



Saskatchewan Mining Industry Hiring Requirements and Talent Availability Forecasts 2011

*A Mining Industry Workforce
Information Network Report*



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For more information, contact:

Mining Industry Human Resources Council
260 Hearst Way, Suite 401
Kanata, Ontario K2L 3H1

Tel: 613 270 9696
Fax: 613 270 9399
Email: research@mihrc.ca

Or visit the website at:

www.mininghrforecasts.ca
www.mihrc.ca

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Executive Summary

The mining industry in Saskatchewan is a vital part of both the provincial and national economies. With an estimated value of mineral production of more than \$7.0 billion in 2010,¹ Saskatchewan's mining industry is the third largest in Canada. As the world continues to emerge from the shadow of the most widespread economic recession since the 1930s, there is a vast opportunity for the Saskatchewan mining industry to grow.

However, like economic sectors across the country, the growth of the mining industry in Saskatchewan is threatened by approaching human resources challenges. With the Canadian population and workforce aging, the sector will face challenges in the near future in meeting hiring requirements.

The Model for Forecasting Employment and Hiring Requirements

MiHR's 2010 forecasting model combines changes in employment due to economic factors and replacement requirements to obtain estimates of total hiring requirements. Three scenarios are developed to forecast provincial and occupational hiring requirements over a 10-year period. Under a baseline scenario, hiring requirements in the Saskatchewan mining industry are expected to be over 15,100² over the course of the next decade. Even under a contractionary scenario, the industry will need to hire almost 9,200 workers. In an expansionary scenario, hiring requirements are projected to reach over 21,600, representing a near doubling of the current mining workforce in the province.

Cumulative Hiring Requirements Forecast By Scenario – 2013, 2016, 2021*

	CUMULATIVE HIRING REQUIREMENTS		
	2013	2016	2021
Contractionary	3,800	5,400	9,200
Baseline	5,300	8,400	15,100
Expansionary	6,700	11,600	21,600

Source: Mining Industry Human Resources Council, Spring 2011

* Note: Numbers may not add perfectly due to rounding.

1 NRCAN estimates of minerals production, mmsd.mms.nrcan.gc.ca/stat-stat/prod-prod/2010p-eng.aspx

2 From MiHR hiring requirements forecast.

Hiring-requirements forecasts for Saskatchewan’s mining industry were further broken down into occupational groups. Cumulative hiring requirements by broad occupational category under a baseline scenario show the greatest need for trades and undesignated occupations, technical occupations, and professional and physical science occupations.

Cumulative Hiring Requirements Forecasts – By Occupational Categories Baseline Scenario – 2021

	2013	2016	2021
Trades and undesignated occupations	1,730	2,740	4,890
Professional and physical science occupations	345	545	975
Human resources and financial occupations	60	95	175
Support workers	170	265	480
Technical occupations	405	645	1,155
Supervisors, coordinators and foremen	295	465	835
All other occupations	2,925	3,635	6,495
Total	5,300	8,400	15,100*

Source: Mining Industry Human Resources Council, Spring 2011

* Numbers may not add perfectly due to rounding in subcategories.

Forecasting Labour Supply and Available Talent

MiHR’s model of labour supply 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, immigrants and “others” – who are generally people who switch occupations or re-enter the workforce after temporarily leaving it. There are also three assumed ways for workers to leave the workforce of a specific province: moving to another province or another country; retiring; and leaving for other reasons, which include changing to another occupation, temporarily leaving the workforce, disability or death.

The annual supply of workers for Saskatchewan in all industries was calculated across the 66 occupations of interest. The Saskatchewan mining industry’s share of the supply was then estimated – based on historic trends of the flow of workers from these occupations into the mining industry. Forecasts of new entrants from international and interprovincial migration, school leavers, and other entry points into the labour market over a 10-year period are used to estimate the available talent to meet future hiring requirements.

Cumulative Available Talent, All Sectors and Mining 66 Occupations to 2013, 2016, 2021

	2013	2016	2021
Total entrants for 66 occupations, all industry sectors	13,900	27,300	48,600
Mining's share of entrants for 66 occupations (assuming the historical rate of 11% per year)	1,600	3,200	5,700

Source: Mining Industry Human Resources Council, Spring 2011

Mining historically attracts approximately 11 per cent of new entrants to the Saskatchewan labour pool each year, across the selected occupations. This rate varies depending on how specific an occupation is to the mining industry. For example, the province's mining industry has historically attracted approximately 2 per cent of human resources and finance workers, and nearly 100 per cent of underground miners.

Cumulative Available Talent – By Broad Occupational Category 66 Occupations to 2021

	MINING'S SHARE OF AVAILABLE TALENT (NUMBER OF WORKERS)	TOTAL AVAILABLE TALENT, ALL SECTORS (NUMBER OF WORKERS)	MINING'S HISTORIC PROPORTION OF AVAILABLE TALENT (%)
Trades and undesignated occupations	4,065	25,965	15
Professional and physical science occupations	535	3,767	14
Human resources and financial occupations	100	4,435	2
Support workers	285	10,005	3
Technical occupations	295	2,960	9
Supervisors, coordinators, and foremen	585	1,775	32

Source: Mining Industry Human Resources Council, Spring 2011

The Gap

To compare outputs between the two types of forecasts and to examine the talent gap, it is necessary to segment the hiring-requirements forecasts to reflect the same occupation grouping as the available-talent forecasts. Hiring requirements are segmented out for the 66 occupations modeled in the available talent forecasts. The hiring requirements for this select group are then compared to the projections of available talent for Saskatchewan's mining sector.

This comparison exposes the gaps in the Saskatchewan industry's ability to meet projected hiring requirements over a two-, five- and 10-year horizon. The predicted gap assumes that mining's share of available talent will remain at historical levels; in other words, the industry will continue to attract new entrants for each occupation at the same rates observed over the past few decades.

The Talent Gap and Challenge – Hiring Forecast Baseline Scenario – 2013, 2016, 2021

THE TALENT GAP	2013	2016	2021
Hiring requirements for selected 66 occupations	2,375	4,755	8,510
Available talent – mining's share of labour pool (11%)	1,600	3,200	5,700
Gap	1,580	1,860	3,379
THE CHALLENGE			
All entrants – selected occupations	13,900	27,300	48,800
Needed share to meet hiring requirements (%)	23%	19%	19%

Source: Mining Industry Human Resources Council, Spring 2011

It is predicted that the available talent for the selected 66 occupations will not be sufficient to meet the forecasted hiring requirements over the short, medium, and long term under a baseline scenario. The industry is expected to attract only 5,700 new entrants to the labour pool to meet a hiring need of 8,510 by 2021.

The Gap and Challenge – By Broad Occupational Category (Baseline Hiring Forecast Scenario) 66 Occupations to 2021

	THE NEED	THE SUPPLY AND GAP		THE CHALLENGE		
	CUMULATIVE HIRING REQUIREMENTS	TALENT AVAILABILITY – MINING'S SHARE	GAP	TOTAL AVAILABLE TALENT ALL SECTORS	MINING'S CURRENT SHARE OF TALENT	MINING'S REQUIRED SHARE OF TALENT
Trades and undesignated occupations	4,890	4,065	-815	25,865	15%	19%
Professional and physical science occupations	975	535	-450	3,767	14%	26%
Human resources and financial occupations	175	100	-65	4,435	2%	4%
Support workers	480	285	-185	10,005	3%	5%
Technical occupations	1,155	295	-855	2,960	9%	39%
Supervisors, coordinators, and foremen	835	585	-250	1,775	32%	47%

Source: Mining Industry Human Resources Council, Spring 2011

Strategies to Fill the Gap

Saskatchewan's mining industry will need to increase the proportion of workers it attracts in each occupational category in order to meet future hiring requirements. That said, the situation with Technical Occupations (technologists and technicians) is particularly dire. The industry currently attracts about nine per cent of available talent for these occupations; in order to meet future needs, the industry must increase the share of the available talent pool it attracts by nearly 30 percentage points.

In some cases, the industry must aim to attract more entrants from an existing talent pool (i.e., carve out a larger slice of the talent pie). In other cases, the industry must increase the numbers of entrants and grow a talent pool that will otherwise be too small to meet its needs (i.e., make the pie bigger). In all cases, the industry must strive to optimize the current workforce and “do more” with what is already there – through strategic workforce planning and supports for improvements to productivity.

To ensure that it is able to meet this challenge, Saskatchewan's mining industry will need to continue efforts to attract previously under-represented groups into the workforce and to enhance planning for human resources challenges. The greatest impacts on closing the talent gap will come from a combination of programs and initiatives to attract First Nations and Métis peoples, immigrants, and workers from other sectors and other provinces; to retain and re-engage the retired workforce; and to support education and training to increase the number of individuals entering the sector after leaving school.



1 Introduction

This report was prepared for the Saskatchewan mining industry by the Mining Industry Human Resources Council (MiHR), in partnership with The Saskatchewan Mining Association (SMA). Through its work and research, MiHR contributes to the strength, competitiveness and sustainability of the Canadian mining industry. This report contributes to MiHR's strategic goal to support the mining industry's ability to anticipate and plan for future labour requirements.

The forecasts presented here are an update and extension of the 10-year outlook on hiring requirements that MiHR provided Saskatchewan's mining industry in the *2008 Report on the Labour Market Demand Projections*. Economic uncertainty resulting from the global recession has driven the need for an updated macroeconomic outlook for Saskatchewan's mining industry. MiHR has incorporated new modeling capabilities for its hiring-requirements forecasts, as recently presented in the *Canadian Mining Industry Employment and Hiring Forecast 2010*.

