

# WORKSHOP REPORT

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## Metal Mining Opportunities Workshop

March 30 - 31 2010 • Dettah, Northwest Territories

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T e r r i p l a n  
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**April 2010**



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## Day 1

### Introduction to the Workshop

**Opening prayer:** Elder Judy Charlo

**Welcome:** Ted Tsetta - Chief of Ndilo

Following the opening prayer led by Judy Charlo, Chief Tsetta thanked everyone for attending and welcomed the attendees to Chief Drygeese' Territory, on behalf of the Yellowknives Dene First Nation (YKDFN). He reminded everyone that the YKDFN have a tradition of communicating and working together to make sure everyone is informed. He told the participants that it is important to acknowledge the land you are on and the people who live there. Chief Tsetta also spoke of the beautiful new Dettah facility and the hard work of previous chiefs who made it possible. He stressed the importance of communication between companies and First Nations – to ensure that the land, wildlife and resources are taken care of and protected.



Elder Judy Charlo

Chief Tsetta stressed the importance of planning for the future, and noted that while mining is a key part of the northern economy, money is not the only issue. He reminded participants of the terrible Giant Mine situation and suggested that communication is key to preventing disasters like that in the future. Chief Tsetta stressed that industry should work closely with communities, elders, and those who live on the land to ensure sustainable and environmentally conscious growth.

Chief Tsetta stressed the importance of education in addition to traditional knowledge. He mentioned that a dream of the people of the north is to establish post secondary programs in the NWT and noted how industry can be instrumental in helping establish such programs. He stated that good education, and programs that will help northerners excel in areas such as mining and resource management, should be available in the north. Then, people would not have to go south for their education and lose their connection to the North.

He also noted that this conference should become an annual event so that sharing can continue and industry and First Nations can continue to communicate and work together.

**Opening Remarks:** Hon. Bob McLeod - GNWT Minister of Industry, Tourism & Investment

Minister McLeod thanked everyone for attending and noted the wonderful venue. He stated that the NWT is rich in natural resources, but in the past the people of the North have done all of the work and yet have seen little benefit from those resources. He noted the importance of secondary industries associated with

mineral resources, such as the diamond polishing facilities that were built to complement the diamond mines.

Minister McLeod emphasized the importance of looking at value-added opportunities, the chance for the North to diversify its economy and to keep jobs and unfinished resources in the North. He closed by saying that this workshop was a great opportunity to come together with industry to learn about the benefits that development can bring to the NWT.

***Opening Remarks: Kimberly Fairman, Director - Canadian Northern Economic Development Agency (CanNor)***

Ms. Fairman thanked the YKDFN for hosting the workshop in their community and thanked the participants for their attendance. She noted that this was an excellent opportunity for industry to work with governments and First Nations to further the economic growth of the NWT. She pointed out that the NWT is a high priority for the federal government, and providing information about economic opportunities in the North is one of the mandates of her agency.

Ms. Fairman stated that this workshop was intended specifically to develop relationships and share information among industry, government and communities. She promised that CanNor will help to build some of these partnerships, help people make connections and bridge any gaps on the road to sustainable development in the North. Ms. Fairman said that her new department wants to help communities get ready for development and assist them with their own economic development.



*Chief Drygeese Government Building, Dettah*

***Opening Remarks: Ricki Hurst - Terriplan Consultants***

Mr. Hurst welcomed the attendees and mentioned the persons who have been instrumental in organizing the workshop and making sure it ran smoothly. He briefly stated the purpose of the workshop and noted that, if successful, it may be the first of other similar “opportunity” workshops. He then gave a breakdown of expectations for the two days and explained the structure of the workshop and the types of speakers who would be presenting.

Mr. Hurst explained that the workshop was about communication; there would be a lot of information over the two days. He noted that comments and questions would be recorded, and if an answer was not available or there was not enough time to provide an answer during the workshop, an effort would be made to address those questions within the workshop report.

Mr. Hurst then reviewed the agenda and explained some of the topics that would be covered during the workshop. He also informed participants of some of the activities that would be taking place in the evening, including Dene hand games and a feast.

## 1. Economic Opportunities and Industrial Economics

*Dr. Michael Doggett, Mining Advisor - HanOcci Group Inc.*

After an introduction by Mr. Hurst, Dr. Doggett thanked everyone for attending and noted his appreciation for the opportunity to speak at this workshop.

Dr. Doggett noted that he would present a big-picture view of economic opportunities. He indicated that we are all, directly or indirectly, active recipients of the products of mining. Everyone who uses metal, or drives a car, for example, are users of the industry. He noted that everyone in the North is blessed to have the opportunity to come together and have a rational and balanced discussion on mining opportunities – not everyone in the world has this luxury.

Dr. Doggett gave a brief overview of relevant economic theories including the “Staple Theory” and the “Resource Curse”. In its simplest form, Staple Theory is a Canadian concept, developed in the 1920s, that suggests that our national economy is based on commodity exports. There are two areas – those which include producing or extracting the resources and those which include refining them into products. By refining our own resources, Canada can build its industry and benefit more completely from its own natural resources. He suggested that countries that only export their raw materials will fall behind with respect to revenue and technology growth.

Dr. Doggett used the example of the Olympic mittens to illustrate the “Staple Theory”: the Hudson Bay Co. sold three million pairs of these red mittens which are red and have a maple leaf that is obviously and outwardly Canadian. On the inside, however, the “made in China” tag reflects how Canada’s industry is still not structured well to respond to such opportunities. Although a Canadian company was probably capable of manufacturing these mittens, it was decided that it would be more cost effective to have the mittens made elsewhere.



The “Resource Curse” reflects the problem of resource-based countries that suffer from a lack of economic diversity, and often have an unstable or corrupt government. Dr. Doggett challenged participants to come up with reasons to keep resources in the ground, and look closely at the “cons” associated with mining and resource-based economies. Economic diversity, profits, and resource revenue are key elements of the discussion happening in northern Canada. Land use and overlapping jurisdictions are other challenges for the industry. He emphasized that here in the North, there are more opportunities to work together toward sustainable development in a peaceful and rational way than most other places in the world.

Dr. Doggett stressed that the key to understanding value lies in recognizing the variability of the industry; when considering ways to move forward, a number of factors have to be determined. There are two main categories of resource – high value and low value. High value might fetch a higher unit value (e.g. diamonds, gold) but are extremely dependent on the market, whereas sometimes the low value resources have a higher value from another perspective (e.g. gravel – used to build roads and foundations for buildings). It is important to consider the different values of available resources and decide what will provide a better overall economic return. Other issues like the costs of refining, manufacturing, or exporting also constitute part of the economic equation.

To demonstrate his point about refining, Dr. Doggett discussed the process for extracting copper, using a number of samples of ore to refined copper. He then discussed the reasons why some companies choose to export their raw resources to countries like China for processing. The general inability of Canadian companies to compete with the low cost processing and manufacturing rates of countries like China was one of his key points.

Dr. Doggett pointed out a number of publicly supported projects that have been started and then repealed or discontinued throughout the history of the north (e.g. diamond polishing). He noted that public support for individual projects may not be realistic, but a publicly funded infrastructure that aids a diversity of industries may be a more reasonable expectation for economic development in the North.

Dr. Doggett concluded by asking participants to consider a number of factors when determining resource extraction and processing in the NWT, and to consider creative ways of competing with southern markets to remain competitive.

## 2. From Mine to Market: Zinc 101

### *Zinc in the Global Marketplace: John Kearney, Chairman - Canadian Zinc Corp.*

Mr. Kearney began his presentation by giving an overview of the NWT and Nunavut Chamber of Mines and how it fits into the overall mining industry in the North. Mr. Kearney stressed that sustainability in mining requires a strong and predictable regulatory system and workable environmental standards. He also stressed the importance of support from government and First Nation communities and availability of skilled human resources.



Mr. Kearney's presentation focused on the importance of zinc production in the NWT and how it has been a strong contributor to the NWT's economy over the years. He noted some of the many uses for zinc in manufacturing, and briefly explained the process for extracting and processing zinc. He noted that zinc has its highest level of value added during the extraction, or mining, phase. Mr. Kearney also noted the differences in production between open pit and underground mines (there are



fewer open pit mines, but they produce a much higher volume of zinc).

Zinc is normally used for galvanizing metal products to prevent corrosion. End users are primarily the construction industry, but zinc is also used in transportation and electronics. Zinc is also valuable to the healthcare industry and is commonly found in vitamin supplements. In fact, the World Health Organization has attributed approximately 800,000 deaths per year to zinc deficiencies and has identified its wide distribution as a supplement as a high priority. Mr. Kearney stressed the importance of zinc as a dietary supplement in developing countries.

China is the world's largest consumer of zinc, particularly as it moves from a rural economy to a more industrialized economy. The rate of global zinc consumption has increased significantly over the past few years, mainly due to the demand in China. China is therefore the key to future zinc production and export, especially for the NWT. As countries develop and industrialize, the demand for zinc will rise. This demand is also linked to the movement of populations into bigger centres, requiring cities to expand.

There are two markets: zinc concentrate and zinc metal. Overall zinc production has continued to increase in China, while it has declined in Canada. There are no zinc mines currently operating in the NWT but, historically, there have been successful zinc mines in the NWT (e.g. Pine Point), Yukon and Nunavut. Chinese companies are currently interested in zinc mining in the North, and are looking at projects in the Yukon, near the NWT border. It is important to recognize China as a strong player in the global zinc market. The best opportunity for the NWT is to first mine the resource, and then export it to smelters closer to the main users.

Mr. Kearney also briefly discussed the Prairie Creek Mine owned by the Canadian Zinc Corporation, which is currently undergoing regulatory review. When considering Prairie Creek along with the Howard's Pass site, there is a vast amount of resource potential in the NWT. Mr. Kearney suggested that the territorial government needs to look at access and how the NWT can benefit from these mines. Zinc has a huge potential for the North and should be considered very closely.

