

# PROSPECTING THE FUTURE

Meeting Human Resources Challenges  
In The Canadian Minerals And Metals Industry



***Summary Report***

The opinions and interpretations in this publication are those of the author and do not necessarily reflect those of the Government of Canada.

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# 1 INTRODUCTION

## 1 INTRODUCTION

*Prospecting the Future: Meeting Human Resources Challenges in Canada's Minerals and Metals Sector* is a comprehensive sector study of the short- and long-term human resource issues and challenges facing the minerals and metals industry. The study's in-depth assessment of current and emerging human resource needs and gaps, served as a foundation for the recommendations designed to maintain the strength of the minerals and metals sector well into the future.

This summary report is a synopsis of a larger report entitled "*Prospecting the Future: Meeting Human Resources Challenges in Canada's Minerals and Metals Sector - Final Report*". The study was 2.5 year long project that commenced in February of 2003 and ended in July of 2005. The detailed industry research phase for the project occurred from October 2004 to May 2005.

The sector study project was funded by the Government of Canada's Sector Council Program. The Mining Industry Training and Adjustment Council (MITAC) managed the project under the guidance of the Minerals and Metals Industry Sector Study Steering Committee (MMISSSC).

### 1.1 Research scope and methodology

The study focused on mining activities in exploration, extraction and primary refining (smelting) of non-ferrous metals (except aluminum), covering Natural Resources Canada's stages 1 - Mineral Extraction and Concentrating and stage 2 Smelting and Refining. The study also focused on the top 10 minerals and metals by value of production in Canada: gold, nickel, potash, coal, copper, iron ore, cement, zinc, sand/gravel/stone and diamonds. The study does not include the oil sands workforce.

The analysis included all geographic regions of the country, a broad range of production activities and operations, and a variety of firm sizes and types.

The study involved extensive research activities, including:

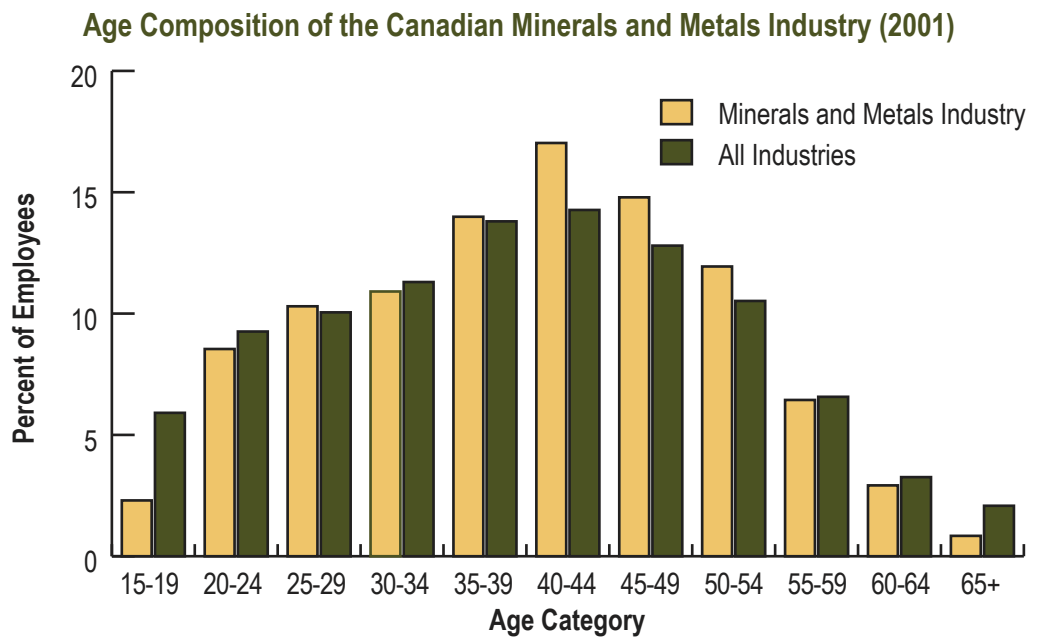
- Surveys of 48 mining firms (representing 276 minerals and metals industry sites) and 46 supplier and contracting firms that provide mining-specific services to the minerals and metals industry;
- Surveys of 694 individuals employed in the mining sector;
- Surveys of 19 educational institutions offering mining programs;
- 59 key informant interviews with various stakeholder groups, encompassing employers, industry associations, training institution representatives and union representatives;
- 5 case studies to identify unique practices in the mining sector;
- 10 focus groups with managers, employees and youth;
- A Roundtable meeting with individuals representing various communities of interest; and
- Secondary research, including a review of existing literature and statistical databases, and other information resources.



## 2 INDUSTRY DEMAND AND LABOUR FORCE PROFILE

### 2.1 An aging workforce

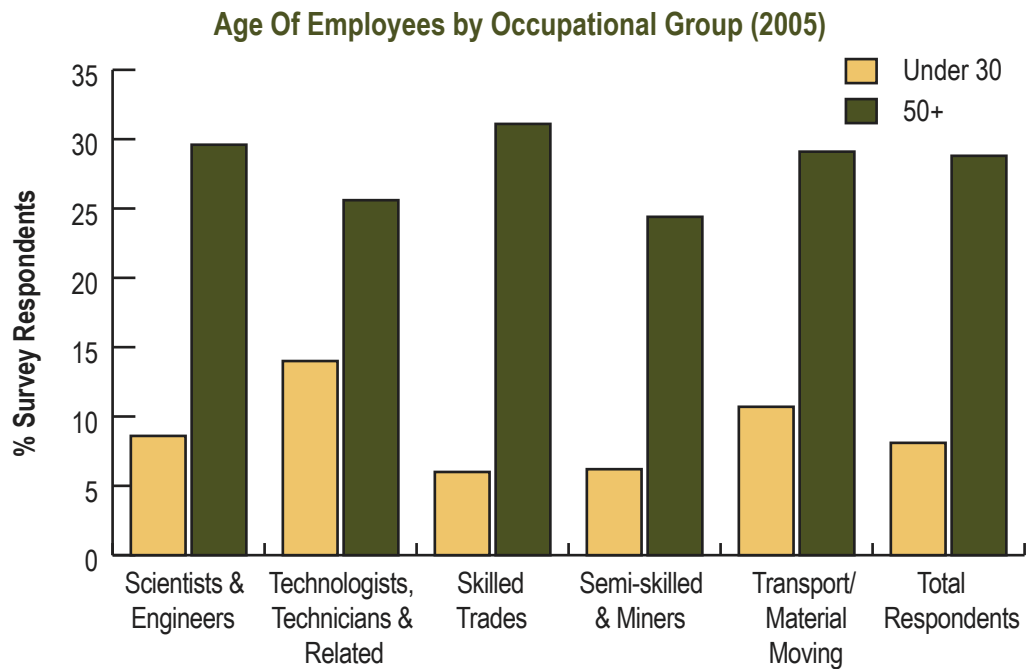
The age of the minerals and metals industry workforce is higher than that of the overall Canadian workforce. The largest cohort in the sector is 40 to 54 years, representing over 50% of workers. This age group represents only 39% of the Canadian workforce as a whole.



