

**A Study on the Career Advancement and Retention of Highly Qualified Women in the
Canadian Mining Industry**

by

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Abstract

The gender imbalance in the Canadian mining industry is considerable and persistent. Despite a substantial forecasted labour shortage, women represent only 14% of the national mining workforce. This research investigates the underutilization and under-representation of a specific labour subset, namely Highly Qualified Women. Highly Qualified Women (HQP) are women who have obtained a Bachelor's degree or higher. HQP represent a substantial source of technical and leadership capacity for the mining industry.

This research study used an online survey as the primary methodology for data collection, and the survey resulted in a sample of 163 HQP respondents. From the responses, HQP career paths were mapped and their perceptions on mining workplace culture and career barriers were analyzed.

Results indicated two distinct career pathway trends for HQP in the mining industry. 'The Specialist,' a career characterized by multiple professional scientific and technical positions, and 'The Corporate,' a career characterized by professional administrative roles and roles in mid-level management. It was found that neither 'Corporates' nor 'Specialists' systematically progressed into senior management and executive roles.

These findings suggest that HQPs careers in mining are stalled, despite a strong indication by respondents of interest in their professional career advancement. With

regards to workplace culture, respondents indicated that blatant forms of gender discrimination have been reduced in mining workplaces; however, exclusion from informal networks, implicit bias and subtler forms of workplace discrimination persist. Consistent with previous mining sector research, improving work-life balance, work flexibility and mentorship were found as key drivers for HQW to advance and remain in the industry.

From the significant insight of the respondents, strategic recommendations for organizations to improve the advancement and retention of HQW in mining were developed.

Preface

This research was approved by the University of British Columbia's Office of Research Services Behavioural Research Ethics Board in August of 2011. The certificate number for this research is H10-03294.

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List of Abbreviations and Definitions

Canadian mining industry: refers to organizations or individuals that work on some aspect of the mining lifecycle within Canada, includes: exploration; extraction and processing of minerals and metals; closure and reclamation of mining lands; and organizations or individuals which support these activities through consultation or other service offerings.

Career Positions (CP): employment in a career oriented role that lasts at least one year.

Highly Qualified People (HQP): individuals who have obtained a minimum of a Bachelor's degree from an educational institute.

Highly Qualified Women (HQP): women who have obtained a minimum of a Bachelor's degree from an educational institute.

Leave of Absence (LOA): a period of time taken away from employment for Maternity, Paternity, Medical, care for a family member, education, etc. that does not change the status of employment.

Mining Industry Human Resources Council (MiHR): national sector council for the Canadian minerals and metals industry. The council is funded in part by the Government of Canada's Sector Council Program.

Professional – Technical and/or Scientific Role (PTS): a career position in a professional technical and or scientific role.

Senior Leaders: individuals at the higher levels of an organization's structure who are responsible for the strategic direction of an organization. Position titles vary in different organizations, but often have titles such as CEO, Executive Director, Executive Team, Director, or Senior Manager.

SWOT: a strategic management tool used in decision making that evaluates and defines the Strengths, Weakness, Opportunities and Threats involved with a specific project or strategy.

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Dedication

To my parents – my first teachers –who have always encouraged me to try and learn a bit more.

To Paul, for believing I could do it and supporting me through the process with patience and love.

1. Introduction

The Canadian mining industry is in need of a workforce renewal. It is facing a substantial skills shortage that has been intensified by a lack of diversity within its labour force. Specifically, Highly Qualified Women (HQP) are underrepresented and underutilized in the Canadian mining industry. Having obtained a Bachelor's degree or higher, HQP are workers with specialized knowledge, and are a key source for leadership in the mining industry.

The purpose of this research is to expand on current knowledge on the under-representation of women in the sector, and specifically gain insight into the careers of Highly Qualified Women in the Canadian mining industry. This insight is aimed to assist mining organizations in addressing the specific gendered barriers to advancement and retention that HQP face in the Industry. In addition, addressing these barriers will enable mining organizations to capitalize on the competency and knowledge of a more diverse workforce.

The following questions have guided this research:

- *What are the career pathways of HQP in the Canadian mining industry?*
- *What factors influence advancement and retention of HQP in mining workplaces?*
- *What is the interaction/influence of Workplace Culture on HQP's careers in mining?*

The objectives of this research are as follows:

- Model the career pathways of HQW in the Canadian mining industry
- Investigate HQW's perspectives on barriers to career advancement, retention and the interaction of workplace culture in the Canadian mining industry.
- Provide recommendations to industry on strategies to increase the advancement and retention of HQW in the mining industry.

In summary, this research investigates the career experiences of Highly Qualified Women in the Canadian mining industry focusing on the 'develop', 'advance', and 'retain' stages of the employment lifecycle, as visualized in Figure 1.

Figure 1 HQW Employment Lifecycle



1.1. Background: Labour and Diversity Shortages in the Canadian Mining Industry

This research is based on the identification of three overarching challenges that the Canadian mining industry is facing, namely:

- The Canadian mining industry is facing a substantial labour shortage (Canadian Mining Innovation Council, 2008; Mining Industry Human Resources Council, 2011a).
- There is a growing demand for Highly Qualified People (HQP) in the Canadian mining industry (Canadian Mining Innovation Council, 2008; Mining Industry Human Resources Council, 2011b).
- Women are significantly under-represented and underutilized in the Canadian mining industry (Women in Mining Canada, 2010; BC Mineral Exploration and Mining Labour Shortage Task Force, 2011; Mining Industry Human Resources Council, 2011a).

1.1.1. ***Labour Shortage***

Despite the recent years of economic volatility, the Canadian mining industry is facing a substantial human resource shortage. This labour shortage was first indicated in a 2005 labour study completed by the Mining Industry Training and Adjustment Council which specified both a pending labour shortage and lack of gender diversity within the sector (Mining Industry Training and Adjustment Council, 2005). Recent labour analysis completed by the Mining Industry Human Resources Council forecasts that the industry will require between 75,280 and 141,540 workers by 2021 (Mining Industry Human Resources Council, 2011a, p. 7), dependent on contractionary or expansionary economic scenarios. Even if there is a negative hiring requirement, when retirement rates and non-retirement separation rates are included a positive cumulative hiring requirement results for both a market contraction and market expansion scenario (Mining Industry Human Resources Council, 2011a, p.7).

The magnitude of the labour shortage is amplified by the lack of diversity within the industry and an aging workforce, with over 40% of the workforce age 50 or older.¹ An 'aging workforce' is not a unique sector characteristic in Canada; however, this challenge is compounded as the workforce is older in mining than other industries. The number of workers and the age of the current workforce does not fully convey the knowledge and competency of the workforce needed to fill the labour shortage.

As the industry engages with new technologies; focuses on optimization during all phases of the mining lifecycle; faces increasing competition and global demand; copes with heightened and complex regulatory environments and engages with new social and organizational developments, it becomes evident that the human resource requirements for the industry are shifting. The mining industry and the research and academic institutions that support it require more capacity to navigate the changes in the sector.

To account for this demand, in 2007, the Canadian Mining Innovation Council (CMIC) was asked by the Federal, Provincial and Territorial mines ministers to develop a Pan-Canadian Mining Research and Innovation Strategy. Through a series of workshops with mining stakeholders, CMIC developed a strategy that included the attraction, development and retention of Highly Qualified People in mining research and innovation as a key strategic pillar (Canadian Mining Innovation Council, 2008). As

¹ http://www.mininghrforecasts.ca/en/thecanadianminingworkforce/An_Aging_Workforce.asp
Accessed February 24, 2012

market competition increases for skilled labour, there exists increasing pressure on the Industry to move swiftly to address the capacity issues identified by CMIC.

With globalization and the improved mobility of workers, retention of skilled labour is becoming more challenging (Gera & Songsakul, 2007). Coupled with, the overall demographic shift in North America as baby boomers age, the labour shortages that are anticipated in mining are not happening within isolation. Increasing competition from other industries in Canada also threaten the current labour invested in the Canadian mining industry (Ekeland, 2001).

