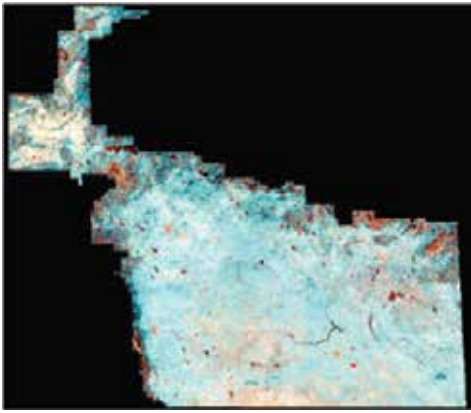
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our ability to use it to solve problems. With the proper tools, training, and experience, satellite imagery can provide answers. Satellite imagery is optimized for vegetation, and with more than 20 years experience analyzing satellite imagery, Western Heritage has developed a management tool that uses remote sensing to accurately measure vegetation change in an environmental footprint. This web-based tool provides managers with a detailed map of the area of interest that measures and displays vegeta-

tion health on several key indices. The map is regularly updated through an imagery subscription, and provides faster, more accurate monitoring and reporting by measuring the health and growth of vegetation in a reclamation area in real time.

One of the most desirable aspects of satellite footprint monitoring is that it provides a visual reference, so that interested parties can actually see the big picture of the progression of environmental and reclamation efforts. In addition to demonstrating the effectiveness of current activities, satellite monitoring has the ability to look back in time. With imagery available dating back to the early 1980's, it is possible to track footprint changes pre-, during-, and post-project. With reclamation judged on equivalent land capability, and many efforts lasting several decades, it can also look at vegetation growth patterns to establish a more accurate baseline for goals.

With Western Heritage's custom model, it is also possible to forecast the

growth and health of a reclamation area. This information can be used to help set realistic goals, or to act as a measuring stick for ongoing activities.

Embracing new technology for monitoring is valuable, as it provides more information and better answers. But using it also demonstrates a commitment to sustainable resource development; it shows that an organization takes its environmental commitments seriously and will employ cutting-edge technology to reach them. As the world changes, so do the ways we are able to see it. Satellite imagery allows us to see the big picture, while focusing on the information we need.

*For more information about remote sensing and other valuable services, contact Western Heritage at [info@westernheritage.ca](mailto:info@westernheritage.ca), or 1-306-975-3860, or visit [www.westernheritage.ca](http://www.westernheritage.ca). □*

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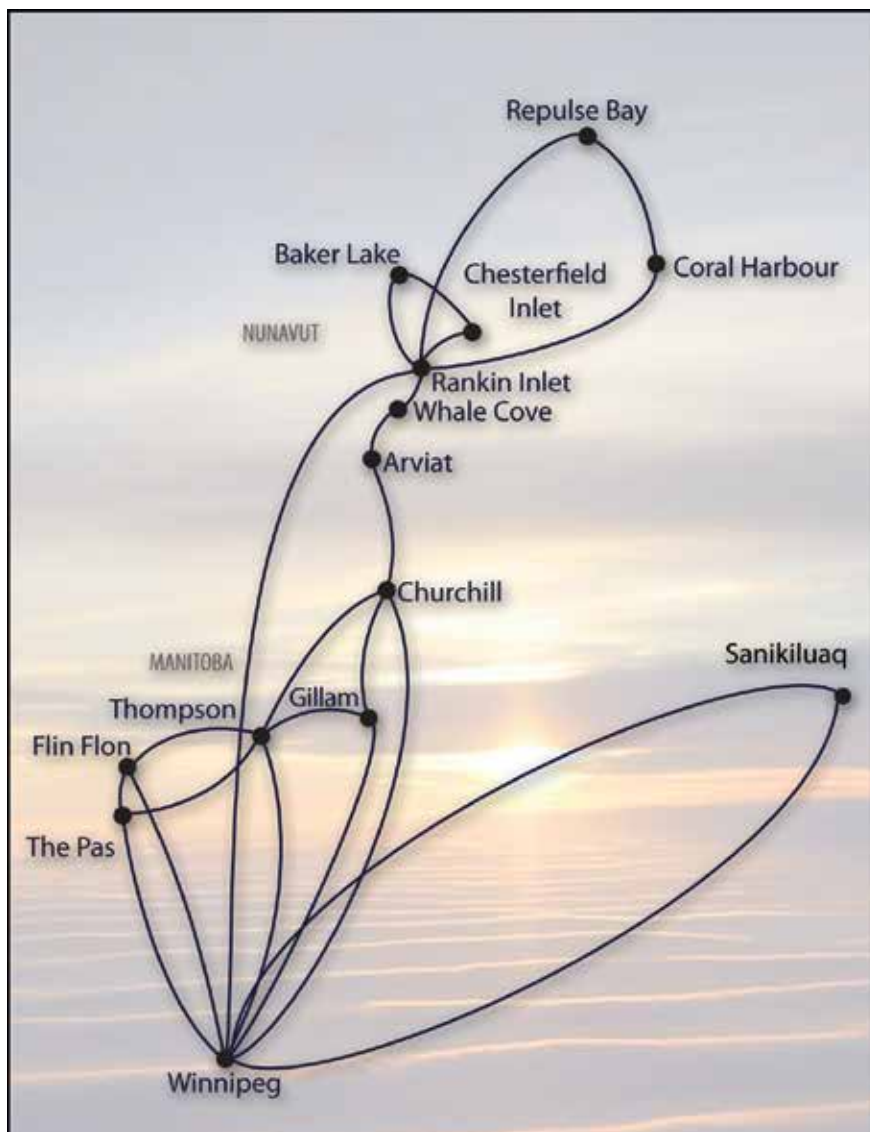
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Calm Air's new routing from Flin Flon and The Pas to Thompson is allowing our passengers to travel with speed and style on the Dornier 328 Jet. The Dornier 328 Jet cuts down travel time with its speed of 370 mph and also offers direct flights between Winnipeg, Thompson, Churchill, and Rankin Inlet. Calm Air's newest scheduled flight destination in Sanikiluaq offers a new level of transportation service for those living within this northern community. Not only is Calm Air offering flights from Sanikiluaq direct to Winnipeg for passengers; but also creating opportunities for businesses and culture to grow with cargo shipments being offered.

