2014

Nunavut Mining Hiring Requirements and Available Talent Forecasts

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Yukon Hiring Requirements and Available Talent Forecasts: Mineral Exploration, Mining, and Support Services

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2014

Northwest Territories Mining Hiring Requirements and Available Talent Forecasts

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SOURCE: THE MINE TRAINING SOCIETY

Northwest Territories Education, Culture and Employment

Northern Territories Mining Hiring Requirements and Available Talent Forecasts:
An Overview of Canada's Three Territories

Nunavut

Mine Training Society
NORTHWEST TERRITORIES

Northwest Territories Education, Culture and Employment

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Research was conducted by

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Prepared for and in partnership with the Government of the Northwest Territories (GNWT), the Government of Nunavut (GN), the Government of Yukon and the Mine Training Society (MTS), with support from the Canadian Northern Economic Development Agency (CanNor)

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Introduction

The mining industry has established itself as an integral source of employment and economic development in Canada's three northern territories. Over the last decade, the territories have witnessed significant mining development, including a number mining operations, advanced development projects and exploration projects. While each territory's mining industry has unique characteristics, in all cases, there is an opportunity for future mining development, especially as many parts of the north remain untapped and undeveloped. There is also anticipation that mining development will continue to bring economic opportunities for the territories. Yet, the territories will need to attract, develop and retain a skilled workforce in order to maximize the potential opportunities moving forward.

This report builds on three territorial reports previously produced by MiHR: *The Yukon Hiring Requirements and Available Talent Forecasts: Mineral Exploration, Mining, and Support Services (2013)*, the *Northwest Territories Mining Hiring Requirements and Available Talent Forecasts (2014)*, and the *Nunavut Mining Hiring Requirements and Available Talent Forecasts (2014)*. MiHR has gathered the key findings from the territorial reports into one report that focuses on the mining labour market in Canada's North. The report also provides a unified forecast for the Northern Canada mining industry, based on the forecasts developed for Yukon, the NWT and Nunavut. This analysis summarizes the key trends in the North, the unique trends in each territory, and includes a summary of key observations derived from MiHR's research on the North.

SOURCE: THE MINE TRAINING SOCIETY

This report is intended to provide the basis for discussions among the key stakeholders (i.e., territorial governments, employers and educators) across the three northern territories. The Pan Northern research provides a reference for comparing mining trends across the territories – allowing the identification of common themes as well as those that are specific to each territory. The insights from this research can be used to inform collaborative partnerships among the three northern territories to address common mining human resource (HR) challenges in the Northern mining labour market. Hereafter, the three territories collectively are referred to as 'the North.' The report frequently refers to the mining industry in the North as 'the Northern mining industry' and forecasts for the North as 'Northern forecasts', etc.

About the Report

The Mining Industry Human Resources Council (MiHR) has prepared this report in partnership with the Government of the Northwest Territories (GNWT), the Government of Nunavut (GN), the Government of Yukon and the Northwest Territories Mine Training Society (MTS), with support from the Canadian Northern Economic Development Agency (CanNor). The report is an amalgamation of three territorial reports produced by the Mining Industry Human Resources Council (MiHR):

- The *Yukon Hiring Requirements and Available Talent Forecasts: Mineral Exploration, Mining, and Support Services (2013)* was prepared in partnership with Derome and Associates for the Government of Yukon to augment the feasibility work completed for the Centre for Northern Innovation in Mining (CNIM) at Yukon College.

- The *Northwest Territories Mining Hiring Requirements and Available Talent Forecasts (2014)* was prepared in partnership with the Government of the Northwest Territories (GNWT) and the Mine Training Society (MTS), with support from the Canadian Northern Economic Development Agency (CanNor).

- The *Nunavut Mining Hiring Requirements and Available Talent Forecasts (2014)* was prepared in partnership with the Government of Nunavut and with support from the Canadian Northern Economic Development Agency (CanNor).

In order to develop a broader understanding of the North's labour market pressures, and provide perspective for each territorial report, this analysis includes MiHR's forecasts for 'the North' (encompassing the three territories combined) as well as highlighting the differences amongst the three individual territorial forecasts.

In preparing this report, MiHR developed forecasts of hiring requirements and available talent for the Northern mining industry over a 10-year horizon (2014-2024). The projected gaps between hiring requirements and available talent are analyzed for a select group of occupations relevant to the Northern mining industry. The data and analysis is then used to compare and contrast the situation across the three territories and to present an informed commentary intended to provide a basis for pan-territorial discussions and strategy development.

The economic data and labour market analysis in this report is organized under the following main headings, which highlight MiHR's observations gleaned from the three territorial reports and from the pan-North analysis:

1) Distinct geologies and commodity mixes
2) Different stages of mining development
3) Comparatively young workforce
4) Under-supply of prepared local workers
5) Engagement with Aboriginal Communities and workforce diversity
6) Dependence on a "Commuter Workforce"
7) Hiring Requirements, Available Talent and Occupational gaps
8) Unique skills requirements by territory

Distinct Geologies and Unique Commodity Mixes

The North is host to a variety of mineral resources. Figure 1 provides a breakdown of the value of minerals produced in 2013 for each territory as well as all three territories combined. Each territory has a unique commodity mix: Yukon's mineral production is made up of gold, silver, copper and zinc; the NWT's mineral production is dominated by the extraction of diamonds with some tungsten production; the majority of the Nunavut's mineral production is gold. These region specific commodity-mixes are integral to understanding the unique characteristics of each territory's specific mining industry and labour market requirements.

Figure 1 also illustrates how regional mineral production is linked to the overall picture in the North. Diamonds and gold make up the largest share of mineral production value followed by copper, silver, tungsten, zinc and other minerals.[1]

Figure 1 – The Percentage Breakdown of Mineral Production Values, by Commodity, in the Territories' Mining Industry, 2013
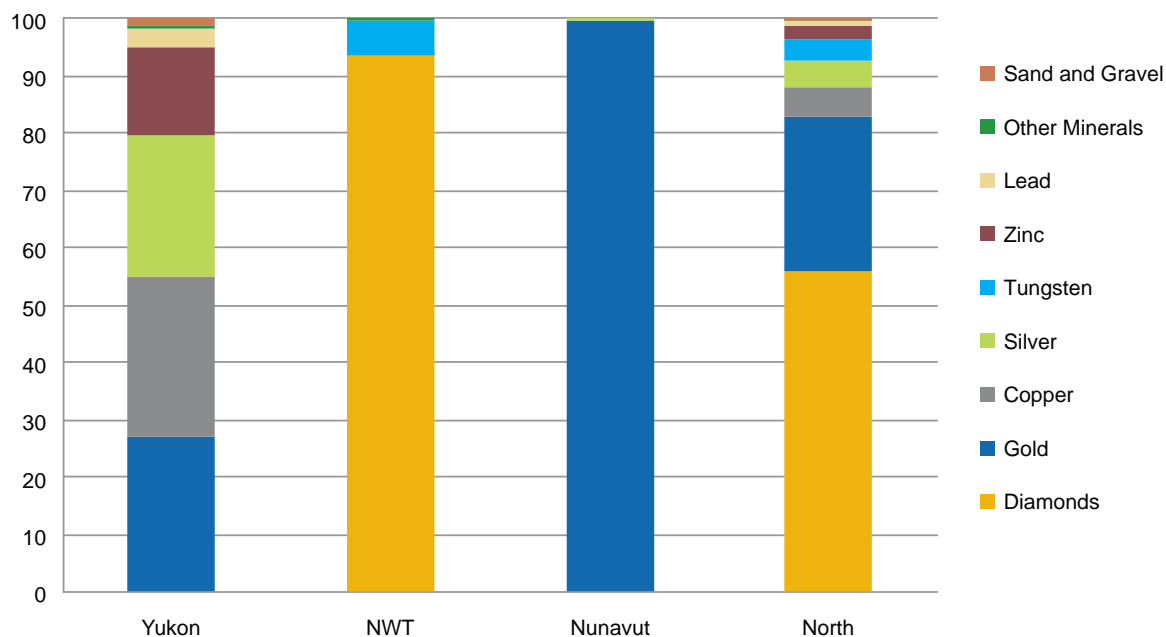
Source: Natural Resources Canada; Mining Industry Human Resources Council, 2014

Each territory's unique mix of mineral deposits results in different economic drivers, customers and marketplaces, which can impact mining development and labour force requirements. Each territory's mining industry is vulnerable to global economic challenges and may face unique challenges depending upon the future outlook for specific commodities.

Commodity prices are one of the key determinants of production levels, mining exploration activity and of the viability of new mining development in a given region. MiHR has found a positive

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1   Note that Figure 1 is only focused on mineral production; if mineral exploration is also taken into account, each territory's mining industry involves a broader portfolio of mineral resources that extend beyond the minerals currently produced.

correlation between commodity price movements and mining employment and these trends are indicators of future employment trends.

Figure 2 illustrates the historical and forecasted price indices for notable minerals that are relevant to the Northern mining industry (i.e., gold, iron, silver, zinc, diamonds and copper). Increased demand from emerging global economies has elevated commodity prices in the years leading up to 2011. Still, sluggish global economic growth, in addition to financial market uncertainty has weakened commodity prices since 2012.

Projections of future diamond prices have a relatively optimistic view. According to Bain & Company's 2013 Global Diamond Report [2], the demand for rough diamonds is expected to grow over the next decade, particularly as the emerging middle class in China and India increase their demand for luxury goods. With increasing global demand and existing global deposits becoming exhausted, diamond prices are anticipated to increase steadily over the next decade. The forecasted price movements for other commodity prices (e.g., other precious metals and base metals) are not as optimistic. According to World Bank commodity forecasts for a number of minerals, a slight downward trend is expected to continue over the forecast horizon (shown in Figure 2), though mineral prices are expected to stay high by historical standards.

Figure 2 – Forecasted Price Indices for Mineral Commodities
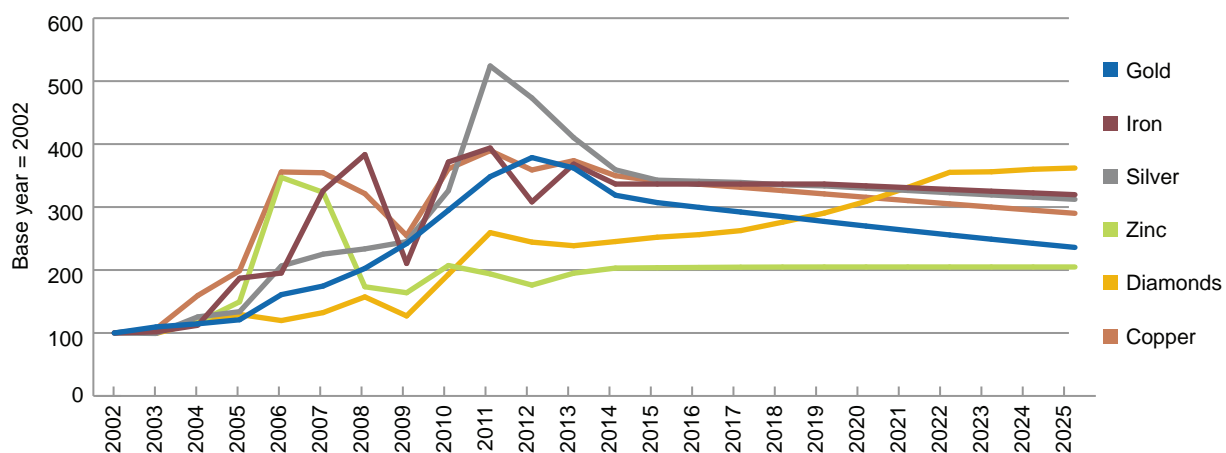
Source: Mining Industry Human Resources Council, 2014
*The diamond forecast is built on a monthly forecast with a base of January 2004.

Note that this commodity outlook has been updated from previous forecasts that predicted a period of downward price adjustment with a modest steady increase thereafter. The recent adjustments to this outlook highlight the uncertainty in the outer limits of the forecast horizon. MiHR's expectation of commodity prices is aligned with the World Bank forecasts, which tend to be conservative estimates.

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2 Bain and Company, Global Diamond Report, 2013

Different Phases of Mining Development

The mining industry is made up of a wide range of activities from exploration to reclamation; each plays a role in the entire process – from discovering and extracting minerals to delivering them to an end user, or for further processing down the line. MiHR's definition of the mining industry groups these activities into defined sectors (i.e. exploration, extraction, support activities and mineral processing) that span the entire timeline of the process (referred to as the 'mining cycle'). For a given territory, understanding which activities/sectors are more active at any point in time can offer a better understanding of that region's mining industry as a whole and its relative position in the mining cycle. In turn, this information helps to inform expectations about current and anticipated labour market pressures.

The level of exploration expenditures in the mining industry is a strong indicator of current and upcoming mining development. Over the last decade, there has been significant investment in Northern mining and exploration activities. Yet, as Figure 3 shows, exploration and deposit appraisal expenditures in each territory experienced a surge that peaked in 2011 but has since fallen steadily with every year to 2014. The slower moving exploration sector is attributed to an uncertain global economy, a cautious investment community and a weakened outlook for many commodity prices. In spite of these trends, the demand for a number of commodities – especially from emerging economies – is anticipated to be strong.

Figure 3 – Value of Mineral Exploration and Deposit Appraisal Expenditures, Northern Territories, 2009 to 2014
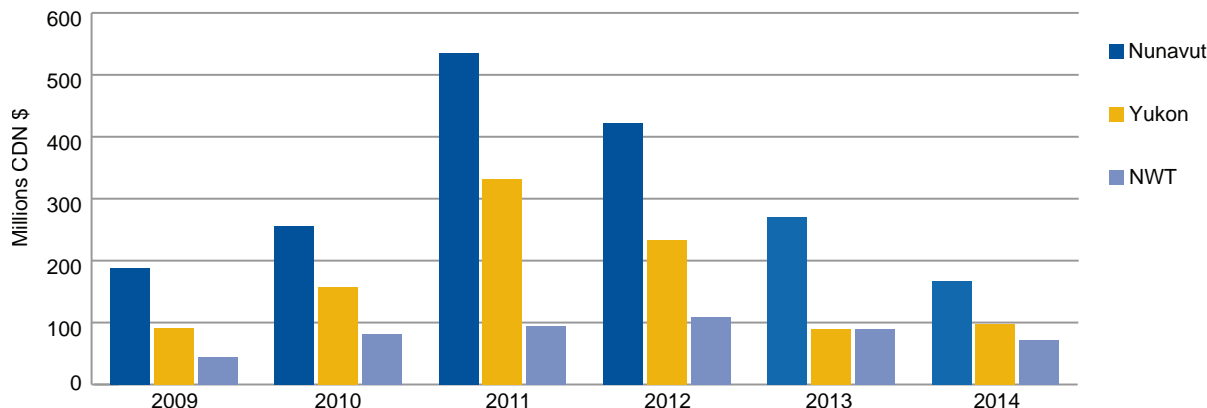
Source: Natural Resources Canada; Mining Industry Human Resources Council, 2014

As illustrated in Figure 3, annual exploration spending levels vary between the territories. Expenditures in Nunavut's mineral exploration sector are notably large, with approximately 11 per cent of Canada's overall exploration spending in 2012 (the fourth largest in the country).[3] Spending in Yukon's exploration sector is also shown to be significant. However, recent exploration efforts have slowed in Nunavut and Yukon. In contrast, spending in the NWT's exploration sector has remained comparatively stable and subdued – a pattern that is consistent with an established mining industry in a relatively matured phase of development. Notwithstanding, there are significant exploration activities associated with the expansion of existing operating sites. Still, reluctance from the investment community also presents challenges for many junior companies looking to fund their exploration activities in the territory.