Mr. Kearney concluded by reinforcing the point that global demand for zinc will continue to rise as countries become more industrialized and populations move into cities. This is a major economic opportunity for countries and regions with zinc resources, such as the NWT. He closed by suggesting that the best value for zinc for the NWT is in the mining phase, which will in turn create opportunities in transportation and other areas of industry.

### ***Zinc Mining Developments in the NWT: Wolf Schleiss, VP Exploration - Tamerlane Ventures Inc.***

Mr. Schleiss began his presentation with a brief history of base metal mining in the North. He noted the characteristics that made these mines viable, such as transportation routes, power supplies, high demand, and quality resources. Transportation and power sources are critical in the operations of a mine.

Mr. Schleiss also pointed out some of the issues that have been detrimental to zinc mining operations in the North. Some of the solutions that Mr. Schleiss suggested to address these issues include developing transportation routes, including access corridors through parks. He also mentioned the value of all-weather roads and pipelines to transport concentrate. Another area that needs improvement, according to Mr. Schleiss, is the regulatory system in the NWT, which must work in a more timely and efficient manner to ensure better development opportunities for government and First Nations.

***Capitalizing on Metal Mining Synergies: David Swisher, VP Operations - Avalon Rare Metals Inc.***

Mr. Swisher thanked the YKDFN and the event sponsors for their invitation. Rather than focusing on one mine in particular, Mr. Swisher discussed a number of potential sites around Great Slave Lake.

He identified some of the key challenges for development in the area as transportation, power and supply chain logistics. Collaboration is all about “synergy”, which is the collaboration of two or more independent entities working together to promote opportunities for enhanced social benefits. It is important for groups to work together rather than independently. First Nations engagement is a key approach to development in the North and to work it must include transparency, honesty, consistency, and soliciting constant feedback. Mr. Swisher stressed the importance of sharing values and “building” rather than “buying” relationships.



He noted that the South Slave region is currently in a better position for potential mining than the North Slave, due to the “Road to Resources” initiative by the federal government in the 1960s that built roads and other transportation infrastructure in the South Slave region. In the North Slave, there are many opportunities to create synergies that will cut costs and reduce some of the operational challenges. An all-season road to the diamond mines has the potential to be beneficial if undertaken responsibly. Mr. Swisher noted that it is important to keep in mind that an all-season road would not necessarily introduce a second “gold rush”, so to speak, but could be a great asset if managed responsibly and in partnership with land users. Communication and cooperation with all stakeholders is a key part of responsible development.

In the South Slave region, there are a number of opportunities for synergies that could be explored. First Nations partnerships for supply of consumables is one example, as is combining prefabrication facilities near railheads and sharing the haulage costs for products and supplies. If funding was available, rebuilding and extending the railway could have a huge benefit for transportation and development in the NWT. Communities as well as industry could benefit from the costs saved by using rail rather than trucking or air transport. Barging provides another opportunity for cost saving and attracting business to the South Slave region.

Mr. Swisher also talked about how power supplies are a real challenge for mining, especially in the remote areas of the NWT. He mentioned the existing power supplies in the NWT and facilities that could be upgraded to supply power to communities as well as industry. Mr. Swisher noted some potential areas for developing new power supplies, in particular, the potential for geothermal power generation. He suggested that through collaboration and the identification of a strategic location, geothermal energy could be a safe, clean, and sustainable power source with multiple benefits. Biomass is also a clean and low cost energy source that may be worth investigating for future power sources.

Mr. Swisher concluded by asking participants how they want to continue with development in the north. He asked about the GNWT’s goals, and whether those goals clearly define deliverables and timelines. He stressed that opportunities should not be wasted and by being proactive, the NWT can benefit from its

tremendous opportunities. It is important to work together to bring sustainability to the North through partnerships, improved transportation and supply chains, efficient and innovative power supplies, and responsible development. He closed by stating that collaboration between governments, communities, industry and First Nations can provide sustainable employment and economic security for the NWT.

### **Question and Answer**

#### **Leonard Beaulieu, Fort Resolution**

*Question:* I recall when you were working in Fort Resolution and talked about resurrecting the Pine Point Mine, and what is on my mind is the railroad, which took only months to build between Hay River and Fort Resolution. I want to know is if you guys have the rebuilding of the railroad in your plans – the people would like to know. They feel they're not being informed of what's going on along the road (weigh scales, etc). If Tamerlane has plans to go open pit in the future, are they going to be barging materials, building the railroad, or what? We would like to know what kind of infrastructure you have planned, and who will pay for maintenance of the highway?

#### **David Swisher, Avalon Rare Metals Inc.**

*Answer:* We had talked to a number of Akaitcho chiefs and the current location of our operations is in an area recommended by these chiefs. Avalon, I know, is not interested in putting the railroad back in, but there's still opportunity for collaboration with other organizations to build it. We are planning on barging, but we are also still in the early phases of development so we will continue to work with local groups to come up with the best solutions.

When it comes to the highway, Tamerlane has a commitment to assist the GNWT DOT in maintaining the highways so that it is safe for truck traffic.

#### **Chief Roy Fabien, K'at'l'odeeche First Nation**

*Comment:* The Dehcho are determined to be involved in the development process, and the foremost concern of First Nations is the environment, which we have no control over right now. We feel that even though we cannot control what is happening in the rest of the world, we can control what happens in our area. We also have social and economic issues to deal with, and we need to remember that as First Nations, we are the most impacted community in the NWT in terms of what is happening socially and economically.



Chief Roy Fabien

We have had no say or input in what has happened around us in the Dehcho when it comes to industry, and I think those days are over. We want full participation. We need to be involved in everything that goes on around us. This new way of “building” relationships with First Nations, rather than “buying” those relationships is important. Money won't fix the environment, and I like what Avalon has to say about sustainable development. I want industry to show an attitude of helping us maintain our beliefs and skills rather than paying us out. I just want to say I hope Avalon continues down this path and other members of industry follow their example of cooperation.

### 3. From Mine to Market: Rare Earths 101

*Global Demand and Outlook: Dudley Kingsnorth, Executive Director – Industrial Minerals Company of Australia*

Mr. Kingsnorth's presentation opened with a greeting to the First Nations Chiefs of NWT, to companies, and to government representatives. He explained that rare earths could provide value-added opportunities for the NWT. He talked about what has happened in recent times, including economic changes in China.

Mr. Kingsnorth identified 15 rare earth metals and explained that heavier metals are rarer and therefore their prices are higher. Drivers of demand are the unique properties of rare earths. The main use of rare earth metals is as magnets for hybrid cars, computer screens, fluorescent lights, television screens, vibration ability in cell phones, energy efficient batteries, and other technology.

He then gave an overview of market demand and market prices for rare earth metals. He described how China is restricting exports of rare earth metals for the economic benefit of its own people and, while the dominant supplier is China, some other smaller suppliers are coming forward. Rare earth development tends to be capital intensive and with a long start up and duration. Mr. Kingsnorth talked about some of the technical concepts related to mining rare earth metals and recommended that before proceeding, people observe a pilot project so they are aware of the environmental risks and the potential economic benefits for their community. He then presented a history of China's exports: they discovered rare earth metals in 1970 and have been working hard at technological advances for the use of these minerals to make value-added products within the country. China utilizes the minerals all the way to the end product to maximize profits in their country. China produces 95% of the world's rare earths and consumes 60%. Mr. Kingsnorth stressed use of economic controls by China to minimize exports of rare earths.



*Dudley Kingsnorth, via videoconference*

According to Mr. Kingsnorth, the recent global economic crisis temporarily reduced the demand for rare earth minerals. China has now declared that there are about 15 years worth of mined "heavy" rare earths left in their country and, because of the limited supply, they plan to stockpile. In addition, the existing mines of Mount Weld and Mountain Pass have decided to almost double their production. Forecasted demand for rare earth metal alloys and magnets is growing. Overall demand is growing 8-11% per year.

Mr. Kingsnorth noted a number of rare earth projects that are slated to start around 2012-2015 and listed ten steps to get rare earth mining to commercial production. He noted that environmental assessment can be an arduous task particularly because of the need to find storage for radioactive material. In 2014/15, the supply of rare earth metals is predicted to be below demand. According to Mr. Kingsnorth, China is offering

to help speed up production by inviting producers to process minerals at Chinese plants. The NWT has an opportunity to open its own processing plant(s) as exporting the raw material to China is not a preferred option for most countries.

Mr. Kingsnorth stressed that he does not want to tell communities what to do, but instead he presented the potential benefits. He discussed the value-added chain: mining employs hundreds, processing employs thousands, and manufacturing, the “ultimate step,” can employ millions. This will not only provide jobs but also long term security of employment and a diversity of opportunities in the NWT. High environmental standards will help to ensure long term sustainability.

Mr. Kingsnorth concluded his presentation by mentioning a number of things to consider: world class (no subsidies); maximize value-added; training for specialized jobs now; excellent environmental management (radioactive waste management); Aboriginal company partnership; and exchange scholarships for First Nations.

### ***Question and Answer***

#### **Ray Jones, North Slave Métis Alliance**

*Question:* I am concerned about rare earth mines because of thorium being a by-product. I would like to see all communities, if there is a mine; get money for culture, education, and other things. Avalon is just speculating, I don't think they know whether they have a mine or not. They just sent out a bulk sample.

#### **James Pugsley**

*Answer:* I am a representative of Canada within CanNor but I am not an expert in mining. Your points are quite right. We are not at a mine stage but we are using this discussion to learn about the realities of rare earths mining. The objectives of today are to gather all the information so we can share it with everyone. Today is not about making decisions but getting knowledge.

### ***Introduction to Rare Metals in the NWT: Dr. David Trueman, Consulting Geologist***

Dr. Trueman began by saying it was an honour and a pleasure to be at the workshop to present a paper on rare earth metals. He has been working out of Yellowknife for 35 years but has also worked throughout the world and seen similar circumstances in other countries.

According to Dr. Trueman, there is no accepted ‘definition’ for rare earth elements. The consumption of each mineral is less than 100,000 tonnes per year and they have a wide range of applications.