Calm Air flies two cargo ATR72 aircrafts and now two passenger ATR72 aircrafts. This model of plane provides the answer to any air travel needs. The versatility of this aircraft is extraordinary; being able to make flight configurations of cargo, passenger or a combination of the two. The combination aspect is one of the most exciting features enabling passenger loads to range from 22 to 62





people depending on demand. When flying with 22 passengers, the ATR72 can hold a maximum of 14,000 pounds of freight; when flying with cargo alone, the maximum load is an impressive 17,000 pounds. The ability to haul bulk tanks and fuel drums cannot be overlooked,

having the capability of holding 10,000 litres of fuel. All four of Calm Air's ATR72s are equipped with roller floors, as well as ice strip and off-strip landing capabilities. As weather conditions are very unpredictable in Northern Canada, choosing to fly with Calm Air's ATR72

will provide you with the comfort knowing that you and your cargo will arrive at its proper destination without leaving anyone or anything behind.

Reliable air service is still one of Calm Air's philosophies today. Passenger service is scheduled to six communities in Manitoba and eight communities in Nunavut. The versatility of our fleet of four ATR72s, two Dornier 328 jets and eight ATR42s paired with major bases in Thompson, Churchill, Rankin Inlet and Winnipeg allows Calm Air to continue to be a gateway to the north. Calm Air is expanding to provide more frequent flights, broader cargo options, and also introducing the opportunity to extend your horizons to new destinations. Calm Air is proud to connect Manitoba and Nunavut. Experience the north with Calm Air. ☐

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For more information on Xylem, please visit the website at [www.xylemwatersolutions.com/ca](http://www.xylemwatersolutions.com/ca). □



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# THERMOPLASTIC DOUBLE-WALL PIPING SYSTEMS

## WHAT YOU NEED TO KNOW

*By Steven Dolejsi, applications engineer, IPEX*



Double-wall piping systems are essentially a piping system within a piping system. The inner pipe is referred to as the “primary” pipe, while the outer pipe is referred to as the “secondary” or “containment” pipe. The goal of double-wall piping is to create a failsafe system where the secondary containment piping contains any leaked fluid if a failure occurs in the primary piping. Available in a variety of materials, double-wall piping systems are ideal for many applications.

### WHEN IS DOUBLE-WALL PIPING REQUIRED?

Thermoplastic piping systems are often regarded as a “cheap” alternative to traditional metal options. Much like exotic alloys and lined pipe, these systems should actually be regarded as engineered piping solutions that happen to be more cost effective and easy to install.