Capital spending is another indicator of current and upcoming mining development. Compared to spending in exploration, capital expenditures reveal a different pattern for each territory's mining industry. According to Industry Canada statistics, capital expenditures in the NWT's mining industry were the highest of the territories at about $905 million in 2013; in Nunavut's mining industry capital spending was roughly $545 million; and Yukon's mining industry was roughly $260 million. This result is not surprising given the level of mineral production in the NWT is substantial. Note that annual information on capital spending is not available in all years for all territories as the data was suppressed by Industry Canada to maintain anonymity of individual producers.

The mining industry's investments at each phase of the mining cycle illustrates its use of resources, its current stage of maturity and its potential future developments – all of which inform labour market needs and projections.

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3 See NRCan's estimation of exploration and deposit appraisal expenditures.

Figure 4 shows the relative size of the workforce employed in different stages of the mining cycle in the three territories, the North and Canada in 2013. These estimates are based on data from Statistics Canada 2011 National Household Survey, MiHR's surveys of employers and various other data sources used to shape an estimate of employment in each stage (i.e., exploration spending, number and type of projects, organizational sizes and comparison with similar data in other regions). The mining sectors shown in Figure 4 (and throughout this report) follow the North American Industry Classification System (NAICS), commonly used to define industry sectors. A detailed description is in Appendix C.

The mix of mining activities in the North is comparable to that of Canada overall, though Canada includes a substantial amount of mineral processing/fabrication activities. Note that the mineral processing/fabrication sector – under MiHR's definition of the mining industry – is not included in the analysis and forecasts given below as the sector is minimal in the three territories. The majority of employment in the NWT's mining industry is in mineral extraction, whereas mineral exploration and mining support services are shown to be more prominent in Yukon and Nunavut. A higher concentration of employment in exploration is indication of an industry that generally exists in an earlier phase of the mining cycle.

Figure 4 – Employment in Mining Sectors, Canada and Northern Territories, 2013
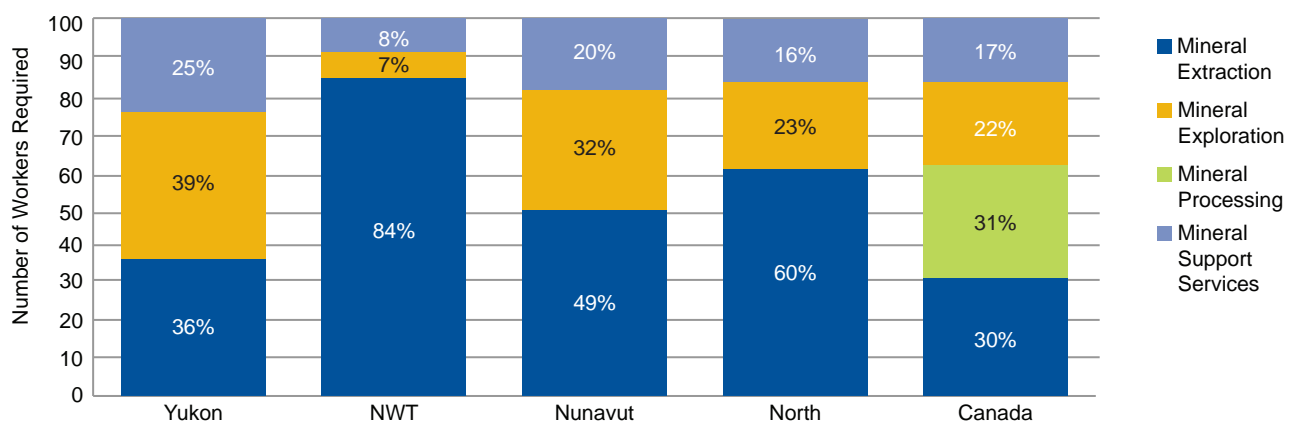
Source: Mining Industry Human Resources Council, 2014

Each territory supports a unique variety of mining activities. Factors such as sector-level employment, exploration and capital spending indicate that each territory is in a distinct stage of the mining cycle – with each reflecting unique activities, spending behaviour and use of industry resources. As a whole, the Northern industry is characterised as in the early stages of development, but still with a sizable percentage of mineral production activities. An understanding of the current mining landscape provides the appropriate context for the labour market forecasts provided in this report.

A Comparatively Young Workforce

Until recently, compared to other industries in Canada, the mining labour force has been relatively older and has attracted fewer younger people.[4] Across the northern territories, however, the resident mining labour force exhibits the opposite pattern: As shown in Figure 5, a higher proportion of the labour force is younger (i.e. 15 to 34 years of age) while a lower proportion is older. Therefore, the impact of an aging population, which is characteristic to Canada's mining labour market, does not appear to be as pronounced in the North.

Figure 5 – Age Profile of the Resident Mining Labour Force,
Canada and Northern Territories, 2011
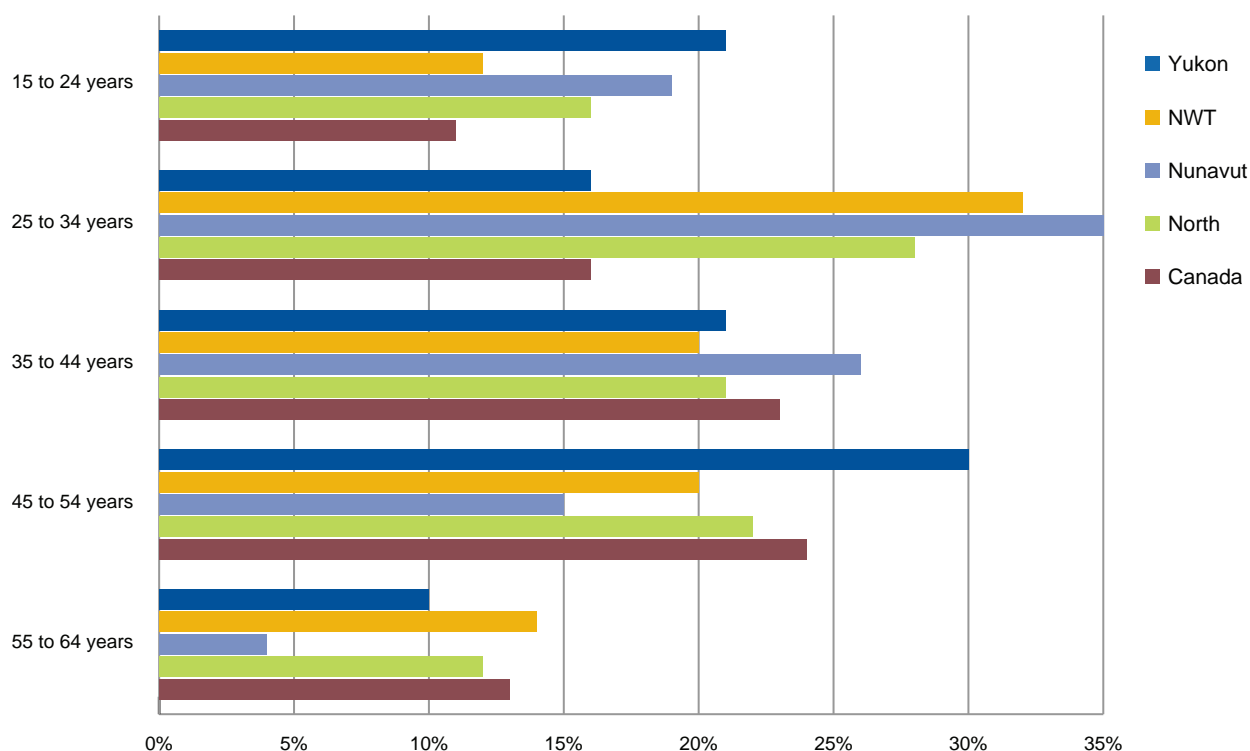
Source: Mining Industry Human Resources Council, 2014

The population in the North is amongst the youngest in Canada: Nunavut's overall population is very young with the lowest median age in the country at 25 years in 2013 according to Statistics Canada. The NWT has the second youngest population with a median age of 33 years, while Yukon has the sixth youngest population with a median age of 39 years in 2013. By comparison, Canada's median age was 40 years in 2013. The territories' young population is a potential advantage because it could, with the right opportunities for training/education and industry experience, reduce the impact of retirement and provide the resident labour pool with career opportunities.

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4   Mining industry Human Resources Council (MiHR), *Canadian Mining Industry Employment, Hiring Requirements and Available Talent 10-year Outlook, 2013.*

Each territory also displays unique age profile characteristics: in Yukon, there is noticeable drop in the 25 to 34 year olds age category and an increased proportion of 45 to 54 year olds. This pattern may be a reflection of commuting workers, leading to a lower number of 25 to 34 year olds residing in the territory. Nunavut's mining labour force exhibits a much higher proportion of younger people (i.e. 15 to 34 years of age) and a lower proportion of older people compared to other territories and Canada. The NWT also displays a relatively high proportion of younger people and relatively fewer older people, and a subtle decline in 35 to 44 year olds compared to the previous age cohort (25 to 34 year old).

Under-supply of Prepared Local Workers

Mining employers have been challenged with limited access to segments of the local population in the North, leading to a diminished number of local labour force participants. Labour force participation is especially low in Nunavut where over thirty-five per cent of the total population are classified as "not in the labour force". This situation is even worse among Inuit people, with more than 42 per cent of the resident population not participating in the labour force.[5]

MiHR's research has found that educational attainment has a profound impact on the labour force participation and employment outcomes of the working-age population (i.e., those aged 15 to 65 years old). Labour force data from Statistics Canada shows that, in the three territories, employment opportunities flow to those with advanced education levels. Northerners with advanced education realize much higher participation and employment rates compared to their counterparts in the rest of Canada. Working-aged people with the least education are also the least likely to participate in the labour force, and those that do participate are less likely to be employed.

Gaps in educational attainment present challenges to mining stakeholders (i.e., territorial governments, employers and education / training providers) looking to establish a healthy local supply of skilled workers. As a result, mining employers in the North often turn to non-resident workers, especially when there are regional differences in certain types of training and an acute need for skilled workers exists. The key challenge for mining stakeholders is to ensure they can continue to align the skills of their labour pool with the skills needed by the industry. Educational attainment gaps also present an opportunity for mining stakeholders to prepare the local labour force for positions that are high in demand.

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5 Note that labour force participants are defined as those who are employed plus those who are unemployed but actively looking for work.

Figure 6 compares the educational attainment in Canada's mining labour force and the three territories. Note that, due to the suppression of some of the data, Nunavut presents the educational attainment profile for the entire labour force, whereas the other regions are focused in the mining labour force. The share of residents without a certificate, diploma or a university degree is higher in the territories compared to the rest of Canada, whereas the share of persons with a university degree is lower compared to Canada.

Figure 6 – Highest Level of Educational Attainment in the Resident Mining labour Force, Canada and Northern Territories, 2011
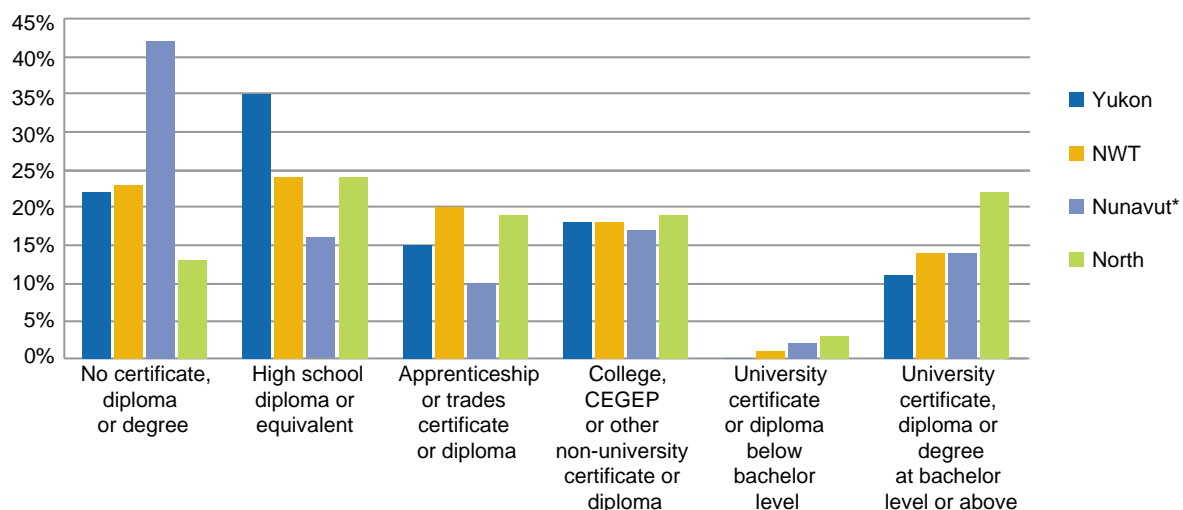
Source: Mining Industry Human Resources Council, 2014
* Nunavut provides the educational attainment of all industries, whereas the other territories and Canada are shown for the mining industry only.

There are also some notable differences among the educational profiles across the three territories; Yukon has a relatively high portion of high school graduates, whereas Nunavut has a relatively high portion of people with no certificate, diploma or a university degree (Note that the profile for Nunavut is for all industries). The NWT's education profile more closely resembles that of Canada for a few educational categories, namely those with a high school diploma or equivalent, apprenticeship/trades certificate or a college certificate.

Aboriginal Peoples and the Northern Mining Industry

In addition to being a major segment of the population in the North, Aboriginal peoples are an integral part of the labour force throughout the territories. The mining industry, in particular, significantly depends on their participation. As Figure 7 demonstrates, Aboriginal peoples represent a higher share of the resident mining labour force compared to other industries in the territories and Canada.

Figure 7 also shows that the share of Aboriginal People in the labour force generally corresponds with the Aboriginal population. Nunavut has a high portion of Inuit in its population and an even higher portion in the mining labour force, suggesting a relatively strong participation among Inuit peoples in Nunavut's mining industry. Yukon displays a pattern similar to Nunavut's, though Aboriginal peoples account for a comparatively lower share of Yukon's population. The NWT is the only region shown in Figure 7 where Aboriginal peoples are less represented in the mining labour force than in the population as a whole. Therefore an opportunity exists to better engage, train and develop the region's Aboriginal labour force, especially given the current dependence on the commuter workforce for a number of skilled workers.