Source: Statistics Canada, 2001 Census



## 2 INDUSTRY DEMAND AND LABOUR FORCE PROFILE

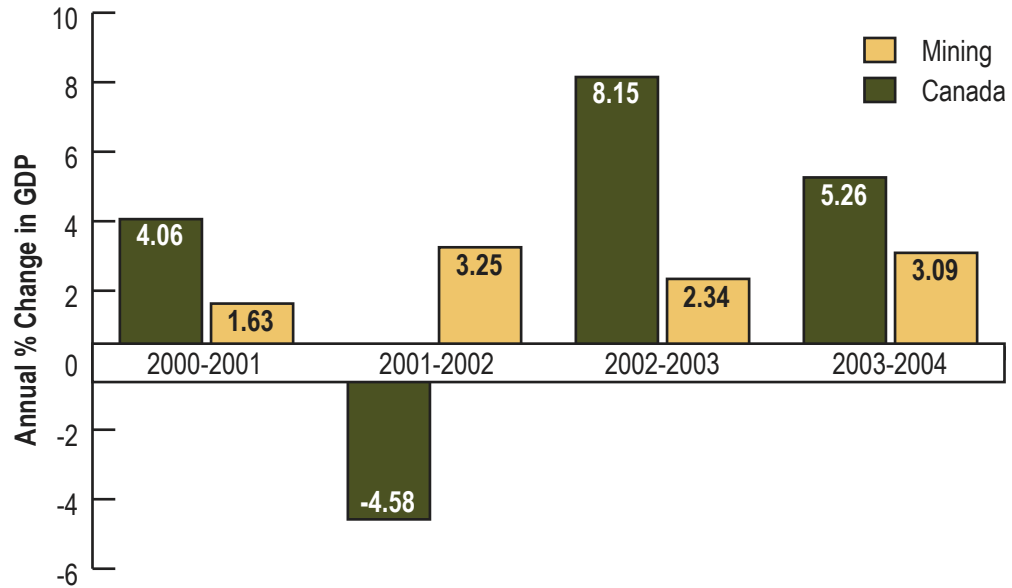


Source: *Prospecting the Future Employee Survey* (n=694)

There is a significant proportion of workers aged 50 and older in all mining occupational groups and a markedly lower proportion of employees younger than age 30. However, there are variations among occupational categories. The research shows that workers under the age of 30 are more prevalent in the technician and technologist jobs (15% of workers). By contrast, in the skilled trades and semi-skilled mining occupations, only 7% of employees are younger than 30.



Change in GDP – Mining (Stage I) and the Canadian Economy (2000-2004)



Source: Statistics Canada CANSIM table 379-0017

## 2.2 Industry growth

Increases in commodity prices since 2002 have fuelled a strong upturn in the minerals and metals sector in Canada. The price increases have fostered considerable exploration activity throughout the country and have accelerated mining GDP growth to about twice the rate of the Canadian economy.

The sector's labour force expanded by 3.6% between 2003 and 2004, compared to an average annual growth of approximately 2% over the past decade.

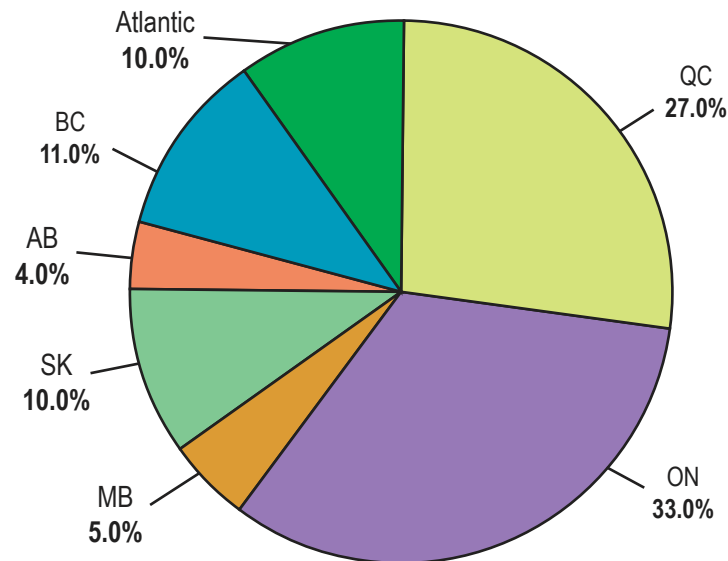
Economic indicators point to continued growth in the industry for a number of years, putting pressure on the sector to meet a growing demand for workers. Demand-driven growth is one factor that will affect future operations and human resource planning. The need to put in place a supply of adequately skilled workers to meet this demand will be important to the Canadian mining industry's ongoing competitiveness.

## 2 INDUSTRY DEMAND AND LABOUR FORCE PROFILE

### 2.3 Regional growth trends

The majority (60%) of the mining labour force works in Ontario and Quebec, followed by British Columbia and Saskatchewan.

**Estimated Percent Employment in the Minerals and Metals industry by Province (2003)**



Source: Statistics Canada, Labour Force Survey (LFS) data

Note: NAICS 2131 was adjusted to exclude support activities for oil & gas. Data were not available for any of the territories.