The updated forecasts presented here also include a number of Saskatchewan-specific customizations, to incorporate factors related to the province's unique commodity mix and labour productivity factors. Finally, this new outlook includes forecasts of labour supply and available talent. This is a new capability in MiHR's Mining Industry Workforce Information Network labour market intelligence program and allows for high-level analysis of the gaps between hiring requirements and available talent.

Industry Definition and Scope

For the purposes of its forecasts, MiHR defines the mining industry as including all phases of the mining cycle: exploration, development, extraction, processing, and reclamation. Forecasts presented in the report rely heavily on data from Statistics Canada. Thus, North American Industry Classification Codes (NAICS) and National Occupational Classification for Statistics (NOC-S) codes are used to define the mining industry.

There is no single NAICS code or set of codes, that directly corresponds to all phases of the mining cycle. Similarly, there is no single set of NOC-S 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-S systems provide a means for grouping statistics to obtain estimates of employment and workforce demographics using Statistics Canada data sources. Details on the NAICS and NOCS codes included in the forecasts are found in Appendix C.

Overview of the Report

This report is broken into three main sections. The first section consists of an overview of economic conditions in Saskatchewan and trends in the mining labour market. This is followed by a section outlining the hiring-requirements and available-talent forecasts for the province's mining industry. The final section of the report provides a high-level gap analysis of the province's forecasted hiring requirements and talent availability. This last section includes discussion of all aspects of labour supply and options for attracting more workers to meet future needs. The forecasts for the industry's hiring requirements and availability of talent are prepared separately and then compared in a gap analysis.

Results from a survey of members of the SMA are also presented. These data complement the model-based hiring-requirements forecast and provide key demographics from a representative sampling of the mining employers in Saskatchewan.



2 Economic Overview and Mining Labour Market Trends

Economic Overview

Over the last decade, the global economy experienced an unprecedented expansion, largely due to growth in emerging economies boosting demand for commodities. With well-developed agriculture, oil and gas, and mining industries, Saskatchewan was well-positioned to meet the world's needs; the upswing in global demand propelled Saskatchewan's economy to experience real GDP growth of more than 2.2 per cent (CAGR³) a year, between 2000 and 2008.⁴ By 2008, the province's real GDP had reached nearly \$41.6 billion, which was equal to about three per cent of the overall Canadian economy.⁵

In the fall of 2008, the global recession hit resource-producing provinces in Canada hard. Saskatchewan's real GDP declined by 3.9 per cent⁶ in 2009 due largely to a nearly 50 per cent decline in potash production⁷ driven by weakening global demand.

The end of the recession and the subsequent recovery in commodity prices has returned Saskatchewan to growth in 2010 and 2011. Demand for commodities has resumed from emerging economies and will slowly strengthen as the United States and European economies digest and deal with the fiscal and labour market challenges caused by the recession.

Market volatility and economic uncertainty continues. The global economy continues to rebalance after the recession and inflationary pressures could suppress demand for commodities in emerging markets. Long-term, fixed price commodities contracts – especially for uranium – are likely to provide some insulation from this volatility; however, the mining sector is highly sensitive to sudden shifts in global demand.

3 CAGR: compound annual growth rate.

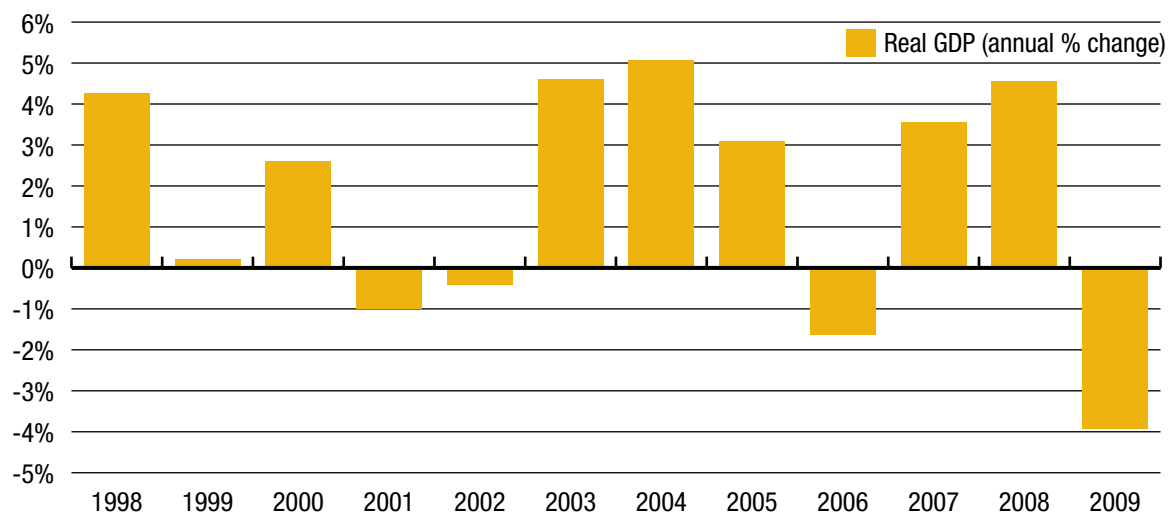
4 MiHR calculations based on Statistics Canada, Provincial Economic Accounts data

5 Government of Saskatchewan (<http://gov.sk.ca/Default.aspx?DN=8f48fa79-d320-48d8-bc6a-f414d4c59694>)

6 Statistics Canada, Provincial Economic Accounts

7 Enterprise Saskatchewan (www.enterprisesaskatchewan.ca/economicoverview)

Figure 1
Real GDP for Saskatchewan, 1998–2009 (Per cent GDP)



Source: Statistics Canada, Mining Industry Human Resources Council

This volatility complicates the forecasting of commodity prices and demand going forward. In the short term, tight supply conditions coupled with growing global demand is expected to lead to a modest increase in minerals and metals prices.⁸ However, over the medium and longer term, prices are expected to moderate as global metals production increases and some deceleration in demand from emerging markets⁹ occurs.

Mining Labour Market Trends

Like most industries in Canada, the mining industry in Saskatchewan is on the cusp of a dramatic transformation of its labour force, as the leading edge of the “baby boom” generation reaches retirement age. According to recent Statistics Canada projections,¹⁰ within the next decade, Canada will have more people at an age where they can leave the labour force than at an age where they can begin working. This shift is destined to have a broad impact on the Canadian economy and the mining industry as a whole.

Over the course of the last 20 years, the average retirement age in the Canadian mining industry has been 59.5 – younger than the average age of 62 for the entire economy. However, the picture for Saskatchewan is different from this national overview. The median age of retirement across the economy in Saskatchewan is nearly 65, while according to a MiHR survey of Saskatchewan Mining Association (SMA) members, the average age of retirement in the province’s mining industry is 62.

While this indicates that the mining industry in Saskatchewan may have more flexibility than mining sectors in other regions of Canada, the industry still faces many challenges associated with an aging workforce. Respondents to MiHR’s survey of SMA members indicated that nearly 12 per cent of their workforce will be eligible to retire in the next five years. This is double the slightly more than six per cent that are currently eligible.

⁸ Bank of Canada, April 2011 Monetary Policy Report

⁹ Ibid. (indicates “same as the source above”)

¹⁰ *Canadian Mining Industry Employment and Hiring Forecasts 2010*, MiHR, Statistics Canada Labour Force Survey

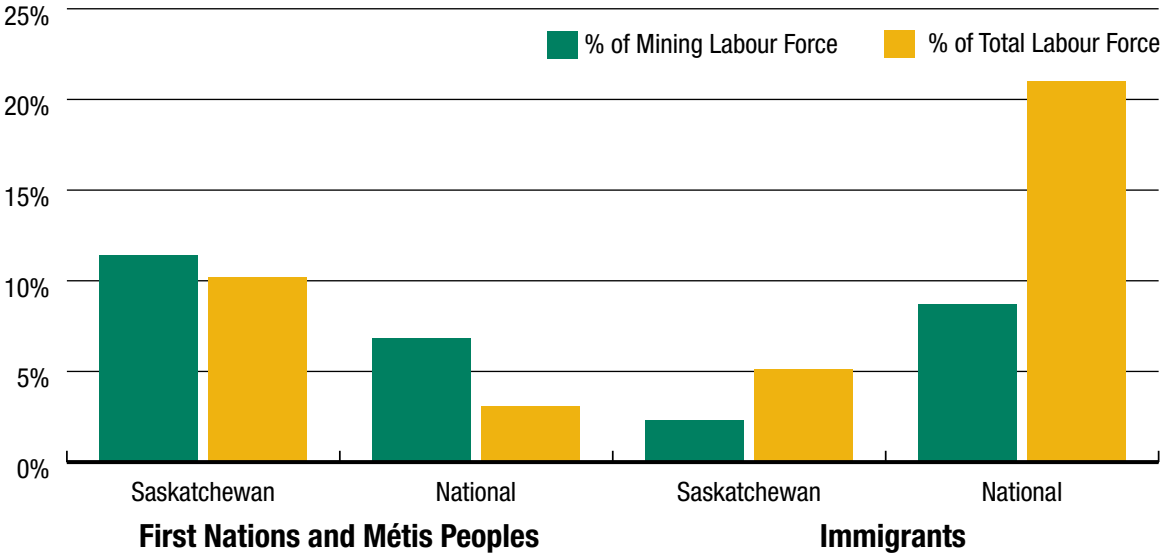
Since the decision to retire is influenced by a number of factors beyond eligibility (e.g., health status, financial circumstances and family responsibilities), the survey data do not indicate that the Saskatchewan mining industry is destined to face the retirement of all eligible workers at one time. However, the growing number of individuals eligible to retire is likely to put significant pressure on the industry, as experienced workers depart and take with them their extensive knowledge and experience.