Figure 7 – Aboriginal Participation in Mining, Canada and Northern Territories, Resident Labour Forces, 2011
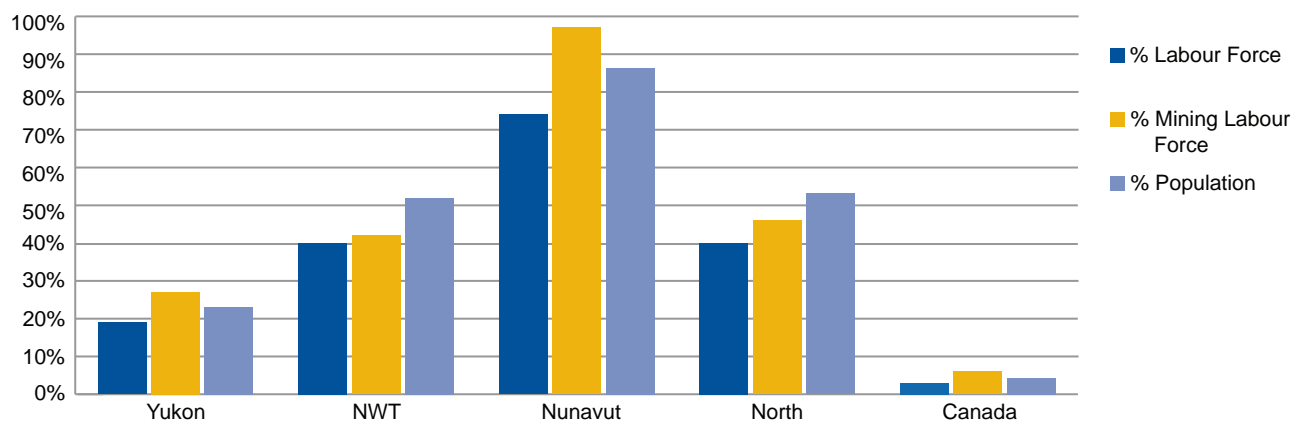
Source: Mining Industry Human Resources Council, 2014

A significant proportion of Aboriginal peoples in the North do not participate in the labour force. Figure 8 shows the labour market outcomes of Aboriginal peoples and Non-Aboriginal peoples in the North. The figure highlights the importance of reducing barriers to Aboriginal peoples' labour force participation thereby increasing access by employers to a larger share of local populations and improving opportunities for employment among Aboriginal peoples in the North.

The low participation rate among Northern Aboriginal peoples is also related to educational attainment. As discussed in the previous section, those with lower educational attainment are less likely to participate in the Northern labour force, while those with higher education attainment are almost assured to be in the labour force. This pattern extends to the Aboriginal population and is compounded by the number of Aboriginal peoples with no certificate, diploma or university degree. For example, according to data from the NWT Bureau of Statistics (2009 Community Survey), there

are more Aboriginal peoples in the NWT with less than grade 9 education (17.8 per cent) than Non-Aboriginal people (1.8 per cent).In addition, the share of Aboriginal peoples with no high school diploma is also relatively high (32 per cent) compared to Non-Aboriginal peoples (10.3 per cent).

Yet, regardless of ethnicity, the participation rate in NWT is found to be fairly similar among those with similar education. The 2009 Community Survey data also shows that Aboriginal and Non-Aboriginal peoples with a university degree have participation rates of 90.8 per cent and 93.5 per cent respectively – at the same time, Aboriginal and Non-Aboriginal peoples with less than grade 9 education have participation rates of 32.4 per cent and 33.2 per cent respectively. This indicates that education level is a major determinant of labour market outcomes for both Aboriginal and Non-Aboriginal peoples. On the other hand, it is important to note that the unemployment rate is noticeably higher for Aboriginal peoples with various levels of educational attainment, as reported by the NWT Bureau of Statistics (2009 Community Survey).

Figure 8 – Labour Market Outcomes for Aboriginal Peoples and Non-Aboriginal Peoples in the North, 2011
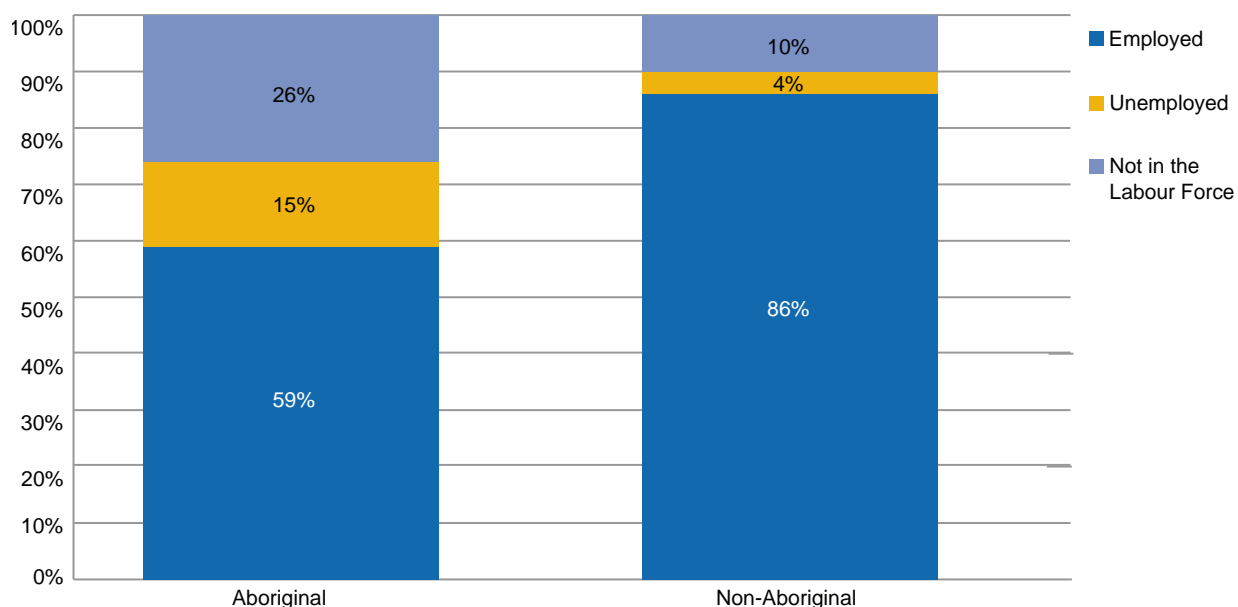
Source: Mining Industry Human Resources Council, Statistics Canada, 2014

At the national level, MiHR has identified potential barriers that may restrict Aboriginal people's entry into certain mining occupations. These include:[6]

- Employer and potential employee perceptions that educational and skills levels do not meet entry requirements;

- Limited employer awareness of how to find and recruit candidates and how to incorporate cultural norms into their hiring processes;

- Need for improvements in HR aspects of various partnership agreements (i.e., Impact Benefit and Socio-economic Agreements)

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6 MiHR, *Take Action for Diversity,* 2011 and MiHR, *Lessons Learned: A Report on HR Components of Aboriginal Community and Mining Company Partnership Agreements, 2012.*

Diverse groups, such as women and immigrants, offer the mining industry an untapped source of skilled workers with the potential to counter labour market pressures. The mining industry has generally faced challenges attracting women and immigrants into their workforce. The Northern mining industry is no exception as both of these groups are underrepresented in each territory's mining labour force.

Immigrants

The mining industry has traditionally underperformed in attracting immigrants. This is especially the case in remote regions of the country as immigrants tend to move to and settle in urban centres with established immigrant populations. As Figure 9 shows, immigrants account for roughly 21 per cent of Canada's overall labour force, but only 13 per cent of the mining labour force. This pattern is similar across the territories where immigrants are also shown to be better represented in the overall labour force compared to the mining labour force. Even though the gap is greater at the national level, the territories do not exhibit a large share of immigrants in the labour force and the population in general. Yukon has the highest portion of immigrants in the labour force among the territories. In Nunavut, there is not a large base of immigrants, and they are nearly absent in the territory's mining labour force.

Figure 9 – Immigrant Participation in Mining, Canada and Northern Territories, Resident Labour Forces, 2011
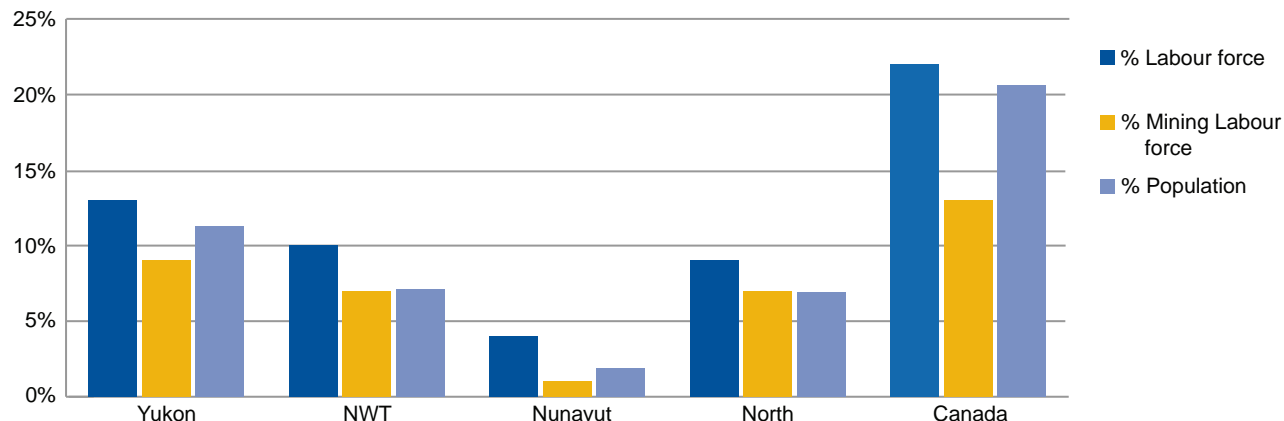
Source: Mining Industry Human Resources Council, 2014

Women

Women are commonly recognized as an under-represented segment of Canada's mining labour force. Across Canada and in the territories, women comprise about half of the population and slightly less than half of the overall labour force (at about 48 per cent). Yet, in these regions, women are consistently less represented in the mining labour force – roughly 18 per cent in Canada's mining industry and between 21 and 24 per cent in the territories.

A 2010 report on women's participation in mining, produced by Women in Mining (WiM) Canada in partnership with MiHR, reveals that certain barriers are more likely to prevent women from entering the mining labour force. These include:

- Limited organizational flexibility in work practices, schedules and career paths;

- Difficulties integrating into male-dominated work cultures; and

- Limited role models in senior positions.

Dependence on a Commuter Workforce

Due to a variety of factors, mining employers in each region are dependent on a commuter workforce – those who work in a particular territory but live in another part of Canada – to supplement their workforce needs. The remoteness of mining operations, a limited population size, a lack of infrastructure, roads and housing, and education gaps are factors that restrict access to the local talent pool. To the extent that northern mining communities continue to face these barriers, employers are likely to continue to rely on commuting workers. The reliance on non-resident workers is a common theme among the three territories.[7]

At the same time, the local labour force remains a priority for mining employers. Impact Benefit Agreements (confidential agreements between mining companies and local Aboriginal communities) and Socio-Economic Agreements (between the mining company and the territorial government) typically include commitments to mitigate negative impacts and optimize education, training, employment and business opportunities associated with development projects with a view of maximizing the benefits for the resident population.

The commuter workforce is currently vital to each territory's mining industry. However, in the long-term, this approach is expensive and inefficient, especially if the resident labour force becomes increasingly well-prepared for mining opportunities. A large commuter workforce also has an impact on tax revenues collected as commuting workers' pay their taxes in other jurisdictions. Overall, the use of commuting workers is necessary for the short-term existence of the industry and, at the same time, an overdependence reduces the long-term flexibly and prosperity of employers, governments, stakeholders in the Northern mining industry and Northern communities in general.

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7   It is also important to note that the commuter mining workforce exists in other parts of Canada as well. For instance, it is common for workers in the exploration sector to work across provincial and territorial boundaries. Geoscientists, in particular, are more inclined to follow geological features in their activities than political boundaries or provincial/territorial borders. Note: employment estimates based on Statistics Canada data alone refer to Northern residents and not the total mining workforce. Hence, MiHR includes other data sources and indicators in its estimates of employment in order to reflect the total mining workforce. The three territorial reports were used to inform and shape an estimate of total employment for the North. Estimating the total workforce is especially challenging in the exploration and support services due to their extremely mobile nature. For these sectors, a number of metrics (i.e., exploration spending, number and type of projects, organizational sizes, and comparison with data in other regions) and consultation with key informants.

Hiring Requirements Forecasts[8]

Forecasts for the North predict cumulative hiring requirements of approximately 5,150 workers by 2024, under a baseline scenario. Note that the mining workforce at the start of the forecast period (from 2014-2024) is estimated to be about 8,495 workers under MiHR's definition of the mining industry (see Appendix C for more details on MiHR's definition). Significant hiring pressure is anticipated to come from replacing exiting workers, including a high share of mobile non-retirees.

Table 1 – Cumulative Hiring Requirements Forecasts, by Scenario – to 2024

	Net Change in Employment	Replacement Requirements		Cumulative Hiring Requirements
		Retirement	Non-Retirement	
Contractionary	-580	1,150	1,340	1,910
Baseline	730	1,590	2,830	5,150
Expansionary	2,320	2,180	4,050	8.540

Source: Mining Industry Human Resources Council, 2014
*Note that numbers may not add perfectly due to rounding. Also note that hiring requirements do not translate to new job growth; they reflect the combination of net change in employment and replacements.

Figure 10 provides a year-by-year breakdown of the hiring requirements under a baseline scenario. The annual hiring requirements average about 470 workers per year; non-retirement exits or industry churn account for about half of hiring pressures over the forecast.

Figure 10 – Annual Hiring Requirements Forecast, Baseline Scenario – 2014-2024
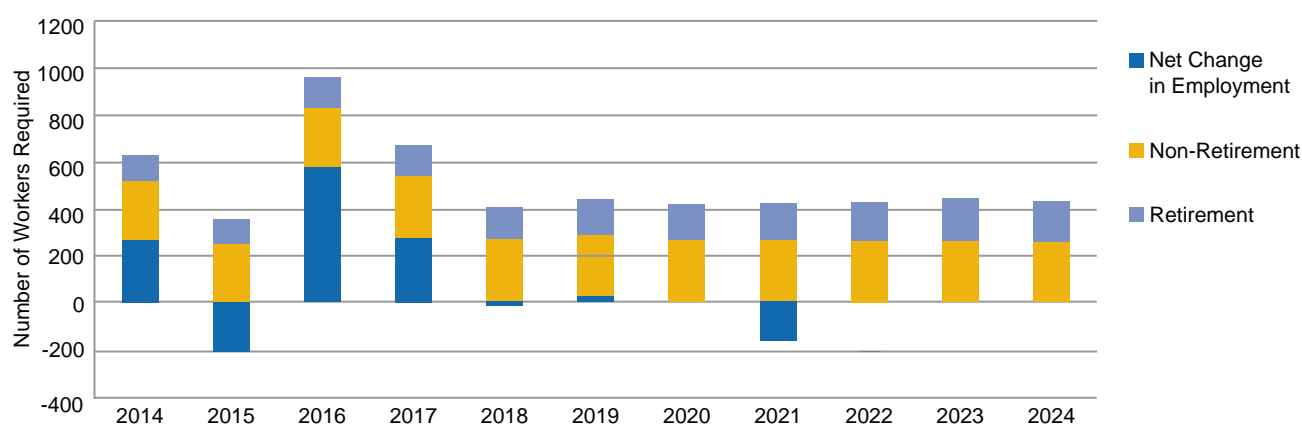
Source: Mining Industry Human Resources Council, 2014

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8 Note: employment estimates based on Statistics Canada data alone refer to Northern residents and not the total mining workforce. Hence, MiHR includes other data sources and indicators in its estimates of employment in order to reflect the total mining workforce. The three territorial reports were used to inform and shape an estimate of total employment for the North. Estimating the total workforce is especially challenging in the exploration and support services due to their extremely mobile nature. For these sectors, a number of metrics (i.e., exploration spending, number and type of projects, organizational sizes, and comparison with data in other regions) and consultation with key informants.