In order to have access to the best talent, organizations and industries must adapt to a new worker: one that is knowledgeable about the value of their skill set, has access to increasing amounts of career and industry information, and has higher expectations on the actions of their organization and their management. Concurrently, these new workers are demanding opportunities in decision making, and fair and respectful treatment (Burke & Ng, 2006). This is a new talent era, and the Canadian mining industry appears to be lagging behind other industries in their ability to attract a new and diverse workforce. This lack of foresight has added complexity to the human capital pressures facing the Industry.

1.1.2. ***Growing Demand for HQP***

As indicated in the previous section, building industry capacity requires individuals with specialized training and knowledge. This knowledge includes an understanding of the Canadian mining industry, and the developing technologies and processes that will drive the industry forward. For the purpose of this research, these workers are defined as - Highly Qualified People (HQP).

The value of a highly qualified workforce is not exclusive to the mining industry. Industries around the world are driving the global demand for HQP and contributing to the mobility of this labour segment (Gera & Songsakul, 2007). They provide “the critical link between technological progress and economic growth, social development and environmental welfare” (OECD , 1995, p.3). Highly Qualified People are essential for the “development and diffusion of knowledge” (OECD , 1995, p. 3).

Organizations are employing the most educated workforce in history, and this knowledgeable worker wants more autonomy than traditional workers. Increasingly, the skill set of a knowledge worker is intangible or invisible (Burke & Ng, 2006, p. 90), giving leverage to the employee with regards to the value of their skill set and mobility of their employment.

Furthermore, HQP are an integral part of the development and preservation of competitive and sustainable industries (Gera & Songsakul, 2007). Mining organizations leverage technology, and mitigate sustainability issues to gain competitive advantage, and these strategies necessitate a diverse and knowledgeable workforce.

1.1.2.1. HQP Defined

Although there has been recent attention to the looming shortage of HQP within the Canadian mining industry, an established definition of what constitutes HQP has eluded the literature. From a broad perspective, this labour segment has been referred to by the following terms:

- Highly Qualified Personnel (McKenzie, 2009); (CFES, 2008),
- Knowledge Worker, (Hall, 2005; Smith, 2005),
- Skilled Worker (Wylie, 2008),
- Qualified Worker (Barta, 2005), and
- Highly Skilled Worker (Ednie, 2004).

Specifically, the term ‘Highly Qualified People’ has been defined in a variety of ways, with particular differences noted in the level of education required and the inclusion or exclusion of industry experience as the key aspects of the definition (Mining Industry Human Resources Council, 2011b, p. 11).

With specific reference to the mining industry, the term Qualified Person is defined in NI 43-101 as an individual who:

- is an engineer or geoscientist with at least five years of experience in mineral exploration, mine development or operation or mineral project assessment, or any combination of these;
- has experience relevant to the subject matter of the mineral project and the technical report; and
- is a member in good standing of a professional association
(Canadian Securities Administrators, 2011).

In comparison, Statistics Canada defines Highly Qualified People as “individuals with university degrees at the Bachelors' level and above” (Statistics Canada, 2008). This definition will be adopted in this research study, as it provides a verifiable parameter for survey respondents.

1.1.3. ***Role of HQP***

Concurrent with the variety of definitions for HQP, there are significant discrepancies in the role that HQP play within the labour market as indicated by the literature. In summary, HQP can be categorized by the following three statements;

- HQP play a significant role in generating innovation;
- HQP play an important role in the application and dissemination of knowledge; and
- HQP play an important role within organizations

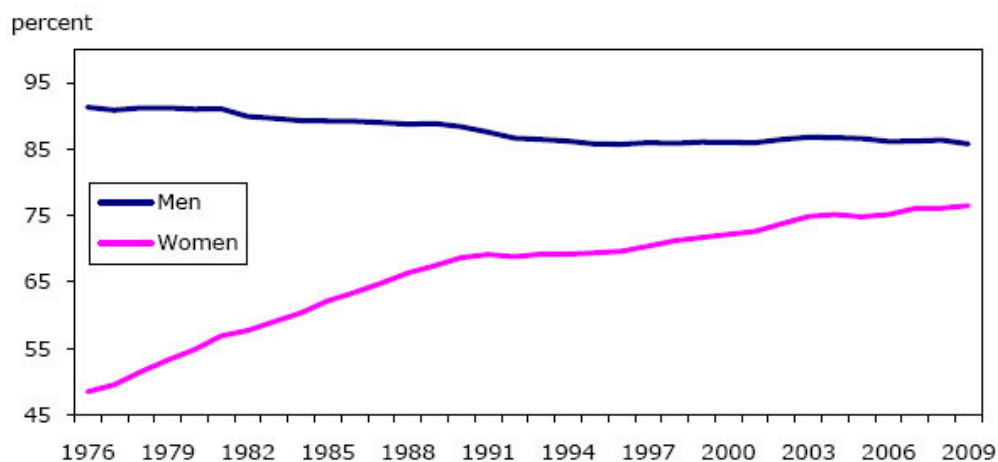
(Mining Industry Human Resources Council, 2011b).

This research will focus on the role that Highly Qualified People, specifically Highly Qualified Women (HQW), have within mining organizations. This research does not focus on the role HQW play within formal academic or educational institutes that are related to the mining industry, nor to their role in generating innovation outside of mining organizations.

1.2. Women in the Canadian Mining Industry

The mining industry has a reputation for “the greybeard phenomenon”. This term describes the prevailing gender and age demographic of the workforce (Gibson & Scoble, 2004). Despite the narrowing gender gap that we are seeing in the Canadian labour market as illustrated in Figure 2, the Canadian mining workforce remains one of imbalance.

Figure 2 Labour Force Participation Rates 1976-2009, Men and Women Aged 25-64²

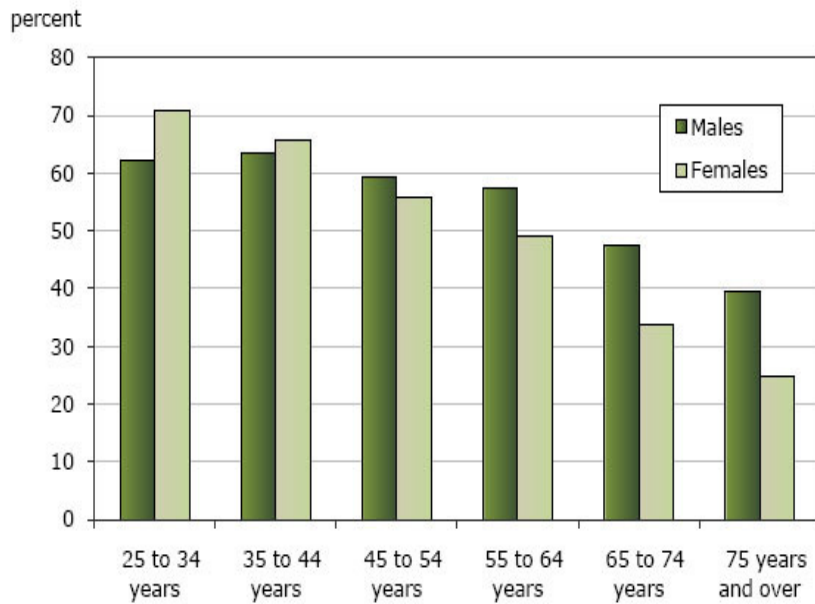


The narrowing of the gender gap in the overall workforce is complemented by the change in the gender balance of Highly Qualified People in Canada. As seen in Figure 3 the gender balance is changing among post-secondary graduates. Today, there are more women than men aged 44 and younger who have a postsecondary education in Canada.

² Source Stats Canada Labour Force Survey
<http://www.statcan.gc.ca/pub/81-004-x/2010001/article/11151-eng.htm>
Accessed March 22, 2012

By comparison, there are more men in the 45+ age ranges who have completed a postsecondary education.

Figure 3 National Population with Postsecondary Education, 2006³



At 14.4%, the representation of women working in the Canadian mining industry is the lowest among primary industry categories (oil and gas, fishing, hunting, trapping, and forestry) in Canada and well below the overall labour force average of 47.4%.