However, the importance of the minerals and metals industry is increasing dramatically in Canada's North. For example, between 2003 and 2004, the Northwest Territories saw an estimated 122% increase in exploration expenditures, while Nunavut saw a 43% expenditure increase. This signals the development of new labour demands in the North.

Much of the northern growth stems from the emergence of the Canadian diamond industry. Diamond production volume increased by more than 340% between 2001 and 2004. In fact, by 2004, Canada was ranked the third-largest producer of diamonds by value in the world.



## 2.4 Retirement projections

Many sectors in Canada are concerned about a looming skills shortage due to the retirement of older, experienced workers. With its older workforce, the mining industry will be facing this type of shortage in the near future. The total number of individuals expected to retire over the next 5 to 10 years is substantial.

### Estimated Retirement Trends for the Industry – Employer and Employee Forecasts (2005)

Time Period	Employer Estimate % Retiring	Employee Estimate* % Retiring
Five Years (2005-2009)	14.5%	16.9% <sup>1</sup>
10 years – cumulative (2005-2014)	24.5%	40.0%

Based on 2004 labour force baseline of 78,184 workers

<sup>1</sup> Includes employees planning to take early retirement

Based on data collected in the employer survey, 14.5% of mining workers are expected to retire within five years and 24.5% are predicted to retire within a decade. However, employees surveyed for the study revealed a much larger impact is on the horizon, with 40% of employees stating they plan to retire over the next ten years.

The largest percentage of workers planning to retire within 10 years was in the skilled trades occupational group (44.6%).

Retirement projections suggest that significant new hiring will be required to address retirement alone. Planning for retirement should be a key priority for the mining sector.

The employees who plan to retire in the next 10 years will be taking with them an average of 21.4 years of mining sector experience, a loss for the industry overall and for individual employers.

Ramifications could include:

- Increased production costs associated with lower worker productivity among new entrants;
- Potential negative impact on safety, with an influx of new entrants who are less knowledgeable and experienced in safe practices.

## 2.5 Workforce planning

In general, firms undertake workforce planning for the current year, with planning seldom extending beyond three years.

Given the retirement forecast over the next 5 to 10 years, mining employers would benefit from making workforce planning a priority and from taking a more proactive approach to identifying and developing key successors to workers who will retire.

## 3 MEETING THE DEMAND

### 3 MEETING THE DEMAND

#### 3.1 Sources of Supply

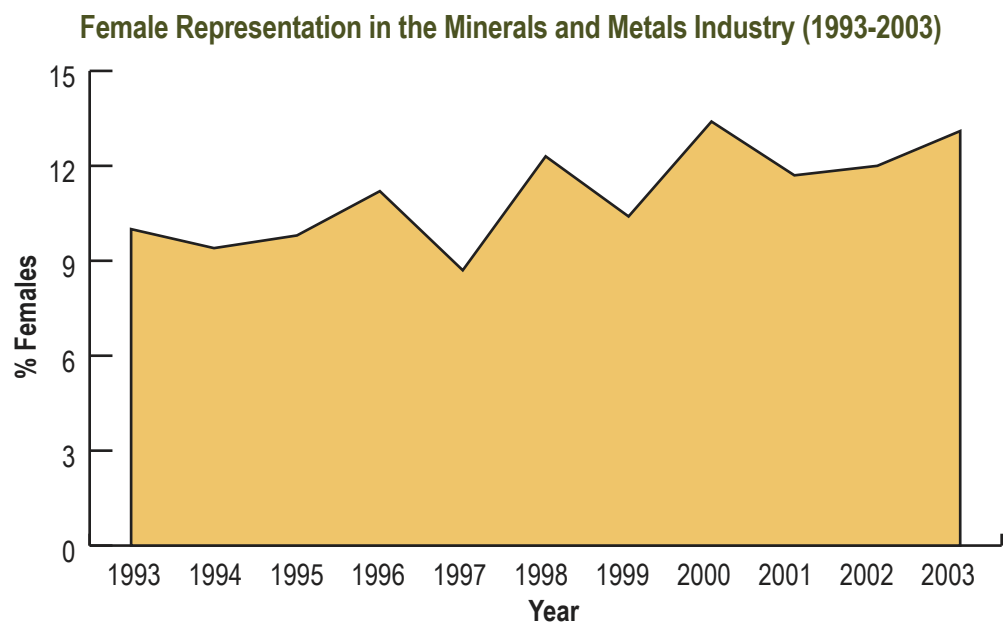
Labour force diversity is becoming an important factor when planning for human resources and employers in the mining sector will need to attract non-traditional groups to work in their industry. The following sub-sections describe various sources of supply for the minerals and metals industry.

##### 3.1.1 Canadian youth

Young people completing high school or under the age of 25 can be viewed as another potential labour source for the mining sector. However, the “youth pool” is shrinking as a proportion of the total Canadian population. In 2001, 13.5% of the population was in the 15-to 24-year-old age group but that proportion is projected to decline to 12.2% by 2016. Operations in northern regions have access to a larger pool of youth but out-migration of youth in many of these areas is becoming an issue.

##### 3.1.2 The female workforce

Women continue to be under-represented in the minerals and metals industry, accounting for only 13% of all employees in 2003, substantially lower than the national average, where women are 46.9% of the workforce.



Source: Statistics Canada LFS, 2003



Women are generally not employed in coal mining and have only recently begun to work in non-ferrous metal production and processing. Females working in the industry are more concentrated in the non-production occupations, representing 62.8% of the finance and administration positions. More than 95% of the workforce associated with many of the production occupations is male.

Although women’s participation in mining-related occupations is increasing in some areas, such as geology, it remains a challenge to recruit women into the industry. This is particularly true in the case of production-related occupations.

Only 14.6% of mining employers surveyed for the study said they had recruitment policies targeted at women. However, many in the industry do believe the female workforce is starting to change its attitudes towards the minerals and metals industry, thereby presenting an opportunity for more active recruitment efforts.

### 3.1.3 The Aboriginal workforce

Aboriginal workers make up approximately 4.8% of the minerals and metals industry workforce. While a small percentage, this rate is much higher than in other industries and in the Canadian workforce overall. In 2001, Aboriginal persons accounted for 2.6% of the Canadian workforce.