Currently, the mining industry underperforms the labour force as a whole, in employing women and new Canadians. Increasing the participation rates of these core groups can help offset the looming wave of Baby-Boomer retirements. In contrast, the sector outperforms the labour force when it comes to employing First Nations and Métis peoples, as shown in Figure 2.

According to Statistics Canada’s 2006 census, participation of women in mining was just 14 per cent in 2006 (compared to 47 per cent across the entire economy). Further, immigrants accounted for only 8.7 per cent of Canada’s mining workforce (versus 21 per cent in the Canadian labour force). However, in Saskatchewan mining participation rates of immigrants are somewhat weaker than in the rest of the Canadian mining industry. Approximately 2.3 per cent of the Saskatchewan mining labour force are immigrants, compared to 5.1 per cent in the national mining labour force.

The Saskatchewan mining industry is a leading employer of First Nations and Métis peoples. First Nations and Métis peoples are the fastest growing segment of the Canadian population. A large number of First Nations and Métis communities are in close proximity to mining operations and mining employers in Saskatchewan make hiring a local workforce a top priority. According to the 2006 census, almost seven per cent of the Canadian mining workforce self-identified as being of Aboriginal descent, almost double that of the rest of the labour force. In Saskatchewan, First Nations and Métis Peoples represent 11.5 per cent of the mining workforce. Further, the majority of First Nations and Métis Peoples in Saskatchewan mining are employed at northern mine sites where over 40 per cent of site workforces are Aboriginal Peoples.

Figure 2
Participation of First Nations and Métis Peoples and Immigrants in Saskatchewan Mining



Source: Statistics Canada 2006 Census, Mining Industry Human Resources Council



3

Hiring Requirements Forecasts

As the previous section shows, the age demographics of the labour force signal a coming wave of retirement that will put significant pressure on employers in Saskatchewan's mining industry. MiHR research has shown¹¹ that employment in the mining sector is more volatile than in many other industries in Canada. Previous labour market forecasts produced by MiHR show that despite this volatility, future hiring requirements will be quite significant across Canada, even under contractionary scenarios. The same trends are evident in labour market forecasts for Saskatchewan's mining industry. Even in a contractionary scenario, mining employers in the province will need to hire thousands of workers to offset workforce attrition that is simply due to retirements and other separation.

Description of the Model

MiHR's forecasts are based on an economic model that combines a number of factors including, labour productivity, changes in commodity prices, retirement rates and non-retirement separation rates. Using a combination of independent economic forecasts and information from industry stakeholders, the model translates these factors into forecasts of mining employment and hiring requirements over a 10-year period.¹²

This report presents three forecast scenarios. The baseline scenario uses a consensus forecast¹³ for fluctuation in Saskatchewan-specific commodity prices and productivity changes. The expansionary scenario assumes greater-than-expected growth, including assumptions regarding new development projects coming into production phases. The contractionary scenario assumes lower-than-expected economic growth. Details on the hiring-requirements model and the methodology used to develop forecasts can be found in Appendix A.

11 MiHR – *Canadian Mining Industry Employment and Hiring Forecasts*, 2010

12 The forecasting model builds upon the model developed for MiHR's *Canadian Mining Industry Employment and Hiring Forecasts*, 2010. MiHR's current forecasting model is the result of an iterative continuous improvement development driven by MiHR labour market research activities. The current model differs from the model used to produce the 2008 report and direct comparisons between the two forecasts are to be avoided or made only at a high level. For example, the new model includes more customization for Saskatchewan specific factors (commodity mix and the addition of productivity measures).

13 Individual economic forecasts vary widely in complexity, theoretical underpinnings, and confidence in outcomes. A consensus forecast is essentially an amalgamation or averaging of individual predictions from leading forecasters. Consensus forecasts tend to balance out overly pessimistic or optimistic forecasts to present an arguably more balanced viewpoint.

Labour Productivity

Labour productivity is influenced by a number of different factors and trends that affect the level of a sector's output over time – for example, technology and training. On the whole, labour productivity has an inverse relationship with the overall level of employment. As productivity grows, the sector is able to “do more with less,” which means that higher levels of productivity tend to be associated with contractions in employment needs.

The labour productivity variable used in the model is derived from the economic definition of labour productivity; where the ratio of output to labour input is calculated by dividing the real gross domestic product (a measure of the value of output adjusted for price effects) of the mining sector in Saskatchewan, by the number of hours worked in the mining sector in the province. Between 1987 and 2008, labour productivity grew in the Saskatchewan mining industry at an average rate of 0.82 per cent¹⁴ annually. However, this rate has fluctuated from an average annual growth of just over 0.1 per cent for the 1987-1996 period to nearly 1.5 per cent between 1999 and 2008.¹⁵

Saskatchewan Minerals Price Index

Mining employment in Canada tends to be more volatile than in many other sectors, making long-term workforce planning more challenging. In large part, the volatility of mining employment is a result of reactionary workforce adjustments due to the large and sometimes unpredictable fluctuations in the prices and demand for mining commodities. MiHR research has recently demonstrated a strong positive correlation between movements in commodity prices and the overall level of mining employment in Canada.

Given the strong relationship between commodity prices and employment levels, MiHR has developed a Saskatchewan-specific Minerals Price Index (SMPI) to capture the unique commodity mix of the province. This price index was constructed based on the methodology for a Laspeyres Price Index.¹⁶ MiHR's SMPI for the forecast period also relies on a consensus view of forecast prices and production rates for Saskatchewan's key mining commodities¹⁷. Authorities contributing to this consensus include, among others, the World Bank, Bank of Canada, private sector Canadian banks and commodity-specific economic analysis consultancies.

Movements in commodity prices and demand are important variables to include in MiHR's forecasts of employment. As shown in Figure 3, the correlation between commodity prices and employment in Saskatchewan is similar to that observed in the rest of the country. Therefore, MiHR translates commodity price inputs, along with labour productivity inputs, into employment forecasts in its hiring requirements models.

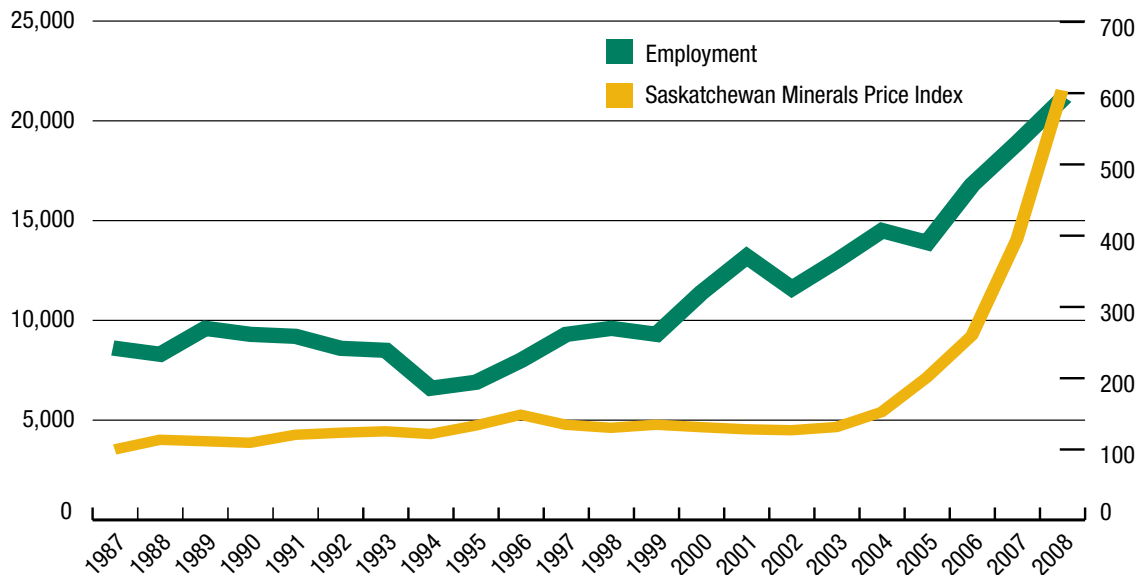
14 MiHR calculation based on Statistics Canada data.

15 *Ibid.*

16 A Laspeyres Price Index reflects the cost of buying what people bought in the base year at the prices they pay in the current year, divided by the cost of the same goods and services at the prices actually paid in the base year, times 100.

17 While potash and uranium were the primary drivers of employment in the model scenarios; the impacts of prices for gold, diamonds, coal, iron ore, and base metals were also considered.

Figure 3
Mining Employment (000s) and the Saskatchewan Minerals Price Index (Base Year 1987=100)



Source: Statistics Canada, Mining Industry Human Resources Council

Retirement Rate

Over the next decade, the entire Canadian labour force is facing a looming wave of retirements, as members of the “baby boom” generation become eligible to leave the workforce. However, it is difficult to predict the timing of retirements. The decision to retire is a complex one and each individual considers a number of factors such as financial goals, levels of debt and savings, family circumstances, health status, retirement policies and other labour market pressures. The complex nature of individual retirement decisions is an important factor when developing predictions for future retirement rates.

MiHR uses a reasonably conservative approach when estimating retirement rates. Historical retirement ages are considered and a profile of expected retirement is created based on the age demographics of the province. To construct the retirement-rate variable used in the forecasts, MiHR has factored in the average age of retirement and labour force demographics data, both from Statistics Canada and from responses provided by Saskatchewan mining employers in MiHR’s survey of Saskatchewan Mining Association (SMA) members in early 2011.

According to the MiHR survey results, the average age of retirement in the Saskatchewan mining industry is 62. This is older than the average retirement age of 59.5 in the national mining industry. This trend is consistent with other industry sectors in the province. Historically, the average age of retirement in Saskatchewan is older than the national average across the entire labour force.