The majority of double-wall piping systems installed in water and wastewater treatment facilities are mandated by the U.S. Environmental Protection Agency (EPA). The EPA requires that all piping systems conveying hazardous wastes listed or identified under Subtitle C of the Solid Waste Disposal Act, or a mixture of such hazardous waste and

other regulated substances, comply with Section 280.42 Requirements for Hazardous Substance Underground Storage Tank (UST) Systems. This section indicates that underground piping must be equipped with secondary containment systems that:

- Contain regulated substances until they are detected and removed;
- Prevent the release of regulated substances to the environment at any time during the operational life of the UST system;
- Must be checked for evidence of a release at least every 30 days.

According to the EPA requirements, underground piping that conveys regulated substances under pressure must also be equipped with automatic leak detection.

### WHAT IS AUTOMATIC LEAK DETECTION?

Automatic leak detection systems monitor the interstitial space in a double-wall piping system. The leak detection system is fully automated, failsafe and can often be integrated into a plant’s programmable logic controller (PLC) or supervisory control and data acquisition (SCADA) system for computer-based monitoring and control. If a leak occurs in the primary pipe, the automated leak detection system will alert an operator by means of a visual and/or audible alarm. The two most common systems available are electronic low-point leak detection and continuous electronic leak detection.

The operating theory behind electronic low-point leak detection is to create “zones” in a double-wall system. This is accomplished by installing leak detection stations at specified locations.

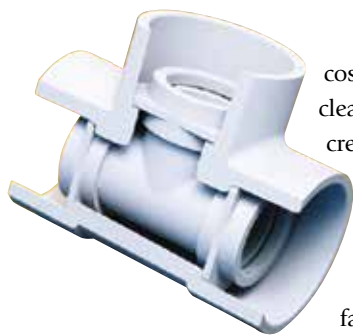
Leak-detection stations are essentially a drip leg in the secondary containment piping where fluid accumulates if there has been a leak in the primary piping. Each leak detection station is monitored with an electronic sensor, and a variety of sensing systems are available. Most systems require the sensor to be in contact with the leaked fluid to send an alarm. There are also systems that employ a proximity sensor that can detect fluid through the wall of the pipe, without coming into contact with the fluid. These sensors eliminate compatibility issues, optimize functionality and render the sensors re-usable and virtually maintenance free.

Continuous electronic leak detection systems employ a sensing cable. The electrical properties of the cable are altered when it comes into contact with a liquid. The sensor cable is pulled through the interstitial space of the piping after installation and rests on the bottom of the secondary piping. It is important to consider the size of the secondary pipe when using continuous electronic leak detection systems – the interstitial space must be large enough to allow the sensing cable and associated connectors to be properly installed.

It is good practice to incorporate visual leak detection along with automatic leak detection. This allows an operator to verify alarms visually before taking corrective action.

### DO I ONLY NEED DOUBLE-WALL PIPING AND LEAK DETECTION FOR UNDERGROUND PIPING?

Although the EPA may not require the use of double-wall piping above ground, safety issues have become a serious concern in North America. The combined



cost of litigation, clean up, and increasingly stringent safety guidelines have necessitated the use of failsafe double-wall systems for

above-ground hazardous piping systems. It is good practice to employ automatic leak detection in above-ground systems by means of electronic low point or continuous electronic leak detection. Clear PVC can be employed for instant visual leak detection in above-ground systems to ensure corrective action is taken immediately.

### WHAT MATERIALS ARE AVAILABLE AS DOUBLE-WALL PIPING?

There are a variety of materials available in thermoplastic double-wall piping systems, ranging from Polyvinyl chloride (PVC) and chlorinated polyvinyl chloride (CPVC), to polypropylene

(PP), polyethylene (PE), and even polyvinylidene fluoride (PVDF). Choosing the correct material for both the primary and secondary system depends on the pressure, temperature, and compatibility with the service fluid.

Many applications may use the same material for both the primary and secondary pipe, but employ a thinner wall for the secondary pipe to provide material savings. One example would be a CPVC schedule 80 by CPVC schedule 40 double-wall system. This practice is often acceptable since the secondary pipe is not required to operate under pressure for a prolonged period of time. It is also possible to use different materials for the primary and secondary piping for maximum performance while further minimizing material cost. For example, a primary CPVC schedule 80 pipe may be contained in a secondary PVC schedule 40 pipe where the CPVC is compatible with a chemical under pressure or at elevated temperatures, and the PVC is compatible only at drainage pressures and at ambient temperature.