Table 2 provides a side-by-side breakdown of the hiring requirements in each territory, the North and Canada under a baseline scenario. The hiring requirements profile in the three territories follows a similar pattern to that of the Northern forecast (as expected). Non-Retirement separation (i.e. exits from the labour force that are unrelated to retirement) is the leading source of hiring pressure in each territory, indicating that separation among non-retirees in the form of out-migration, industry separation, etc. is evident in the Northern mining labour market. Furthermore, hiring pressure stemming from retirement is less prominent across the North and is relatively modest compared to retirement pressures in Canada's mining industry.

Table 2 – Cumulative Hiring Requirements Forecast, Canada and Northern Territories, Baseline Scenario – to 2024

	Net Change in Employment	Replacement Requirements		Cumulative Hiring Requirements
		Retirement	Non-Retirement	
Yukon	370	560	1,380	2,310
NWT	310	690	1,170	2,170
Nunavut	30	400	690	1,120
North	730	1,590	2,830	5,150
Canada	24,600	67,180	54,100	145,870

Source: Mining Industry Human Resources Council, 2014
*Canada's figures are from MiHR's National Forecast Report for 2013

The regional breakdown of hiring requirements forecasts (under a baseline scenario) is also visualized in Figure 11. Overall, the profile of hiring requirements in the North is roughly similar to Canada, though each territory also has its own unique circumstances.

Underpinning Figure 11 is each territory's unique portfolio of mining activities, the stage of development and the inherent economic and demographic characteristics which can distinctly influence the state of hiring pressures over the next decade. For example, hiring pressure in the NWT's mining industry is currently dominated by the extraction of diamonds over the last decade; hence the forecast largely reflects the labour market pressures in mineral extraction activities. Nunavut's mining activities, on the other hand, are represented across phases. Despite the initiation of mineral production activities, Nunavut is still at a relatively early stage of industry development with a more significant focus on exploration activities. Yukon's mining industry supports both established producing mines as well as a robust exploration sector, spread over a various types of minerals. These characteristics offer valuable context of the hiring requirements forecast presented in this report. A sector-by-sector breakdown and an occupational breakdown are given for the North and for each territory in the following sections.

Figure 11 – Percentage Breakdown of Cumulative Hiring Requirements Forecast, Canada and Northern Territories, Baseline Scenario – to 2024
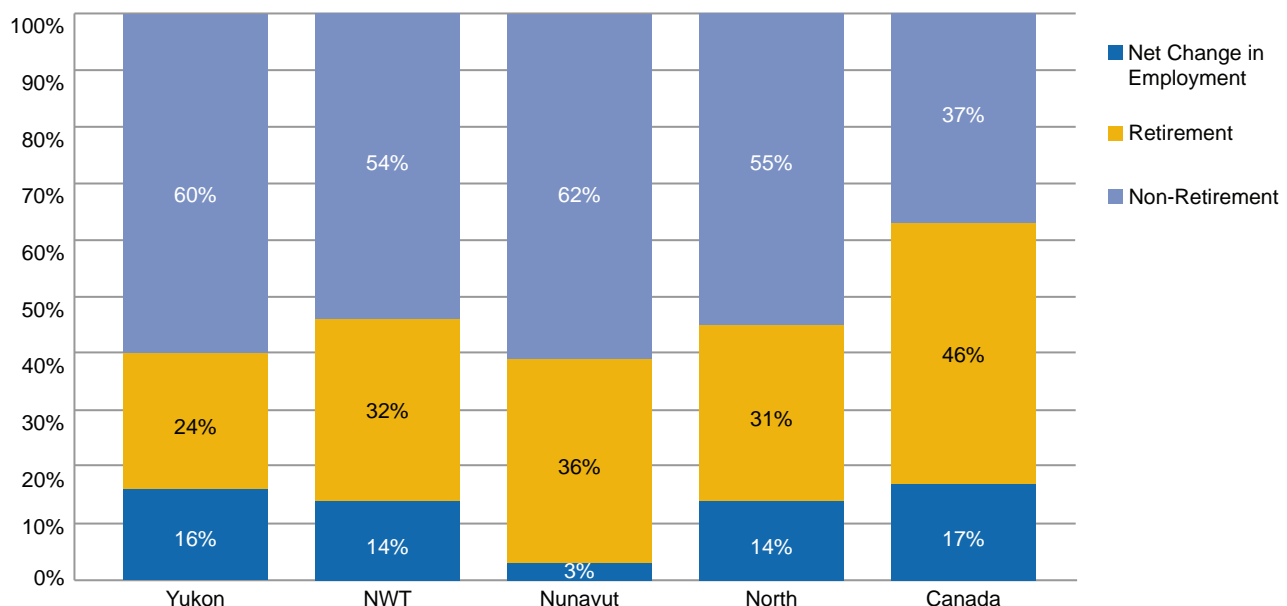
Source: Mining Industry Human Resources Council, 2014
*Canada's figures are from MiHR's National Forecast Report for 2013

Hiring Requirements Forecasts by Industry Sector

Hiring requirements forecasts are also broken down for three industry sectors – *Mineral Extraction*, *Mineral Exploration* and *Mining Support Services*. Table 3 presents cumulative hiring requirements for each sector in the North under a baseline scenario. These forecasts illustrate each sector's unique labour market characteristics as well as their separate responses to forecasted economic conditions.

Mineral Extraction is shown to have the largest share of forecasted hiring requirements. This result reflects the large size of the current extraction sector, the outlook for certain commodity prices that are currently focused in production, and encompasses projects coming online and current producers shifting their production capacity over time. Among the sectors, mineral exploration and mining support services are expected to have modest hiring needs as the global economic climate continues to dampen the sectors' growth potential. The side-by side sector-forecasts indicate that non-retirement exits are a significant contributor of hiring pressures in all cases.

Table 3 – Cumulative Hiring Requirements Forecast, by Industry Sector, Baseline Scenario – to 2024

	Employment in 2013	Net Change in Employment	Replacement Requirements		Cumulative Hiring Requirements
			Retirement	Non-Retirement	
Mineral Extraction	5,115	910	1,200	1,830	3,940
Mining Support Services	1,400	50	210	440	690
Mineral Exploration	1,980	-230	360	560	690

Source: Mining Industry Human Resources Council, 2014
*Note that numbers may not add perfectly due to rounding. Also note that the Statistics Canada industry sector definitions and classification schemes constrain some of the data analysis, "exploration" and "support services" may include or exclude activities that the sector would categorize differently—for example, drilling services are counted under "support services" and assay laboratories are counted under "exploration".

The sector hiring requirement forecast for the three territories, the North and Canada is given in Table 4, under a baseline scenario. The highest segment of hiring requirements over the next 10 years is again mineral extraction across all regions, while the share of the mineral exploration and mining support services sectors is shown to vary among the regions. This pattern is a reflection of each region's major mining activities and focus for the next decade.

Table 4 – Cumulative Hiring Requirements Forecast, by Industry Sector, Canada and Northern Territories, Baseline Scenario – to 2024

|	Cumulative Hiring Requirements – to 2024				
	Yukon	NWT	Nunavut	North	Canada
Mineral Extraction	1,550	1,900	680	3,940	48,255
Mining Support Services	310	230	240	690	18,100
Mineral Exploration	460	140	180	690	21,690

Source: Mining Industry Human Resources Council, 2014
*Canada's figures are from MiHR's National Forecast Report for 2013

The regional breakdown of hiring requirements (by sector) is further illustrated in Figure 12. The picture presents a similar pattern across the regions with the *Mineral Extraction* having the highest share of hiring requirements. At the same time, certain industry sectors are underlined in each region. In the NWT, hiring needs are anticipated to primarily come from *Mineral Extraction*; Yukon displays an increased emphasis on the *Mineral exploration* and *Mining Support Service* sectors, as does Nunavut. These outcomes are aligned with the observed trends described in an earlier section of this report: notably, the relatively large size of mineral production in the NWT, the high level of exploration spending in Nunavut and Yukon, as well as the current stage of development/ maturity in each respective territory are further reflected in the breakdown of hiring requirements shown in Figure 12.

Figure 12 – Percentage Breakdown of Cumulative Hiring Requirements Forecast, by Industry Sector, Canada and Northern Territories, Baseline Scenario – to 2024
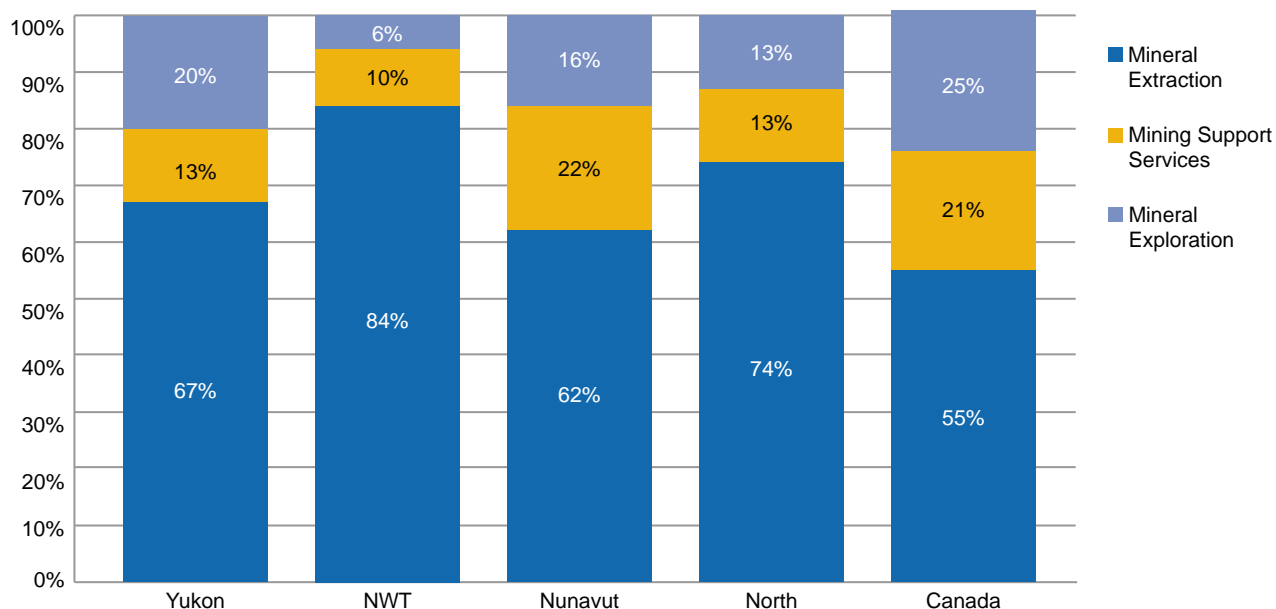
Source: Mining Industry Human Resources Council, 2014
*Canada's figures are from MiHR's National Forecast Report for 2013

Hiring Requirements Forecast by Occupational Category

Table 5 provides the cumulative hiring requirements for broad occupational groups, under a baseline scenario. The table shows the greatest number of hiring requirements will be in *Trades and Production Occupations*. Of course, high demand in terms of numbers does not necessarily translate to high concern or difficulty to find. For example, the need to hire over 300 professional and physical science workers may be more of a challenge or require longer term planning than other categories given the education and job experience requirements needed to replace retiring workers in this category.

The categories shown in Table 5 consist of key occupations identified by MiHR to be core to the mining industry. These occupations are defined by the National Occupational Classification (NOC) categories (see Appendix C for a complete list).

Notable occupations with the highest projected hiring requirement include:
- Underground production and development miners
- Heavy equipment operators (except crane)
- Central control and process operators, mineral and metal processing
- Machine operators, mineral and metal processing
- Heavy-duty equipment mechanics
- Underground mine service and support workers
- Supervisors, mining and quarrying
- Industrial electricians
- Construction millwrights and industrial mechanics (except textile)
- Truck drivers
- Labourers in mineral and metal processing

Table 5 – Cumulative Hiring Requirements Forecast, by Broad Occupational Categories, Baseline Scenario – 2016, 2019, 2024

	Cumulative Hiring Requirements		
	2016	2019	2024
Trades and Production Occupations	1,005	1,885	3,015
Professional and Physical Sciences Occupations	95	190	305
Human Resources and Financial Occupations	50	85	135
Support Workers	110	200	320
Technical Occupations	80	165	255
Supervisors, Coordinators, and Foremen	110	220	350
All Other Occupations	280	465	770
Total	**1,730**	**3,210**	**5,150**

Source: Mining Industry Human Resources Council, 2014

The occupational hiring requirements forecast are further represented for the three territories, the North and Canada in Figure 13. As shown in the figure, the occupational mix is roughly similar across regions. *Trades and Production Occupations* are the most represented; this result is expected as this category includes the most occupations among the list analysed by MiHR for the mining industry.
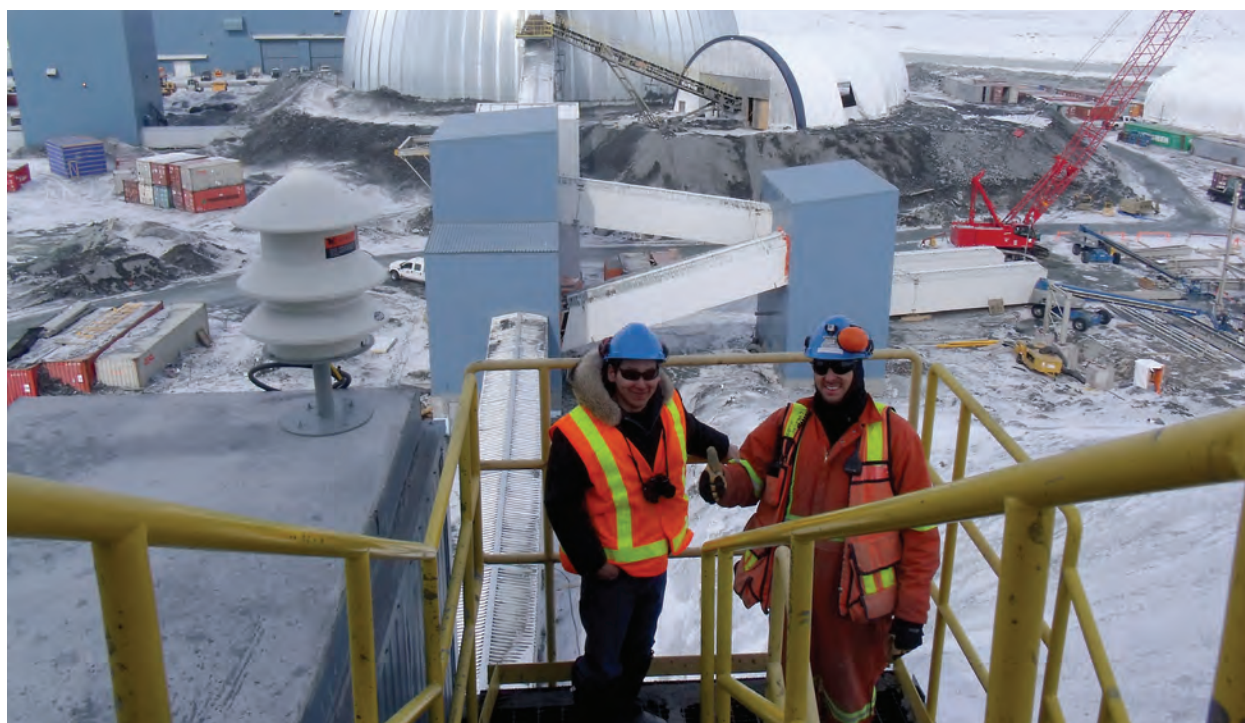
There are also a few subtle differences in the occupation composition for each region. The NWT shows a large segment of *Trades and Production Occupations*, while Yukon and Nunavut exhibit a relatively large share of *Professional and Physical Sciences* and *Technical Occupations*. The high share of workers in professional sciences in Yukon and Nunavut is consistent with the level of mineral exploration activities in those territories as well as their respective stage of mining development over the forecast period.