#### Aboriginal Representation in the Minerals and Metals Industry Workforce (2001)

NAICS	Percent of Total Workforce
2121 - Coal Mining	2.9%
2122 - Metal Ore Mining	6.3%
2123 - Non-metallic Mineral Mining and Quarrying	4.0%
2131 - Support Activities - Mining and Oil & Gas Extraction <sup>1</sup>	6.2%
3314 - Non-ferrous Metal (except Aluminum) Production and Processing <sup>1</sup>	1.8%
<b>Total</b>	<b>4.8%</b>

Source: Statistics Canada, Census 2001

<sup>1</sup> Note: the labour force numbers have been adjusted for NAICS 2131 and NAICS 3314 to align with the industry definition used in this sector study.

## 3 MEETING THE DEMAND

The minerals and metals industry has increasingly recognized the Aboriginal labour force as an important human resource, especially for firms operating in remote locations. Over 20% of the employers surveyed for the study said their firms had an Aboriginal human resource strategy. In some parts of the country, such as the territories and northern Saskatchewan, mining firms have a well-established history of engaging the Aboriginal work force. This is partly a reflection of the Aboriginal labour force distribution in various regions. In 2001, the Northwest Territories had the highest percentage of the participating Aboriginal labour force (5.6%) working in the Canadian minerals and metals industry.

In more recent developments, such as the diamond industry in the North and Inco's Voisey's Bay operation in Newfoundland, companies have undertaken targeted initiatives to engage the Aboriginal labour force and to establish partnerships with the communities. For example, at the Ekati mine in the Northwest Territories, 39% of the operation's 800 direct jobs are held by Aboriginal persons.

There is evidence that Aboriginal workers are under-represented in the more highly skilled positions and are often hired for entry-level positions that do not require certification. The lack of educational opportunities for Aboriginal persons in certain regions is a contributing factor.

Continuing to build relationships with Aboriginal workers and developing long-term and sustainable skills for these workers will be key to maintaining a skilled labour force in the industry. The knowledge base that has been built upon the successes and failures of developing relationships between mining firms and Aboriginal communities is a valuable resource to the minerals and metals industry and provides a critical advantage over other industries which do not have the same depth of experience. Efforts have already begun to build on best practices and to develop goals for expanding the relationships in the future.

### 3.1.4 New Canadians and visible minorities

Less than 3% of minerals and metals industry workers are members of visible minorities. This is well below the national average of 12.6%. Furthermore, in 2001, the proportion of recent immigrants working in the mining sector was 0.5%, markedly lower than 1.9% of recent immigrants employed in the Canadian economy as a whole.

Immigration policy is an issue of growing interest to Canada's mining industry as it explores options for increasing the supply of skilled workers. Current immigration criteria and processes may limit the ability of the mining sector to recruit foreign-born workers and allow them to use their skills once here.

Canada's points-based immigration system is based heavily on formal educational attainment. Although there have been improvements, it remains a challenge for individuals without university education to obtain the points required to gain entry into the country. The selection criteria may be contributing to the mining industry's labour shortage by turning away workers in the trades and semi-skilled occupations at the border.



Another hindrance to the recruitment of internationally trained workers is difficulty in obtaining Canadian recognition of foreign credentials. Consequently, while the mining industry experiences a skills shortage, there is a vast under utilisation of skills among the immigrant population.

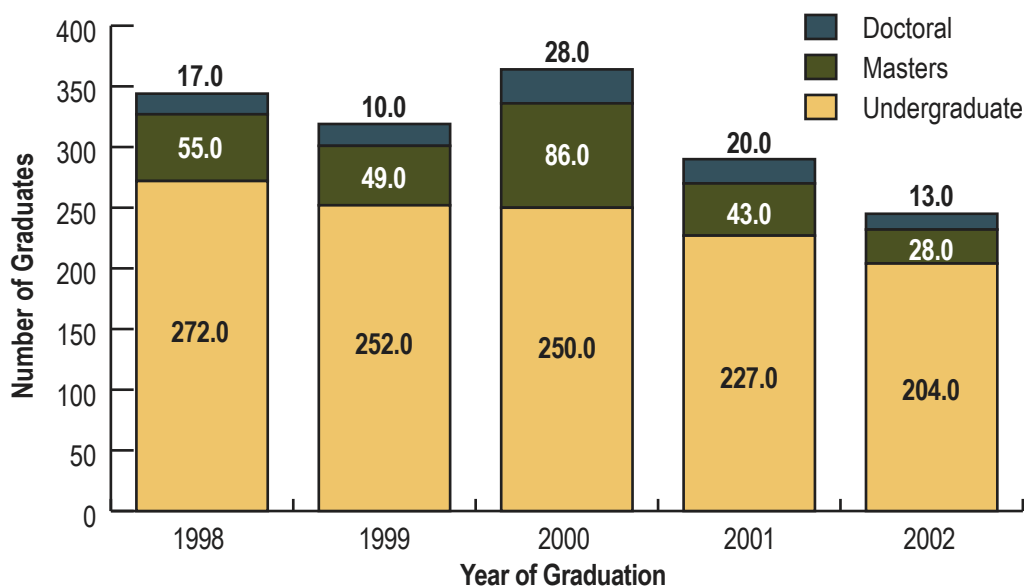
Very few mining firms specifically recruit immigrants as part of their human resource planning process and many in the industry believe active recruitment should be undertaken to meet future supply needs in the workforce.

### 3.2 New entrants from education and training programs

Graduates of mining-related education and training programs have traditionally been a source of labour for the minerals and metals sector. Historically, enrolment in these programs has been tied to cycles in the industry. For example, enrolment declines in the late 1990s and early 2000s resulted in fewer graduates from mining-related engineering programs.

Given the recent growth trends in the industry, survey respondents in the study expect enrolments in mining-related programs to increase over the next 10 years at an estimated average annual rate of 3.3% for universities and 7.5% for colleges and technical institutes.

**Graduation Patterns for Mining-Specific Engineering Degrees<sup>1</sup> (1998-2002)**  
(1998 – 2002)



Source: Canadian Council of Professional Engineers

<sup>1</sup> Mining-specific engineering degrees include geological and mining & mineral degrees.



## 3 MEETING THE DEMAND

An estimated total of 13,800 students will enrol in mining-related university programs over the next decade. However, the challenge remains for minerals and metals employers to attract, recruit and retain these graduates.