Despite a perception that more women are in the mining industry today, the number of women in mining remains relatively unchanged since 2001 (Women in Mining Canada, 2010).

³ Statistics Canada Labour Market Survey
<http://www.statcan.gc.ca/pub/81-004-x/2010001/article/11151-eng.htm>

1.2.1. ***Gender Imbalance***

The reasons for the continued gender imbalance in the Canadian mining industry are multi-faceted, but for young women, and those in career transition, negative perceptions of employment in the sector and a lack of familiarity are significant factors (Women in Mining Canada, 2010). Female enrollment in Canadian universities, or future HQW, is 40% higher than male enrollment; however, there are still very few women in traditional mining educational disciplines, such as engineering (Natural Sciences and Engineering Research Council of Canada, 2010).

The vertical representation of diversity within organizational structures also provides insight into the underutilization of female labour. In mining organizations there is a lack of women in leadership roles, partly due to fewer women within the talent stream; however, this does not account for the entire gender imbalance.

In 2010, the Natural Science and Engineering Council found that even when women and men had equal education, men are much more likely to be working in a management capacity in science and engineering. Specific to mining, labour research indicates a similar underutilization of women at higher levels within organizations. In administration and corporate services, women account for 60% of the professional mining roles, but hold only 44% of the management roles in these categories (Women in Mining Canada, 2010).

1.3. The Issues in Summary

The Canadian mining industry is facing a substantial labour shortage, and the workforce make-up of the industry is in transition. New technology, automation, challenging and remote mining environments, and growing social and legal expectations are building a reliance on a more highly qualified miner.

The overall skills shortage is coupled with a lack of diversity in the industry, as women and other minorities continue to be underrepresented in the sector. In order to meet the requirements for Highly Qualified People in the mining industry there needs to be a collaborative effort to attract new and diverse labour sources. In addition, the sector must address the attraction challenges that are deterring women from a career in mining and identify and mitigate the underutilization of Highly Qualified Women.

2. Literature Review

2.1. Overview of Women in Mining Research

There is a growing body of literature on women and mining, this research includes studies on the socio-economic impacts that mining operations have on women within mining communities (Lahiri-Dutt, 2011). Recent research by Shandro et al. evaluated the effects that the mining industry has had on women's health, within mining communities in Canada (Shandro, Veiga, Shoveller, Scoble, & Koehoorn, 2011). Shandro et al. found an increase in pregnancies in mining communities during boom cycles, and challenges with regards to domestic violence in communities during both boom and bust cycles. Due to the remote nature of mining operations a lack of health and social services were a significant source of stress for women in mining communities (Shandro, Veiga, Shoveller, Scoble, & Koehoorn, 2011).

Outside of the socio-economic impacts, there has been focused human resource research on women working in mining (BC Mineral Exploration and Mining Labour Shortage Task Force, 2011; Gibson & Scoble, 2004; Keck & Powell, 2000; Minerals Council of Australia, 2005; Women in Mining Canada, 2010). This research focuses on the role women workers have in the conventional mining industry; however, it should be recognized that women make up 30% of the world's artisanal miners, and if part-time work was considered this number would likely be higher (Hinton, Viega, & Beinhoff, 2003 p. 25). Research conducted by the World Bank indicates that adverse

effects of mining are distributed heavily to women, while the benefits and rewards, such as employment, are distributed more heavily to men (Eftimie, Heller, & Strongman, 2009). Much of the research on women in mining communities and developing nations focuses on the issues of health, and childcare, but not necessarily looks at gender in a larger context in the way that power is embedded within the resource industry (O'Shaughnessy & Krogman, 2011).

Equity challenges are economically dependent. The equity challenges that are occurring in mining are exasperated in developing nations by poverty, limited mechanisms for environmental control and a lack of social resources. By comparison, in developed nations, the equity challenges within the mining industry are more focused around employment.

2.2. History of Women and the Canadian Mining Industry

In 1890, the Ontario Mining Act included the first legislative prohibition of women, indicating “the prohibition any girl or woman...in or about any mine” (Keck & Powell, 2000, p. 3). Amendments to the act in 1912 and 1913 allowed companies to hire women in a “technical, clerical or domestic capacity” (Keck & Powell, 2000 p.4).

The gender divide within mining employment remained in place except for a temporary lift of the ban during the second world war. Even during the liberation movement in the 1960's, the International Labour Organization Underground Work

Convention of 1935 was ratified in Canada in 1966. This convention included the forbidding of employment of women in any mine, except: women who were employed in health and welfare services; women receiving training underground for a non-manual job; and women managers in non-manual occupations (Espley, Francis, & Catonguay, 2002).

Women remained predominately outside of the mine sites until 1970, when they were allowed to work at surface sites (Espley, Francis, & Catonguay, 2002). A paper documenting women's work experiences at Inco's Sudbury operations is one of the only accounts of first generation women entering blue collar Canadian mining jobs since the postwar period (Keck & Powell, 2000). Between 1974 and 1976 Inco hired 100 women for hourly rated jobs at the company's surface mining operations in Sudbury, a significant decision as it was the first time women had access to industrial unionized jobs, and some of the highest paying industrial wages in the country (Keck & Powell, 2000).

In 1978, women were allowed to work underground in Ontario (Keck & Powell, 2000). Coinciding with the changes indicated in the Ontario Mines Act, the 1970's⁴ were a significant time for gender equality as human rights legislation included gender as grounds for discrimination for the first time in Canada.

⁴ <http://criaw-icref.ca/millennium>
Accessed March 20, 2012

The legislative changes to the Mines Act and the inclusion of gender in the human rights legislation illustrates that full access to employment in mining is a relatively recent phenomenon for women.

The explicit legislative exclusion of women from heavy labour occupations, as well as operational and site roles, is a legacy that permeates the current gender divisions within the Canadian mining workforce. Women continue to work predominately in the environments and roles that were permitted historically – such as administrative and corporate roles - the gender divide remains more prominent in the environments where the historical exclusion was legislated in Canada (Women in Mining Canada, 2010).

This labour imbalance within the Canadian mining industry is reflective of the broader global gender based inequity seen in the distribution of benefits within mining. In Canada, on average, women earn 32% less than their male counterparts (Women in Mining Canada, 2010 p.9). The gendered wage gap within the Canadian mining industry is quantifiable evidence of this economic incongruity.

2.3. Education Indicators - Future HW in Canada

During the past decade, women have maintained a nearly 40% lead over male students in enrolment at the Bachelor's level in Canadian Universities (Natural Sciences and Engineering Research Council of Canada, 2010). However, the discipline decisions that female and male students make are remarkably different. As seen in the Statistics

Canada data of 2008-2009, the top three disciplines chosen by female students were arts and humanities, business, and health professions; male students selected business, engineering, and arts and humanities (Natural Sciences and Engineering Research Council of Canada, 2010). This is perhaps not surprising, as there is long been an understanding that young women select educational avenues that are human-centric; however, a sociological analysis implies that these choices “do not occur in isolation from the social contexts in which they emerge” (Charles, 2010, p. 23).

The gender gap is most present in the specific disciplines that lead naturally into highly qualified employment in the mining industry. With regards to engineering, 15% of total male enrollment, and only 2% of total female enrollment is in the field of engineering (Natural Sciences and Engineering Research Council of Canada, 2010).

Globally, these numbers vary in unexpected ways; developing countries with gender-traditional societies have higher representation of female graduates in science and engineering than western countries. Canada has seen a decline in gender inequality with regards to labour force participation, and legal rights (Charles, 2010, p. 23). In 2010, the United Nations Educational, Scientific and Cultural Organization collected data on the engineering and science graduates globally; it was found that Japan, Switzerland, Germany and the US have highly male-dominated engineering programs. In contrast Saudi Arabia and Jordan have nearly 50 percent female science graduates. Indonesia has the highest representation of female engineering graduates (48%) (Charles, 2010, p. 23).

The persistence of the science and engineering gender representation gap can be attributed to the greater diversity in educational pursuits and career options that are presented to both women and men in western societies, and that catering of western education to human-centric programs that are of interest to women, while in developing nations education is driven more by advancing economic development (Charles, 2010).