Non-Retirement Separation Rate

The non-retirement separation rate captures important movement and churn in the labour market that is not directly related to a change in the overall level of employment. This variable includes, for example, individuals leaving the mining industry in Saskatchewan for another industry sector or for the mining industry of another province, as well as people leaving the labour force due to death or disability, or to return to school.

Previous MiHR research found that the national non-retirement separation rate in the mining industry was two per cent. However, this rate will be higher for an individual province, due to interprovincial migration. Workers leaving the Saskatchewan mining industry may work elsewhere in Canada, so two per cent represents the lower-limit of a provincial separation rate.

Survey responses from SMA members indicated that average turnover rates among mining employers in Saskatchewan are approximately six per cent. Some of the employees captured in this percentage have presumably left one employer to work for another mining company in the province. Workers leaving a particular mining company may remain in Saskatchewan at another company. Thus, six per cent represents the upper-limit of a provincial separation rate.

Given these two assumptions, MiHR has estimated the non-retirement separation rate for Saskatchewan mining to be four per cent – a figure that is midway between the employer-reported rate and the national industry separation rate.

Cumulative Hiring Requirements Forecasts

Forecasts of hiring requirements for the Saskatchewan mining industry were produced for three scenarios – baseline, contractionary and expansionary. In all three cases, demand for workers will exceed changes in employment driven by price and productivity changes. This leads to projected cumulative hiring requirements over the next 10 years of 15,100 workers in a baseline scenario; 9,200 workers in a contractionary scenario; and 21,600 workers in an expansionary scenario.

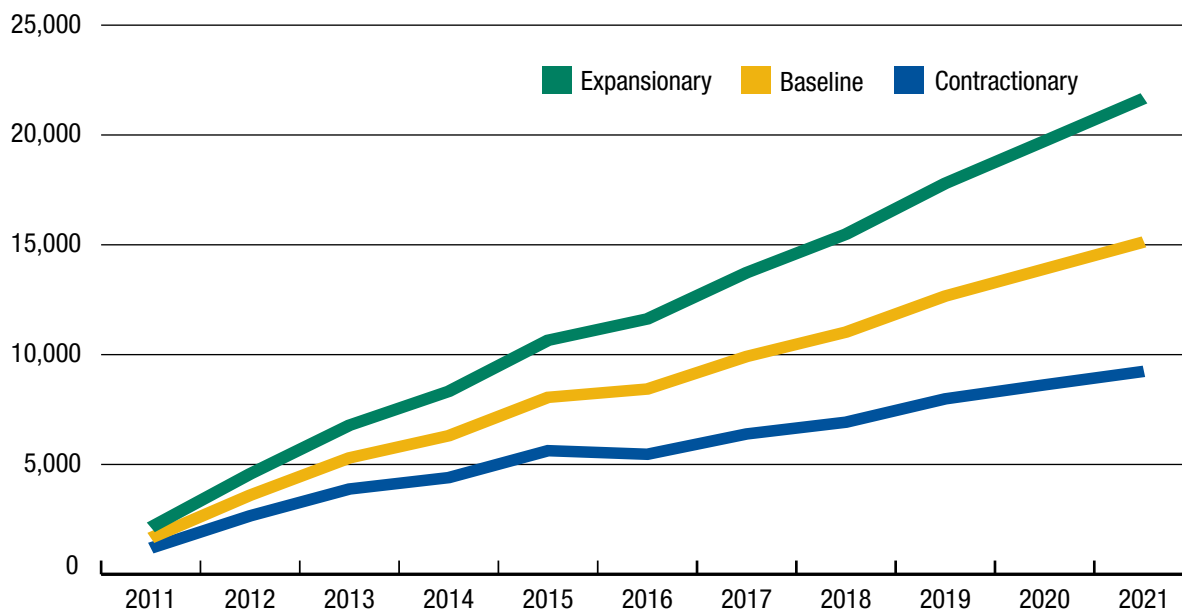
Table 1
Cumulative Hiring Requirements Forecasts
By Scenario – 2021*

	CHANGE IN EMPLOYMENT	REPLACEMENT REQUIREMENTS		CUMULATIVE HIRING REQUIREMENTS
		RETIREMENT	NON-RETIREMENT	
Contractionary	-2,700	3,800	8,100	9,200
Baseline	1,100	4,500	9,400	15,100
Expansionary	5,400	5,200	10,800	21,600

Source: Mining Industry Human Resources Council, Spring 2011
* Note: Numbers may not add perfectly due to rounding.

As illustrated in Figure 4, even under a contractionary scenario – which includes an assumption of above-trend growth in labour productivity and a below-trend level of the SMPI – the Saskatchewan mining industry will face significant hiring requirements in the short and long term. The chart also shows that while the forecast range of hiring requirements is similar across all three cases in the near-term, over the longer term – as uncertainty increases – the forecasts for the three scenarios diverge.

Figure 4
Cumulative Hiring Requirements Forecasts
By Scenario – 2011 to 2021



Source: Mining Industry Human Resources Council, Spring 2011

Table 2 summarizes the cumulative hiring requirements for Saskatchewan in 2013, 2016 and 2021, under MiHR's contractionary, baseline and expansionary scenarios. The baseline scenario projects the need to hire 15,100 workers by 2021, due to changes in economic factors, and to increased retirements and other separations from the industry. If commodity prices perform better than expected and/or productivity growth is weaker than forecast in the baseline scenario, and if planned development projects move into production, (i.e. the expansionary scenario), the total cumulative hiring requirements could grow to 21,600 workers by 2021.

Table 2
Cumulative Hiring Requirements Forecasts
By Scenario – 2013, 2016, 2021*

	CUMULATIVE HIRING REQUIREMENTS		
	2013	2016	2021
Contractionary	3,800	5,400	9,200
Baseline	5,300	8,400	15,100
Expansionary	6,700	11,600	21,600

Source: Mining Industry Human Resources Council, Spring 2011
 * Note: Numbers may not add perfectly due to rounding.

Hiring Requirements Forecast by Occupation

The occupational breakdown of the Saskatchewan hiring-requirements forecasts includes 66 key mining occupations, as defined by the National Occupation Classification for Statistics (NOC-S) categories. NOC-S codes seek to classify individuals doing similar kinds of work into the same job categories. However, there are some constraints imposed by the NOC-S categories. For the purpose of its forecasts MiHR includes a selection of 66 occupations that are essential and/or typical of the mining workforce. As a result, the employment by occupation forecasts included in the report represent about 60 per cent of the mining-industry workforce in Saskatchewan. More discussion on the occupation codes and categories used in MiHR's forecasts can be found in Appendix C.

Table 3 provides estimates of cumulative hiring requirements for the baseline scenario by broad occupational category. The specific occupations with the greatest forecasted hiring requirements include:

- Underground production and development miners
- Heavy equipment operators (except crane)
- Truck drivers
- Construction millwrights and industrial mechanics
- Primary production managers
- Heavy-duty equipment mechanics

Table 3
Hiring Requirements Forecasts – By Broad Occupational Category
Baseline Scenario – 2021*

	2013	2016	2021
Trades and undesignated occupations	1,730	2,740	4,890
Professional and physical science occupations	345	545	975
Human resources and financial occupations	60	95	175
Support workers	170	265	480
Technical occupations	405	645	1,155
Supervisors, coordinators and foremen	295	465	835
All other occupations	2,295	3,635	6,495
Total	5,300	8,400	15,100

Source: Mining Industry Human Resources Council, Spring 2011
 *Note: Numbers may not add perfectly due to rounding.

A listing of the 66 occupations and associated cumulative hiring requirements forecasted over a 10-year horizon can be found in Appendix D.



4

Labour Supply

The labour supply forecast presented here uses a stock-and-flow model for specific occupations. This model is best illustrated using a simple bathtub analogy, in which the water in the bathtub represents total supply; water coming from the spout represents new entrants; and water going out the drain represents “leavers” or people exiting the labour force. The model adjusts the labour force each year for each occupation across all industries, by starting with the existing labour force, adding new entrants, and then subtracting the number of people who leave the workforce.

The main sources of new entrants include school leavers (i.e., individuals leaving high school or post-secondary school to join the workforce); individuals coming to Saskatchewan from other countries (international migration) or other provinces (interprovincial migration); and “others”, such as people changing occupations and those re-entering the workforce after a temporary absence. The sources of labour force exits include individuals leaving Saskatchewan to work in other countries or other provinces; workers who have retired; and “others”, such as people changing occupation or those who fall ill, are disabled, or die. Details on the model and its assumptions can be found in Appendix B.

Labour Supply for Saskatchewan Mining

Forecasts of labour supply for Saskatchewan were prepared for 66 different occupations of interest to the mining sector. The list of occupations is included in Appendix C. The results of this forecast provide estimates of supply for those occupations for all industry sectors over a 10-year horizon.

Although a number of these occupations are specific to the mining sector, many are not. Therefore, the total supply of workers by occupation was forecast across all industries. In this way, it is possible to assess the size of the potential pool of workers from which the Saskatchewan mining industry can draw, for each occupation. In addition, an estimate is provided of the number of workers in each occupation that are employed within the mining sector. This allows for an assessment of the relative tightness of the mining labour market for each occupation.

The annual supply of workers for Saskatchewan in all industries was calculated across the 66 occupations of interest. The Saskatchewan mining industry's share of the supply was then estimated – based on historic trends of the flow of workers from these occupations into the mining industry. Assuming a continuation of these historic trends, MiHR estimated the number of workers in each occupation that the industry will continue to attract each year, over the next 10 years.