### 3.2.1 Geologists, geochemists and geophysicists

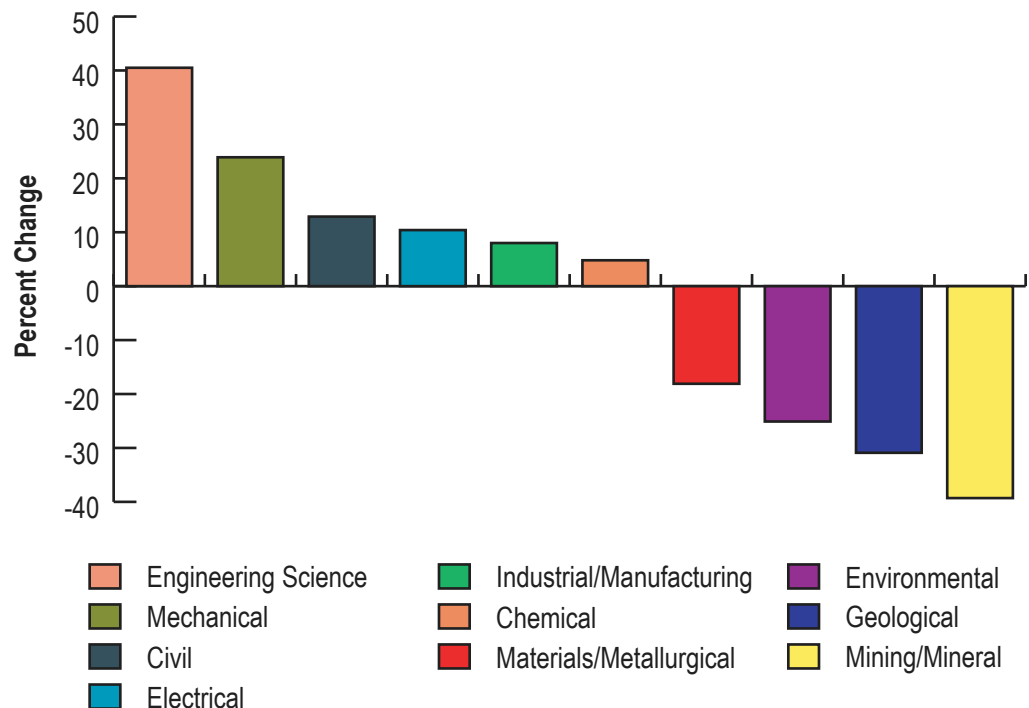
Geoscientists are critical to exploration activities, but there is evidence that the supply of workers in these occupations may not be meeting current demand. This raises a concern for the future, given the projected increases in exploration in the coming years.

Another challenge is that these occupations are highly affected by the cyclical nature of the industry. During times of low or limited exploration, geologists typically leave the sector to work in other industries or to pursue employment overseas.

### 3.2.2 Engineers

There was a 19% increase in overall engineering enrolments at Canadian universities from 1998 to 2002. However, since 1998, 40% fewer students have enrolled in mining/minerals engineering and there have also been declines in geological, minerals, and metallurgical engineering programs.

**Cumulative Rate of Change in Undergraduate Enrolments in Engineering for the 1998 – 2002 Period**



Source: Canadian Council of Professional Engineers



However, there is some evidence that declining trends have started to reverse, with increases in enrolment numbers expected for each of the next 10 years.

### 3.2.3 Entrance of new graduates into mining

Although precise numbers are not available, qualitative research suggests that only a percentage of graduates from mining-related courses will actually seek or obtain employment in the minerals and metals industry. Employers noted that recruiting graduates to Canadian-based mining operations can be difficult.

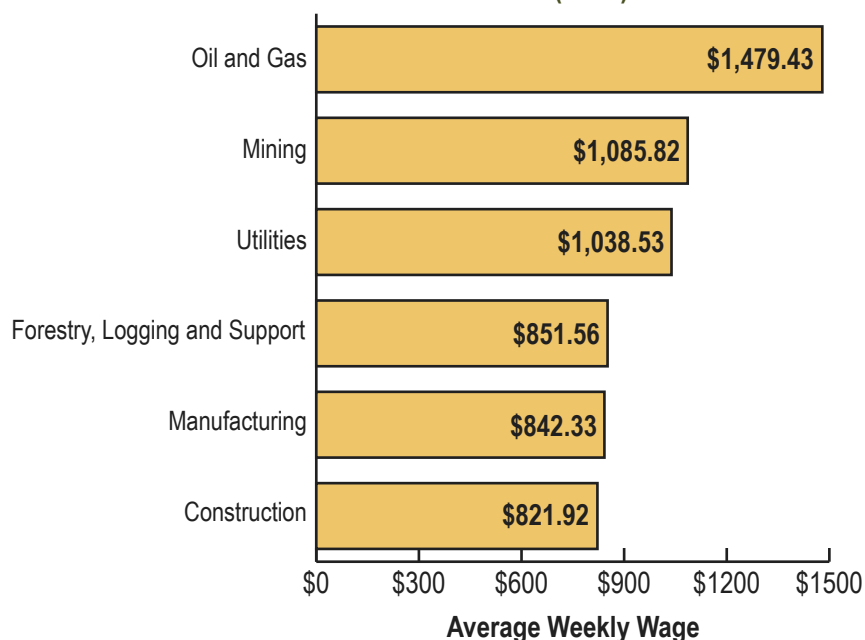
The recruitment challenge is further compounded by the global nature of the industry. The competition for Canadian graduates is fairly intense at the global level. Many graduates, even if they start at Canadian firms, are often lured away by the prospect of work in more “exotic” parts of the world.

## 4 ATTRACTION, RECRUITMENT AND RETENTION

### 4.1 Attraction to the industry

Compensation and benefits in the minerals and metals sector are a potentially important attraction and recruitment factor. Employees surveyed for the sector study indicated that wages were the most important factor when considering a career in the industry.