Figure 13 – Annual Hiring Requirements Forecast, Mining Support Services, Baseline Scenario – 2014-2024
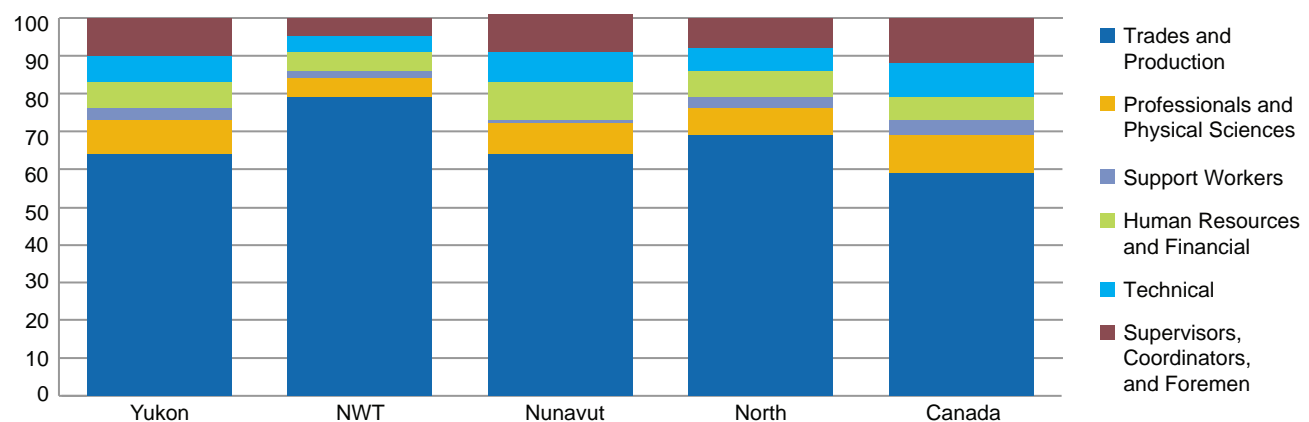
Source: Mining Industry Human Resources Council, 2014
* Canada's figures are from MiHR's National Forecast Report for 2013

Available Talent Forecasts

Available Talent describes the pool of skilled workers that could potentially offset the mining industry's hiring requirements. As described above, the hiring requirement forecast estimates the number of hires the industry will need in order to keep the mining industry competitive over the next 10-years. To fully understand labour market pressures, the hiring requirements must be balanced with an estimate of the workforce entrants that, under existing conditions, are expected to be available to fill those positions.

Forecasts of the labour pool consider selected mining-related occupations of interest (see Appendix C for a complete list). Given that some of the occupations are not relevant to the Northern mining industry, the number of core occupations considered was trimmed from 66 to 63. In a given year, the forecast begins with the previous year's labour pool, and then considers the flows of workers projected to enter and exit during the course of the year. MiHR first estimates the number of new entrants that will be available in the labour pool for all industries and then, based on historic trends, calculates mining's share of these entrants. The cumulative number of workers that the mining industry will attract describes the available talent figures presented in this report.

A detailed description of the model and its assumptions is in Appendix B.

Table 6 shows the forecast of available talent for 63 mining related occupations in the North, over a 2-, 5- and 10-year time horizon. Approximately 7,970 new entrants are projected to enter the selected occupations, for all industries in the North.[9] Assuming that mining will continue to attract

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9   This includes all industries captured under the North American Classification System (NAICS), encompassing all industry activities in the Northern economy including other resources industries.

talent at historical rates for these occupations, the Northern mining industry is expected to attract 1,410 new entrants in those occupations (listed in Appendix C) over the coming decade to 2024.

Table 6 – Cumulative Available Talent, All Industries and Mining, Selected Occupations, Northern Territories – 2016, 2019, 2024

	2016	2019	2024
Total Entrants for Select Occupations All Industries	2,240	4,550	7,970
Mining's Share of Entrants for Select Occupations (assuming historical rate of attraction)	350	770	1,410

Source: Mining Industry Human Resources Council, 2014

The ability to find talented workers remains a primary concern in the northern territories. As shown in Table 6, the incoming supply of talent into the mining industry is projected to be moderately low in the North. This pattern is more evident in certain regions in which mining activities are relatively new, and where industry has not established the capacity to capture talent entering mining-related occupations.[10] To the extent that the recent historical trends are an indication of the current state, the estimates of mining's share point to an industry that will continue to be challenged to find workers. Maximizing education and training opportunities, attracting new talent and growing the available talent pool will be essential for the industry to meet its hiring needs.

Labour Market Pressures

The degree to which talented workers are difficult to find can vary among occupations. For the mining industry, finding talent for a particular occupation can become harder because (1) the labour pool for that occupation may shrink over time, and/or (2) the mining industry relies heavily on that occupation, and is therefore sensitive to changes in its labour pool.

Some of the occupations considered are typically found in different industries and the mining industry accounts for a small share of total employment in those occupations. Other occupations are very industry-specific and for these, the mining industry accounts for the majority of total employment. Taking a closer look at the pressures in the talent pools for each occupation gives the mining employers, governments and education providers important information about future challenges and opportunities.

Table 7 illustrates the relative pressures in the different occupational talent pools in the North— whether a particular pool is growing or shrinking, and what that means for the mining industry — based on how industry-specific the occupation is. This illustration is not to be confused with a gap analysis. It does not take into account projected hiring requirements; it simply illustrates projected trends in various occupational talent pools and the extent that the mining industry relies on that occupation.

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10 For more detail on the available talent in certain regions, see the territorial reports for Yukon, the NWT and Nunavut.

Table 7 – Labour Pool Pressures, by Occupation

	Growing Labour Pool	Steady	Shrinking Labour Pool
MINING-SPECIFIC OCCUPATIONS (VERY HIGH / HIGH)	• Geologists, geochemists and geophysicists • Mining engineers • Engineering managers • Supervisors, mining and quarrying • Geological and mineral technologists and technicians • Biological technologists and technicians • Construction millwrights and industrial mechanics (except textile) • Drillers and blasters – Surface mining, quarrying and construction • Underground mine service and support workers • Machine operators, mineral and metal processing	• Production clerks • Heavy-duty equipment mechanics • Heavy equipment operators (except crane) • Mine labourers • Central control and process operators, mineral and metal processing	• Primary production managers (except agriculture) • Industrial electricians • Welders and related machine operators • Underground production and development miners
MEDIUM	• Administrative clerks • Land surveyors • Chemical technologists and technicians • Material handlers • Construction trades helpers and labourers	• Financial managers • Specialists in human resources • Secretaries (except legal and medical) • Inspectors in public and environmental health and occupational health and safety • Cooks • Carpenters • Truck drivers	• Human resources managers • Financial auditors and accountants • Other trades helpers and labourers
SMALL **NON-MINING-SPECIFIC OCCUPATIONS**	• Financial and investment analysts • Transportation route and crew schedulers • Electrical and electronics engineering technologists and technicians • Steamfitters, pipefitters and sprinkler system installers	• Biologists and related scientists • Dispatchers and radio operators • Engineering inspectors and regulatory officers • Mapping and related technologists and technicians • Plumbers • Crane operators	• Chemists • Civil engineers • Mechanical engineers • Electrical and electronics engineers • Geological engineers • Construction managers • Contractors and supervisors, mechanic trades • Construction estimators • Civil engineering technologists and technicians • Mechanical engineering technologists and technicians • Land survey technologists and technicians • Labourers in mineral and metal processing

Source: Mining Industry Human Resources Council, 2014

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For some occupations, such as *Plumbers*, the industry attracts fewer members of the total labour pool and the overall size of the labour pool is expected to remain steady; this means that pressures to find workers is weak for this occupation. For other occupations, such as *Underground production and development miners*, the talent pool is projected to shrink over time and the mining industry attracts almost all of the workers in this occupation; therefore, the shrinking talent pool is expected to have a strong negative impact on industry employers.

Table 7 summarizes the forecasted labour supply pressures in the North as a whole; however, each territory displays its own unique pressures for various occupations. A summary of critical or 'red-zone' occupations in each territory is listed below. Note that the list for Nunavut is not given below as Nunavut's available talent forecast was aggregated to the broad occupation level due to particular challenges in creating detailed estimates for the territory. *Trades and Production Occupations* are shown to have the highest share in the mining industry while *Supervisors, Coordinators and Foremen* are expected to have the greatest losses in Nunavut's Labour Pool. Further detail for all territorial available talent forecasts is provided in each territorial report.

Yukon:

- Mining engineers
- Underground production and development miners
- Underground mine service and support workers
- Supervisors, mining and quarrying
- Chemical technologists and technicians

The NWT:

- Primary production managers (except agriculture)
- Construction millwrights and industrial mechanics (except textile)
- Underground mine service and support workers
- Human resources managers
- Truck drivers
- Other trades helpers and labourers

Available Talent Forecasts by Industry Sector

Note that, a sector-specific analysis of available talent is possible to the extent that occupations are assumed to belong to a particular industry sector. For example, available talent for occupations such as underground miners will likely impact production, while available talent for geologists are expected to impact mineral exploration.

Talent Gap Analysis

Understanding the gaps between hiring requirements and available talent is important, as it can inform the development of targeted strategies and initiatives to address the gaps. To this end, MiHR's gap analysis provides a side-by-side comparison of hiring requirements and available talent for the key occupations that are core to the mining industry in the North. Given that available talent is an occupation-based forecast, occupation-level hiring requirements are used to provide an appropriate comparison.[11] The Northern forecast highlights the central trends in the North as whole, and provides a reference point for each of the territorial forecasts.

The projected gaps for the selected occupations combined are summarized in Table 8. In the top row, the available talent forecast for the mining industry in the North is given for the next 2-, 5- and 10-years. The middle row provides MiHR's hiring requirements forecast for the 63 key occupations combined, under a baseline scenario (estimated at about 85 per cent of the industry-wide hiring requirements). The bottom row is the difference between the top and middle rows, and reveals the forecasted gap between hiring requirements and available talent. The 63 occupations are listed in Appendix C.

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11 As indicated, these forecasts are based on the three territorial reports that MiHR has produced in 2012 (Yukon) and 2014 (NWT and Nunavut).

Table 8 – Projected Gaps, All Industries and Mining, Selected Occupations, Northern Territories – 2016, 2019, 2024

	2016	2019	2024
Mining's Share of Entrants for Selected Occupations (assuming the historical rate)	350	770	1,1410
Hiring Requirements for Selected Occupations	1,450	2,745	4,380
The Gap	-1,100	-1,975	340

Source: Mining Industry Human Resources Council, 2014
*Note: To ensure appropriate comparisons, these figures do not include the full industry-wide hiring requirements forecast, but rather only the forecast for broad occupational groups to be consistent with available talent forecasts

The forecast indicates the cumulative available talent will not be sufficient to meet the forecasted hiring requirements, assuming the "status quo" will continue. Specifically, the industry is expected to attract only 1,410 new entrants to meet hiring needs of 4,380 – leaving a shortfall of 2,970 workers by 2024. The presence of the gaps expressed in Table 8 is not surprising given that gaps were also found in each of the territorial forecasts – with each displaying its own occupational mix. The occupational breakdown of the northern gap analysis is provided below.

Occupational Gap Analysis

The nature of talent gaps varies among occupations. In some cases, there is an existing pool of talent and the industry must strive to attract more new entrants from this pool into mining careers (i.e., carve out a larger slice of the pie). In other cases, there simply aren't enough people in the talent pool to meet the industry's needs, let alone the demands from other industries (i.e., there is a need to make the pie bigger). In all cases, the mining industry must strive to retain the workers it already employs and to make the best possible use of talent (e.g., through technology, innovation, improved productivity, and appropriate skills and knowledge development).

A talent gap can also have a different impact, depending on the occupation. This is especially true for occupations that are highly specialized and require a number of years of training and experience. A seemingly small gap can pose a challenge when there are only a few people with the specialized skills and experience to perform the role. The analysis presented in this report presents gaps in terms of raw numbers, but this analysis should be balanced with the awareness that not all the illustrated talent gaps are mission-critical or high-concern gaps.

Table 9 provides the side-by-side comparison of the hiring requirements and available talent forecasts for broad occupational categories. The first column shows the hiring requirements forecast under a baseline scenario. The second column shows the available talent forecast – specifically mining's share for that occupation. The third column shows the difference between the forecasted hiring requirements and available talent to reveal a potential gap in that occupational category. The size of the talent gaps varies among the occupational groups considered. For instance, *Trades and Production Occupations* collectively exhibit the largest gap between hiring requirements and available talent.

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The three right-hand columns entitled "The Challenge" show (1) the available talent pool for all industry sectors, (2) the mining industry's historic share of the labour pool and (3) an estimate of the share that the industry will need to attract to meet its projected hiring requirements. These columns can be used to gauge the degree that the industry needs to change its historical share in order to meet its future hiring needs. For example, *Trades and Production Occupations* have an available talent forecast of 740 – for all industries; of that number, the mining industry is projected to attract 20 per cent based on historical patterns; yet, the industry is projected to require 80 percent of what is available to all industries.

Table 9 – The Gap and Challenge, by Broad Occupational Categories – to 2024

	The Need	Available Talent & Gap		The Challenge		
	Cumulative Hiring Requirements	Available Talent – Mining's Share	Gap	Total Available Talent – All Industries	Mining's Share	Mining's Required Share
Trades and Production Occupations	3,015	740	-2,275	3,780	20%	80%
Professional and Physical Sciences Occupations	305	190	-115	680	28%	45%
Human Resources and Financial Occupations	135	30	-105	1,010	3%	13%
Support Workers	320	150	-170	1,450	10%	22%
Technical Occupations	255	110	-145	600	18%	43%
Supervisors, Coordinators, and Foremen	350	190	-160	450	42%	78%

Source: Mining Industry Human Resources Council, 2014

Types of Talent Gaps

The cumulative talent gap alone does not shed light on how best to address the labour shortages. The unique characteristics of the gaps within each of the occupational categories must first be identified. Three distinct types of gaps emerge in this analysis.

Figure 14 offers a visualization of the gaps presented in Table 9. The columns represent the available talent for all industries; the dark blue portion of the columns represent mining's share of available talent; the yellow squares denote the hiring requirements. A gap for a particular occupation is found if the hiring requirements (yellow square) outstrips mining's share of available talent in that occupation (dark blue). In some cases the hiring requirements also surpasses the total available talent for all industries (the entire column) indicating another type of gap. Three specific types of gaps are further explored in the discussion below.