### CAN I BUILD A DOUBLE-WALL SYSTEM?

With double-wall piping systems, engineers do not design two separate single-wall systems, but rather a combination of the two. The primary and secondary piping of double-wall systems are interrelated, where changing conditions continually affect both pipes. It is therefore critical to have double-wall systems professionally designed by an experienced engineer and assembled at the factory by an experienced manufacturer.

*Steven Dolejsi is an applications engineer with IPEX USA, LLC in Mississauga, Ont. Dolejsi received a B.S. degree in mechanical engineering from Ryerson University. He has over seven years of experience in thermoplastic piping system design and application, and has assisted in material selection and design for multiple water and wastewater treatment facilities.*

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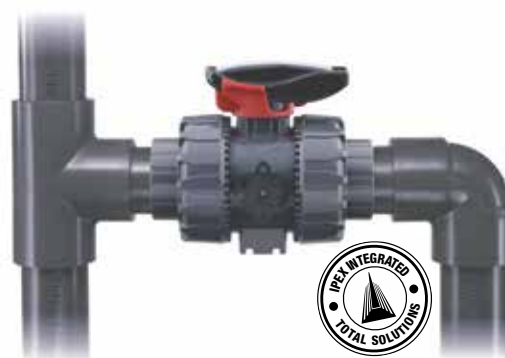
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# 2015 ARGOS CAN TACKLE EVEN MORE TASKS IN THE MINING INDUSTRY



ARGO 8X8 XTD WITH ACCESSORIES.

**A**RGO's 2015 lineup of extreme terrain vehicles provides customers in the mining industry with extra power, capacity, versatility and safety. Extreme terrain, extreme

weather, and extreme applications are all in a day's work for the heavy-duty 8x8 XT models and the ARGO 8x8 Centaur.

Customers in the mining industry are already using ARGOS to collect geotechnical data and stake claims in remote and difficult terrain because of ARGO's ability to safely carry crews and equipment where other vehicles can't go. In environmentally sensitive areas, ARGOS – even fully loaded – leaves less of a footprint than a person walking, making it ideal for surveying and exploring. With power pack and auger attachments available, ARGOS are also being used to collect core samples. Recognizing its customers' needs, ARGO has now added new features and accessories to further extend their utilization.

"ARGOS offer extreme productivity," says Bernhard Wagenknecht, ARGO's VP sales & marketing. "The 2015 models are the hardest-working ARGOS ever built. They perform safely in even the most demanding mining applications."

## ARGOS TAKE WORKERS, TOOLS ANYWHERE

ARGO's optional track systems and exclusive tire design make 2015 models virtually unstoppable. Lightweight and easy-to-install, these new track systems are available in tandem or quad sets. They include 18-inch (457 mm) HD tracks with industrial-strength HDMW PE guides and high impact-resistant 24-inch (610 mm) turf tires that offer increased flexibility, durability and performance. These track systems are ideal for extreme terrain and snow-covered areas.

## ARGO OFFERS MORE STANDARDIZED EQUIPMENT

To meet the varied needs of its industrial customers, ARGO has expanded its selection of heavy-duty equipment add-ons,



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ARGO 8X8 XTD WITH VMAC-DETAIL.



ARGO 8X8 750HDI WATER APPLICATION WITH FOUR PEOPLE.

adding a new Maxilift mono-boom crane that mounts to the Centaur. This crane can lift up to 2,870 pounds (1,300 kg) and raise loads to a maximum height of nine feet, 11 inches (302.26 cm).

The 2015 XT models also have the capability to use most of the equipment previously available only for the Centaur. Power packs, tool attachments, generators, welders, and compressors utilizing the ARGO Universal Mounting System (UMS) include packages developed in conjunction with industry-leading brands such as VMAC, Lincoln Electric, and Chicago Pneumatic. ARGO cargo options include a flat bed, a utility box, an electric dump-box, eight-wheel and four-wheel amphibious trailers, with a capacity of up to 1,400 pounds (635 kg).

### ARGOS GO DIESEL

As diesel is the standard fuel for industry, ARGO is now offering its most popular workhorses with diesel engines. The new ARGO 8x8 XTD is powered by a 24 HP, 1028 cc Kohler/Lombardini diesel engine matched to the triple differential ADMIRAL transmission. The Centaur's new liquid-cooled 34 HP turbo-diesel engine with high-torque Centaurmatic dual-differential transmission produces 10 per cent more power than any other ARGO. Customers appreciate the convenience of fueling all their vehicles from the same pump.