2.3.1. ***Career Selection of Graduates***

Coinciding with enrollment selection, there is a gender difference in the career outcomes of Bachelors, Masters, and Doctorate holders in the Natural Sciences and Engineering (NSE). In Canada, women who hold NSE degrees are more likely to work in areas of social science, education, government, health, business, and finance administration. Conversely, male NSE holders tend to hold positions in management, and natural and applied sciences (Natural Sciences and Engineering Research Council of Canada, 2010). Women represent a minority among professionals in the natural sciences, engineering and mathematics. In 2009, just 22.3% of professionals in these occupations were women, up marginally from 19.5% in 1987. In primary industries, the percentage of women employed is unchanged from 1987-2009⁵.

⁵ <http://www.statcan.gc.ca/pub/89-503-x/2010001/article/11387-eng.htm#a11>
Accessed March 23, 2012.

These findings support the current participation rates of women in the mining industry. They indicate that the gender imbalance can be partially explained by supply of women in traditional mining educational fields, and in career choice tendencies.

As cited in Andrew's 2009 study of women in non-traditional careers Cockburn in 1987 argued, that occupational segregation is partly due to young women leaving school with sex-stereotyped preferences, but in many cases unconscious discrimination against them is also a factor. It is important when considering career tendencies that discrimination may not be visible at an individual level, but may be a more broader illustration of "power relationships and social and cultural barriers" (Weller, 2006 as stated in Andrew, 2009, p.350).

2.4. National and Provincial Studies of Women in Mining

In developed mining countries such as Canada and Australia, there have been national studies on female mining employment (Women in Mining Canada, 2010; Minerals Council of Australia, 2005). These studies provided baseline data on women in the mining industry, and identified barriers to their employment. Prior to this research, the gender imbalance within the industry had not been studied on a broad scale. The limitations of these broad scale studies were that they looked at women workers as a predominately homogenous group.

In a current mining context, there are two national studies that provided foundational information for this research study. In 2009, Women in Mining Canada and the Mining Industry Human Resources Council (MiHR) conducted the first national study of women in the sector. This study mirrored a similar research study that was conducted in 2005 in Australia. Both the Australian and Canadian national studies found similar descriptive statistics with regards to occupational representation in the industry.

In 1998 a report to the Australasian Institute of Mining and Metallurgy found that the mining industry was the most highly sex-segregated industry in Australia (Pattendem, 1998). The active Australian workforce was comprised of 43% women, but the minerals industry contained only 11% women, with the majority in traditional female roles with an administrative or clerical nature (Pattendem, 1998, p. 7). In 2005, in partnership with the Australian Government Office of Women, the Minerals Council of Australia conducted a national study of women and the mining industry. This study included three distinct studies: Young Women, Career Expectations & the Minerals Industry; Female Mining Engineering and Minerals Process Students: Career Drivers, Expectations and Perceptions; Retention of Women in the Minerals Industry. Key findings supported Pattendem's earlier research of a strong descriptive gender divide, with only 18% of the total workforce identified as women (Minerals Council of Australia, 2005, p. 1), and consistent with previous occupational categorization, the majority of women worked in clerical and administrative roles, and women were under-

represented in supervisor and management roles, and particularly at mine sites were they represent only 3% of employees (Minerals Council of Australia, 2005, p. 1).

Despite the under-representation, the majority of the women surveyed were working in an operating mine (87%) (Minerals Council of Australia, 2005, p. 147). In comparison, the WIM study respondents were predominately women working in corporate roles within the industry.

With respect to retention, sexual harassment was found to be a significant issue in Pattendem's 1998 study (Minerals Council of Australia, 2005). In 2005, moderate levels of sexual harassment and discrimination were disclosed by respondents of the Minerals Council of Australia's study, but more severe sexual harassment, particular physical harassment was not the issue that it once was (Minerals Council of Australia, 2005). Indicating a slight workplace culture shift, and articulated by one respondent "They've got above the sexual harassment but it's still assumed that women can only get so far" (Minerals Council of Australia, 2005, p. 161).

In summary, the Minerals Council of Australia's 2005 study found that the key challenges facing the industry were: changing dominate masculine culture; implementing new work arrangements and structure and changing the image of the industry (Minerals Council of Australia, 2005, p. 19).

In 2009, a similar research study was taken to address the gender discrepancies that were seen in the Canadian mining industry (Women in Mining Canada, 2010). This

research was conducted by surveying female students, educators, women working in the mining industry, and exploration and mining employers.

The Canadian study found that women represent 14 percent of the mining industry (Women in Mining Canada, 2010, p. 9), which represented a participation rate that was slightly lower than the Australians 18 percent found in their 2005 study (Minerals Council of Australia, 2005, p. 1). Consistent with the Australian findings, women in Canada were predominately in traditional clerical, and support roles in mining organizations. The Canadian and Australian study both found that women working in the industry were primarily in the 25-34 year age group.

There is some evidence that older women have left the industry, as part of the down-cycle in the 90's. As the mining industry is classified as a 'boom and bust', there are likely highly qualified women who have migrated to other sectors during the down cycles (Women in Mining Canada, 2010, p. 11).

With regards to the attraction challenges, similar findings in the Australian and Canadian studies were made. In Canada, female post-secondary students (future HQW) lacked familiarity of the industry, and had not selected educational pathways that had natural progressions into the mining industry. In particular, outside of the Natural Science and Engineering disciplines, trades represented the last field of study chosen by women (Women in Mining Canada, 2010).

The Canadian study found that workplace culture was a critical barrier to employment as indicated by women working in the industry; however, mining

employers generally did not indicate recognition of this challenge (Women in Mining Canada, 2010 p. 24). There was also a strong indication of a concern about women's perception of their own abilities within the industry, a finding that was consistent with a recent study of female engineers in the United States (Fouad & Singh, 2011). Consistent with the Australian findings, inflexible work arrangements was the most pressing issue identified by women working in the industry. The second most pressing issue was workplace culture.

During 2010, the BC Labour Task Force - Women in Mining Subcommittee commissioned a study to establish baseline data of women in mining within British Columbia. This research was released publicly in November of 2011, and surveyed three groups: women working in the industry, post-secondary and secondary school career advisors, and human resource personnel within mining and exploration organizations.

The BC Labour Task Force study was unique in that it examined career advisors readiness to promote the mining industry to female students. The results illustrated a lack of knowledge and resource awareness by career educators, but did not indicate a gendered preference for promoting careers in the industry. There are indications from other research that career discussions with educators can create further boundaries in attracting women to careers in non-traditional industries (Andrew, 2009, p. 351). This was indicated in a study conducted in the United Kingdom on apprenticeship applicants for engineering construction. It was found that career advisers had little information on

engineering apprenticeships and were not seen as promoting the engineering career to women (Andrew, 2009, p.351).

The sample of employed women in the 2011 BC study was similar to the national 2005 Australian study, in that the women surveyed were predominately from operational sites. In comparison the 2009 Canadian study the respondents were predominately women working in a corporate mining setting.

The barriers to retention of employed women in the 2011 BC study had similar themes to the Canadian and Australian research. Women indicated work-life imbalance as the top reason to leave their employment, and career barriers resulting from a male-dominated culture.

Women report the continued existence of a culture that precludes women from joining in social activities. They also comment on a lack of respect for women through doubting women's abilities and the existence of inappropriate female images placed around the worksite. In addition women also cite the lack of women in senior roles as a way of perpetuating the notion that women are not equal to men.

(BC Mineral Exploration and Mining Labour Shortage Task Force, 2011, p. 41).

In summary, the Canadian, Australian and British Columbian sector studies found that women are significantly underrepresented in the mining industry, and primarily work in traditional female roles such as administration and clerical work. All of the studies found that women employed in the industry are subject to barriers to their career development. Some of these barriers are specific to gender, such as male dominated workplace culture, while others can affect both genders such as work-life balance. As

women are often predominate care takers within their families, issues of flexibility and work-life balance have a greater impact on their employment and retention in the industry.

2.5. Implicit Bias and Gender Schema

“Any woman who identifies herself as a woman in this industry rather than a person in this industry will find it more difficult to advance”

(Respondent, 33).