1. **Retain and Develop the Workforce:** For occupations with this type of gap, the labour supply is sufficient for the forecasted labour needs and strategic efforts should focus on retaining the workforce through engagement, retention and development initiatives. Table 9 does not show an example of a broad occupational group with this type of gap. Therefore the strategy to meet hiring needs must go beyond normal efforts to retain and engage talent.

2. **Increase Mining's Share of the Labour Pool:** For occupations with this type of gap, there is large enough labour pool to draw from, but mining does not attract enough of them to meet future need. As a result, the mining industry must compete with other industries to capture a larger share of the pool through strategic efforts to attract new labour market participants into careers in mining.

   All of the broad occupational groups shown in Table 9 demonstrate this type of gap. In each case, the available talent forecast for all industries is enough to support the needs of the mining industry; at the same time, due to competition with other industries, the mining industry is not projected to attract enough of the available talent to meet its hiring needs. The mining industry must therefore increase its share of the available labour pool by focusing strategic efforts on awareness of opportunities in the mining industry. Table 9 reports this type of gap for all broad occupational categories, though many of the occupations within these categories exhibit the third type of gap (discussed below).

3. **Grow the Labour Pool:** For occupations with this type of gap, there simply will not be enough new talent entering the labour pool over the next 10-years to meet hiring needs. These occupations require considerable growth in the labour pool in order to meet the forecasted requirements. In many cases the deficits are large. In order to address this type of gap, the industry may have to collaborate with other industries, education providers, immigration policy makers and others to increase the available talent pool for all industries.

   This type of gap was found for many occupations in the three territorial forecasts, and was especially prevalent in many of the *Trades and Production Occupations*. The results found in Table 9 also allude to this type of gap as well; considering that the mining industry needs to increase its share of available talent in *Trades and Production Occupations* from 20 per cent to 80 per cent –this shift is perhaps unrealistic to the extent that other industries would resist this shift in the labour market to protect their share of available talent. It is apparent that, as a significant share would have to be captured from other industries, the total available talent for all industries is insufficient.

Figure 14 illustrates the projected gaps for the North (presented in Table 9). In all cases the hiring requirements (yellow) outstrip mining's share (dark blue), indicating a talent gap for that occupational group. Additionally, the available talent for all industries is enough to meet the hiring requirements. This picture illustrates the second type of gap discussed above (i.e., Increase Mining's Share of the Labour Pool) for the occupational groups presented; however, the third type of gap (i.e., Grow the Labour Pool) is also apparent in instances where the mining industry will have to increase its share extensively in order to meet its hiring requirements. This type of gap is apparent in many of the Trades and Production Occupations. Figure 15 shows no instance whereby mining's share was found to fully accommodate the hiring requirements.

Figure 14 – Projected Gaps, by Broad Occupational Categories – to 2024
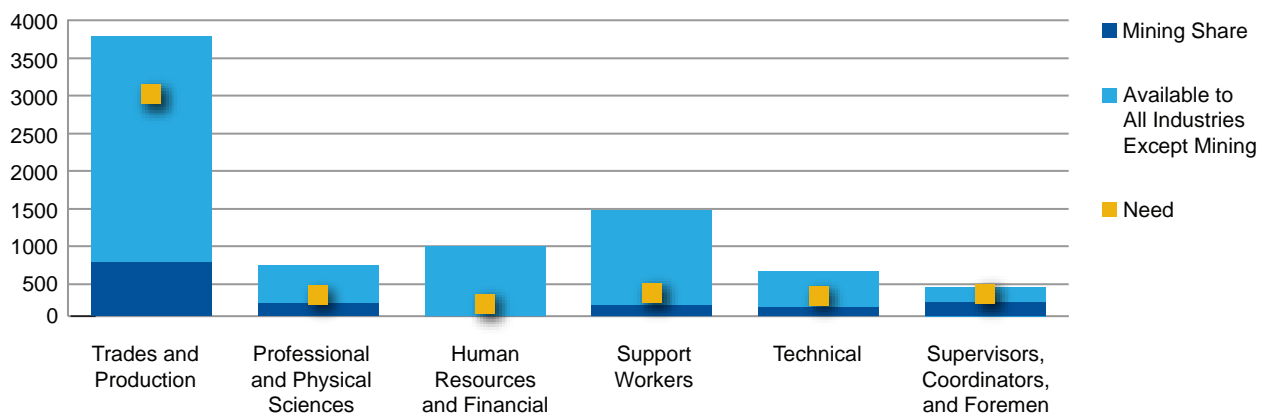
Source: Mining Industry Human Resources Council, 2014

Figures 15, 16 and 17 illustrate the five largest gaps in Yukon, the NWT and Nunavut respectively. The majority of the gaps represented are in *Trades and Production Occupations*. The figures also demonstrate that the most of the gaps are of the third type described above (i.e., grow the labour pool). In other words, for a number of the occupations with the largest gaps, there is a need to grow the labour pool for all industries in order for the mining industry to meet its hiring requirements. Note that an effort to monumentally grow the labour pool is a long-term undertaking, and that the mining industry's share of each occupation is relatively stable from year-to-year.

Figure 15 – Five Largest Gaps, Yukon, Projected Gaps – to 2024
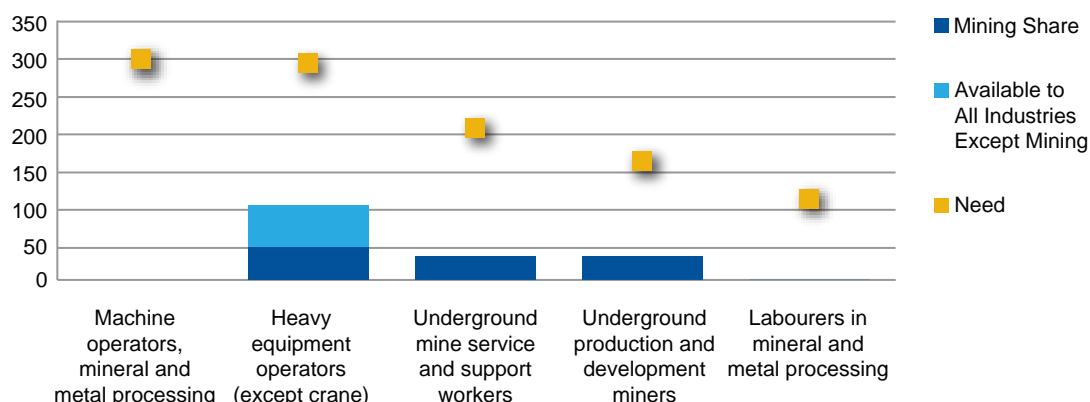
Source: Mining Industry Human Resources Council, 2014

Figure 16 – Five Largest Gaps, the NWT, Projected Gaps – to 2024
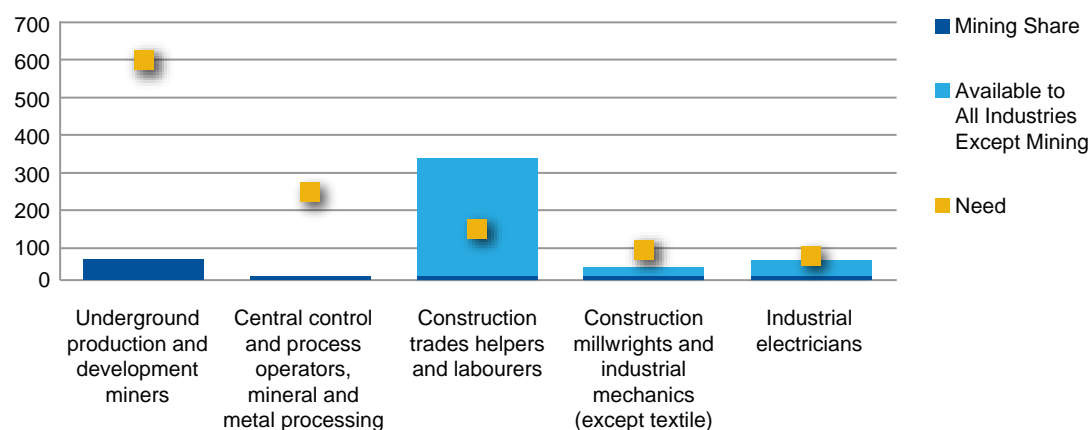
Source: Mining Industry Human Resources Council, 2014

Figure 17 – Five Largest Gaps, Nunavut, Projected Gaps – to 2024
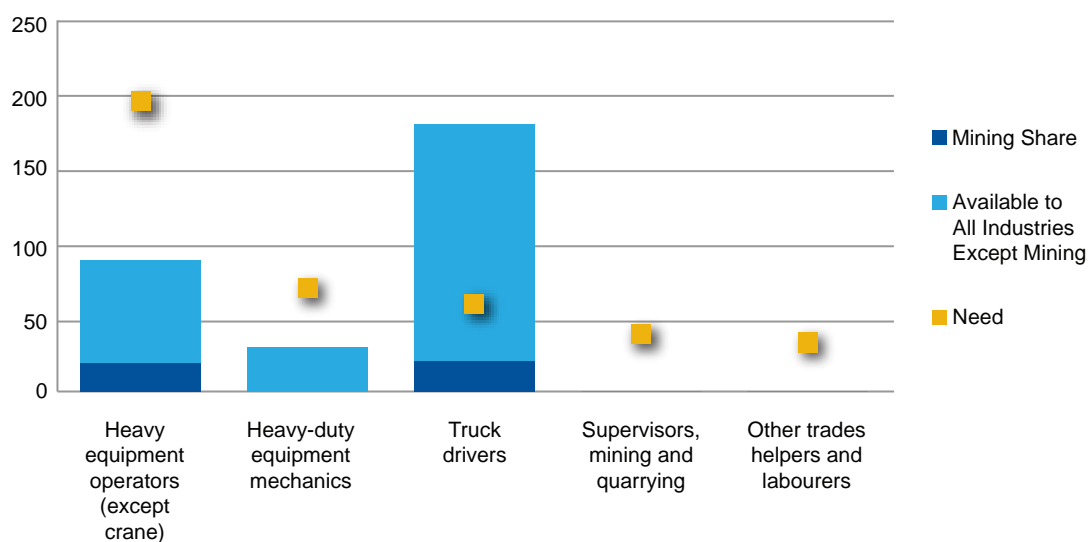
Source: Mining Industry Human Resources Council, 2014

This section summarizes the key observations derived from this report as well as MiHR's broader research on the mining labour market in the three territories. Findings are grouped into two main categories: the first category recognizes themes that are territory-specific; the second recognizes themes that are common to the three territories. Just as the nature of the talent gaps differ, so too do the optimal strategies to address the gaps. The optimal strategies also depend on the various regional differences between territories combined with the common characteristics in the North as a whole. As a result, the insights from this research can be used to inform collaborative partnerships between the territories to address common mining HR challenges.

Factors Specific to Each Territory

Different Stages of Mining Development

Each territory is in a different stage of mining development. Hence, the major mining activities found in each territory vary, reflecting the maturity of each region's mining development.

- Nunavut – is relatively young and in an early exploration phase. The territory supports one producing mine and another advanced development project. Aside from this current construction/production activity, the territory is dominated by exploration activity.
- NWT – is more developed and is primarily active in mineral production; there are four established producing mines in the territory, with plans to open three to four new mines and expand at least two of the existing sites in the coming years. Exploration activity is being negativity affected by regulatory process and financing difficulties.
- Yukon – supports a mix of activities – active mining production and exploration projects; there are currently three operating mines and a number of explorations projects in the territory.

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Unique Geology and Mineral Mix

Each territory has a unique set of minerals that underlie their respective mining industries:

- In the NWT, diamonds are the main commodity produced, though there is also some tungsten production. The territory's limited mineral exploration activities include a variety of other commodities including gold, bismuth, base metals, and rare earth metals, among others.
- Yukon also produces a variety of mineral resources. The three most prominent mineral resources in the territory are copper, silver and gold.
- Nunavut's mining industry is involved in exploration for a number of minerals including gold, silver and uranium. The territory's mineral production is almost exclusively in gold production.

Each territory's unique mineral-mix can impact its mining development and labour force requirements, given that each of these minerals has specific economic drivers, customers and marketplaces. Of course, each territory's mining industry is vulnerable to global economic challenges. It is important for each territory to monitor economic factors relevant to its respective circumstances and individually track the progress of initiatives to address the gaps.

Common Themes across the North

Insufficient Available Talent

MiHR's forecasts have found insufficient available talent in all three territories. This outcome is related to many factors, but ultimately the base of skilled workers is too thin to support the mining labour market in many occupations. Furthermore, the critical occupational gaps are primarily driven by the lack of an existing trained talent pool, as opposed to escalating hiring requirements or the demand for new labour. Until the latest wave, mining activity has been relatively sporadic in many parts of the North - further perpetuating a thin labour market.

Efforts to increase the available talent are faced with the long-term challenges. Mainly, the current resident labor force is neither prepared nor well-equipped with the skills required to fill available positions. It also is difficult to attract people to remote areas and mining operations in the North.

Dependence on a Commuter Workforce

Industry employers across the North have relied heavily on experienced commuters from the South to supplement their workforce needs. The commuter workforce is currently a reality in each of the territories' mining industries, even though this approach carries many costs for mining companies and northern economies. Typically employers have adopted a rotational schedule to accommodate workers living outside of the North. The fact that industry employers are choosing to fill a large part of their workforce with commuters, despite the added costs, indicates that employers do not have adequate access to a sufficiently prepared local population and suggests a lack of resources to support the necessary up-skilling required to ensure a well-trained local workforce.

From the employers' perspective, the commuter workforce is expensive; a large commuter workforce can also be a challenge to retain considering that commuting workers are flexible to explore their employment options in other regions of the country, including their own place of residence. From an economic and public perspective, a sizable commuter workforce does

not contribute to building the local economy as commuters spend their earnings and pay taxes elsewhere. This can potentially compromise the development of infrastructure and the sustainability of local communities that support the mining activities in their region.

Labour Force Non-Participants
A number of the resident Northerners in the three territories are not currently looking for work and thus not are included in the labour force (i.e., people either employed or actively looking for employment). Non-participators are generally found to have less education. MiHR's research has found that a person with an advanced education level (i.e. university) is almost assured to be not only in the territories' labour force (available and seeking work) but fully employed.

A relatively large percent of the resident mining workforce are without a certificate, diploma or degree in each of the territories; working-aged people with the least education are also the least likely to participate in the labour force. As a result, mining employers' access to their resident labour force is diminished by non-participants among the local populations.

SOURCE: THE MINE TRAINING SOCIETY

Aboriginal Peoples
Aboriginal peoples are essential to each territory's mining industry; they make up a significant share of the population of the North and they are a primary part of the resident labour force in each territory. In addition, Aboriginal peoples are strongly represented in the Northern mining industry (as shown in Figure 7). Yet, employers have trouble accessing this group as companies and communities often struggle to find individuals with work-readiness and essential skills. Many Aboriginal peoples are among the segment of the population not participating in the labour force (as shown in Figure 8); this is in part due to educational limitations as many are not prepared for employment in mining while others may not be interested in employment in the mining industry.

Women and Immigrants are Under-represented
Women and Immigrants are under-represented in Canada's mining industry, and the three territories are no exception. While both of these groups represent a significant segment of the overall labour force, a number of factors can limit their access to positions in the mining industry. A long-standing workplace culture in the mining industry may inhibit women from pursuing careers in the industry. Immigrants are not likely to settle in mining communities as they tend to land in major cities upon their arrival to Canada. Improving mining participation among these groups would address the missing available talent issue facing the territories.