New entrants from international and interprovincial migration, school leavers and others entering the labour market represent a reasonable estimate of available talent to meet future hiring requirements. This assumes relative equilibrium in current supply, assuming that those already employed or looking for work will remain employed in the province (not necessarily with the same employer) or will be captured as exiting the industry in the “leavers” estimates. Under this assumption, new entrants represent the talent available to meet hiring requirements.

Table 4
Cumulative Available Talent, All Sectors and Mining
66 Occupations to 2013, 2016, 2021

	2013	2016	2021
Total entrants for 66 occupations, all industry sectors	13,900	27,300	48,600
Mining's share of entrants for 66 occupations (assuming the historical rate of 11% per year)	1,600	3,200	5,700

Source: Mining Industry Human Resources Council, Spring 2011

Table 4 shows the availability of talent over a two-, five-, and 10-year time horizon. According to model projections, there will be approximately 48,600 new entrants to Saskatchewan's labour force, for the selected 66 occupations, over the next 10 years. Historically, mining has attracted approximately 11 per cent of new entrants.¹⁸ Assuming this rate remains consistent moving forward, mining can expect to attract 5,700 new entrants over the next 10 years.

Labour Supply by Occupational Category

As noted above, mining historically attracts an average of approximately 11 per cent of new entrants to the labour pool each year, across all occupations. This rate varies among occupations depending on how specific an occupation is to the mining industry. For example, the mining industry has historically attracted approximately two per cent of carpenters from Saskatchewan's labour pool but has attracted 96 per cent of underground miners.

Table 5 shows mining's share of the cumulative available talent over the next 10 years by broad occupational category. The table also shows the total available talent for the occupational categories in all sectors, along with the proportion (per cent) that the mining industry has historically attracted from each category.

¹⁸ Mining's share of talent was calculated based on historic information obtained from Statistics Canada about mining's share of total employment for each occupation.

Table 5
Cumulative Available Talent – By Broad Occupational Category
66 Occupations to 2021

	MINING'S SHARE OF AVAILABLE TALENT (NUMBER OF WORKERS)	TOTAL AVAILABLE TALENT, ALL SECTORS (NUMBER OF WORKERS)	MINING'S HISTORIC PROPORTION OF AVAILABLE TALENT (%)
Trades and undesignated occupations	4,065	25,865	15
Professional and physical science occupations	535	3,767	14
Human resources and financial occupations	100	4,435	2
Support workers	285	10,005	3
Technical occupations	295	2,960	9
Supervisors, coordinators, and foremen	585	1,775	32

Source: Mining Industry Human Resources Council, Spring 2011

A detailed list of all 66 occupations and associated cumulative share of available talent can be found in Appendix D.



5 The Talent Gap

MiHR's hiring-requirements forecasts provide predictions for all occupations in the mining industry, while the available-talent forecasts are produced for each of 66 key occupations associated with mining-related activities. To compare outputs between the two types of forecasts and to examine the talent gap, it is necessary to segment the hiring-requirements forecasts to reflect the same occupation grouping as the available-talent forecasts.

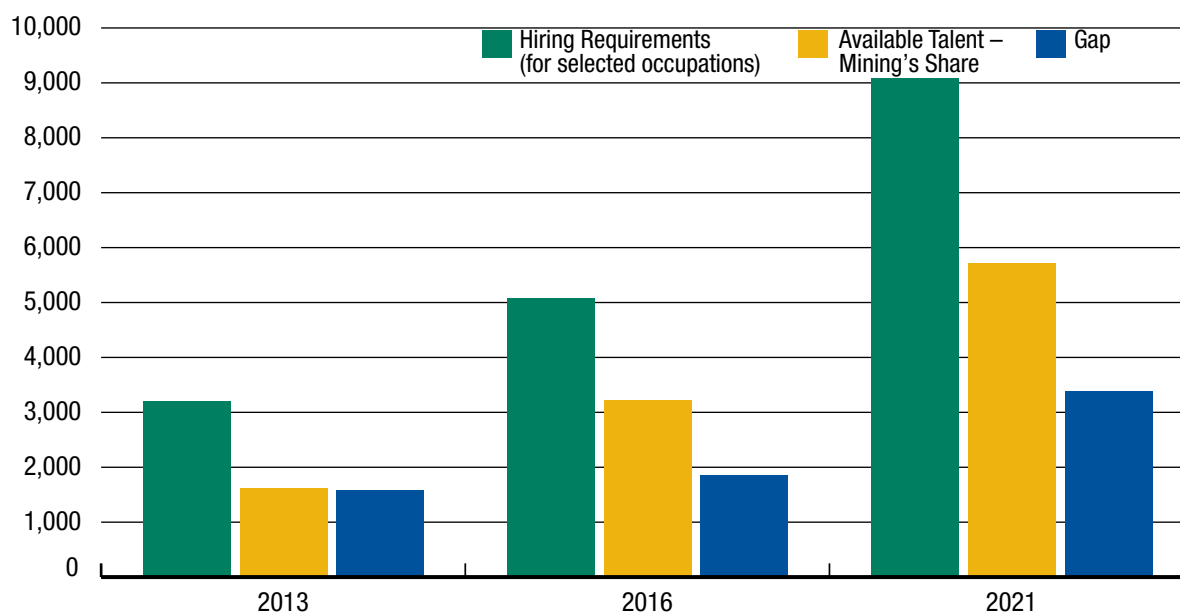
Therefore, this chapter reports on Saskatchewan's hiring requirements under the baseline scenario for only the 66 key occupations of interest to the sector (60 per cent of the total hiring requirements). The hiring requirements for this select group are compared to the projections of available talent for the mining sector. This comparison exposes the gaps in the Saskatchewan mining industry's ability to meet projected hiring requirements over a two-, five- and 10-year horizon. The predicted gap assumes that mining's share of available talent will remain at historical levels (on average of 11 per cent); in other words, the industry will continue to attract new entrants for each occupation at the same rates observed over the past few decades.

As shown in Figure 5, it is predicted that the available talent for the selected 66 occupations will not be sufficient to meet the forecasted hiring requirements over the short, medium and long term, under a baseline scenario. The industry is expected to attract only 5,700 new entrants to the labour pool to meet a hiring need of more than 8,510 for the selected 66 occupations.¹⁹

The share of the labour pool that mining will need to attract to meet hiring requirements for the 66 occupations fluctuates slightly over the 10-year horizon; however, by 2021, Saskatchewan's mining industry will need to attract nearly 20 per cent of the available talent for these occupations. This represents an increase of almost nine percentage points over the historical rate for mining.

¹⁹ Note that the gap analysis only includes discussion of the 66 key occupations that are essential to mining industry. It does not include discussion on the hiring requirements and gaps for "other" occupations, as defined in Chapter 3. In the baseline scenario forecast there are an additional 5,925 workers needed in the "other" occupations category by 2021.

Figure 5
The Talent Gap in Saskatchewan Mining – 66 Key Occupations
2013, 2016, 2021



Source: Mining Industry Human Resources Council, Spring 2011

Table 6
The Talent Gap and Challenge – Hiring Forecast
Baseline Scenario – 2013, 2016, 2021

THE TALENT GAP	2013	2016	2021
Hiring requirements for selected 66 occupations	2,375	4,755	8,510
Available talent – mining's share of labour pool (11%)	1,600	3,200	5,700
Gap	1,580	1,860	3,379
THE CHALLENGE			
All entrants – selected occupations	13,900	27,300	48,800
Needed share to meet hiring requirements (%)	23%	19%	19%

Source: Mining Industry Human Resources Council, Spring 2011

Occupational Breakdown

Mining's ability to attract new entrants to the labour pool is not the same for each occupation and occupational category. Mining currently attracts a range of less than one per cent to almost 100 per cent of available talent, depending on how specific an occupation is to the mining industry. For example, mining attracts approximately two per cent of human resources and financial workers in Saskatchewan, but attracts over 30 per cent of available supervisors, coordinators, and foremen, and nearly 100 per cent of underground miners.

The talent gap and the urgency to meet hiring requirements vary among the 66 key occupations. Table 7 shows the talent gap in each occupational category and the proportion of the available talent pool that mining will need to attract, to meet forecasted hiring requirements under a baseline scenario.

Table 7
The Gap and Challenge – By Broad Occupational Category (Baseline Hiring Forecast Scenario)
66 Occupations to 2021

	THE NEED	THE SUPPLY AND GAP		THE CHALLENGE		
	CUMULATIVE HIRING REQUIREMENTS	TALENT AVAILABILITY – MINING’S SHARE	GAP	TOTAL AVAILABLE TALENT ALL SECTORS	MINING’S CURRENT SHARE OF TALENT	MINING’S REQUIRED SHARE OF TALENT
Trades and undesignated occupations	4,890	4,065	-815	25,865	15%	19%
Professional and physical science occupations	975	535	-450	3,767	14%	26%
Human resources and financial occupations	175	100	-65	4,435	2%	4%
Support workers	480	285	-185	10,005	3%	5%
Technical occupations	1,155	295	-855	2,960	9%	39%
Supervisors, coordinators, and foremen	835	585	-250	1,775	32%	47%

Source: Mining Industry Human Resources Council, Spring 2011

Saskatchewan’s mining industry will need to increase the proportion of workers it attracts in each occupational category in order to meet future hiring requirements. That said, the situation with Technical Occupations (technologists and technicians) will be particularly dire. The industry currently attracts about nine per cent of available talent for these occupations; in order to meet future needs, the industry must increase the share of the available talent it attracts by nearly 30 percentage points. Details for each of the 66 occupations can be found in Appendix D.