The Canadian mining industry’s lack of diversity is founded in a legacy of exclusion. As indicated in the legislative and workplace culture barriers, women have been segregated from complete employment within the mining industry. The mining industry has long been perceived as a male domain (Espley, Francis, & Catonguay, 2002, p.1), and this is largely due to work design characterized by heavy manual and labour intensive tasks.

The ‘maleness’ of the mining work environment does not happen in isolation. According to social theories, this work environment is occurring alongside the implicit biases that determine our evaluation of women within the world of work. Implicit bias refers to the hypothesis that both men and women hold “gender schemas” (Valian, 1999, p. 2) or unconscious hypothesis about sex differences that frame our evaluation of performance and ability (Valian, 1999). These implicit biases are often over looked in contrast to their more explicit neighbor: the stereotype. In most Canadian work environments, overt stereotyping or discrimination is something that is no longer

tolerated (Valian, 1999, p. 2). However, the less obtrusive, yet no less powerful, 'implicit bias' plays a dominant role in determining how power, leadership, and resources are distributed within organizations. From the development standpoint of women and men's professional careers, women are consistently underrated, and men are consistently overrated (Valian, 1999, p. 2). It can be argued that in a highly gender dominant industries, like mining, the gendered schema that disadvantages women in the professions is further compounded. Additionally,

...as women receive less favorable professional evaluations when gender schemas are invoked. Thus, conditions that highlight a woman's femininity, especially if she works in a traditionally male area, put her at risk of being considered unsuited to the "male" job and therefore devalued

(Valian, 1999, p. 310).

For a woman to succeed in a male dominated work environment, she must mask her gender, as it will be seen as unsuited for the work environment. Work environments that are gender dominant are part of a larger more complex equity problem, where the arrangement of organizations has developed "in favor of men for the preservation of their advantages" (Fox, 1998, p. 223). This concept of preservation was supported by the following survey response;

"Often seniors tend to advance persons who seem to be like themselves = male, same hobbies, same family situation etc. That mental scheme must be overcome"

(Respondent, 89).

2.6. Gender and Organizational Diversity

The gender imbalance of women in the mining industry is the most telling of diversity barriers within mining employment in Canada. This is due to the advances in gender representation that we have seen in other industries. From the literature we know that diversification of a workforce is more than generating numerical representation (Thomas & Ely, 1996). Vertical representation of women ensures that the labour demographics are dispersed throughout hierarchal configurations within organizations. At the organizational level vertical representation of women illustrates that opportunities for personal career development and capacity building are available to all.

Gender differentiation and sex segregation has been prevalent in both educational and occupational contexts. Some of the most persistent examples of this differentiation are documented in science, engineering and technology (Andrew, 2009; Charles, 2010). There are however, gaps that exist between education and employment, where women have the training but are not working in these fields. For example, in the United Kingdom, male dominated sectors such as engineering, information technology and skilled trades are experiencing a deficit of workers, and yet 70% of women with science, engineering, or technology qualifications are not working in these fields (Desvaux, Devillard-Hoellinger, & Meaney, 2008). This indicates that the skills shortage has been exasperated by the persistent homogeneity of the workforce.

With only a handful of exceptions, occupations within the mining industry are exclusively male dominated (Women in Mining Canada, 2010). Gender dominance is defined as 70% or more of one gender in a particular occupation (Gunderson, 1998, p. 136). At 14.4%, the representation of women working in the Canadian mining industry is the lowest among primary industry categories in Canada (WIM, 2010). With specific reference to Highly Qualified Women, recent research conducted by the Mining Industry Human Resources Council indicates that HQW make up only 16.6% of the total knowledge workers⁶ in the Canadian mining industry (Mining Industry Human Resources Council, 2011b, p. 83). In this case the percentage of HQW is only slightly higher than the total percentage of women in the industry.

Not only are their general representation challenges in mining, but also there is a lack of women in the upper echelons of organizational hierarchies (Women in Mining Canada, 2010). Although vertical gender representation challenges are prevalent in many industries, the mining industry has challenges in representation even in areas where women are more prominent. In the 2009 Canadian Women in Mining study, it was found that even in female dominated occupational categories such as administration and corporate services; women were not equally represented in management or executive roles (Women in Mining Canada, 2010, p. 12).

⁶ Knowledge Workers in this study include individuals that typically have completed a Bachelors and higher, but may also possess no degree but have a breadth of technical or industry specific knowledge or skill

In summary, women are underrepresented in mining organizations and throughout the mining industry. Their underrepresentation is particularly staggering because of the progress in gender balance that has occurred in other industries in Canada. There is indication that the lack of diversity is not solely related to a small labour pool of women to select from. It has been found that women with science and engineering degrees are likely to be working outside of these fields. Within the Canadian mining industry even when women hold gender dominance within an occupational category such as administration or corporate service they are still less likely to be vertically integrated into management and executive roles.

2.7. HQW's Mining Career Paths

Career Paths are becoming more challenging to define. Historically, careers developed along linear and defined organizational paths in a mostly predictable manner. Deregulation, deconstruction of union environments, decreased reliance on manufacturing and increased reliance on technology has led to career paths that are harder to predict, mobile, and are shaped by diverse organizational structures (Brown, van Leeuwen, & Mitch, 2004, p. 3). These changes have created further complexities when attempting to categorize or predict career paths, particularly when quantifying advancement.

The BC WIM report found that women's career pathways in the mining industry tended to form around three distinct occupational categories:

- **Traditional Careers:** largely industry transferable, required educational qualifications from high school to university, and included professional support roles in HR, public relations, administration. Traditional Career women typically worked in office work environments, in urban or mine site offices.
- **Science Careers;** largely industry specific, required a university degree or college diploma, worked in office or field work environments, and included engineers, geoscientist, and technologists.
- **Operations Positions;** that required from high school to apprenticeship qualifications, and the work environment included surface and underground operations, women in these roles often work in remote environments, and included positions such as labourer, mine supervisor, certified tradesperson

(BC Mineral Exploration and Mining Labour Shortage Task Force, 2011, p. 20).

Alternatively, Teck Resources has initiated a program to assist technical employees in building their technical and managerial capacity. Through their career at Teck, employees can choose to work in either stream based on business need, and may make decisions throughout their career to switch from management to technical positions along their career pathway (MiHR Innovate, 2010). This streaming of the career pathways is supported by the professional-in-training program which provides technical employees (engineers, scientists, etc.) with a wide range of professional development, opportunities to expand understanding of the overall management of the organization (MiHR Innovate, 2010). This program indicates recognition of the different competencies required in management vs. technical roles.

An American study of female and male engineering career paths found that over a seven year segment of time there was little difference between men's and women's careers. The difference of note was that at the point of the study 19% of the women who were surveyed had left engineering since graduating, while only 4% of the men had left (Ranson, 2003, p. 29).

In summary, careers are complex to define, and in mining there have not been extensive studies on the career development paths within the industry. Previous research has categorized careers by occupational categories (Women in Mining Canada, 2010), and occupational groups (BC Mineral Exploration and Mining Labour Shortage Task Force, 2011). These categorizations are based on current or most recent positions held by workers and do not look at the career trends over time.

2.8. Women as Leaders

Although there are examples of women in leadership roles in the mining industry, there is still a lack of vertical representation within Canadian mining organizations (Women in Mining Canada, 2010). There is also a concern that as we see more women in high profile roles, there will be less pressure on organizations to address barriers in employment faced by diverse groups (Conference Board of Canada, 2011).

At the organizational level, vertical representation illustrates opportunities for personal career development and capacity building are available to all. The

diversification of a workforce is more than generating numerical representation (Thomas & Ely, 1996). Analyzing the career paths of HQW will generate a deeper insight into the employment barriers and issues facing women at different stages of advancement in their mining career.

There is significant and growing body of research that has found linkages between organizational performance and the number of women in leadership roles within organizations (Conference Board of Canada, 2011; Desvaux, Devillard-Hoellinger, & Meaney, 2008). In developed countries women have made substantial inroads in organizations and sectors; however, the gender gap widens at the top levels of organizations (Desvaux, Devillard-Hoellinger, & Meaney, 2008).