### APPLICATIONS FOR ARGO EXPAND

Because of ARGO's renowned versatility and its ability to safely go where other equipment can't, customers in the mining industry continue to find more applications for their vehicles. ARGO engineers and field teams continue to work closely with its distributors and customers to create a growing range of quick-change attachments and tools.

### ABOUT ARGO

ARGO extreme terrain vehicles and custom utility packages are manufactured since 1967. ARGO markets its products to more than 300 distributors and dealers worldwide and continues to grow at a steady pace.

ARGO's unique durability, safety and versatility are driven by the renowned engineering capability of its parent company, Ontario Drive & Gear Ltd. (ODG). Since 1962, ODG has manufactured quality precision gears and transmissions.

For more information about ARGO or the new products for 2015, please contact Paula Barros, marketing manager, ARGO Amphibious UTV220 Bergey Court, New Hamburg, Ontario, Canada, N3A 2J5; 519-662-2840 ext. 471; [pbarros@ARGOutv.com](mailto:pbarros@ARGOutv.com); 1-877-274-6288; [www.ARGOutv.com](http://www.ARGOutv.com) □



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# TECHNOJET SM

## THE ULTIMATE SUBMERSIBLE PUMP FOR HIGH HEAD APPLICATIONS

By Eric Beaupré



**T**echnosub has just finished the production of its latest high-pressure pump in the Technojet series. This unique multistage submersible pump is designed to respond to the mines looking for pumping straight to the top.

It also adds a new category in the selection of models available in the Technojet multistage series.

This pump is available with 250 horsepower or 300 horsepower submersible motors and can handle up to 1,000 PSI or 2,361 feet at 275 gallons per minute.

For applications where volume is needed, it can also be built for high flow and can handle up to 2,000 gallons per minute PM at 380 feet of head pressure.

The Technojet multistage submersible pumps are made of cast iron for suction, discharge and stage casings. All internal components are made of duplex stainless steel in order to stand up to the hard conditions of mine dewatering.

Technosub owns the biggest pump manufacture in Canada and has the knowledge to fabricate custom pumps suited to the customers' needs. We have an interesting portfolio of solutions and realisations in mine dewatering across Canada.

For more information, visit our websites, [www.technosub.net](http://www.technosub.net) or [www.tsurumicanada.com](http://www.tsurumicanada.com). □

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**W**ehoSlurry Pipe is a pipe with an exterior HDPE pressure layer and a co-extruded thermo-elastic wear layer that is very abrasion resistant.

Typical problems in transport of abrasive material are:

- Downtime associated with pipe failure and replacement.
- Frequent pipe rotation.
- Frequent pipe replacement due to premature pipe failure associated with excess wear of the inner layer.
- Plugged pumps caused by inner-layer delamination.
- Uneven joints resulting in pipe failure.
- Higher pumping costs associated with smaller pipe bore to provide sacrificial wear layer.
- Pipe corrosion.

The WehoSlurry piping system can address all of these problems.

Typical applications for Weho Slurry Pipe:

- Mining industry process and tailings lines
- Dredging
- Food processing
- Pulp and paper industry
- Metallurgy
- Transport of Kaoline
- Fish farming
- Dry goods transportation

## SYSTEMS PARTS

### *High-wear resistance*

This product is intended for applications currently using HDPE

pressure pipe, steel pipe, ceramic-lined pipe, or rubber-lined metal pipe, but where service life is less than desired. The wear or rate of abrasion in a piping system is influenced by the characteristics of the product, the type of flow regime established in the pipe, and the geometry of the piping layout. Consequently, it is very problematic to “predict” how much wear will occur in a given application.

Uponor Infra has conducted evaluation of the wear-resistance of WehoSlurry pipe for a variety of slurries found in mining and commercial applications. Wear tests were performed by pumping slurries that contain extremely abrasive solids through a pipe loop with a pipe of different materials. Pipe loop tests were performed at Uponor Infra test facilities with pipe outside diameters of 63 millimeters for polymer pipes and 60.3 millimeters for steel pipes. All pipe samples weighed before and after the test, and the weight losses converted into volume losses for comparison between materials. The pipe loop test made it possible to measure wear much faster than in a real field installation with a test that is more representative of field conditions than a Taber Abrasion Test.

Typically, the duration of the pipe loop test were measured in weeks. Parameters that were controlled were particle concentration, test duration, and flow velocity. The types of slurries included iron tailings, copper tailings and power plant ash. The test flow velocity was high, around four m/s, to ensure that measureable wear was obtained for each pipe sample within the chosen test period. □

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