Addressing the Gaps: A Double Edged Sword

Just as the nature of the talent gaps differs among occupations, so do the strategies for addressing the gaps. In some cases, the industry must aim to attract more entrants from an existing talent pool (i.e., carve out a larger slice of the talent pie). In other cases, the industry must increase the numbers of entrants and grow a talent pool that will otherwise be too small to meet its needs (i.e., make the pie bigger). In all cases, the industry must strive to optimize the current workforce and “do more” with what is already there – through strategic workforce planning and supports for improvements to productivity.

For occupations such as geological and mineral technologists and technicians, mining can draw from an available talent pool that serves all industry sectors. The challenge in these cases is to increase the share of workers the industry has historically attracted. In other cases, such as that of supervisors, mining and quarrying, the mining sector already

attracts the vast majority of new entrants to the labour force. The supply forecasts, however, predict an overall shortage of available talent for all industry sectors. In these cases, the mining industry must focus on increasing the number of new entrants to the labour pool (e.g., individuals leaving school, local Métis or First Nations peoples, or workers coming to Saskatchewan from other countries or provinces).

Increase Mining's Share of Available Talent

Increasing the share of talent a sector traditionally attracts from a labour pool is an arduous undertaking. At play are a host of complex factors that are difficult to influence. Industry sectors are competing against each other for this talent, and as one sector increases attraction efforts, other sectors feel the pressure and boost their own efforts. As the labour market tightens, it becomes exponentially more difficult for a particular sector to attract more new entrants.²⁰

In addition, the sector's workforce becomes more mobile, which increases competition for talent from other countries and other provinces. Similarly, workers in other industry sectors who have the necessary skills for mining also become more mobile – creating pressure from other industry sectors. It also becomes more difficult to attract school leavers and other new entrants, as other sectors become increasingly competitive in their efforts to attract new talent.

Workers also become more mobile within the Saskatchewan mining sector, which heats up competition for talent among the province's mining employers. This essentially moves around talent that is already employed, as opposed to increasing a sector's share of new entrants to the labour force.

In the past, these pressures have driven employers to offer more competitive salaries, increase benefits, and attempt to attract new talent with perks, bonuses, more vacation time and other incentives. These strategies may result in short-term gains but come at a high cost. For example, longer-term employees may feel that new incentives are unfair and demand equal treatment creating strain on labour relations, or additional costs in equalizing incentives across the workforce.

Growing the Labour Pool

In some cases, the Saskatchewan mining industry will need to increase the number of new entrants to the labour pool in order to meet forecasted hiring requirements. Industry stakeholders, education, government and associations will need to coordinate their efforts to attract people to the labour market at all entry points: international and provincial migration; education and training to increase the numbers of school leavers; attracting other entrants; and re-attracting labour force leavers, such as retired workers. Furthermore, targeted efforts to retain mature workers will ensure that an already small labour pool does not shrink further, and that the knowledge and experience of older workers are properly transferred to incoming talent.

20 Discussion of influencing the ability to attract talent from the labour pool gained popularity in the *Organizational Effectiveness and Labour Market Studies* literatures in the early 1990s. Decades of research has shown that despite powerful influences of branding and early recruiting campaigns for individual organizations in attracting talent; there is relative stability in a sector's overall ability to attract talent. (See for example, Rynes, Sara L. and Barber, Alison E., "Applicant Attraction Strategies: An Organizational Perspective" (1989). CAHRS Working Paper Series. Paper 412; and Collins, Christopher J. and Han, Jian, "Exploring Applicant Pool Quantity and Quality: The Effects of Early Recruitment Practice Strategies, Corporate Advertising, and Firm Reputation" (2004) Personnel Psychology.

Workforce Optimization

In addition to strategies aimed at growing the talent pool and increasing mining's share of the labour force, employers can also turn to workforce optimization and strategic workforce planning. Initiatives in these areas will ensure that the current workforce is well-tuned and functioning at its best, despite a tight labour market.

Workforce optimization analysis should not be confused with downsizing or other reactionary workforce adjustments. Rather, it is a combined analysis of workforce management and systems, organizational design, technology and equipment, and employee training and development, to ensure strategic planning and continuous improvement to support the existing workforce. Optimization initiatives will become essential as the labour market tightens, increasing pressures on employers and the workforce to maintain outputs, ensure high standards for occupational health and safety, and protect the bottom line – despite the talent gaps.

Optimization analysis helps organizations identify optimal staffing ratios; sources of inefficiencies (e.g., equipment functionality, work process and organizational design); and opportunities for productivity improvements. For example, investments in research and development, employee training and promoting rapid uptake of technological advancements have all been shown to enhance productivity. High standards for equipment upkeep, increasing investments in new technology and supporting innovation in the workplace are also beneficial.

Meeting the Needs in Saskatchewan

Addressing the talent gap in the Saskatchewan mining industry will require a unified, coordinated and strategic approach. First, industry associations and employers can join forces to attract talent to mining, and to develop initiatives to brand and promote the industry as an exciting career option. Second, the sector can work strategically with education and training organizations to ensure that the talent pool grows and that highly skilled and qualified workers are available to fill positions. Third, employers can also make the best possible use of all currently available sources of talent, with particular efforts to retain, transition, and re-engage the aging workforce.

1. Attraction: The Competition for Talent

The mining industry faces several challenges in attracting talent from other sectors. These include: negative public perceptions about mining's social and environmental impacts; factors related to working or living in remote locations (e.g., high cost-of-living, access to recreation and leisure activities, and the pressures of a "fly-in fly-out" lifestyle). Challenges are offset, however, by several opportunities, including: relatively positive growth and stability in the industry compared with other sectors; highly competitive compensation and benefits; and diverse and interesting career paths.

A common theme emerged in recent consultations with industry-workforce planners on strategies to attract talent to Saskatchewan mining. Employers will benefit from aligned efforts to attract talent to the industry as a whole, rather than competing within the industry to fill positions. Participants in the discussions had the following suggestions:

- Work with the Saskatchewan Mining Association (SMA) to present a united front to promote mining careers within Saskatchewan, as well as to potential workers in the rest of Canada and internationally.
- Support industry associations in career awareness and outreach and to raise awareness of the Saskatchewan mining industry and careers in mining earlier in the education system (e.g., in elementary school, rather than waiting until late high school or post-secondary levels).
- Coordinate with other employers to launch recruitment campaigns targeted at universities, alumni groups, other related industry sectors and communities with comparator industry sectors in decline.
- Adopt an industry brand that promotes positive impressions of the sector – highlighting features such as education and training opportunities, sustainability and environmental responsibility, and exciting career opportunities. MiHR's *Explore for More* brand can be successfully licensed by provincial mining associations and industry and materials developed and adapted for province-specific needs. (e.g., *Explore for More, British Columbia*).
- Coordinate and expand initiatives to engage, develop, support and provide employment opportunities for local First Nations and Métis populations.
- Coordinate and expand initiatives to attract, develop, support and provide opportunities for underrepresented groups in Saskatchewan mining (e.g., women, new Canadians).
- Develop a community of practice within the province to share experiences, initiatives and practices, and to create synergies with other employers wherever possible – similar to, and extending on, the activities of the SMA's HR Committee.

2. Growing the Talent Pool: Immigration, and Education and Training

It will be essential for the Saskatchewan mining industry to employ strategies for growing the talent pool, in order to close the talent gap and meet future hiring requirements. Over the past few years, through the SMA, the Saskatchewan industry has worked closely with provincial government and training institutions to address the looming labour shortages. The goal is to provide new training programs in the province to ensure that graduates are ready to meet industry's demand for talent. In addition, stakeholders have enhanced community-level training and education, by investing in pre-employment education, as well as in-house training programs in mining companies.

Industry workforce planners from SMA member companies recently reinforced the importance of continuing these efforts in the coming years as the labour market continues to tighten. They also suggested that stakeholders undertake the following:

- Explore flexibility in apprenticeships and programs of study, to develop new and existing talent (e.g., case by case arrangements on how employers and education providers interact in providing work experience for apprenticeships). The Saskatchewan Mining industry employs approximately 12 per cent²¹ of the province's registered apprentices. Exploring opportunities to increase apprenticeships in the sector would be an attraction point for students training in trades.

²¹ According to a recent inquiry on active registered apprentices presented in Apprenticeship and Trades Certification Commission 2009 Annual Report.

- Increase industry participation in education taskforces, boards, and committees.
- Coordinate industry efforts to strengthen and improve opportunities for work-experience programs, cooperative education placement, on-the-job training programs and internships.
- Support and strengthen efforts to facilitate communication among employers and post-secondary education institutions on the requirements for new graduates; both in terms of numbers available and having the necessary skills sets.
- Invest in pre-employment education and training programs and in-house training programs, to ensure equal opportunity for education in all communities of interest and smooth transitions from education to employment.

Another important source of new talent will be immigration. New Canadians have not traditionally been attracted to Saskatchewan and provincial stakeholders are working to change that trend. Employers and other stakeholders can work together to ensure smooth immigration and transitions for new Canadians, appropriate recognition of foreign professional credentials and licenses, and evaluation of foreign education and training certificate equivalencies. Industry stakeholders can also collaborate to promote mining career opportunities among international audiences and to provide a positive image of Saskatchewan as a place to live.

3. Retaining and Re-engaging the Aging Workforce

Employers in Saskatchewan’s mining industry already have in place a number of initiatives to retain workers and remain competitive with other sectors. As a whole, the industry offers highly competitive compensation packages, flexible work environments, employee training and development opportunities, and exceptionally high standards for occupational health and safety.

The Saskatchewan mining workforce is aging and looming retirements threaten to widen the talent gap. Special efforts to retain, transition and re-engage the aging workforce are starting to emerge. Employers are nurturing retiree-alumni groups; offering flexible work or job-sharing in order to transition retirees; re-engaging retirees as part-time contractors; encouraging mature workers to become mentors for younger employees; and offering education and training programs to transitioning or retired workers – to ensure they keep up with technological advances and new processes.