**Average Weekly Earnings in the Minerals and Metals Industry and Competing Industrial Sectors (2003)**



Source: Statistics Canada as reported in *Mining Facts and Figures* and LFS (for oil and gas, and utilities)

## 4 ATTRACTION, RECRUITMENT AND RETENTION

Wages in the sector – especially in coal and metal ore mining – are very competitive. Employees in these areas earned considerably more in 2003 than employees in almost all other sectors. For example, they earned more than their counterparts in industries that often compete with mining for labour: utilities, forestry, manufacturing and construction.

In 2003, average weekly earnings in coal mining were \$1,257.91. In metal ore mining, employees earned an average of \$1,159.50 per week. The lowest wages were in non-metallic mineral mining and quarrying activities, with average weekly earnings of \$962.70. The relatively higher salaries in mining are likely related in part to the long-term employment of many workers, which means that the “average” salaries are closer to top earning levels.

Workers in the oil and gas sector were the highest paid among occupations compared to mining in 2003.

Benefits are also very competitive in the mining industry. A high percentage of employees surveyed for the research cited their overall compensation package (93.8%) as important in their decision to work in the sector.

Many firms offer production bonuses in addition to regular wages, and such incentive programs correlate strongly with high rates of job satisfaction. Most employers provide attractive health and dental benefits and a majority surveyed provide such benefits as stock options (80.6%), reimbursement of educational program costs (79.3%), relocation funding (74.3%) and in-house training programs (73.3%).

Firms with fewer than 100 employees are significantly less likely to offer programs and benefits than firms with more employees. Nevertheless, between two-thirds and four-fifths of the smaller firms offer a range of attractive benefits.

Job security was the second most important factor when considering a career in mining, according to the employees surveyed. Other attractive features cited by employees were opportunities for career development and advancement; work-life-balance; and safety on the job. The least attractive factor noted by respondents was the potential (or need) for travel.

### 4.2 Recruitment practices

The most common recruitment method cited by employers was the review of résumés submitted to the company, followed by personal contacts or “word of mouth”. Newspaper or trade journal advertisements are also frequently used.

In terms of effectiveness, the most highly rated recruitment practices were co-op and apprenticeship programs—although these methods are used less frequently. Using personal contacts for staff recruitment is a long-standing practice, but rated as less effective.



The industry's recruitment efforts are informal and network-based. Given the new human resource challenges, it may be time for the industry to introduce more formal and structured approaches to recruitment.

### **4.3 Retention strategies**

Firms generally have no retention strategies beyond offering a competitive compensation and benefits package. Traditionally, employees have tended to stay for several years with the same employer. Employee satisfaction in the industry is comparatively high, which bodes well for retention.

Retention will become a critical element of human resource planning in the face of growing competition from other industries and the projected retirement of large numbers of experienced workers.

### **4.4 Challenges in recruitment and retention**

#### ***4.4.1 Competition for skilled labour***

There is considerable competition for workers from all industries in Canada but three sectors are seen as key competitors: oil and gas, electricity utilities and construction. Oil and gas and electricity utilities have wage structures as high as or higher than those of the mining sector and require many of the same skill sets. The construction industry offers employment in urban locations rather than the rural or remote regions associated with many mining operations. In Ontario and Quebec, the electricity sector is a particularly strong competitor.

Competition from mining sites outside of the country is also posing challenges on both recruitment and retention in the minerals and metals industry in Canada. One important strategy will be to attempt to make Canadian operations more attractive than opportunities in other countries.

#### ***4.4.2 Awareness and perception of the industry***

Limited awareness and inaccurate perceptions about the industry are critical challenges in terms of attracting workers. The public—particularly young people—are often not familiar with the industry. Marketing and awareness campaigns to promote the modern mining industry and improve perceptions are important.

## 5 MEETING SKILLS REQUIREMENTS

### **4.4.3 Commuter operations**

Commuter mines are operations to which employees must travel long distances to live and work on-site for periods of time. Commuter mining has become the dominant approach to new developments in Canada. One-quarter of employees surveyed regarded traveling to remote locations for work as a negative factor that affected job satisfaction. Some firms have developed strategies to help employees and their families better cope with the challenges of this model.

### **4.4.4 Post-retirement retention**

The research indicates that there may be some opportunities to encourage workers to work past their eligible retirement date, as employees or contractors, especially in the physical science, engineering and technical occupations. However, the potential for post-retirement retention as a human resource solution is very limited. Employers see this approach as a stop-gap measure with only short-term benefits at best. Many employees in the industry, particularly in the skilled trades and production jobs, do not wish to work past retirement.

## 5 MEETING SKILLS REQUIREMENTS

### **5.1 Education and training**

Industry representatives and post-secondary institutions provided an assessment of the adequacy of the education and training systems in meeting the industry's current and future skill needs.

Among employers, 22.9% believe that the skill gaps of workers are a major issue, while 50% see these gaps as a modest issue. Both employers and educators perceive that a critical gap occurs because of insufficient preparation and motivation of high school students, although they acknowledge that this issue is beyond their control. Another gap in education that can be addressed more aggressively by industry stakeholders is the need to recognize the earth sciences as a core science at the high school level.

Other gaps identified by employers were in geological technology, environmental technology, and radiation and chemistry technology. They also cited "soft skills" as being increasingly important, especially for supervisors and management. These skills include communication skills, a firm understanding of ethics, socio-environmental issues and the need for cultural awareness.

### **5.2 Skill requirements and the northern workforce**

Although substantial investments have been made to develop the labour force (primarily Aboriginal) in northern regions of Canada, many firms find that not enough workers have the essential skills required to move beyond entry-level or semi-skilled occupations. In remote operations, individuals with higher skill sets are typically imported from elsewhere in the province or country.



The growing gap between the needs of industry in the North and the skills available in the local labour force could be addressed through increased emphasis on community-based or distance learning. Individual firms will require the assistance of government and other communities of interest to establish an appropriate and effective training system.

### **5.3 Impact of technological change**

The mining industry is increasingly knowledge-based and technology-intensive, utilizing sophisticated and innovative technology to reduce risks in exploration, improve productivity and enhance environmental protection.

New technologies are being developed to overcome the geo-mechanical and operational challenges of underground mining of deep ore deposits, as much of the remaining mineral inventories in Canada's traditional mining camps are found at depths exceeding two kilometres below the surface. There is evidence that additional skill gaps may emerge over the next decade as tele-mining and automation become increasingly important to the viability of Canadian mines.