Three producers of tantalum in Australia and Canada are now shut down. Brazil (30% of market), Congo, Mozambique, and Egypt still produce it. The Slave craton has many potential areas for mining rare earth metals. In terms of mining horizons, Dr. Trueman stated that it would likely take 5 years to expand production but 9.5-11.5 years to begin new production.

### ***Northern Opportunity, National Implications: Jack Lifton, Independent Consultant***



Mr. Lifton made his presentation via a recorded phone conversation from London, England. He thanked the chiefs and organizers who asked him to speak about the national implications of producing rare earths in the NWT. Avalon's operation at Thor Lake is the largest single deposit of rare earth metals in the world. Mr. Lifton noted that he comes from a Canadian background and thinks Canada needs to step up to the international plate as a high tech producer. This will start in Yellowknife.

Mr. Lifton said that he visited Thor Lake last summer, and he stressed that this is a new beginning for Canada and everyone needs to focus on this. Not only will it bring jobs and wealth to the area but it will also help Canada's global economic position in the future.

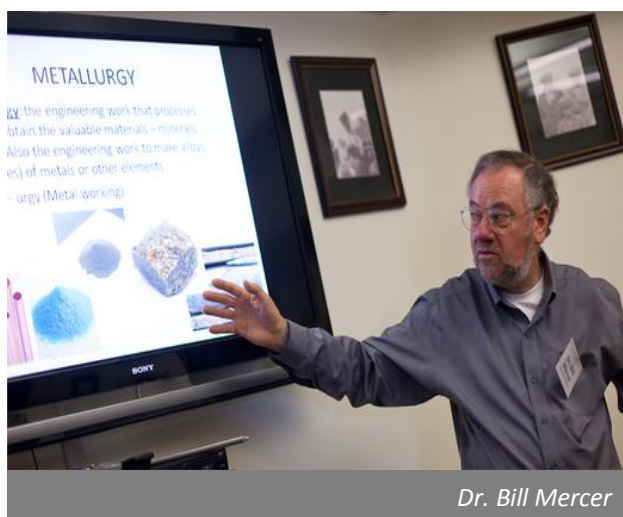
The number one customer for finished goods that can be produced in the region will be Asia – primarily China and Japan. Mr. Lifton noted the reverse of the trend of the last 30 years: previously, all high technology was coming from China because it was its own source of rare earth metals, whereas now, Yellowknife can be the main source of the most precious metals in the world.

Mr. Lifton also described rare earth mining as a clean industry – not a “smoke stack” industry. For example, to make the Blackberry phone (a Canadian product) the manufacturer needs rare earth metals. When it comes to the auto industry, we currently don't have Canadian made hybrid cars. However, if we produce rare earth metals for batteries in Yellowknife, Canada can economically produce hybrid cars for export. According to Mr. Lifton, eastern Canada is currently the production centre of the country but all supplies tend to come from the west.

In closing, Mr. Lifton stressed the idea that wealth is created in the area where final products are created.

### ***Rare Earth Elements: Processing and Manufacturing: Dr. Bill Mercer, VP Exploration – Avalon Rare Metals***

Dr. Mercer spoke about the basics of metallurgy. He talked about the basics of rock – that it is made up of elements (e.g. individual substances like copper), compounds (groups of elements like copper sulphate) and minerals (crystallized compounds). Rare earths are elements like copper but are also found in rock mixed in as minerals. In rock there are both valuable and non-valuable components.



According to Dr. Mercer, the first step in mining is separating the valuable minerals from rock. Most often the mineral itself is not valuable, and the element (such as copper) needs to be separated from the mineral. Basic steps to remove an element from the mineral would include grinding up the mineral, and then using a process to break down the minerals and remove the desired elements. A geologist needs to identify which elements are present and how tightly they are linked together. A geologist and chemist designs the separation process which can be unique depending on the mix of minerals and elements. Heavy rare earths are often 100 times the value of light rare earths; they

are often found in alkaline rocks which are more difficult to break down.

The first step in the process is to crush and pulverize the rock, which is the most energy demanding step. The second step is to separate the minerals from the rock using magnetism, gravity, or flotation (add chemicals to water to help change flotation properties). This process results in a concentrate of the desired mineral. If an element rather than a mineral is desired, you need to extract it using pyrometallurgy (heat) or hydrometallurgy (water) or a combination of the two (rare earths extraction uses both). When a mineral containing rare earth element is washed with water after being heated, other elements are left in a solution with the rare earths.

The next step is to further refine the product using a chemical solvent (e.g. sulphuric acid) and further heating. The byproducts are very acidic and can be balanced with lime. The resulting tailings are mostly calcium sulphate (lime + sulphuric acid).

Dr. Mercer noted that China is currently the only producer of heavy rare earths. China processes these metals by leaching surface rocks and thereby directly adding reagents to the environment, which has generated considerable environmental concern. Most of the restrictions around rare earths are because of problems in China. The deposits in the NWT are the only other known deposit in the world at this time.

Dr. Mercer then discussed magnets. To create magnets, there are three main steps. The rock must be mined, then purified in a separation plant, and then added to a product in manufacturing. There are very few separation plants in the world and operating costs are competitive, but the knowledge is there. If the NWT wanted to join the magnet market, it could make a deal with another country that has a separation plant but lacks rare earth resources. Right now Canada has a lot of knowledge and experience in the primary steps of obtaining rare earth metals, but less experience at advanced stages such as separation and manufacturing. Dr. Mercer concluded by stating that Canada can do it, but might need help.

### ***Rare Earth Applications: Products and Markets: Dr. Gareth Hatch, Director of Technology – Dexter Magnetic Technologies***

Dr. Hatch began by thanking the chiefs, elders, and everyone in the YKDFN and other communities. He also thanked the government for helping put this workshop together. He noted that it was a pleasure to be present and to learn and discuss issues and challenges related to this new opportunity.

Dr. Hatch's background is in magnets, which is a common end use of rare earths. He talked about two broad areas for rare earths: to enable processing and to use them as building blocks to enable technological advances. He stressed the true value of rare earths is in the big picture.

Dr. Hatch explained how rare earth elements are used to enable processing of other materials, such as fluid cracking catalysts used in the petroleum refining industry and catalysts for automobile catalytic converters.

Rare earth elements can also be incorporated with other components to build even more valuable products. Dr. Hatch described some of these products, which include: magnets, batteries, phosphors (LCD & plasma screens, CFL & LED lights), and glass additives (which can block UV light passage, clarify and remove colours). Beyond that, a product could include a combination of numerous rare earth products – for example, an electric car that requires rare earth metals for many of its components.

According to Dr. Hatch, the value of rare earth elements in 2008 was about \$1.2-\$1.4 billion US but this is not the full story of the value of rare earth elements as enablers. As an example he discussed the wind turbine industry where rare earth elements are used in direct-drive wind turbines. A recent trend has been towards building larger turbines because they have the potential to produce more power. A larger turbine means a larger gearbox and a lot more maintenance, but if the gearbox is removed then that drastically reduces costs for maintenance. Dr. Hatch explained how a permanent magnet-based system can replace the gearbox. He predicted that by 2013 we will see great increases in a new system based on these permanent magnets which could mean a market value of \$25 billion USD from rare earth element turbines. The value of rare earth elements in this market is only \$130 million USD but, without them, this potential \$25 billion USD industry could not exist. Dr. Hatch concluded by stating that the value of rare earth elements is \$130 million USD. However, this number does not take into consideration their value for enabling an entire industry.

## 4. From Mine to Market: Cobalt, Bismuth and Gold 101

***Cobalt and Bismuth Mining and Processing in the NWT: Robin Goad, President/CEO and Director – Fortune Minerals Ltd.***

Mr. Goad thanked the YKDFN Chief and former grand chiefs in attendance, INAC, everyone who travelled to this workshop, and the GNWT and others for hosting. He talked about the NICO project in Tłı̄chó territory and the desire to work with government and communities to produce high value products in Canada.

Mr. Goad discussed the NICO mine and the fact that the processing plant that is being built in Saskatoon. He talked about plans for electricity (building a power plant) and road access that are being developed. The NICO deposit is mostly cobalt but also includes gold, bismuth, and copper. Mr. Goad described how gold production will be 83,000 tonnes in the first year (underground) but then will diminish down to 30,000 tonnes (open pit) in following years. He noted that demand for cobalt is expected to double in the next 5 years for the same reasons as rare earth elements, and that it is also an essential component for battery production in electric cars and portable electronic devices. He also noted that bismuth is one of the safest metals available and is found in medicines and cosmetics. The demand for bismuth is expected to grow as lead is eliminated from products and replaced by bismuth, a safer alternative.

Mr. Goad predicted that the NICO project will create about 150 jobs in the NWT (250 in years 1 & 2). He described why the project will start as an underground operation; it needs to make a lot of profit in the first few years to pay for capital expenses. The pre-production development work has cost \$20 million to date. Also, a large sample was





collected in a pilot project plant test to verify that the materials can be recovered economically.

A three-stage process will take place onsite: rock will be crushed and ground, flotation separation will be used to recover the bulk concentrate, and the concentrate will then be bagged and trucked to Hay River and shipped by train to a processing plant in Saskatchewan. Mr. Goad stressed that project economics always have to be considered and this is why the plant is located in Saskatoon, and not in the NWT. He described Saskatchewan as a business friendly government, with cheap electricity, available labour and easy access to lime. These economic considerations also make room for the production of value-added components in Canada. Mr. Goad noted that environmental studies, permitting and community consultation have been undertaken, as is required in any project of this type. He noted that the Northwest Territories has the most extensive and time consuming process for permitting of any jurisdiction he has experienced throughout the world.