For the past two decades in Canada (even with the differences in labour force participation factored into the analysis), men are two to three times more likely than women to hold a senior management role, and 1.5 times more likely than women to be middle managers (Conference Board of Canada, 2011, p. 6).

In mining this challenge is further compounded by both the educational choices that women make, and the boom and bust aspect of the industry. Engineering remains a top field of study for male graduates, and this educational choice can steer graduates into “middle management roles at a business-unit level that provide feeder pools for senior management positions” (Conference Board of Canada, 2011, p. 7).

Outside of the education choices made by women, the female leadership talent stream has been further reduced by the economic downturn in the 90s. This downturn

resulted in a mass exodus of women and men from the mining industry in Canada, and resulted in the closure of mining schools. The effects of this downturn are now very visible in the demographic make-up of the industry. We see very few workers in the middle-age ranges, and many more workers in the end or beginning of their career path (Mining Industry Human Resources Council, 2011a). This creates a generational gap in the industry where it is quite possible that those at the later stages of their careers did not attend school with women, nor at any time in their career did they work for a woman.

This diversity gap in leadership is not exclusive to the mining industry. Private companies have seen a boost in the percentage of women board of directors from 12% in 2007 to 16% in 2009, but there has not been a radical shift in gender equality in any industry (Catalyst, 2009). Organizations in arts, entertainment, and recreation led in representation of women board of directors: mining, quarrying and oil and gas extraction industry had the lowest (Catalyst, 2009).

2.9. The Business Case for Diversity

Diversity includes a wide range of differences and can include ethnicity/nationality, gender, ability, language, religion, lifestyle or tenure (Kossek & Lobel, 1996 as cited in Basett-Jones, 2005 p.169-170). Leonard and Swapp, as cited in Basett-Jones (2005) , found that diversity in the workplace needs to comprise of more than just a mix of

demographics. In order for companies to benefit from the performance aspects of diverse workplaces, they must include intellectual and cultural diversity (Basett-Jones, 2005). In this respect, organizations must seek more than tokenism to capitalize on the benefits associated with a diverse workforce; quota's or percentages of representation are only one measurement of diversification (Thomas & Ely, 1996).

There are perceived and proven risks associated with a homogenous or heterogeneous workforce. One of the well known objections to diversity is that it damages cohesiveness, and increases conflict (Basett-Jones, 2005). Conflict is seen as negative or harmful to organizations, and should be avoided. In contrast, cohesiveness and a lack of conflict can be the result of group think, and can hinder organizations from taking a more critical evaluation, which can lead to creative thought, and innovation (Basett-Jones, 2005, p.172). This is of particular importance to the mining industry as an oversight or failure in a mining project poses the risk of monumental financial and social costs.

In 2005, Orenstein found that the case for diversity was developed around the following four business objectives: increasing revenue or gross margin; reducing litigation; enhancing corporate goodwill; and as part of corporate social responsibility where leadership believes that diversity is the right thing to do (Orenstein, 2005; Weigand, 2007, p.70).

The business case for diversity is further supported by the strategic reasoning that a diverse workforce will expand an organization's market access. Diversity

management programs are good for business as they can diversify the demographic make-up of the organization to mirror market segments, and ultimately gain access and legitimacy to specific demographic segments and cultural markets (Thomas & Ely, 1996). Building relationships with a variety of diverse stakeholders is crucial to the success of a mining operation. These relationships will become more important as organizations expand into new and increasingly remote regions around the globe.

Organizations can also benefit from diversity through the internalization of differences (Thomas & Ely, 1996). This approach to diversity management – referred to as the Emerging Paradigm (Thomas & Ely, 1996) organizations get the best of both worlds. Equal opportunity is stressed, and differences are acknowledged. This paradigm looks at how organizations gain new perspectives, knowledge, and experience and then how to integrate them back into the organization. In this, organizational learning and integration leads to innovation. This paradigm is of significance when we consider the role of Highly Qualified People in the mining industry as leaders in innovation.

Outside of the increase in innovation, organizations looking to increase diversity will often outline the linkages between diversity and its connection with the bottom-line (Orenstein, 2005). In 2004 Catalyst conducted a study of 353 Fortune 500 companies which revealed that organizations with the highest representation of women in top management experienced better financial performance than organizations with the lowest representation— including a 35% higher return on equity (Catalyst, 2004). A European Commission study showed that 58% of companies with diversity programs

reported higher productivity as a result of improved employee motivation and efficiency (Desvaux, Devillard-Hoellinger, & Meaney, 2008, p. 2). Further, 62% said that the program helped attract and retain highly talented people (Desvaux, Devillard-Hoellinger, & Meaney, 2008, p. 2). Utilizing statistics and quantitative examples provide a compelling case for organizations that base their decisions on information presented in this format.

Providing quantifiable evidence for diversity is important for Human Resource professionals in that it contextualizes the business case in the language of decision makers. However, establishing the value of diversity must go beyond presenting evidence and move towards linking business objectives with the benefits associated with strategic diversity management.

2.9.1. ***Diversity Management***

Organizations should not be asking *whether we should deploy a diversity management strategy?; to how are we going to manage diversity within our organization?* Basset-Jones in 2005 argued that if organizations are interested in innovation as part of their strategy, they may not have a choice in diversification. With the combination of demographic pressure, competition for scarce labour, and increasing demand for innovation barriers facing under-represented labour groups will be more permeable(Basett-Jones, 2005).

Successful management of diversity involves linking diversity management to core organizational activities (Dass & Parker, 1999). The creation or implementation of a program to manage diversity will influence and change the way that business is conducted in the organization; however, the plan needs to be more than a free standing project.

According to Dass and Parker's model for implementation, the diversity plan should be one that is systematic and proactive and is a result of structural and cultural transformation to integrate diversity within the organization (Dass & Parker, 1999). In order for this to occur, organizations need to integrate diversity into their mission statements and values, and evaluate business decisions with a framework that includes diversity.

Shifting an organization into one that values diversity requires commitment from leaders and a genuine valuing of diversity within the organization (Thomas & Ely, 1996). In particular, the preconditions for this shift rely heavily on leaderships' commitment to employees, and a genuine valuing of diversity in the organization. Successful organizations are led by managers who make work environments conducive to high performance and maintain a positive morale (Orenstein, 2005, p.25).

2.10. HQW and Barriers to Career Advancement

Women's advancement in organizations is a developing topic of management theory. Initially research focused on identifying discrimination and developing strategies to increase attraction and recruitment. Within much of this literature it was implied that once women entered organizations and sectors where they did not have critical mass, there would be a natural progression to advancement into the hierarchies of organizations (Gunderson, 1998, p. 136). This simply did not happen. A recent report from the Conference Board Canada found the representation of women in senior management roles in Canada has remained static since the Canadian Charter of Rights and Freedoms came into effect (Conference Board of Canada, 2011). In spite of widespread predictions, that time would remedy the gender imbalance in leadership; men are still twice as likely to be senior managers in Canada (Wohlbold & Chenier, 2011).

This issue is further compounded by the educational choices that are made by women. Engineering was among the top fields of study for males in 2006, whereas Canadian female post-secondary graduates selected business, management, and public administration (Natural Sciences and Engineering Research Council of Canada, 2010). In mining, many organizations recruit senior managers from among employees with technical disciplines, and these positions often become recruitment pools for more senior roles in organizations (Wohlbold & Chenier, 2011). This research will be evaluating advancement from the perspective of HQW in the mining industry with reference to

their career aspirations, and exploring the concept of leadership within the sector.

2.11. HQW and Barriers to Retention

From the current labour demographics it can be seen that attracting more women to the mining industry is a key component to removing the gender dominance that the industry is currently facing. Attracting more women to the industry will also be necessary to meet the forecasted labour demand, but it will not be enough to solve the skills shortage. The mining industry also needs to take a long-term approach at ensuring that current HQW are retained and developed to their fullest potential. The cost of involuntary turnover is simply too high.