### **5.4 Certification requirements**

In the professional and technical occupations related to mining and metallurgy, employees must meet the requirements of the provincial jurisdiction in which they work.

Skilled trades common to other industries, such as construction, require completion of a journeyman apprenticeship program, and are generally recognized by the national Red Seal program, which permits inter-provincial mobility.

In contrast, most production-related mining occupations are not certified trades and do not require credentials or training programs beyond those provided by the industry. This lack of standard credentials and requirements impedes the mobility of workers between employers and between the provinces.

Ontario and Quebec have legislated training requirements for mining occupations, although the training is not provided by public post-secondary institutions as part of mining programs. New occupations related to the diamond industry in the Northwest Territories provided the impetus for the development of three sets of occupational standards for mineral processing technicians, as well as for training based on these standards.

## 6 SUPPLIERS AND CONTRACTORS

Many employers and educators believe that mining should be a Red Seal trade with national occupational standards, and training and apprenticeship programs. They feel that such standards would help improve the image of the minerals and metals sector as a career option and would allow provincial mobility.

### 5.5 Gaps in skills provided by post-secondary mining programs

There are currently 26 post-secondary institutions in Canada which provide mining-specific programs. This includes 9 universities and 17 colleges/technical institutes.

These institutions face a number of challenges in the provision of mining programs—most notably, the high cost of technology and equipment for the programs and low enrolments. Many educators say these two factors combine to create a critical situation for institutions offering mining programs.

The most recent downturn in the industry (pre-2002) has threatened the long-term viability of many programs. Funding is enrolment-driven and as numbers of students decline, it becomes increasingly difficult for institutions to maintain the curriculum to produce graduates with the skills industry requires. Increasingly, mining programs have been placed within other departments, producing a loss of mining focus and decreased relevance to industry skill needs.

The study identified a number of potential solutions to help educational institutions meet industry demand, including expanded co-op placements, greater collaboration between educators and employers to identify real needs in the workplace, and expansion of some of the formal educator-employer partnerships that have already been developed.

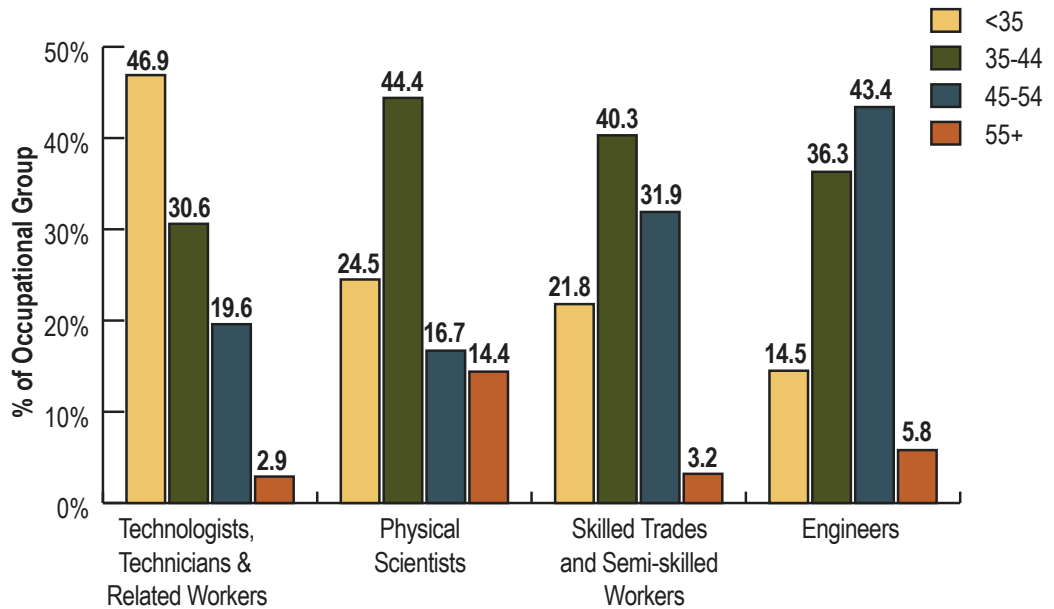
## 6 SUPPLIERS AND CONTRACTORS

*Prospecting the Future* also studied human resource issues among suppliers and contractors to the minerals and metals industry.

Since their services include exploration, mining and processing activities, as well as external services, suppliers and contractors compete with mining firms for the same pool of labour. In addition, many suppliers and contractors serve competing industrial sectors as well as the minerals and metals sector.



### Age Profile of Supplier and Contractor Employees by Occupational Group (2005)



Source: *Prospecting the Future* Supplier and Contractor Survey (n=30, weighted average)

## 6.1 Increase in outsourcing

The quantity and type of labour outsourcing in the mining sector has been on the rise in recent years. The trend is particularly prevalent in mine construction, mine development and mining operations. Companies often outsource when they lack sufficient in-house expertise, frequently for highly specialized tasks that are intermittently required during operations.

The minerals exploration industry is in transition. To accommodate growth and expansion, major firms are more frequently outsourcing exploration activities to junior firms, which in turn commonly outsource their work to contractors. There is also increased outsourcing in such activities as transportation, reclamation and environmental services, and support services.

Coal operations have not adopted the large-scale use of contractors common to other mining operations.

## 6.2 Labour profile of suppliers and contractors

The age demographic of the workforce for suppliers and contractors is much younger than that in the minerals and metals industry workforce. For example, 46.9% of technologists, technicians and related workers employed by suppliers and contractors are under the age of 35.

Only 17.6% of suppliers and contractors surveyed have a workforce that is fully or partially unionized.



## 7 SUPPLY-AND-DEMAND GAP

### 6.3 Human resource issues for suppliers and contractors

With their comparatively younger workforce, suppliers and contractors report that retirement is less of an issue in meeting current human resource needs than it is for the minerals and metals industry.

In terms of factors relevant to human resource needs, suppliers and contractors report that the largest issue is an insufficient supply of qualified staff. Other important issues are the high cost of wages and benefits, skill gaps experienced by workers and the cost of employee training.

With industry employers increasingly outsourcing exploration and production-related activities, the limited supply of qualified personnel, combined with insufficient provision of training or upgrading of skills by contractors and suppliers, could have serious future implications for the industry's human resources.