Mr. Goad then reviewed the reasons for locating the processing plant in Saskatchewan:

- Low cost of electricity
- Save money transporting reagents
- Tłı̨cho government concerns of chemical reagents used on their land
- Save on cost of importing specialized labour to NWT and general labour to camps
- Saskatchewan government hospitable to development
- Capital costs reduced with size of NICO camp
- Lesser project risk without weather and labour uncertainty

Mr. Goad acknowledged that there have been mistakes in the past in northern mining experiences, but said that he feels recent work has been very positive for the people of the NWT. He listed some of the strengths and remaining impediments to NWT development:

- About 50% of the NWT's GDP comes from natural resources and a large amount of the income comes from government jobs
- NWT has an impressive mineral and hydrocarbon resource endowment
- High costs in the NWT are due in part to its remote location and climate
- Inadequate infrastructure— roads, electrical power, railways
- Permitting process penalizes developers and is excessively long (3+ years for NICO)
- There is poor intergovernmental coordination – and inefficient and poor communication between governments and aboriginal organizations

### ***Gold Mining and Processing in the NWT: Dave Webb, President/CEO and Director – Tyhee Development Corporation***

Mr. Webb thanked the organizers for inviting him to Chief Drygeese territory and began his talk by introducing another rare metal – gold. Gold is well known and identifiable to a common person. It has been mined for a long time but the biggest change now is reclaiming the land after project completion (e.g. Giant Mine). Mr. Webb described two types of gold deposits: refractory and free gold.

Free gold is easily recoverable. It is mined, then crushed and ground. Gold is removed from ore by shaking (to separate heavy gold particles from others) followed by flotation or dissolution with chemicals (like cyanide). Gold is then melted, physically separated, and formed into gold bars.

Mr. Webb concluded by noting that gold in the Yellowknife area was mined previously and that at least one company has returned to mine using enhanced gold recovery processes (e.g. the newly discovered gold next to Discovery Mine).

# Metal Mining Opportunities Workshop

March 30 - 31 2010 • Dettah, Northwest Territories

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## Day 2

### *Recap of previous day's sessions: Ricki Hurst - Terriplan Consultants*

Mr. Hurst briefly summarized the Day One proceedings and discussed the agenda for Day Two. He then introduced the first panel of the day, comprised of Presidents and Vice Presidents of companies in the mining industry and chaired by John Kearney.

## 5. Economic Opportunities and Industrial Realities

### *Introduction to Panel Discussion: John Kearney, Panel Chair*

John Kearney thanked the participants for attending the workshop and reiterated how important it is to have strong and open communication between industry, government and First Nations. Mr. Kearney noted that the panel's purpose is to answer questions and inform participants about the mining industry's contribution to the NWT. He referred to the infrastructure that has been established through mining, and emphasized that gold and diamonds are not the mining industry's only drivers of the NWT economy. There are other mines, including both tungsten and zinc mines, that have also contributed significantly to the GDP of the NWT.

Mr. Kearney noted that about \$35 billion has been generated by mining in the NWT throughout its history. He also mentioned the continued investment by the mining industry in local and First Nations companies and the NWT jobs that have been generated both directly and indirectly by mining.

Employment throughout the NWT and Canada, said Mr. Kearney, has also increased significantly thanks to the mining industry. He noted that the mining industry is the largest employer of First Nations members in Canada. In the last 10 years, the diamond mines in particular have increased First Nations employment in the NWT, for both men and women. The mines have also provided training and education opportunities through industry funding of programs and scholarships. These increased levels of education funding have provided the NWT with a stronger, more educated workforce.

### *Introduction to Location Analysis: John Kearney, Robin Goad, Wolf Schleiss, David Swisher, Dave Webb*

#### *John Kearney*

John Kearney began by talking about the plans for development of the Prairie Creek Mine. Transportation is a significant aspect of this project, and Mr. Kearney referred to the significant business opportunities available in transportation and site positioning. He stated that they are hoping to sub-contract most of the operation's activities, which would provide a number of jobs for locals. He also noted that the mine is expected to have a 20 year lifespan, but may continue to operate even beyond that timeline.

### *Robin Goad*

Robin Goad began by talking about potential mines, and that there are several that are currently about half-way through their regulatory phase. He noted that most of the companies on the panel are small, and focused on unique mineral opportunities. Mr. Goad noted that his company (Fortune Minerals) hopes to be operational in the NWT in the near future. The Fortune Minerals' NICO project on Tłı̄chǫ lands will involve extensive road building; something that would improve the quality of life for a number of isolated Tłı̄chǫ communities as well as reduce electricity costs for residents.



(L-R) John Kearney, Robin Goad, Wolf Schleiss,  
David Swisher, Dave Webb

Fortune Minerals also plans to provide employment to community members in a manner that allows them to commute rather than spend extended periods in a camp. Power is another important infrastructure project; Fortune is looking at a number of potential power sources that would benefit residents as well as the mining project.

Approximately \$80 million has already been spent on this project, with \$170 million as the estimated final price tag. Mr. Goad noted that there are many employment opportunities associated with this project including a wide variety of trades and education opportunities.

### *Wolf Schleiss*

Mr. Schleiss spoke about Tamerlane Ventures and discussed the employment opportunities available, particularly once the project begins production. These jobs would be focused around Hay River and Fort Resolution and would include a number of contractors in construction, transportation, services, and materials suppliers. Mr. Schleiss noted that his company plans to fill most of these contracts with First Nations companies. He also noted that the economic downturn has slowed development somewhat, but activity is gradually increasing now that things are more stable.

### *David Swisher*

Mr. Swisher talked about Avalon Rare Metals and focused on the project area about 100 km east of Yellowknife. Currently, Avalon is in early development stages and has located a site for processing concentrate based on consultation with local Chiefs. Avalon plans on shipping that material to Hay River for rail shipment to the south.

Avalon plans to begin construction in approximately 24 months and the mine has a long anticipated mine life. Construction and operations on the mine site would require about 200 personnel, and the processing facility would need about 200 personnel during construction and would operate with about 98 personnel.

A significant amount of supplies will be required for both facilities, and each one will provide economic and employment opportunities for local businesses. Mr. Swisher noted that this project will be one of very few

rare earth metal mines in the world, and it provides a great opportunity for the North to become competitive globally in this unique area of metals.

Mr. Swisher concluded by noting the tremendous opportunity for the NWT economy with respect to jobs, sustainability, and attracting people to the north. The downstream benefits could be very significant.

#### *Dave Webb*

Mr. Webb began by stating that the jobs available in rare earth mining will require an education – not just ‘shovel carriers’ – and it’s important to provide people with an education that will make them qualified, not only for mining, but for other areas of the economy as well, e.g. electricians, engineers, etc.

Mr. Webb noted the timelines for operations and highlighted the fact that the regulatory and permitting phases take a long time, particularly when you consider the lifetime of a mine. He emphasized that education that keeps people in the north is important – education that is relevant to northern jobs and trains people to stay in the north and contribute to the local economy.

#### *John Kearney*

Mr. Kearney reiterated Mr. Webb’s comment about timelines and stated that the sharp decline of mineral exploration in the NWT is due to a number of factors; including limited access to investment money, questions over land access, and a regulatory framework that discourages prospectors from getting out to explore potential deposits. When the NWT regulatory framework is improved, more exploration will take place.

## **Introduction to the Second Day of the Workshop**

#### *Introduction: James Pugsley, CanNor*

Mr. Pugsley introduced this section of the program and emphasized the “workshop” element of the agenda. He noted the unique opportunity that participants have been given to hear information from experts and industry leaders on topics related to mining.

He also noted that this workshop is only the beginning of the discussion – government, industry and communities can take the information they gather during these two days and consider it further. Mr. Pugsley emphasized that the information gathered during the workshop will be compiled and distributed to all participants, so that everyone has the same information to work with. He stated that there may be more workshops in the future on more topics so that the information gathering can continue.

## **6. Citizen’s Guide to Mining in the Northwest Territories**

#### *Tom Hoefer, Director of Minerals and Petroleum, INAC*

Mr. Hoefer began his presentation with an introduction to INAC's role with respect to mining in the NWT. He mentioned some of the offices operated by INAC, including the Geosciences office and the Minerals and Petroleum Division.

He then introduced the five phases of the mining cycle: exploration, deposit appraisal, mine construction, mineral production, and closure and reclamation. The guide that was handed out at the workshop includes a breakdown of this cycle and other information for people interested in mining.

Mr. Hoefer discussed how the mining cycle is a useful tool for planning and assessment. One could use the cycle to consider the size, impact and timing of a mine by breaking down an operation into the five phases of the cycle.

Using the cycle also assists with predicting the probability of success for a mine, prospects for employment, goods and services, and business opportunities. For example, Mr. Hoefer explained how, by breaking down the phases of a project, you can determine what resources and personnel are required for each phase and what the overall benefit and cost will be for each phase. The cycle can also be used to consider training opportunities and monitor successes to date.

According to Mr. Hoefer, using the cycle to track benefits enables a phase-by-phase analysis of local and territorial benefits. This may include employment, education, training, or other aspects of mining, such as heritage and tourism.

Mr. Hoefer concluded by reiterating that exploration needs to occur continuously for mining to be a realistic prospect in the north. For every 100 prospects, 10 sites may be identified, and for those 10 sites, maybe one mine will actually be constructed.

## 7. Introduction to Metal Mining Inputs

**Module 1 - Goods and Services:** *Mike Vaydik, General Manager, NWT and Nunavut Chamber of Mines (this talk was moved on the agenda)*

During his presentation, Mr. Vaydik used the mining cycle introduced by Mr. Hoefer to highlight the benefits of the mining industry for local economies. He noted that there is a generation of northern prospectors who have worked in the bush and on the barrens in mineral exploration and are now at retirement age. The challenge to prospecting is to entice youth to take their place and train as prospectors. The Chamber of Mines and the Mine Training Society are training young people in exploration so they can get out on the land and carry out mineral exploration.

Growing economic sectors attached to mining and exploration includes aviation and expediting. Several northern companies have grown significantly with the increase of diamond mining and exploration. These



Mike Vaydik

industries are below the radar to the average person, but there are considerable economic opportunities for local businesses attached to them.

Mr. Vaydik noted that some jobs are very technical and require expertise outside of our training capabilities, but we should still pursue opportunities that are available to northern residents. Mr. Vaydik stressed the importance of a healthy, reliable workforce. Mines are not willing to entrust machinery and equipment to unreliable or unsafe workers, and the Chamber of Mines is very proud of the safety record at the diamond mines.