Involuntary turnover is a tangible quantity: organizations can calculate this cost by valuing the costs of recruitment, training, knowledge loss, and strain on other human resources within their organization. Casually, the cost of turnover is often referred to by Human Resource professionals as being approximately two times the cost of the salary of the new employee for one year. This cost is exasperated at a time when the mining industry does not have workers to spare.

In the case of women, there has been much written about the retention challenges that occur after women start a family (Hewlett, Buck Luce, Shiller, & Southwell, 2005). Recently, there has been an increasing amount of “attention on the 'opt-out revolution' in which large numbers of highly qualified women are dropping out

of mainstream careers” (Hewlett, S., 2005). Hewlett found in the On-Ramps and Off-Ramps study, that “37% of highly qualified women voluntarily leave their careers for some time, and 58% take a variety of more scenic routes” (Hewlett, S., 2005). Scenic routes are described as flexible working options like reduced hours and job shares. Taking time off of their career was largely attributed to family responsibilities, including childcare and elderly care. The off ramps were usually short lived for women, but the penalties to the career development and compensation were significant as there were very real barriers in getting their careers back on track. (Hewlett, Buck Luce, Shiller, & Southwell, 2005).

There were a variety of factors that lead women to leave their careers and included what were termed push and pull factors. Pull factors were classified as things that pulled a women from her career, like parenting, elderly care, or personal health issues; push factors were identified as workplace related factors like lack of job satisfaction, or opportunity (Hewlett, Buck Luce, Shiller, & Southwell, 2005, p. 44). For women in science, engineering and technology fields the retention issue is more pressing. Many women leave and do not return to these fields, despite completing qualifications in these disciplines. It was found that 52% of women in these fields quit their jobs and most of this exodus occurs during their mid-30’s (Hewlett, Luce, & Servon, 2008). The reasons why women leave science, engineering, and technology careers can be summarized by the following:

- The hostility of the workplace culture drives them out;

- Isolation of being the only woman on their team;
- Disconnect from the work rhythms of science and engineering careers and the firefighting or diving catch behaviors that are rewarded in these careers;
- Extreme nature of the jobs with punishing long work weeks, and travel schedules; and
- The mystery of advancement – women are isolated, lack mentors and are unable to navigate the pathways to progress in their career

(Hewlett, Luce, & Servon, 2008, p. 23).

Similar retention barriers were indicated by women working in the Canadian mining industry. Some women perceived that they were not offered the same opportunities “as their male colleagues due to preconceived notions about physical strength, leadership ability, and willingness to travel to remote locations,” (Women in Mining Canada, 2010, p. 20). The women who held these perceptions were significantly more likely to leave the industry.

The retention barriers in the Canadian Women in Mining 2010 study can be classified as push factors (Hewlett, Buck Luce, Shiller, & Southwell, 2005), or factors that occur at work that push women out of their workplace. In contrast, pull factors come from outside of the workplace. The importance of push factors with regards to retention are significant to organizations because they represent barriers, in which the organization has some degree of control over, and can be rectified. The significance of the push factors is further reiterated by the recent findings from a study of over 3000 women engineers in the United States (Fouad & Singh, 2011) entitled ‘Stemming the Tide.’ This research found workplace climate to be a significant factor of retention, and

turnover for women in engineering. Particularly, one third of the women who left the engineering field indicated the workplace climate, or culture, as the significant reason for exiting (Fouad & Singh, 2011).

Recent research findings by the Mining Industry Human Resources Council reinforced this mid-career exit with regards to the geosciences (Mining Industry Human Resources Council, 2011c). Working in remote locations and in the field was seen as a deterrent for women to stay within the industry (Mining Industry Human Resources Council, 2011c). This mid-career exodus is in contrast to what is occurring in education. Women are making strides in geoscience classrooms in Canada, but they still only represent 20% of the exploration sectors employees (Mining Industry Human Resources Council, 2011c).

Even with drastic increases to the participation of women in post-secondary programs that naturally progress into mining careers (geoscience, engineering, science and technology), there still exists a very real need for organizations to address the challenges facing women within the industry. The costs of losing these women are just too high. Women face a variety of challenges that contribute to their desire to leave workplaces. Predominately, the key barriers to women's retention in science and engineering, and mining environments are issues of flexibility, work-life balance, and workplace culture.

2.12. Workplace Culture

Early psychology research looked at 'group norm's or 'climate'; however, organizational or workplace culture research has been explicitly referenced only in the last few decades (Schein, 1990, p. 109). Organizational or workplace culture can be defined as:

“...the beliefs, attitudes, practices, norms and customs ‘the way things are done around here’ that characterize workplaces. They can be both obvious and implied”

(McLean, 2003, p.3).

By comparison, organizational climate is the “surface manifestation of culture” (Schein, 1990, p. 109), and therefore lends “...itself to direct observation and measurement” (Schein, 1990, p. 109). Workplace culture does not happen within a vacuum, and Hofstede recognized the influence of national and regional culture on organizational culture. He defined workplace culture using four dimensions:

- power distance,
- uncertainty avoidance,
- collectivism vs. individualism, and
- masculinity vs. femininity

(Hofstede, 1998).

Hofstede, also found the workplace culture is not homogeneous within an organization, and in many cases localized or subcultures within organizations exist. This

can be seen in the mining industry when we compare the cultures of mining operations with that of their corporate headquarters.

Johnson defines workplace culture as 'the paradigm' (Johnson, 1988), and it is comprised of a generalized set of beliefs and assumptions about the organization and the way it is or should be (Johnson, 1988, p. 85). The paradigm can be challenging to articulate as it is comprised of elements that are taken for granted, and is more likely to emerge through the stories and explanations of individuals in the organization. It "is preserved and legitimized in a cultural web of organizational action in terms of myths, rituals, symbols, control systems and formal and informal power structures..." (Johnson, 1988, p. 85).

A "culture perpetuates itself through the socialization of new members" (Schein, 1990, p. 115). In this, organizations maintain and preserve their current workplace culture by "looking for new members who already have the "right" set of assumptions, beliefs, and values" (Schein, 1990, p. 115).

The subverive and implied nature of workplace culture makes it difficult to define, and when the culture is unhealthy, difficult to change. This is especially true when we look at workplace cultures that are creating barriers to employment for diverse groups.

"A workplace might be characterized by frequent overtime, often unplanned. Rewards are tied to working late hours, additional pay, promotions or being seen as part of the team, etc. Although these cultural characteristics might appear to affect men and women equallly, they will typically have a different impact on

women who could be less able to work late hours due to additional family responsibilities, safety concerns, etc. And these observable and apparently gender-neutral aspects of the workplace cultures, could reflect underlying attitudes or myths in the organization, such as working late is an individual choice, or, women just don't want this kind of work"

(McLean, 2003, p.3).

The model of work culture epitomized in Mclean's quote, may have been "functional at a time when male breadwinners were the norm" (Lewis, 2010, p. 358), but persist inappropriately in today's context (Lewis, 2010). Lewis describes this work culture as a male model of work, and she argues that it encompasses a range of barriers to women (Lewis, 2010).

"At the most fundamental are gendered assumptions about the separation of work and home and the division of labour which results in the greater valuing of male workers or those without active family commitments"

(Lewis, 2010, p. 358).

The relationship between workplace culture and advancement and retention of women is intuitive: an inclusive workplace culture will directly impact the employment of women within the culture. However, workplace culture as indicated by McLean in 2003 is also an important aspect of attracting diversity too an industry, therefore it has an impact on external perceptions of mining workplaces.

2.12.1. ***Mining Workplace Culture***

Recent Women in Mining studies in Australia and Canada found that a significant number of women perceive workplace culture as a barrier to their employment and career advancement (Women in Mining Canada, 2010; Minerals Council of Australia, 2005; BC Mineral Exploration and Mining Labour Shortage Task Force, 2011). Although these studies identified workplace culture or masculine workplace culture as a challenge for women in the mining industry, the research did not look at the elements of the workplace culture that were causing the challenges.

From previous research it is clear that the workplace culture is an issue for women working in the mining industry, and there has been demonstrated links between healthy organizational cultures and organizational performance. When women employees from across the industry have identified the culture of the mining industry as problematic for women, the mining industry as a whole is underperforming.