## 7 SUPPLY-AND-DEMAND GAP

*Prospecting the Future* researchers analyzed the possible magnitude of the labour supply-and-demand gap in Canada's minerals and metals industry. They completed the analysis for three industry growth scenarios: no-growth, low-growth and high-growth. For a complete description of each scenario and the relevant assumptions, please view "Section 4.5 Supply – Demand Gap" in the final report.

### ***No growth***

In the no-growth scenario, the mining sector will need to fill approximately 3,647 positions per year for the next 10 years. It is estimated that 891 of those annual positions will be filled through post-secondary education and training, and immigration. The potential labour supply gap is therefore projected to be approximately 27,560 workers over the next 10 years.

### ***Low growth***

Under the low-growth scenario, the sector will need to fill approximately 5,715 positions per year for the next 10 years. Supply through post-secondary education and training, plus immigration, is projected to fill 980 positions per year. This leaves a potential labour supply gap of approximately 47,350 workers over the next decade.

### ***High growth***

The high-growth scenario will result in considerable recruitment challenges for the Canadian mining sector. The sector will need to fill approximately 7,081 positions a year, after the supply of post-secondary graduates and immigrants is factored in. This means that over the next 10 years, under a high-growth scenario, the mining sector will experience a potential labour supply gap of approximately 70,810 workers.



### Estimated Supply and Demand Gap – Summary

Scenario	Cumulative Ten-Year Gap (2005 – 2014)		
	No Growth	Low Growth	High Growth
Estimated Total Workforce (based on a total 2004 workforce of 78,184)	82,712	90,343	93,672
Total Cumulative Demand	36,470	57,150	81,970
Total Cumulative Supply	8,910	9,800	11,160
“Gap” to be filled by other sources	27,560	47,350	70,810

### Supply – Demand gap summary

The projected supply and demand gap for human resources will pose a major challenge for the minerals and mining sector under any of the potential scenarios.

The education and training systems will not produce sufficient numbers of qualified graduates to meet the sector’s needs. Although there are other potential labour pools, it is evident that there is an immediate need for employers and education/training institutions to develop a coordinated strategy to address the industry’s current and potential hiring needs.

## 8 RECOMMENDED STRATEGIES

*Prospecting the Future* included development of recommended strategies and action items to address the major human resources issues facing the minerals and metals industry over the next 10 years. The recommendations were based on consultations with the Minerals and Metals Industry Sector Study Steering Committee (MMISSSC), the MITAC project team and representatives of various communities of interest.

The recommended strategies and action items have been developed to meet 4 primary objectives:

Objective A: Meet current and projected human resource demand by increasing and making best use of all potential sources of supply.

Objective B: Address existing and expected skill gaps in the industry.

Objective C: Ensure standardization of skills and consistency of training delivery in order to facilitate recruitment, establish clear educational requirements and increase worker mobility.

Objective D: Ensure that all stakeholders are aware of and understand the critical human resources issues currently facing the minerals and metals industry.

## 8 RECOMMENDED STRATEGIES

Strategies were developed for each objective, all of which are summarized below. The final study also includes action items for each strategy, and suggested timelines and lead organizations, as well as partners to implement the action items.

### ***Objective A: Meet current and projected human resource demand by increasing and making best use of all potential sources of supply.***

The research results suggest that Canada will need to hire as many as 81,000 new employees to meet current and future demands, and to fill positions vacated by retirees.

**Strategy A1:** Promote the minerals and metals industry to youth as a safe, modern, environmentally friendly and technologically advanced career option.

**Strategy A2:** Develop a national strategy that focuses on the engagement, recruitment and retention of Canada's Aboriginal workforce, focusing on sites and operations that neighbour Aboriginal communities.

**Strategy A3:** Actively target non-traditional groups in promotion and recruitment efforts to expand labour supply sources.

### ***Objective B: Address existing and expected skill gaps in the industry.***

Research findings suggest that the industry could lose up to 40% of the existing workforce in the next 10 years due to retirement, early retirement and voluntary separation. This significant loss of skills represents a major risk to the sector, especially given that skill gaps currently exist in the workforce.

**Strategy B1:** Mitigate the risk to industry associated with an aging workforce and pending retirements through proactive human resource practices and workforce planning.

**Strategy B2:** Develop programs to bring back retired workers and retain older workers to minimize the impact of the workforce exodus and facilitate the capture of knowledge and experience that will be necessary to maintain skills levels within the industry.

**Strategy B3:** Encourage industry to develop mentoring programs to facilitate the transfer of knowledge from older experienced workers to their replacements.

**Strategy B4:** Develop a collaborative, cross-industry strategy for educational preparation; training and educational programs; continuing education/life-long learning; and employer-provided training to facilitate the availability of a skilled labour force.



***Objective C: Ensure standardization of skills and consistency of training delivery in order to facilitate recruitment, establish clear educational requirements and increase worker mobility.***

Mining-specific occupations are generally not credentialed in Canada (with the exception of basic common core training in Ontario and Quebec). In the future, there will be a need for advanced training and further education to help employees meet increasingly complex skills requirements. In addition, there is a need to identify required common and core skills to facilitate the development of career paths, maintain occupational and professional standards, and enhance worker mobility.

**Strategy C1:** Present a clear case for the potential benefits of occupational standards, certification and program accreditation to employers and other industry stakeholders.

**Strategy C2:** Develop and implement occupational standards for key industry occupations.

**Strategy C3:** Implement national occupational standards and standardize credentialing of professional occupations within Canada.

***Objective D: Ensure that all stakeholders are aware of and understand the critical human resources issues currently facing the minerals and metals industry.***

It is critical that key players in the minerals and metals industry understand the importance of human resources to the industry's continued success and long-term competitiveness, and that it begin proactive, strategic human resources planning.

**Strategy D1:** Develop and implement a communications strategy that emphasizes the impending human resource crisis facing the minerals and metals industry. The strategy is intended to raise awareness and understanding of the issues and to promote collaboration between the industry stakeholders who have an important role to play in overcoming the human resource challenges facing the industry.

For more information on any of the proposed strategies, please see the detailed action plan in the full version of the report.