Mr. Vaydik compared a remote mine site to a town. This “town” needs everything from toilet paper to ball bearings, and these supplies have to come from somewhere. Fuel and explosives are huge commodities, as are food supplies. Transportation is a key element to mine operation, and the biggest issue is getting supplies to the mine sites on a reliable basis. There are hundreds of jobs associated with supply transport, including packaging and transporting supplies.

Many mines sub-contract the majority of their operations. Many of these contracts are available for local and First Nations businesses, especially in the areas of construction, transportation, and expediting. Mr. Vaydik also noted the capital funding issue that companies face when they are looking for investment. He noted that the drop in exploration will set back the NWT, since exploration leads to development. All of the jobs and supplies Mr. Vaydik has discussed in his presentation will not continue unless exploration increases and more potential mine sites are identified.

Mr. Vaydik concluded by reminding participants of the infrastructure that has been built in the NWT based on the demands of mining. By working together, communities and industry can improve infrastructure and services in a cost effective way that benefits everyone.

## ***Module 2 - Energy Sources and Uses: Dave Nightingale, Jim Sparling, and Leon Courneya***

### ***Dave Nightingale, Director of Energy Planning, GNWT Industry Tourism and Investment***

Mr. Nightingale explained how his department supports energy planning in the NWT. He provided an overview of energy planning initiatives in the NWT, including pricing and a priorities framework.

Mr. Nightingale explained how the global price of oil affects power pricing in the NWT. As oil prices continue to rise in the long-term, pricing for energy will be a real challenge for the North. The GNWT plans to address the cost of living but he noted that communities like Yellowknife and Fort Smith, which are connected to hydro, see rates that are comparable to major southern cities.

Mr. Nightingale spoke about some GNWT initiatives to reduce cost and consumption, including working with communities to advance alternative energy sources and reduce the use of imported diesel. The GNWT is also looking at community energy plans, alternate energy sources, and increasing support to the Arctic Energy Alliance. Mr. Nightingale also indicated that the GNWT is looking at expanding existing power projects through the hydro strategy and upgrading transmission lines.

The GNWT is undertaking an Electricity Review, and Energy Plan Renewal, and increasing funding to the Territorial Power Subsidy program. The NWT Hydro Strategy is due for completion over the next year. Mr.



Nightingale discussed some of the recommendations of the Electricity Review Team, which include simplifying the rate structure, and changing the allocation of operating costs.

Mr. Nightingale concluded by stressing the need to work together to achieve a sustainable energy system in the NWT, as oil prices will continue to rise in the future.

***Jim Sparling, GNWT Environment and Natural Resources***

Mr. Sparling noted that the best way to reduce your energy costs is to practice energy saving activities. He did not go into detail on energy saving activities, but talked about some new and exciting energy saving products.

Solar panels are a successful option for most of the year (between February and October). GNWT research stations are run on new technologies such as solar panels, and these could be beneficial for exploration camps, especially in the summer. Wind power is another form of energy that users can adopt to save costs and fuel use. There are grants available from the GNWT for alternative energy usage in smaller remote locations. The GNWT has also been working with Avalon and First Nations to establish these alternative energy sources in remote locations.

Wind power is also a good option for mine operations. Establishing wind turbines onsite during construction can save a lot on the cost of operating a mine throughout its lifetime. Biomass energy has also been very successful. The GNWT has seen large savings after converting a number of its buildings to operating on wood-pellet boilers. The GNWT purchases pellets from High Level Alberta, which is relatively close, so there have been savings on bulk buying. In addition, the pulp and paper industry is using co-generation to turn a waste source into an energy source.



The GNWT provides incentives for people who want to install pellet boilers and stoves. As the GNWT becomes the anchor supply for pellets in the NWT, the supply will become more readily available for smaller users. If smaller communities are interested, they can work with the GNWT to make pellets available. The GNWT is also looking into whether or not pellets can be produced within the NWT, which could provide jobs and a rejuvenation of the forestry industry. If demand for pellets increases locally, this type of harvesting and production could be a viable economic development option for the NWT.

Mr. Sparling concluded by reiterating that the supply and price of alternative energy make them a cost-effective source of power that has long term benefits. The GNWT has a number of programs and funding available to any parties interested in utilizing these new energy sources.



***Leon Courneya, Northwest Territories Power Corporation***

Mr. Courneya discussed the potential for the expansion of the NWT power grid system. He gave a brief history of the existing power plants in the NWT and their current output and state of repair. Mr. Courneya talked about the back-up diesel generators that the NWT Power Corp uses when there is an interruption in hydro supply, as well as the variable demand for power from industry, such as the diamond mines.

Mr. Courneya discussed the potential expansion of Site 7 on the Snare River northeast of the Snare Rapids. This new facility would be connected to existing plants. He then discussed the potential expansion of Site 4 and on the La Martre River. Pre-feasibility work has been done on the La Martre River project and this is the most likely site for expansion at this time. The Bluefish Dam is 70 years old and requiring some reconstruction. The Taltson expansion is in the feasibility study phase and the permitting process is underway.

Mr. Courneya explained that electricity rates increase when diesel is being used, and that rates are regulated under the NWT Energy Act. The NWT Power Corp requires a franchise agreement approved by the GNWT to sell power to mines. If a large user enters the market, rates will increase, but on the other hand that consumption demand is required to justify expansion of existing facilities.

***Module 3 - Transportation: Mark Kimakowich, Martin Landry, and David Wasylciw***

***Mark Kimakowich, CN Rail***

Mr. Kimakowich discussed the CN rail line and its current condition. He noted the considerable investment in upgrading the railway to its current safe standards. Safe operations are the primary concern for rail operators – providing safe and consistent services and moving goods and services to and from the NWT. A small corporation is not able to cost-effectively maintain safe rail lines, which was one of the factors in CN's purchase of the NWT line.

With access to rail, you can reach ports such as Vancouver, New Orleans, and Halifax, which are major supply hubs to Asia, Africa and Europe. Closer markets in Alberta are also more accessible by rail. CN Rail is working with companies like Avalon and Tamerlane to improve the rail infrastructure in the NWT and use it as a viable means for transporting goods. Improving the rail infrastructure will be important to the growth of industry in the NWT, especially if the proposed Mackenzie Valley Pipeline Project becomes a reality.

Recruiting employees is CN's biggest challenge in the north, as staffing has been difficult here and in northern Alberta. A reliable and stable work force is a key requirement to operate and maintain a safe and efficient railway. Track inspection is a huge part of maintaining safe railways and CN has purchased a number of inspection vehicles to enhance safe and reliable service. Railways also take pressure off roads.

In closing, Mr. Kimakowich restated that CN is back in Hay River and looking forward to working with mines and communities to provide safe, reliable, and environmentally friendly transport services to industry.

***Martin Landry, Northern Transportation Company***

Mr. Landry gave a brief history of NTCL's involvement in transportation in the NWT, including the Hay River loading terminal. The Hay River site has over 180 acres of secure holding space, and is located at the end of the CN Railhead. The Hay River facility also includes a rail depot and shipyard.

The NTCL fleet is significant, and includes barges, tugs and an ocean capable barge. The fleet services a wide area from Alaska to Hudson's Bay. NTCL has terminals in Inuvik, Norman Wells and Tuktoyaktuk, and a number of smaller landing areas along the Mackenzie River and in the Inuvialuit Region.

NTCL also has a fuel program that supplies communities from the west coast to the eastern arctic. NTCL also has a number of "truckable" modules which includes 7 mobile bridges and is part of a partnership with Mammoet.

#### ***David Wasylciw, GNWT Transportation***

Mr. Wasylciw discussed the importance of roads and transportation to industry. The Department of Transportation is constantly improving its road system which includes all-weather and winter roads. The GNWT operates five ferry crossings; the most relevant to the Great Slave Lake Area is the Mackenzie River crossing at Fort Providence. Road maintenance is continuous, and there are ongoing reconstruction projects taking place throughout the NWT.

The Department of Transportation contracts local and First Nations companies, whenever possible, for road maintenance and construction and for ferry operation.

The Department is considering an extension of Highway 4, which is currently connected to a private winter road to the diamond mines. This expansion would be a seasonal road, but would be overland and would extend the life of the road by approximately 30 days each year. Mr. Wasylciw noted that the Department of Transportation is working with its partners to provide longer and better road service to industry and communities.

#### ***Module 4 - Labour: Hilary Jones, Northwest Territories Mine Training Society***

Ms. Jones discussed the mandate of the Mine Training Society and noted her appreciation of Chief Tsetta's comments about the value of education. She talked about people and how the labour force has changed over the years.



*Hilary Jones*

Ms. Jones emphasized the historical changes in mining and noted that it is no longer a "pick and shovel" industry. Training requirements are higher and a more skilled labour force is required to work in the mining industry today. Less than 20% of the workforce has only a high-school education and that percentage is shrinking. Ms. Jones noted that around 50% of the participants in the mine training are now female, and statistics show that women are "nicer" to their machinery, which companies consider when employing people to use expensive equipment.

A significant number of vacancies in the mining industry are opening up due to retirement, and Ms. Jones emphasized again the importance of education. She noted that levels of education are higher amongst women in First Nations communities and this is a means for better employment. A real challenge for the Mine Training Society when working with small communities is the low level of education in men – it is difficult to run a training program when high school is a requirement and many of the prospective trainees have not yet attained that level of education. Attracting women in small communities is also difficult, as they tend to be the primary care givers of children and are unable to work either full time or outside the community.

Ms. Jones discussed the areas of skilled labour, as they make up over 70% of the labour force in the mining industry. For example to pass a trade entry exam, one requires at least a high-school level diploma, and some of the more technical trades require more advanced courses (e.g. electricians).