In recent consultations, industry workforce planners from SMA member companies suggested other strategies for retaining and re-engaging the aging workforce:

- Develop industry-wide and coordinated outreach and communications strategies to keep the retired workforce engaged.
- Work with local, regional and provincial governments, and organizations to ensure smooth transitions for retirees returning to the workforce for temporary or contract work assignments.
- Coordinate stakeholder efforts to change perceptions of “retirement” and promote industry opportunities for continued work.
- Support and promote retraining and “second-career” opportunities for retirees.

In summary, to ensure that the Saskatchewan mining industry is able to meet its forecasted labour market challenges over the next 10 years, it will need to continue efforts to attract key talent groups, and to coordinate workforce planning efforts among employers and other stakeholders. All stakeholders must work together to close the talent gap. Common goals include: attract key talent groups, including First Nations and Métis peoples, new Canadians, and workers from other sectors and other provinces; retain the aging workforce and re-engage retirees; and support education and training initiatives to increase the number of individuals who choose a career in mining once they leave school.

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. 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.

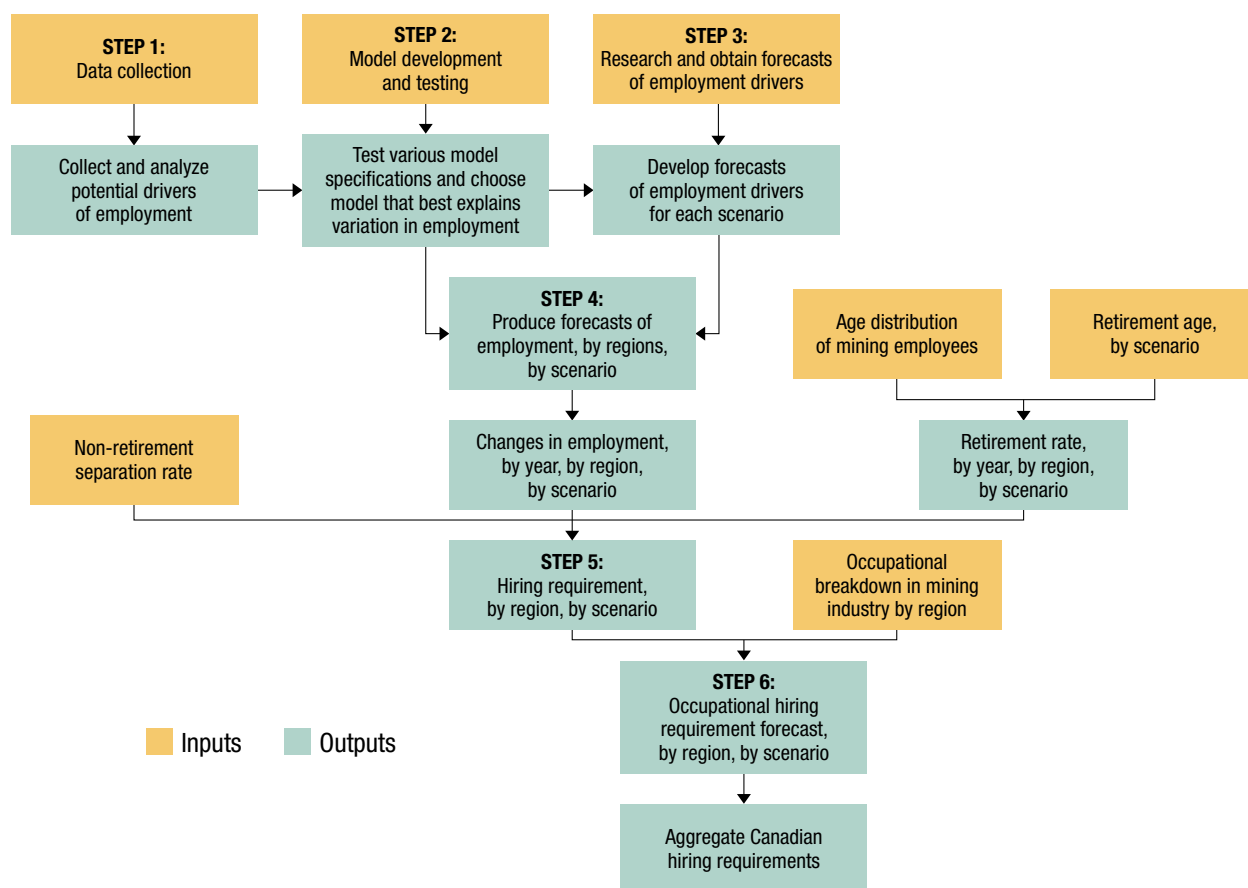
Several indicators were considered as explanatory variables for predicting employment. Statistical analysis showed that commodity prices, in conjunction with labour productivity and previous year's employment, were the best predictors of employment in mining in Saskatchewan. There is a positive relationship between commodity prices and employment, and a negative correlation between labour productivity and employment.

In the fall of 2010, MiHR partnered with the Saskatchewan Mining Association (SMA) to survey SMA members on the size and age profile of their workforces and the turnover and separation patterns they observe. The survey was sent to 13 SMA member companies and 9 participated (a 70 per cent response rate). Survey findings were used to validate forecasts and augment the assumptions for the forecast scenarios, particularly the expansionary scenario which incorporated responses on estimates on future workforce needs for advanced development projects.

Assumptions

MiHR's hiring-requirements forecasting model combines the effects of changes in commodity prices, growth in productivity, retirement rates and non-retirement separation rates, to produce estimates of hiring requirements. Table A1 presents the key assumptions used in model development. Note that all growth rates in Table A1 are compound annual growth rates (CAGR), with the exception of non-retirement separation rates, which are estimated based on national averages.

Figure A1
Employment and Hiring Requirements Forecasting Model



Source: Mining Industry Human Resources Council, Spring 2011

Table A1
Key Assumptions, MiHR Hiring Requirements Forecasts for Saskatchewan

ASSUMPTION	BASELINE	CONTRACTINARY	EXPANSIONARY	RATIONALE
Saskatchewan Minerals Price Index (SMPI)	World Bank Forecast (2010), Private Sector Canadian Banks 0.48% CAGR	External forecasts less the standard deviation of historical price indices over the past 20 years -1.83% CAGR	External forecast plus the standard deviation of historical price indices over the past 20 years 2.13% CAGR	The most reliable long-term forecasts
Labour Productivity	0.82% CAGR	1.42% CAGR	0.08% CAGR	Used 20-year average developed from Statistics Canada data for baseline. Historical standard deviation applied for contractionary and expansionary scenarios
Median Retirement Age	62.0 years	62.0 years	62.0 years	Results of survey of Saskatchewan Mining Association Members
Non-Retirement Separation Rate	4.0%	4.0%	4.0%	Saskatchewan Average

Source: Statistics Canada, Mining Industry Human Resources Council, Spring 2011

Appendix B

MiHR's model of supply 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, immigrants 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: moving to another province 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) is incorporated into the forecast, to verify and validate the estimates from 2007 to 2010. Forecasts, particularly cumulative counts, are for the 2011 to 2021 period only.

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 occupies – 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 Human Resources and Skills Development Canada's (HRSDC's) Canadian Occupational Projection System (COPS) model. Saskatchewan's share of international-migration flows, relative to the national average, is based on the relative strength of Saskatchewan's labour market.

Net interprovincial migration is based on the balance of supply and demand of workers in a particular occupation in Saskatchewan, 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 2006 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 province'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 2006 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 province 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. Consistent with MiHR's existing model, the retirement rate is assumed to be the same across all occupations.

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.

Other Leavers

Other leavers include people moving to other occupations, people temporarily leaving the workforce, and people dying. The leavers' rate is sourced from MiHR's existing models. The model then assumes equilibrium in "other" labour mobility, thus the model matches "other" exits with "other" entrants.

Appendix C

This Appendix lists the North American Industry Classification Codes (NAICS) and National Occupational Classification for Statistics (NOC-S) codes used throughout this report to define the mining industry. MiHR is engaged in ongoing, iterative research to include more NOC-S 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 for Statistics (NOC-S). Both systems provide a hierarchical structure that divides higher-level categories into more detailed categories in order to group similar establishments and individuals.

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-S system was developed by Statistics Canada and Human Resources and Skills Development Canada (HRSDC) to provide standardized descriptions of the work that Canadians perform in the labour market. NOC-S codes organize labour-force participants according to the nature of work they perform, thereby enabling similar occupations to be grouped. NOC-S 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-S 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-S 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.

The Mining Sector

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. The NAICS codes that define the mining industry include:

NAICS 212: Mining and Quarrying (except Oil and Gas). This subsector comprises establishments primarily engaged in mining, beneficiating or otherwise preparing metallic and non-metallic minerals, including coal.

NAICS 213: Support Activities for Mining and Oil and Gas Extraction. This subsector 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.

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).

MiHR uses the following 66 NOC-S codes to define the occupations that are essential to the mining sector.