A Relatively Young Workforce

The North's population is relatively young and have among the lowest median ages in Canada. The resident mining labour force is also found to be relatively young compared to Canada – with more people in the younger age categories and fewer in the older age categories. As a result, retirement pressures are less pronounced in the North compared to other regions in Canada. This result is certainly an advantage to the territories. At the same time, younger workforces collectively possess fewer years of experience and are perhaps premature to be the stewards of the mining industry in the North. Therefore, the older workforce is increasingly valuable as they continue to pass their knowledge and expertise to the younger generations.

Large Hiring Gaps in Trades and Production Occupations

MiHR's forecasts for the North found that the largest occupational gaps were in *Trades and Production Occupations*. Of course, occupations in other categories were also shown to have gaps, but the *Trades and Production* category consistently exhibited occupational gaps that were among the largest.

Next Steps

This report is intended to provide a foundation for understanding the labour market conditions and outlook for the mining industry in the territories and the North. The analysis provides a reference for comparing mining HR trends across the territories – allowing mining employers, territorial governments, education providers and other stakeholders to identify common themes as well as those that are specific to each territory. The insights from this research can then be used to inform collaborative partnerships between the territories to address common mining HR challenges and to develop and support targeted solutions in a coordinated and strategic manner.

The next steps are to convene a group of key stakeholders (policy makers, Aboriginal community representatives, territorial and federal governments, employers and educators) to discuss future initiatives and develop a concrete action plan for addressing key mining HR challenge at both a territorial level and across the North. The following sections outline some recommended discussion points for consideration in developing this action plan. These discussion points are linked to the key observations described in the previous section.

Growing the Labour Pool

Given that the most critical occupational gaps are driven by the lack of an existing trained talent pool, the strategy of *growing the labour pool* is the leading recommended approach to filling the gaps in each of MiHR's territorial reports. Growing the labour pool is consistent with the goals of Northern mining employers: to engage Northern communities as outlined by their specific commitments (in Impact Benefit and Socio-Economic Agreements) to develop and employ a skilled resident workforce. In other words, mining industry stakeholders will need to increase the number of new entrants into the Northern labour force – for all industries - in order to meet forecasted hiring requirements for the mining industry. This undertaking will require stakeholders, (i.e. employers, educational institutions, governments and associations) to coordinate their efforts to attract people at all entry points including boosting education and training to increase the numbers of graduates with required skills; re-attracting labour force leavers (such as retired workers) and attracting other entrants, including women, international and inter-provincial migrants.

Engaging local populations is an important step in expanding the labour pool and will help to reduce the dependency on commuters for skilled workers. This step includes initiatives to train and develop the skills of the local Aboriginal workforce so that they are able to fill available mining

positions. The industry can also take steps to better include Aboriginal peoples by incorporating cultural customs and norms into all levels of operations. Finally, the industry can enlarge their labour pool by attracting groups that are traditionally underrepresented, such as women and immigrants. In addition, strategies to promote mining to young people will be important as youth may not be fully aware of the mining industry and the range of job opportunities available to them.

Increase Mining's Share of Available Talent

Increasing the share of talent for any one industry is a difficult undertaking. As the labour market tightens, it becomes exponentially more challenging for a particular industry to attract a greater share of new entrants in the face of competition from other industries. A plan to increase mining's share of available talent is often supported through partnerships and collaborative efforts among mining industry employers, education providers and other stakeholders. For instance, mining stakeholders can work with education providers to promote mining as a career of choice. This may include a strategy that begins at the grade school level and incorporates mining-related examples in the curriculum.

Education and Training Strategy

A strategy that emphasizes education of all kinds – including efforts to develop essential skills and provide early career awareness – is needed to boost labour force participation among the non-participating segments of the population and to ultimately grow the local talent pool. Encouraging Northerners with higher education to stay in, or return to, the North after graduation to work will also help establish a skilled Northern workforce that will be prepared for future mining development.

Mining employers consider essential and work readiness skills as one of the most important in determining the employability of potential job candidates. A pan-Northern strategy to ensure that local populations are able to demonstrate these skills to employers will help to support increased participation, both in education/training and in the labour force.

Educational attainment among Northern Aboriginal peoples is a major concern. Low high school graduation rates are connected to the high number of Aboriginal peoples choosing not to participate in the labour force. Educational opportunities, including apprenticeships and training, that effectively engage Aboriginal peoples will increase the likelihood of participation among this group. This includes education programs that embrace cultural practices in Aboriginal communities, and allow for further advancement into new educational opportunities of all types.

PHOTO COURTESY OF THE GOVERNMENT OF YUKON

Given that each of the three territories is in a different stage of mining development, and given that each has a different mix of minerals driving their mining activities, the required skill set of the mining labour force will vary across the North. MiHR's occupational forecasts do not point to a consistent occupation(s) in all three territories – rather, the occupational gaps are specific to each region. While a pan-territorial education/training strategy may be the most efficient approach to skills development to support the mining industry, it must also take into account the distinctive skills requirements in each territory.

It is important to consider the time it takes to develop a local labour pool with the required skills and experience to be fully competent on the job. Therefore, overcoming supply pressures through targeted education and training must take into account that the shift may occur over a longer time horizon. Such changes can sometimes take a generation to realize its full potential impact. For some occupations the ability to train and develop talent will be manageable if immediate action is taken (e.g., for underground mine service and support workers). For other occupations, an emphasis on longer-term solutions will be needed (e.g., professional geoscientists).

Incentives for Commuters

Both short-term and long-term objectives will be required to mitigate the costs associated with a substantial commuter workforce. In the short-term, commuters are vital to each territory's mining industry. Industry employers can reduce attrition among commuters through innovative employee engagement strategies and increasing opportunities for professional development. Efforts to accommodate the schedules and preferences for the commuter workforce can also improve their willingness to endure the high travel demands. In the long-term, a well prepared and skilled resident workforce can reduce pressures to find skilled workers in other jurisdictions. Increasing the readiness of the territorial population over time will open the Northern labour force to new mining opportunities and support its sustainability.

Infrastructure Improvements

The territories can also improve employer's access to a local, skilled workforce by improving infrastructure (i.e. roads, hospitals, internet access, housing, and other amenities). Such longer-term improvements will increase the indigenous population's access to appropriate training (work-readiness and essential skills, technical and trade training, etc.) and employment opportunities. Established infrastructures also improve access for prospective employees outside of the North - including commuters and potential migrants – so that they may choose to permanently live in the North.

Career Progression among Aboriginal Peoples

A broader understanding of the "glass ceiling" for career progression among Aboriginal peoples will ensure that future vacancies in all occupation categories can be filled with locally engaged workers. Further research will strengthen knowledge of the educational and skills development requirements of this important group. In the next 18 months, MiHR will be conducting specific research and assessing the challenges and opportunities around career progression for Aboriginal people in the mining industry. In addition MiHR is developing a National Occupational Standard for Frontline Supervisors, which will clearly identify the skills and competencies required to perform in these jobs. These initiatives will help to support the development of longer-term strategies designed to facilitate career progression from entry-level to supervisory positions.

Support Systems for Women

Women are a growing segment of the mining workforce. An opportunity exists to encourage women into trades and ensure that barriers to inclusion are eliminated. The potential strategies to remove barriers are broader than expanding opportunities for education; they may include improving family support systems, daycare options and infrastructure to accommodate the needs of the individual.

Attract Immigrants to Live in the North over Major Southern Cities

Mining is a global industry and many immigrants coming to Canada have a wealth of industry-specific knowledge and experience. However, immigrants tend to gravitate towards large urban centres and many are not finding opportunities to utilize their skill-sets to full potential.

Proactive strategies to attract immigrant talent from large cities may encourage them to find opportunities in the mining industry. A detailed study on integration of immigrants into the industry and barriers to inclusion will help inform campaigns and initiatives to attract Canada's new immigrants to the North (e.g., foreign credential recognition, language training, multicultural assessments, etc).

PHOTO COURTESY OF THE GOVERNMENT OF YUKON

Mentorship from Older Generations

Younger workers generally benefit from the knowledge and guidance of more experienced workers. Without a targeted approach to mentorship, the expertise of the older generations may not be realized to its fullest potential, especially as older workers enter retirement. A deliberate approach to mentorship may help ensure that valuable expertise is imparted to the younger generation – which is a significant segment of the population in the North.

Proactive Strategies for Attracting Youth

Proactive solutions will prepare the younger generations for future opportunities in the Northern mining industry. These include strategies such as improving access to career information before grade 12, early emphasis on mining related subjects (i.e., math and sciences) and maintaining high standards for education at all levels. Developing information for career seekers through career awareness campaigns, career path/ education support and recruiting initiatives can provide youth awareness of the possible career options in the mining industry.

Summary

Across the North, there is a huge opportunity for mining development. The Northern mining industry remains relatively undeveloped and is in an early stage of growth. Labour market pressures such as the gaps identified in this report have the potential to derail future progress of the recent economic growth in the Northern mining industry. The preparedness of stakeholders will determine the extent to which the industry is able to respond to labour market pressures. This includes adopting both short and long-term strategies to grow the labour pool – supporting the education, training and skills development of local workers to create a skilled Northern workforce that will help to reduce the reliance on the commuter workforce. A combination of approaches is important to ensure the future sustainability and success of the industry.

Appendices

Appendix A

Methodology

This appendix outlines the methodology used by MiHR to produce forecasts of hiring requirements in the mining industry. It also describes the various data that were required, along with the development of the forecasting models.

The Mining Industry Human Resources Council (MiHR) has prepared this report in partnership with the Government of the Northwest Territories (GNWT), the Government of Nunavut (GN), the Government of Yukon and the Mine Training Society (MTS), with support from the Canadian Northern Economic Development Agency (CanNor). The report is an amalgamation of three territorial reports produced by the Mining Industry Human Resources Council (MiHR):

- The *Yukon Hiring Requirements and Available Talent Forecasts: Mineral Exploration, Mining, and Support Services (2013)* was prepared in partnership with Derome and Associates for the Government of Yukon to augment the feasibility work completed for the Centre for Northern Innovation in Mining (CNIM) at Yukon College.

- The *Northwest Territories Mining Hiring Requirements and Available Talent Forecasts (2014)* was prepared in partnership with the Government of the Northwest Territories (GNWT) and the Mine Training Society (MTS), with support from the Canadian Northern Economic Development Agency (CanNor).

- The *Nunavut Mining Hiring Requirements and Available Talent Forecasts (2014)* was prepared in partnership with the Government of Nunavut and with support from the Canadian Northern Economic Development Agency (CanNor).

In this report, the 'the North' is defined as the amalgamation of Yukon, the NWT and Nunavut. The forecasts for North utilize inputs that were derived from the three territorial forecasts, but, they are not estimated by adding the three territorial forecasts. Instead, the forecasts for the North are estimated using the same methodology that was employed in each of the three territorial forecasts to produce an analysis that is consistent with the territorial forecasts. It is critical to note that the forecasts for the North are not the direct sum of the forecasts found in the three territorial reports for Yukon, the NWT and Nunavut. The reason for this is two-fold: First, Yukon's forecast has been adjusted to reflect the current time frame of 2014-2024. Second, MiHR's forecasts are sensitive to modifications in the region's defined boundary. The addition of the three territorial estimates does not subtract the inter-territorial migration that is not applicable in the Northern forecast.

A flowchart depicting this methodology is provided in Figure A1.

Forecasting models of employment were estimated based on the following six steps:

- Step 1: Collect and analyze data that may potentially explain changes in the number of jobs in each region.

- Step 2: Determine the driver(s) that explain the greatest level of variation in the number of jobs in each region by testing various model specifications through regression analysis.

- Step 3: Produce baseline, contractionary and expansionary forecasts for each driver determined in Step 2.

- Step 4: Combine Steps 2 and 3 to produce the forecasts for employment under baseline, contractionary and expansionary scenarios.

- Step 5: Produce forecasts of the total hiring requirements given the change in employment (determined in Step 4) and estimates of retirement and non-retirement separation rates.

- Step 6: Calculate and apply occupational coefficients to produce estimates of hiring requirements by occupation.

Several indicators were considered as explanatory variables for predicting employment. MiHR's hiring-requirements forecasting model combines the effects of changes in commodity prices, growth of mining GDP, labour productivity, retirement rates, non-retirement separation rates and other economic variables to produce estimates of hiring requirements over the next 10 years.

In each territorial study, mining employers participated in an employer survey to provide inputs used to produce each territorial forecast (i.e., the size and profile of their workforces). The territorial studies further collected feedback from mining stakeholders in a validation session.

Figure A1 – Employment and Hiring Requirements Forecasting Model
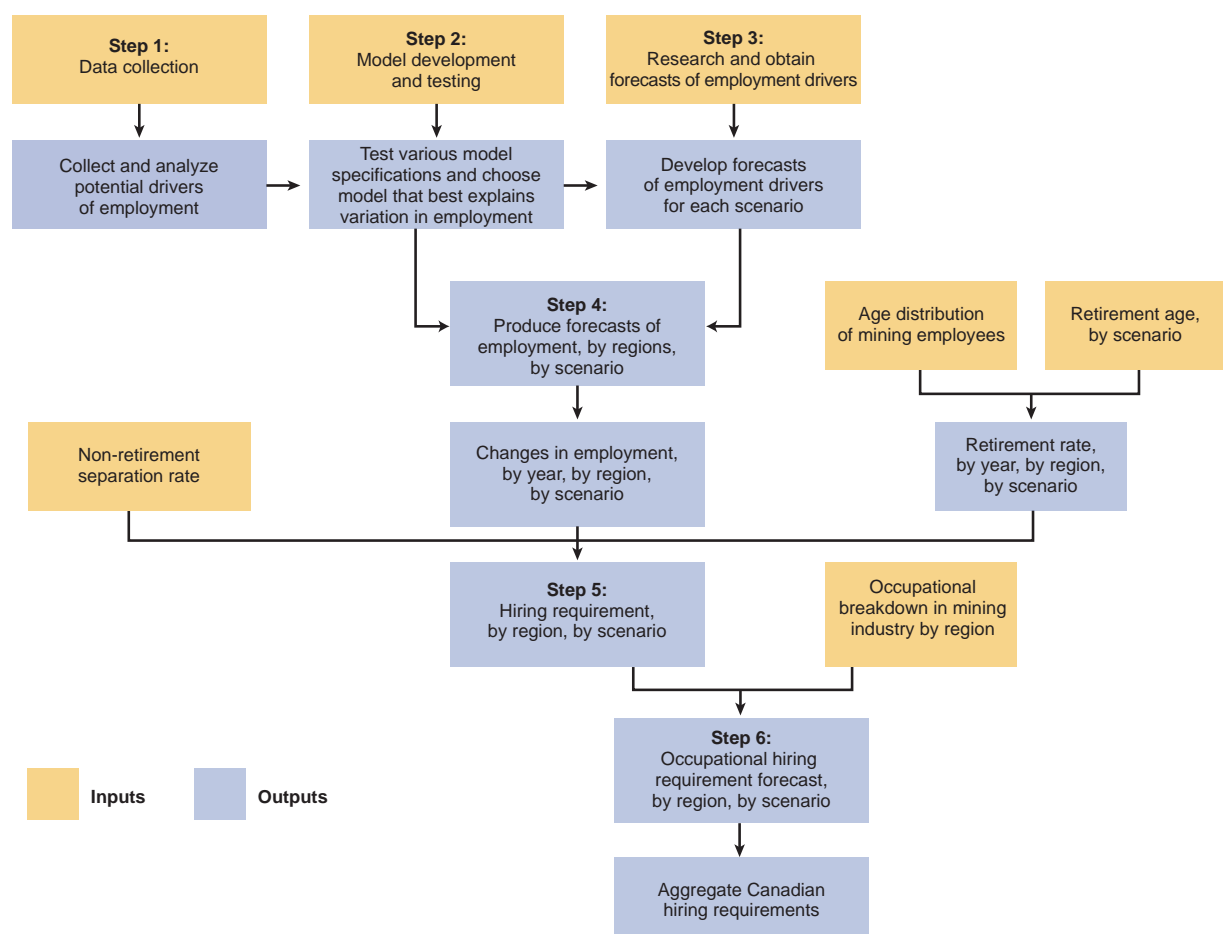
Source: Mining Industry Human Resources Council

MiHR's Available Talent forecast is an occupation-based forecast that predicts, for a particular province or territory, the number of entrants that each occupation will successfully attract into the mining industry and all industries combined. It is important to note that the Northern forecast of Available Talent is based on the previous territorial forecasts' produced by MiHR; at the same time, each of the territorial forecasts' also remove irrelevant occupations and focus only on those specific to their respective mining industry. Of the 66 occupations that MiHR considers, Yukon's forecast included 42 occupations; the NWT's forecast included 54 occupations; while Nunavut's forecast included 42 occupations. The Northern forecast includes 63 occupations.