The Mining Training Society works with industry and colleges to offer programs to build up the skilled labour force in the NWT. A significant percentage of employment in the NWT is either directly or indirectly related to mining. If northerners are going to reap the benefits of the mining industry, they have to possess the skills to fill the positions required by the industry, or the jobs will go to people from the south.

### ***Module 5 – Limestone and Sulphur: Dave Watson, Northwest Territories Geosciences Office***

Mr. Watson focused on the use of limestone and sulphur in the processing of metals. He began by giving a brief overview of the composition of limestone and comparing it to lime and dolomite. Limestone is used to control pH levels when processing metals. Acids are often used to extract the metal from the rock, and limestone is then added to neutralize the acids. This also reduces the danger of these acids to the environment by making mining waste safe to dispose of. Limestone also acts as a water purifier.

Limestone is very common in the NWT, and constitutes a large proportion of the territory's geology. There are a number of open escarpments which have enabled the Geosciences Office to obtain samples and do testing – Kakisa and Pine Point are two such locations. Pure limestone is 56% calcium and to be considered a high-calcium limestone, a sample must contain at least 53% calcium. There are 11 locations of high-calcium limestone between Behchoko and Pine Point. Dolomite is just as valuable as limestone, in that it will neutralize more acids than limestone.

Mr. Watson explained that the quantities of limestone required for mining activities depend on what it is needed for. He noted that the NWT has a large supply of local limestone that could potentially be quarried to supply industry.

Sulphur is another product required for mining. Sulphur can be mined, but is also a waste product of burning Hydrogen Sulphide ( $H_2S$ ). Sulphuric acid ( $H_2SO_4$ ) is produced by burning sulphur, and the acid is used to extract metals. Importing sulphur and making your own sulfuric acid can save on costs. Roughly 32 tonnes of sulphur produces 98 tonnes of acid. When sulphides are burnt, a lot of energy is produced which is a potential source of electricity. It is possible to produce acid by burning sulfides, which creates energy, and then use the acid to extract metals. When limestone is used to treat acids, the final waste product is a form of gypsum which is becoming increasingly popular in construction.

Mr. Watson concluded by stating that the technologies and processes outlined in his presentation are currently “on the shelf” products that are readily available to industry. He also noted that the NWT Geosciences office has a report on limestone locations and qualities available in their office.

*Comment:* David Swisher noted that Avalon plans to utilize some of the sulphuric acid energy production in their plant.

*Comment:* W.G. Bacon noted that there are other ways to convert acid to energy and mines generally prefer lime to limestone because it negates the environmental impact. Mines also prefer limestone to dolomite because the tailings are preferable for gypsum production.

## Questions and Comments

**Manuel Jorge:** How are northerners going to develop the skills they need to start up mines and get the training they need?

**Hillary Jones:** The Mine Training Society has a number of programs but they need the partnerships to get them up and running.

**Question about Pine Point:** Where is the sulphur going to run off to?

**Wolf Schleiss:** The mine there will be a fairly clean mine, water purity will be tested regularly and sulphur will not be getting into the water system.

**Tom Hoefer:** Looking at the overland route that DOT is proposing, there was another prospect of using the Yellowknife River route so that Tyhee Mine would have access to the road. I would like to know why they're no longer considering that route. I also want to know about charges for river use.

**Leonard Beaulieu:** My concern is about tailings and waste products and their impact on the land. The legacy of Giant Mine will haunt the land for a long time and I do not see enough elders and youth at this workshop, as they have seen the impacts and will be impacted in the future. I want to see more about future impacts alongside this talk of making money right now. I want to see a workshop on impacts, as the future of the lake is at stake.

**Ricki Hurst:** Perhaps the next workshop could be about impacts – make sure you get your comments, questions, and suggestions to James Pugsley.

**Chief Louis Balsillie:** I think the message about the waste and cleanup is important, because there are areas such as Fort Resolution that are still dealing with it. The Dene and Métis need to be involved in any mine planning because we have been left out of so many processes, when we have land claims still under negotiation. Areas that do not have land claims need to be directly involved and there is no reason for people to be left out if they are not right next to the mines – Fort Resolution and Lutsel'ke are part of the same area, but were split up when it came to the government's socio-economic benefits agreements. You can't do that. It has to be a whole group you deal with, not individual communities. Big picture benefit is important, not “here are a few jobs here or here”. That approach splits communities and creates animosity in regions.

**Ray Jones:** Mining companies need to educate themselves on the traditional lands of the Dene people, which go from Hudson Bay to Lake Athabasca, to Fort Smith, to Yellowknife. There are different terms assigned to first nations by government, but we are all Dene.

**Leonard Beaulieu:** The problem with consultation has been one representative from Métis and one from Akaitcho, but they are from specific communities, and do not represent the whole First Nation or Métis Nation. These representatives are not talking to elders and this has the elders concerned. So the consultation is flawed – I would like to see a representative from each Nation for each community as part of the consultation, otherwise there will be pieces missing. A lot of people have lost land and been moved around – for example, the power commission – and there is no way to ask questions because the representation isn't there to deal with these questions.

**Chief Steven Nitah:** This workshop is a good opportunity. My community is both blessed and cursed, as we have numerous opportunities for development. When talking about land and resources and connection to that land by those who own the land, our culture, our spirituality and our way of life are connected to the land. This means we take the processes for developing land very seriously. When companies go ahead with their plans that are based on short-term thinking, immediate benefit and profit for companies, they fail to consider the long-term impacts.

Markets are unstable, and you can't think just from the point of view of the proponents. This is an opportunity for First Nations to work together to help get the mines on the power grid and to stabilize the infrastructure in the NWT to benefit all northerners. We need to look at the rare earths opportunities and others that are not dependent on one mine, but on mines all over the western world – compete with China – and this is something we should think about very carefully, and work together to establish something sustainable and long-term, rather than a time-limited development. CanNor can go a long way to help the North develop a long-term economic base, rather than operating on a mine-by-mine basis.



Chief Steven Nitah

A stable resource agreement also needs to be finalized before we can head into more development, as an environment of uncertainty is not favorable for investors, developers or residents. The government of Canada collects taxes and royalties, and then doesn't invest much back into the North, so we all need to work together to put pressure on Canada to settle this issue. When developing the North, we should move slowly, and surely, and make sure we can mitigate impacts as much as possible so that the way of life of First Nations is not compromised.

**Chief Roy Fabien:** An issue I am looking at right now is that of the unions. During the Norman Wells pipeline construction, a lot of our people didn't get work because they couldn't get unionized. ITI is a workshop sponsor and is promoting economic development, and for Dene people, there are things our people aspire to, and oil and gas and mining aren't one of those things. The GNWT on one hand is

encouraging us to get involved in mining and industry, and on the other hand, because of the union issues, some of our companies have to close their doors because the GNWT is refusing to pay us what the unions demand. The main issue is meeting the demand of the union and the amount they wanted to be paid and still being able to competitively bid on the government contracts.

## 8. Introduction to Metal Mining Outputs

### *Concentrates and Waste Products: Malcolm Robb, Indian and Northern Affairs Canada*

Mr. Robb began by recognizing that a mine's number one output is cash flow. You generate that cash flow by mining and processing minerals or metals. Direct shipping is when you can take the rock out of the ground and send it directly to a client or consumer. Most mines, however, process the rock into a concentrate, which is a material that has been separated from the rock. Concentrate is generally sent to a processing facility for further refinement.

Tailings are what are left after the concentrate has been extracted from the parent rock. Tailings contain a mixture of the minerals or metals that could not be extracted, the compounds used for extraction, and any other waste products. Tailings can have some potential for future use, in regard to further extraction of metals. Some waste products can actually be put back underground, but it will never be the same as it was before blasting.

Another aspect of waste management at mines is access. Access to what is being mined results in the production of waste rock (material that is removed to access the mineral or metal). Often this waste rock is valuable as a source of aggregate for roads, construction, airstrips, etc.

There are also waste streams associated with communities at mine sites including food wastes, sewage, recyclables and garbage. There is also industrial waste, which includes reagents, chemicals, and other operational wastes.

## 9. Beyond the Concentrate: Value Added Opportunities

### *Processing: Dr. W. Gordon Bacon, KLE Consulting*

Dr. Bacon began his presentation by thanking the YKDFN for their invitation and their comments. He noted the value of the comments made by the Chiefs during the question and answer period and hoped they would be interested in his scientific information. He noted that the economic model for mining companies follows the premise of the bottom line – that is to say, profit is the main focus for a mine.

He stressed the importance of minerals in metal mining and that, with some exceptions, extracting minerals from ore is the primary goal. He gave an overview of the process for extracting minerals from ore and used the example of the Pine Point mine and its production of zinc concentrate.

Dr. Bacon also discussed extractive metallurgy, which is the process by which metals are extracted from minerals contained in the concentrate. He explained the two types of metallurgy: pyrometallurgy, and hydrometallurgy. Most metals are extracted by the former. Dr. Bacon then talked about cyanidation which is used to extract gold. The Giant Mine in Yellowknife, combined pyro- and hydro-metallurgy. What Giant



Mine failed to do was capture the waste products in a safe manner, and as a result, there is a large deposit of waste arsenic trioxide. There are new methods of processing that produce an environmentally neutral waste that will not harm animals or humans.

Dr. Bacon illustrated some of the processes for smelting and processing metals that are more environmentally sound as the waste products generated by these processes are either usable in other areas of industry or are environmentally neutral. He then presented a table that compared the two types of metallurgy processes in five areas; environmental effects, recovery, losses, economics, and safety:

*(see if you can get a copy of this table)*

Dr. Bacon then described some examples of two hydrometallurgy processes that have potential in the NWT: Pressure Leach to extract zinc, and Thiosulphate Leaching to recover gold. Both these processes are currently the most environmentally friendly way of extracting the respective metals. He then showed some diagrams of the processes involved in deciding whether or not to extract metals.