A111 Financial managers	C044 Geological engineers
A112 Human resources managers	C048 Other professional engineers, n.e.c.
A121 Engineering managers	C054 Land surveyors
A371 Construction managers	C111 Chemical technologists and technicians
A381 Primary production managers (except agriculture)	C112 Geological and mineral technologists and technicians
B011 Financial auditors and accountants	C121 Biological technologists and technicians
B012 Financial and investment analysts	C131 Civil engineering technologists and technicians
B021 Specialists in human resources	C132 Mechanical engineering technologists and technicians
B211 Secretaries (except legal and medical)	C133 Industrial engineering and manufacturing technologists and technicians
B541 Administrative clerks	C134 Construction estimators
B573 Production clerks	C141 Electrical and electronics engineering technologists and technicians
B575 Dispatchers and radio operators	C153 Drafting technologists and technicians
B576 Transportation route and crew schedulers	C154 Land survey technologists and technicians
C012 Chemists	C155 Mapping and related technologists and technicians
C013 Geologists, geochemists and geophysicists	C162 Engineering inspectors and regulatory officers
C015 Other professional occupations in physical sciences	C163 Inspectors in public and environmental health and occupational health and safety
C021 Biologists and related scientists	G412 Cooks
C031 Civil engineers	H013 Contractors and supervisors, pipefitting trades
C032 Mechanical engineers	H016 Contractors and supervisors, mechanic trades
C033 Electrical and electronics engineers	H111 Plumbers
C034 Chemical engineers	
C041 Industrial and manufacturing engineers	
C042 Metallurgical and materials engineers	
C043 Mining engineers	

H112	Steamfitters, pipefitters and sprinkler system installers	H821	Construction trades helpers and labourers
H121	Carpenters	H822	Other trades helpers and labourers
H212	Industrial electricians	I121	Supervisors, mining and quarrying
H326	Welders and related machine operators	I131	Underground production and development miners
H411	Construction millwrights and industrial mechanics (except textile)	I141	Underground mine service and support workers
H412	Heavy-duty equipment mechanics	I214	Mine labourers
H611	Heavy equipment operators (except crane)	J011	Supervisors, mineral and metal processing
H621	Crane operators	J111	Central control and process operators, mineral and metal processing
H622	Drillers and blasters – Surface mining, quarrying and construction	J121	Machine operators, mineral and metal processing
H711	Truck drivers	J125	Inspectors and testers, mineral and metal processing
H812	Material handlers	J311	Labourers in mineral and metal processing

Appendix D

This Appendix presents an occupational breakdown of hiring requirements and available talent. All numbers represent cumulative counts over a 10-year horizon to 2021. Cumulative hiring requirements represent the sum of changes in employment, retirement and non-retirement exits. Available talent is calculated as the share that mining historically attracts from the talent pool for all sectors, for each occupation. Cumulative hiring requirements are subtracted from mining's available talent to estimate the looming talent gap.

In Table D1 below, the column titled "The Challenge" shows the available talent pool for all industry sectors and mining's historic share of Saskatchewan's labour pool for each occupation. For each occupational category, an estimate is provided of the share of the labour pool that mining will need to attract to meet projected hiring requirements.

Table D1
Cumulative Occupational Breakdown of Hiring Needs and Available Talent*
To 2021

	THE NEED	THE SUPPLY AND GAP		THE CHALLENGE		
	CUMULATIVE HIRING REQUIREMENTS	TALENT AVAILABILITY – MINING'S SHARE	GAP	TOTAL AVAILABLE TALENT ALL SECTORS	MINING'S CURRENT SHARE OF TALENT	MINING'S REQUIRED SHARE OF TALENT
TRADES AND UNDESIGNATED OCCUPATIONS						
Underground production and development miners	835	595	-240	625	95%	
Heavy equipment operators (except crane)	735	565	-170	2,295	25%	
Truck drivers	630	550	-80	6,845	8%	
Construction millwrights and industrial mechanics (except textile)	550	440	-110	1,215	36%	
Heavy-duty equipment mechanics	395	345	-50	1,385	25%	
Welders and related machine operators	210	225	15	2,920	8%	
Mine labourers	210	130	-80	135	96%	
Industrial electricians	185	120	-65	330	37%	
Underground mine service and support workers	170	155	-15	160	98%	
Construction trades helpers and labourers	160	125	-35	2,855	4%	
Material handlers	145	110	-35	2,215	5%	
Central control and process operators, mineral and metal processing	125	315	190	345	91%	

* The forecasting model builds upon the model developed for MiHR's *Canadian Mining Industry Employment and Hiring Forecasts, 2010*. MiHR's current forecasting model is the result of an iterative continuous improvement development driven by MiHR labour market research activities. The current model differs from the model used to produce the 2008 report and direct comparisons between the two forecasts are to be avoided or made only at a high level. For example, the new model includes more customization for Saskatchewan specific factors (commodity mix and the addition of productivity measures).

	THE NEED	THE SUPPLY AND GAP		THE CHALLENGE		
	CUMULATIVE HIRING REQUIREMENTS	TALENT AVAILABILITY – MINING'S SHARE	GAP	TOTAL AVAILABLE TALENT ALL SECTORS	MINING'S CURRENT SHARE OF TALENT	MINING'S REQUIRED SHARE OF TALENT
Steamfitters, pipefitters and sprinkler system installers	90	80	-10	460	17%	
Drillers and blasters – Surface mining, quarrying and construction	80	70	-10	120	57%	
Crane operators	80	45	-35	135	32%	
Machine operators, mineral and metal processing	80	75	-5	135	56%	
Other trades helpers and labourers	60	10	-50	230	4%	
Labourers in mineral and metal processing	60	40	-20	95	44%	
Carpenters	50	40	-10	2,460	2%	
Plumbers	30	30	0	905	3%	
Total	4,890	4,065	-815	25,865	15%	19%

PROFESSIONAL AND PHYSICAL SCIENCE OCCUPATIONS

Civil engineers ²²	245	0	-245	715	0%	
Geologists, geochemists and geophysicists	165	160	-5	350	46%	
Mining engineers	145	155	10	190	83%	
Mechanical engineers	115	55	-60	455	12%	
Electrical and electronics engineers	75	40	-35	560	7%	
Geological engineers	55	20	-35	35	49%	
Other professional occupations in physical sciences	40	15	-25	20	58%	
Chemical engineers	40	25	-15	140	18%	
Industrial and manufacturing engineers	35	25	-10	290	8%	
Biologists and related scientists	25	20	-5	730	3%	
Other professional engineers, n.e.c.	25	0	-25	60	0%	
Chemists	10	20	10	220	9%	
Metallurgical and materials engineers	10	0	-10	2	0%	
Total	975	535	-450	3,767	14%	26%

22 According to MiHR's survey of SMA members, the number of civil engineers employed by the mining industry has increased markedly; the majority having been hired since January 1, 2008. In addition, anecdotal evidence suggests that civil engineers are being used in other engineering roles by mining employers in efforts to utilize transferable skills set for hard to fill roles.

	THE NEED	THE SUPPLY AND GAP		THE CHALLENGE		
	CUMULATIVE HIRING REQUIREMENTS	TALENT AVAILABILITY – MINING'S SHARE	GAP	TOTAL AVAILABLE TALENT ALL SECTORS	MINING'S CURRENT SHARE OF TALENT	MINING'S REQUIRED SHARE OF TALENT
HUMAN RESOURCES AND FINANCIAL OCCUPATIONS						
Financial auditors and accountants	80	50	-30	2,410	2%	
Human resources managers	40	25	-15	350	7%	
Specialists in human resources	25	15	-10	575	3%	
Financial managers	10	0	-10	730	0%	
Financial and investment analysts	10	10	0	370	2%	
Total	175	100	-65	4,435	2%	4%
SUPPORT WORKERS						
Secretaries (except legal and medical)	230	130	-100	3,300	4%	
Inspectors in public and environmental health and occupational health and safety	70	50	-20	380	13%	
Administrative clerks	60	35	-25	1,450	2%	
Dispatchers and radio operators	55	40	-15	440	9%	
Cooks	15	15	0	4,130	>1%	
Production clerks	10	10	0	160	5%	
Engineering inspectors and regulatory officers	10	0	-10	20	0%	
Construction estimators	10	0	-10	75	0%	
Inspectors and testers, mineral and metal processing	10	5	-5	20	34%	
Transportation route and crew schedulers	0	0	0	30	0%	
Total	480	285	-185	10,005	3%	5%

	THE NEED	THE SUPPLY AND GAP		THE CHALLENGE		
	CUMULATIVE HIRING REQUIREMENTS	TALENT AVAILABILITY – MINING'S SHARE	GAP	TOTAL AVAILABLE TALENT ALL SECTORS	MINING'S CURRENT SHARE OF TALENT	MINING'S REQUIRED SHARE OF TALENT
TECHNICAL OCCUPATIONS						
Drafting technologists and technicians	260	25	-235	550	4%	
Geological and mineral technologists and technicians	180	95	-85	180	52%	
Land surveyors	170	30	-140	185	17%	
Chemical technologists and technicians	115	85	-30	725	12%	
Civil engineering technologists and technicians	90	0	-90	95	0%	
Mechanical engineering technologists and technicians	90	30	-60	160	20%	
Land survey technologists and technicians	80	5	-75	75	7%	
Electrical and electronics engineering technologists and technicians	75	15	-60	290	5%	
Industrial engineering and manufacturing technologists and technicians	45	10	-35	95	12%	
Mapping and related technologists and technicians	25	0	-25	150	0%	
Biological technologists and technicians	20	0	-20	455	0%	
Total	1,155	295	-855	2,960	9%	39%
SUPERVISORS, COORDINATORS, AND FOREMEN						
Primary production managers (except agriculture)	325	345	20	510	68%	
Supervisors, mining and quarrying	315	150	-165	155	95%	
Engineering managers	60	5	-55	110	4%	
Contractors and supervisors, mechanic trades	55	40	-15	310	12%	
Construction managers	35	10	-25	575	2%	
Supervisors, mineral and metal processing	25	25	0	55	42%	
Contractors and supervisors, pipefitting trades	20	10	-10	60	17%	
Total	835	585	-250	1,775	32%	47%

Source: Mining Industry Human Resources Council, Spring 2011

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