In order to produce an analysis that is consistent with the previous reports, the Northern forecasts provided in this report are indented to report on 'the North' as though it were its own entity. As a result, the Northern forecast is inclusive to any occupation that is relevant to at least one territory - even if that occupation is not relevant to all of the territories. That is, an occupation that was removed in one (or two) of the territorial forecasts is still considered relevant to the North if it was included in at least one of the territorial forecasts. Occupations that fit this criterion were first incorporated back into to each territorial analysis so that the Northern forecast could then be formulated. The estimates from the three territorial reports therefore do not necessary sum to the estimate for the North. A total of 3 occupations were removed from the analysis of the North as they were also excluded in each territory's respective forecast.

MiHR's model of Available Talent for each occupation starts with the existing supply, adds in new entrants, and then subtracts people who leave. The model assumes three main sources of new entrants: school leavers, migrants and "others"; the latter group consists generally of people who switch occupations or re-enter the workforce after temporarily leaving it. The model also assumes three paths of departure from the workforce of a specific province or territory: moving to another province/territory or another country; retiring; and leaving for other reasons, which include transferring to another occupation, temporarily leaving the workforce, disability or death.

Model Inputs and Assumptions

Model inputs come from a combination of sources. Due to the level of detail required for these analyses, it was necessary to use census data. The census is the most detailed source of employment data available from Statistics Canada. It provides the simultaneous breakdown of employment by industry, region, occupation and other required demographic detail. The major weakness of the census data is that it is compiled only once every five years and the most recent census data available is from 2006. As such, the forecast for supply data begins in 2007. Where possible, more recent data (e.g., from the Labour Force Survey and the National Household survey is incorporated into the forecast, to verify and validate the estimates from 2007 to 2011.

Employment by Occupation

MiHR generates estimates of employment, retirements and "other" exits by occupation, as part of its hiring-requirements forecasts. Employment outlooks for each occupation in mining were tied to MiHR's employment forecasts. Employment estimates for each occupation in other industry sectors were tied to The Conference Board of Canada's provincial forecasts for non-mining sectors.

Employment by occupation is used to help estimate migration patterns in the model. Employment for each occupation is divided into two categories: the mining industry and other industries. The census data provides information on the starting points of these two series. The mining portion of employment is taken from MiHR's mining-employment forecasts, and employment for all other sectors is taken from The Conference Board of Canada's employment forecasts. These results are then summed to generate total employment by occupation.

The underlying assumption behind this methodology is that occupational employment in the mining sector will grow at the same pace as the entire mining industry, and that occupational employment outside of the mining sector will grow at the same pace as the rest of the economy. This is a reasonable assumption, as it implies that the share each occupation has – both within the mining sector and within the rest of the economy – will remain constant.

Migration

Net international migration forecasts are based on estimates of net international migration for Canada by occupation, taken from Employment and Social Development Canada's (ESDC's) (formally Human Resources and Skills Development Canada) Canadian Occupational Projection System (COPS) model. The share of international-migration flows, relative to the national average, is based on the relative strength of its labour market.

Net interprovincial migration is based on the balance of inflows and outflows of workers in a particular occupation in a particular territory in the North, relative to the Canadian average. This assumes that a surplus of workers (a "soft labour market") leads to net outward migration, while a lack of workers (a "tight labour market") leads to a net inflow of workers to the province. According to modelling done by The Conference Board of Canada (CBoC), the unemployment rate in a region is an important determinant of migration flows, and the gap between supply and demand is a proxy for the unemployment rate for each occupation.

The forecasts of employment by occupation are used to generate net migration estimates for each occupation. Interprovincial and international immigration by occupation is known from the census. To forecast immigration, the share of immigrants by occupation, relative to total immigration, is kept constant over the forecast period, and applied to the CBoC's provincial forecast for immigration by province. This is done for both interprovincial and international immigration.

This methodology incorporates the relative mobility of each occupation into the forecast. Occupations where people have historically been less likely to move will continue to display this characteristic and those with historically higher levels of mobility will continue to behave in a similar manner. As well, by tying the forecast to the CBoC's existing forecasts for provincial immigration, this methodology incorporates a measure of the attractiveness of a region. The CBoC's forecasts are dependent on the relative tightness of a region's labour markets and its historic ability to attract migrants.

School Leavers

The forecast of school leavers is generated using two methods. The first method is based on the occupation's historic ability to attract people leaving school; if a certain share of the population under the age of 25 has historically entered a particular occupation, it is assumed that the share of entrants will remain similar going forward. Thus, the number of new entrants depends on the age profile of the territory's workforce. School graduation figures and forecasts for specific occupations are also considered.

Second, to estimate the number of school leavers by occupation, the educational attainment of workers aged 25 to 34 is used to establish the education profile for each occupation. The census provides the most recent data on the number of workers by age group, occupation, and highest certificate, diploma or degree obtained. This information is combined with demographic data for the territory to estimate the number of school leavers per occupation. An estimate of how attractive a particular occupation is to school leavers is also applied for each occupation. Finally, estimates of how many school leavers will enter the workforce every year are created. School-leaver estimates are calculated for three broad levels of education: high school diploma or lower; trade, college or other post-secondary education below the bachelor's degree level; and university degree.

Retirements

Retirement leavers are estimated using MiHR's forecasted retirement rates by province and territory. Consistent with MiHR's existing model, the retirement rate is assumed to be the same across all occupations. Retirement rates are forecasted by first estimating the probability that an individual will retire from the labour force in a given time period. This will depend on many factors, most notably the individual's age and educational background. This behavioural estimation is then applied to the mining labour force, capturing its unique demographic characteristics.

Other Entrants

The last group of new entrants is the "other" category, which largely consists of new people entering from other occupations or re-entering the workforce. Given the degree of training required for many of these occupations, it is very likely that these entrants would be already trained in that occupation. For simplicity, the number of new entrants is assumed to be a certain percentage of the existing labour force. This rate is set equal to the "other" leavers' rate that MiHR uses as part of its existing models and is constant across occupations for a particular province. In this manner, "other" entrants are precisely equal to and offset "other" leavers.

This appendix lists the North American Industry Classification Codes (NAICS) and National Occupational Classification (NOC) codes used throughout this report to define the mining industry. MiHR is engaged in ongoing, iterative research to include more NOC codes in this definition of the sector and to better capture Statistics Canada data related to the mining-industry workforce.

Industry Definition and Scope

Statistics Canada, the main source of Canada's labour market information, uses two different coding systems to classify data: the North American Industry Classification System (NAICS) and the National Occupational Classification (NOC).

NAICS codes are used by statistical agencies throughout North America to describe economic and business activity at the industry level. The system features a production-oriented framework where assignment to a specific industry is based on primary activity, enabling it to group together establishments with similar activities.

The NOC system was developed by Statistics Canada and Employment and Social Development Canada (ESDC) (formally Human Resources and Skills Development Canada) to provide standardized descriptions of the work that Canadians perform in the labour market. NOC codes are specific to Canada.

There is no single NAICS code that directly corresponds to all phases of the mining cycle (which includes exploration, development, extraction, processing and reclamation). Similarly, there is no single set of NOC categories that pertain to only mining. People employed in occupation groups that are prevalent in mining also work in a variety of other industries. Together, the NAICS and NOC systems provide a means for grouping statistics to obtain estimates of employment and workforce demographics using Statistics Canada data sources. A full description of both classification systems can be found on Statistics Canada's website (www.statcan.gc.ca).

The Mining Sector, Industry Classifications

MiHR has defined the sector according to the following NAICS codes, thereby providing the best correspondence between the industry's main primary and processing activities as defined by Natural Resources Canada. Note that certain NAICS codes listed are not relevant to the Northern mining industry. These are not included in the forecasts presented in this report. The list below describes the NAICS codes considered and underlines those that are relevant to the NWT's mining industry. The NAICS codes that define the mining industry include:

Mineral Extraction:
- NAICS 2121: Coal mining. This industry group comprises establishments primarily engaged in mining bituminous coal, anthracite and lignite by underground mining, and auger mining, strip mining, culm bank mining and other surface mining.

- NAICS 2122 Metal ore mining. This industry group comprises establishments primarily engaged in mining metallic minerals (ores). Also included are establishments engaged in ore dressing and beneficiating (treatment of raw materials such as washing or pulverizing) operations, whether performed at mills operated in conjunction with the mines served or at mills, such as custom mills, operated separately.

- NAICS 2123 Non-metallic mineral mining and quarrying. This industry group comprises establishments primarily engaged in mining or quarrying non-metallic minerals, except coal. Primary preparation plants, such as those engaged in crushing, grinding and washing, are included.

Mining Support Services:
- NAICS 2131 Support activities for mining and oil and gas extraction. This industry group comprises establishments primarily engaged in providing support services, on a contract or fee basis, required for the mining and quarrying of minerals and for the extraction of oil and gas. Establishments engaged in the exploration for minerals, other than oil or gas, are included. Exploration includes traditional prospecting methods, such as taking ore samples and making geological observations at prospective sites.

Mineral Processing:
- NAICS 3311: Iron and Steel Mills and Ferro-Alloy Manufacturing. This industry group comprises establishments primarily engaged in smelting iron ore and steel scrap to produce pig iron in molten or solid form.

- NAICS 3313: Alumina and Aluminum Production and Processing. This industry group comprises establishments primarily engaged in extracting alumina.

- NAICS 3314: Non-Ferrous Metal (except Aluminum) Production and Processing. This industry group comprises establishments primarily engaged in smelting, refining, rolling, drawing, extruding and alloying non-ferrous metal (except aluminum).

Mineral Exploration:
- NAICS 5413: Architectural, engineering and related services. This industry group comprises establishments primarily engaged in providing architectural, engineering and related services, surveying and mapping, laboratory and on-site testing, and specialized design services. MiHR has undertaken an extensive review of the primary activities in exploration and their coverage under the NAICS system in order to develop an appropriate definition of the exploration sector. Given that only a portion of NAICS 5413 is related to exploration activities, MiHR has adjusted estimates under this code accordingly to capture only the activities that are relevant to mineral exploration (such as those under geosciences, surveying and mapping, and assay laboratories, etc.)

Occupation Classification

MiHR uses National Occupation Classification (NOC) codes to classify occupations. Listed below are the 66 NOC codes that MiHR uses to define the occupations that are relevant to the mining industry. Note that the occupation titles listed below are those used in the Statistics Canada system. Note that certain NOC codes listed are not relevant to the Northern mining industry and are therefore not included in the forecasts presented in this report.

An occupation can often have multiple titles and Statistics Canada offers a means to map or connect job titles back to the proper NOC code, found on the ESDC website (www.esdc.gc.ca) (specifically the "Quick Search" box).[12] For example, a "Quick Search" for "haul truck driver underground mining" shows that this occupation maps directly to "Underground mine service and support workers". The site will also show which job titles are listed for each occupation category. For example "Heavy equipment operators (except crane)" include job titles such as: apprentice heavy equipment operator; heavy-duty equipment operator; heavy equipment operator; operating engineer, heavy equipment; ripper operator – heavy equipment; shovel operator – heavy equipment; spreader operator – heavy equipment; stacker operator – heavy equipment. The list below flags (with an asterisk) the NOC codes that are relevant to the Northern mining industry (54 NOC codes).

NOC Code	Title
0111	Financial managers*
0112	Human resources managers*
0211	Engineering managers*
0711	Construction managers*
0811	Primary production managers (except agriculture)*
1111	Financial auditors and accountants*
1112	Financial and investment analysts*
1121	Specialists in human resources*
1241	Secretaries (except legal and medical)*
1441	Administrative clerks*
1473	Production clerks*
1475	Dispatchers and radio operators*
1476	Transportation route and crew schedulers*
2112	Chemists*
2113	Geologists, geochemists and geophysicists*
2115	Other professional occupations in physical sciences*
2121	Biologists and related scientists*
2131	Civil engineers*
2132	Mechanical engineers*
2133	Electrical and electronics engineers*
2134	Chemical engineers
2141	Industrial and manufacturing engineers*
2142	Metallurgical and materials engineers*
2143	Mining engineers*
2144	Geological engineers*
2148	Other professional engineers*
2154	Land surveyors*
2211	Chemical technologists and technicians*
2212	Geological and mineral technologists and technicians*
2221	Biological technologists and technicians*
2231	Civil engineering technologists and technicians*
2232	Mechanical engineering technologists and technicians*
2233	Industrial engineering and manufacturing technologists and technicians*
2234	Construction estimators*

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12 See http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/Welcome.aspx

2241	Electrical and electronics engineering technologists and technicians*
2253	Drafting technologists and technicians
2254	Land survey technologists and technicians*
2255	Mapping and related technologists and technicians*
2262	Engineering inspectors and regulatory officers*
2263	Inspectors in public and environmental health and occupational health and safety*
6242	Cooks*
7213	Contractors and supervisors, pipefitting trades
7216	Contractors and supervisors, mechanic trades*
7251	Plumbers*
7252	Steamfitters, pipefitters and sprinkler system installers*
7271	Carpenters*
7242	Industrial electricians*
7265	Welders and related machine operators*
7311	Construction millwrights and industrial mechanics (except textile)*
7312	Heavy-duty equipment mechanics*
7421	Heavy equipment operators (except crane)*
7371	Crane operators*
7372	Drillers and blasters - Surface mining, quarrying and construction*
7411	Truck drivers*
7452	Material handlers*
7611	Construction trades helpers and workers*
7612	Other trades helpers and workers*
8221	Supervisors, mining and quarrying*
8231	Underground production and development miners*
8411	Underground mine service and support workers*
8614	Mine workers*
9211	Supervisors, mineral and metal processing*
9231	Central control and process operators, mineral and metal processing*
9411	Machine operators, mineral and metal processing*
9415	Inspectors and testers, mineral and metal processing*
9611	Workers in mineral and metal processing*

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