## 10. Opportunity Awareness and Project Readiness

### *GNWT ITI, INAC, and CanNor: Sonia Saunders, Tom Hoefer, and Kimberly Fairman*

Ms. Saunders stating how pleased she was with the workshop and the discussion that has occurred. She restated Mr. Pugsley's comments that this workshop is only the beginning of the discussion and that the GNWT is interested in working toward a sustainable and creative economic future for the NWT. There is a lot of potential in the value added industries associated with mining and minerals and the GNWT is leaving this workshop with a renewed sense of purpose. She concluded by thanking her co-sponsors and all the people who have worked behind the scenes to make this workshop a success.



*(L-R) Sonia Saunders, Tom Hoefer, and Kimberly*

Mr. Hoefer also thanked everyone for their participation in the workshop and for the presence of all the First Nations representatives who contributed to the conversation. He noted that as an inaugural workshop, this event has been a success and that future workshops will provide more opportunities for sharing and collaboration. Mr. Hoefer stated that it is the government's job to listen and work with people, and in future workshops, it would be good to have more First Nations representatives on the panels and as speakers. He noted that over the years the dynamic of the North has changed and future workshops could focus on how to move forward in new ways that are sustainable and satisfactory to all parties involved.

Ms. Fairman acknowledged all the valuable information that has been shared throughout the workshop and the connections that have been made by participants. She stressed that each community needs to be approached in a manner that addresses their interests and concerns. That was the impetus for this first workshop, to bring people together to discuss economic development initiatives, and it would be valuable

to build on that and bring other issues to the table in future workshops. CanNor looks at a workshop such as this as a venue for presenting information, but also for networking and making contacts with people who can assist in developing benefits agreements.

## 11. Workshop Acknowledgements

### *Closing statements: Chief Ted Tsetta, N'dilo*

Chief Tsetta acknowledged the hard work that had gone into the workshop and noted that turning it into an annual conference would be greatly beneficial. He talked about the change in approach by industry to engage First Nations and local residents. He mentioned his background in mining and how he used to work for companies to send resources south. He noted that now he works with First Nations to maintain a sustainable economy in the north.

Chief Tsetta restated the importance of establishing a post-secondary institution in the North to provide advanced education for First Nations and northerners that will enable them to be part of the growing northern economy.

We live on the land of our ancestors, and we have to pay the land, pay the water, for its use. We work with our elders and listen to our elders, and their legacy will remain. It is important to listen to our parents and to our youth. Youth are the future. If you work with industry, it can do a lot for you. The government can do a lot for you, but you have to work with them.



Chief Ted Tsetta

On behalf of the YKDFN, Chief Tsetta thanked the organizers, the key speakers, and others involved, and stated that he looks forward to the next workshop when everyone can come together and continue to cooperate.

### *Closing Prayer: Elder Judy Charlo*





## Appendix A: Agenda

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# Metal Mining Opportunities Workshop

March 30-31, 2010 • Dettah, Northwest Territories

## Agenda Day One – Tuesday, March 30, 2010

7:00 a.m. – 7:30 a.m.	Continental Breakfast at Yellowknife Super 8
7:45 a.m.	Workshop Shuttle Bus Departs Yellowknife Super 8
8:15 a.m. – 8:55 a.m.	Coffee and Registration
9:00 a.m. – 9:05 a.m.	Opening Prayer by Elder
9:05 a.m. – 9:10 a.m.	Welcome by YKDFN Chief
9:10 a.m. – 9:25 a.m.	Welcome from CanNor, Government of the Northwest Territories, Introductions, Acknowledgements, Objectives, Agenda
9:25 a.m. – 10:00 a.m.	1. Economic Opportunities and Industrial Economies Speaker A 25 Mins Dr. Michael Doggett Mining Advisor HanOcci Group Inc
Health Break 10:00 a.m. – 10:15 a.m.	
10:15 a.m. – noon	2. From Mine to Market: Zinc 101
Questions at the end of each section (5 mins)	Module A: <b>Zinc in the Global Marketplace</b> Speaker A: John Kearney 25 Mins Chairman and President Canadian Zinc Corporation
	Module B: <b>Zinc Mining Developments in the NWT</b>
	Speaker B: 25 Mins Wolf Schleiss VP Exploration Tamerlane Ventures Inc.
	Module C: <b>Capitalizing on Metal Mining Synergies</b>
	Speaker C: 25 Mins David Swisher VP Operations Avalon Rare Metals Inc.
Lunch Break noon – 1:00 p.m.	

1:00 p.m. – 3:45 p.m.

3. From Mine to Market: Rare Earths 101

Module A: **Global Demand and Outlook**

Speaker A: Dudley Kingsnorth (Video Message)  
25 Mins Executive Director,  
Industrial Minerals Company of Australia

Module B: **Introduction to Rare Metals in the NWT**

Speaker B: Dr. David Trueman  
25 Mins Consulting Geologist

Module C: **Northern Opportunity, National Implications**

Speaker C: Jack Lifton (Video Message)  
25 Mins Independent Consultant

Health Break

2:15 p.m. – 2:30 p.m.

Module D: **Rare Earth Elements: Processing/Manufacturing**

Speaker D: Dr. Bill Mercer  
25 Mins VP Exploration  
Avalon Rare Metals

Module E: **Rare Earth Applications: Products and Markets**

Speaker E: Dr. Gareth Hatch  
25 Mins Director of Technology  
Dexter Magnetic Technologies

3:45 p.m. – 4:35 p.m.

*Questions at the end of  
each section (5 mins)*

4. From Mine to Market: Cobalt, Bismuth and Gold 101

Module A: **Cobalt and Bismuth Mining and  
Processing in the NWT**

Speaker A: 25 Robin Goad  
Mins President, CEO and Director  
Fortune Minerals Ltd

Module B: **Gold Mining and Processing in the NWT**

Speaker B: Dave Webb  
25 Mins President, CEO and Director  
Tyhee Development Corporation

4:35 p.m. – 5:00 p.m.

*Questions at the end of  
each section (5 mins)*

5. Economic Opportunities and Industrial Realities

Panel A: **Introduction to Locational Analysis**

Panel Chair: John Kearney  
President  
NWT/Nunavut Chamber of Mines

Panelist A: Robin Goad  
President, CEO and Director  
Fortune Minerals Ltd

Panelist B:      Wolf Schleiss  
                         VP Exploration  
                         Tamerlane Ventures Inc.

Panelist C:      David Swisher  
                         VP Operations  
                         Avalon Rare Metals Inc.

Panelist D:      Dave Webb  
                         President, CEO and Director  
                         Tyhee Development Corporation

5:00 p.m.                      Day I Presentations Complete, Agenda and Transportation Review

5:10 p.m. – 5:35 p.m.      Community Walking Tour

5:45 p.m. – 7:30 p.m.      Cultural Events / Feast

7:30 p.m.                      Workshop Shuttle Bus Departs Conference Centre

# Metal Mining Opportunities Workshop

March 30-31, 2010 • Dettah, Northwest Territories

## Agenda Day Two – Wednesday, March 31, 2010

- 7:00 a.m. – 7:30 a.m. Continental Breakfast and Check-Out at Super 8
- 7:45 a.m. Workshop Shuttle Bus Departs Yellowknife Super 8
- 8:15 a.m. – 8:55 a.m. Coffee and Networking / Drop Luggage in Storage Area
- 9:00 a.m. – 9:10 a.m. Facilitator: Recap of Day 1, Introduction to Day 2 and “Information Items”
- 9:10 a.m. – 9:35 a.m. 6. Citizen’s Guide to Mining in the Northwest Territories
- Information Item 1 / With Presentation By:**  
Tom Hoefer, Director of Minerals & Petroleum, INAC
- 9:35 a.m. – noon 7. Introduction to Metal Mining Inputs
- Inputs Module I: Goods and Services (20 Mins)
- Information Items 2-3 / With Presentation By:**  
Mike Vaydik, Executive Director, NWT/Nunavut Chamber of Mines
- Inputs Module II: Energy Sources and Uses (40 Mins)
- Information Items 4-7 / With Presentations By:**  
Dave Nightingale, GNWT – Industry, Tourism and Investment  
Jim Sparling, GNWT – Environment and Natural Resources  
Leon Courneya, Northwest Territories Power Corporation
- Health Break  
10:35 a.m. – 10:45 a.m.
- Inputs Module III: Transportation (45 Mins)
- Information Items 8-15 / With Presentations By:**  
Mark Kimakowich, CN Rail  
Martin Landry, Northern Transportation Company Ltd.  
David Wasylciw, Department of Transportation
- Inputs Module IV: Labour (30 Mins)
- Information Items 16-18 / With Presentation By:**  
Hilary Jones, Northwest Territories Mine Training Society
- Lunch Break  
noon – 1:00 p.m.
- Inputs Module V: Limestone and Sulphur (30 Mins)
- Afternoon Session  
Begins 1:00 p.m.
- Information Items 19-21 / With Presentation By:**  
Dave Watson, Northwest Territories Geoscience Office

1:30 p.m. – 1:50 p.m. <i>Questions at the end of each section (5 mins)</i>	<b>8. Introduction to Metal Mining Outputs</b> <u><i>Outputs Module I: Waste Products (10 Mins)</i></u> <b>Information Items 22-23 / With Presentation By:</b> Various Sources  <u><i>Outputs Module II: Concentrate (10 Mins)</i></u> <b>Information Items 24-25 / With Presentation By:</b> Various Sources
1:50 p.m. – 2:40 p.m.	<b>9. Beyond the Concentrate: Value Added Opportunities</b> <u><i>Value Added Module I: Processing (30 Mins)</i></u> <b>Information Items 26-29 / With Presentation By:</b> Dr. Wm. Gordon Bacon, KLE Consulting
Health Break 2:15 p.m. – 2:30 p.m.	<u><i>Value Added Module I: Manufacturing (20 Mins)</i></u> <b>Information Items 30-31 / With Presentation By:</b> Various Sources
3:00 p.m. – 3:20 p.m.	<b>10. Opportunity Awareness and Project Readiness</b> Canadian Northern Economic Development Agency Indian and Northern Affairs Canada GNWT, Department of Industry, Tourism & Investment
3:20 p.m. – 3:25 p.m.	CanNor – Acknowledgements
3:25 p.m. – 3:30 p.m.	Closing Prayer
3:30 p.m. – 3:55 p.m.	Feedback Forms / Travel Claim Forms
4:00 p.m.	Buses Leave Conference Centre for Airport



## Appendix B: Participants List

Last Name	First Name	Title	Organization
Amos	Harry		Prolog
Antoine	Don	Diavik Participation Agreement Representative	Yellowknives Dene First Nation
Auger	Elaine		K'atl'odeeche First Nation
Bacon	William Gordon	Principal	KLE Consulting
Balsillie	Greg	Councilor	Deninu K'ue First Nation
Bannon	Peter	Chairperson	Mackenzie Valley Environmental Impact Review Board
Barichello	Jeff		GNWT - Bureau of Statistics
Barichello	Jeff		
Basil	Alison		Lutsel K'e Dene First Nation
Beaudin	Alex		MACA
Beaulieu	Daryl		Northern Aboriginal Business Association
Beaulieu Sr.	Leonard	Councilor	Hamlet of Fort Resolution
Beck	Trevor	Member	Hay River Métis Council
Bisaro	Wendy	MLA - Frame Lake	Northwest Territories Legislative Assembly
Biscaye	Anne	Translator	
Bohnet	Darryl	Vice-Chairperson	Mackenzie Valley Environmental Impact Review Board
Boland	Kells		Prolog
Bonhomme	Erica	Environmental Scientist	INAC
Boucher	Albert		Lutsel K'e Dene First Nation
Bouvier	Mary Louise	Translator	
Buist	John		GNWT - ITI North Slave
Camsell	Shawn		Tłı̨chǫ Government
Camsell-Blondin	Violet	Chairperson	Wek'eezhii Land and Water Board
Cardinal	Lloyd		Fort Resolution Métis Council
Cartwright	Adrienne		Terriplan
Casaway	Marc	Translator	
Catholique	Shonto		Lutsel K'e Dene First Nation
Catholique	Bertha	Translator	
Catholique	Florence	Translator	Lutsel K'e Dene First Nation
Charlo	Angela		Yellowknives Dene First Nation
Coe	Charlene		INAC



<b>Last Name</b>	<b>First Name</b>	<b>Title</b>	<b>Organization</b>
Collins	Lona		Bottomline Event Planning
Connelly	David	Principal	Ile Royale Enterprises
Constant	Philip	Translator	
Courneya	Leon	Presiden & CEO	Northwest Territories Power Corporation
Covello	Lou		NWT/Nunavut Chamber of Mines
Dean	Don		Prolog
Delorme	Tyler		Fort Resolution Métis Council
Dinsdale	Wilson	Energy, Mines and Petroleum Advisor	GNWT
Doan	Doug	ADM	GNWT - ITI
Doan	Doug	ADM	GNWT - ITI
Doggett	Michael	Dr.	HanOcci Group Inc.
Doherty	Bob	President	NWT Construction Association
Drygeese	David	Community Member	Yellowknives Dene First Nation
Drygeese	Dennis	Translator	
Duggar	Manik	Policy Advisor	Mackenzie Valley Land and Water Board
Ellison	Bob		MACA
Enzoe	Terri		Lutsel K'e Dene First Nation
Erasmus	Roy	CEO	Deton'Cho Corporation
Fabian	Roy	Chief	K'atl'odeeche First Nation
Falvo	Paul	Councilor	City of Yellowknife
Football	Celine	Translator	
Fowler	Alita		CanNor
Froehlich	Dustin	Member	Hay River Métis Council
Gargan	Sarah	Translator	
Gaulton	Barry	Board Member	NWT Construction Association
Goad	Robin	President	Fortune Minerals Ltd.
Goodin	Josey		Trinity Helicopters
Gordon	Valerie	Mineral Dev. Advisor	INAC - MPRD
Grandjambe	Dora		
Guild	Travis		Fort Resolution Métis Council
Hanna	Tia		Terriplan
Hatch	Gareth	Dr.	Dexter Magnetic Technologies
Heron	Allan	Board Member	Fort Smith Métis Council
Hobart	Jane	Mayor	Town of Fort Smith
Hoefer	Tom	Director	INAC
Hunter	Tammy		Fort Resolution Métis Council
Hurst	Ricki		Terriplan
Huskey	Peter	Translator	
Impett	Stu		Deton'Cho Ltd.

<b>Last Name</b>	<b>First Name</b>	<b>Title</b>	<b>Organization</b>
Inglis	Dave		GNWT - ITI
Jaque	Don	President	Fort Smith Chamber of Commerce
Jones	Ray	Director	North Slave Métis Alliance
Jones	George E.	Elder	North Slave Métis Alliance
Jones	Hilary	General Manager	NWT Mine Training Society
Jorge	Manuel	Vice-President	Energy Wall
Kearney	John	President	Canadian Zinc Corporation NWT/Nunavut Chamber of Mines
Kenny	Tom	CEO	RTL, Robinsons' Enterprises Ltd.
Kimakowich	Mark		CN Rail
Knott	Bruce		Consultant
Koe	Fred	Board Member	Mackenzie Valley Environmental Impact Review Board
Kolausok	Edwin		Consultant
Kurszewski	George	Director	Fort Smith Métis Council
Lafleur	Jennifer		K'atl'odeeche First Nation
Lakhani	Altof		CanNor
Landry	Martin		Northern Transportation Company Ltd.
Lantz	Angie		Lutsel K'e Dene First Nation
Lennie-Misgeld	Peter	Manager, Advancement	NT Hydro Corporation
Liske	Eileen	Councilor	Yellowknives Dene First Nation
Liske	Ernie		Yellowknives Dene First Nation
Liske	Phillip		
Lobb	Garry	Member	Hay River Métis Council
Mackenzie	George		Wek'eezhii Land and Water Board
Mackenzie	Violet	Translator	
MacPherson	Calum		GNWT - ITI
Mageean	Mike	Manager	GNWT - ITI
Maher	Mike	Deputy Mayor	Town of Hay River
Mallon	Amanda	Councilor	City of Yellowknife
Marlowe	Trevor		Lutsel K'e Dene First Nation
Martin	Berna		
Mathesson	Debbie		CanNor
McCormick	Kevin		Terriplan
McKay	Angela	Councilor	Deninu K'ue First Nation
McLeod	Warren		Yellowknife Chamber of Commerce
McLeod	Bob	Minister	Northwest Territories Legislative Assembly
McPherson	Callum		
Mercer	Bill	Dr.	Avalon Rare Metals Inc.

<b>Last Name</b>	<b>First Name</b>	<b>Title</b>	<b>Organization</b>
Mercredi	Paul	Staff Member	Mackenzie Valley Environmental Impact Review Board
Miller	Rick	Business Dev. Manager	Deton'Cho Corporation
Minute	Bernie	Councilor	Town of Fort Smith
Moon Son	Phil	Executive Director	NWT Construction Association
Mossman	Matt		Deton'Cho Logistics
Munroe	Sunny	Staff Member	Mackenzie Valley Environmental Impact Review Board
Naidoo	Neela		CanNor
Nevitt	Zabey	Executive Director	Mackenzie Valley Land and Water Board
Nightingale	Dave	Director	GNWT - ITI
Nitah	Steven	Chief	Lutsel K'e Dene First Nation
Nitsiza	Dolphus	Mine Liaison Coordinator	Tlicho Government
Nitsiza	Mike		Wek'eezhii Land and Water Board
Norn	Ken		K'atl'odeeche First Nation
Olson	Mike	Director of Sales - Western Region	First Air
Ootes	Luke		GNWT - ITI
Paivalainen	Jari		CanNor
Parker	Chuck		Discovery Air
Paulette	Samson		Smith Landing First Nation
Pierrot	Dave	Councilor	Deninu K'ue First Nation
Pilgrim	Thom	General Manager	Arctic Sunwest Charters
Potts	Gary	Specialists	INAC
Pugsley	James	Aboriginal Economic Development	CanNor
Ramsay	David	MLA - Kam Lake	Northwest Territories Legislative Assembly
Robb	Malcolm	Manager	INAC
Rowe	Jack	President	Rowe's Construction
Sangris	Edward	Chief	Yellowknives Dene First Nation (Dettah)
Sanspariel	Noonee	Councilor	Yellowknives Dene First Nation
Sauders	Sonya	Director	GNWT - ITI
Sayine	Robert	Councilor	Deninu K'ue First Nation
Scheiss	Wolf	Vice President	Tamerlane Ventures Inc.
Simpson	Jessica	Staff Member	Mackenzie Valley Environmental Impact Review Board
Sparling	Jim	Manager, Climate Change Programs	GNWT - ENR
St. Denis	Tracy		GNWT
Stevens	Jim	Director	GNWT - Transportation
Sunberg	Maryrose	Translator	

<b>Last Name</b>	<b>First Name</b>	<b>Title</b>	<b>Organization</b>
Swisher	David	VP Operations	Avalon Rare Metals Inc.
Tourangeau	Robert		Smith Landing First Nation
Trueman	David	Dr.	Consulting Geologist
Tsetta	Ted	Chief	Yellowknives Dene First Nation (N'dilo)
Umpleby	Anne	Regulatory Manager	Mackenzie Valley Land and Water Board
Vaydik	Mike	Executive Director	NWT/Nunavut Chamber of Mines
Vician	Peter		GNWT - ITI
Villebrun	Nolleen		Construction & General Workers Union, local 92
Wah-Shee	James	Board Member	Mackenzie Valley Environmental Impact Review Board
Washie	Leonard		Tlicho Government
Wasyliciw	David		
Watson	Dave		NWT Geoscience Office
Westman	Dan		GNWT - ITI
Wheaton	Larry	Vice President	RTL, Robinsons' Enterprises Ltd.
Wifladt	Alice	Translator	
Zoe-Chocolate	Camilia		Wek'eezhii Land and Water Board
		Member	Northern Air Transport Association
	Jessica		CanNor
	Petra		CanNor
Saunders	Emily		Lutsel K'e Dene First Nation