Cultivating a workplace culture of diversity creates value for organizations. There have been strong linkages in research between cultivating a culture of diversity, and performance advantages 'in terms of profitability and value metrics' (Weigand, 2007, p. 69). While the inclusivity of mining workplace cultures presents a challenge for women, Highly Qualified Women who work in specific occupations may also face the additional challenge of gendered occupational cultures. Research on occupational cultures has found that women engineers "are not seen as having identities that are compatible with the engineering community, and that they have to develop these in order to belong

(e.g. Wall and Clarke, 1996; Dryburgh, 1999; Clarke et al., 2004; Faulkner, 2005a; Andrew, 2009, p. 350).

Workplace culture can vary within organizations, and subcultures can develop. This is of particular importance when we consider the diverse working environments that occur within mining organizations. From isolated, remote field workplaces, mining operations, corporate, and small business settings: the mining industry encompasses a variety of workplaces, and within them there are likely differences in workplace culture.

2.13. Literature Gaps

Previous research of women in mining has looked at the educational attainment of women, and their current career position at a fixed point in time (BC Mineral Exploration and Mining Labour Shortage Task Force, 2011; Women in Mining Canada, 2010; Minerals Council of Australia, 2005); but there has not been an investigation of women's career development integrated through the employment lifecycle. Careers are not static, and are becoming more difficult to define. A more integrated approach at defining women's career paths is needed to determine trends in career advancement and retention in the industry.

Although previous research studies identified that workplace culture was a barrier to women's retention and employment in the mining and science and engineering fields (Fouad & Singh, 2011; BC Mineral Exploration and Mining Labour Shortage Task Force,

2011; Minerals Council of Australia, 2005; Women in Mining Canada, 2010), previous research has not looked at defining the particular aspects of the workplace culture that are problematic.

In the national and provincial studies in Canada (Women in Mining Canada, 2010; BC Mineral Exploration and Mining Labour Shortage Task Force, 2011), women were broadly researched and there was not a distinction between the experiences of women based on their education or experience.

Previous research has identified barriers to women's advancement and retention, but specific research on HQW and their experience of career barriers has not been conducted within the mining industry. The perception of advancement and retention of HQW is important, because at a foundational level, they have the qualifications to advance in the Canadian mining industry.

3. Research Design and Methodology

The design of this research was guided by the following research objectives;

- Model the career pathways of HQW in the Canadian mining industry.
- Investigate HQW's perspectives on barriers to career advancement, retention and the interaction of workplace culture in the Canadian mining industry.
- Provide recommendations to industry on strategies to increase the advancement and retention of HQW in the mining industry.

3.1. Research Scope and Definitions

This research maps the career paths of Highly Qualified Women who are currently working or who have worked within the Canadian mining industry based on the definitions of the variables described in the List of Abbreviations and Definitions. Although the mobility of Highly Qualified Women was considered; this research focuses on HQW's perspectives of the Canadian mining industry, and Canadian mining workplaces. To be included in the study HQW must have worked in the Canadian mining industry for at least one full year in a career oriented position.

3.2. Research Methods

A survey was chosen as the primary methodology for data collection, as it was deemed the best fit methodology for gaining socio-demographic and career information needed to model HQW's career paths. The survey used both qualitative and

quantitative approaches to data collection to gain HQW's perspectives on mining workplace culture, barriers to career advancement and retention. The survey was developed and then approved for dissemination by Behavioral Ethical Review from the Behavioral Research Ethics Board (BREB), Office of Research Services, at UBC.

The survey included a variety of questions to facilitate both the exploratory and casual aspects of the research. To ascertain the descriptive data from the respondents the survey used multiple choice questions. Open-ended questions and Likert measurements were used to determine respondent's perception of mining workplace culture, and career barriers.

3.3. Research Tools

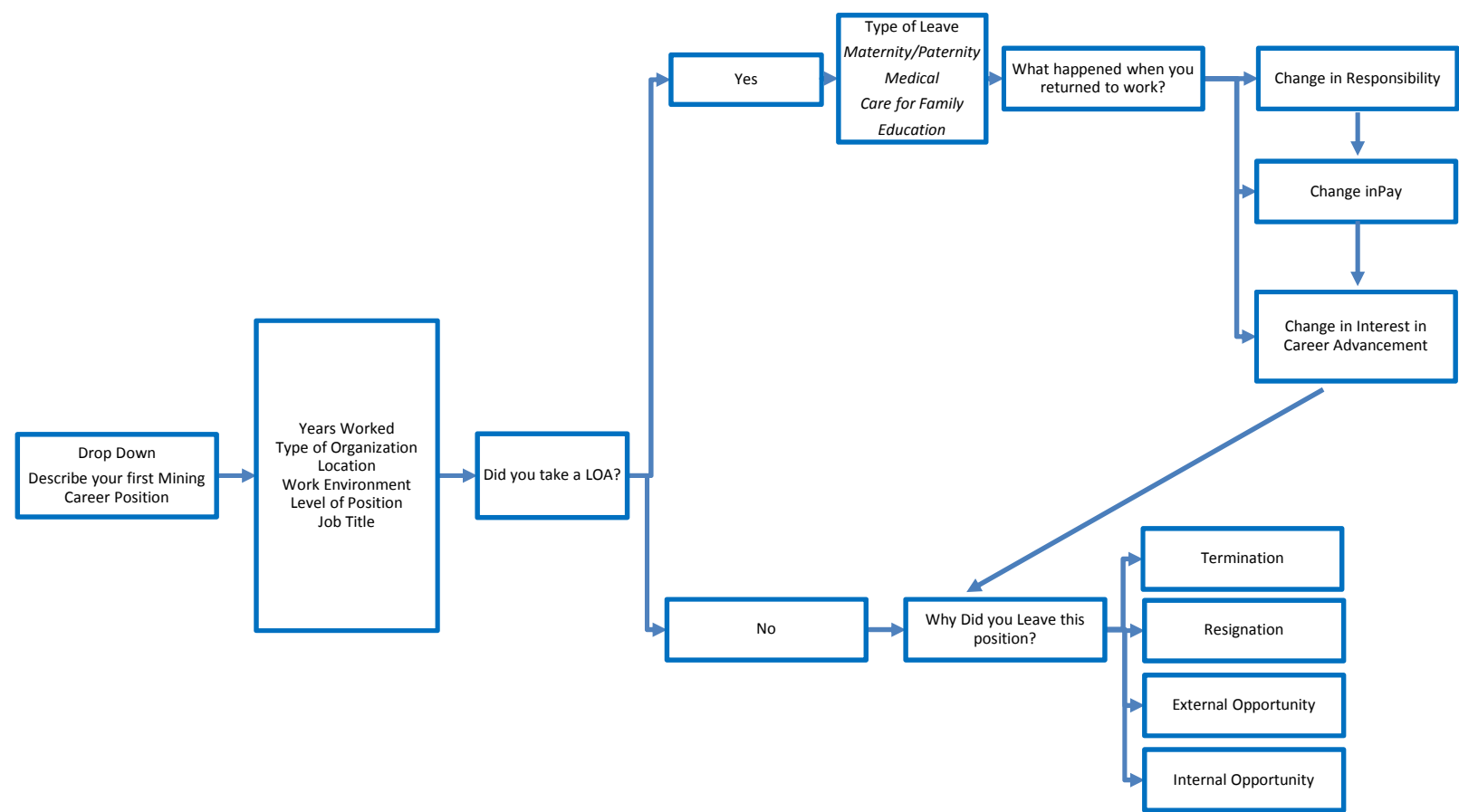
3.3.1. *Survey Questionnaire Design – Career Path Mapping*

A significant portion of the survey was concentrated around gathering career path information from each of the respondents. A model was developed and programmed into the online survey platform that included a variety of questions tailored to generate a standardized career pathway for each of the HQW respondents. This questioning model was designed using question logic to tailor the length of the questionnaire depending on the number of career positions that a women had held, and their experience in senior leadership roles.

The purpose of this survey model was created to generate data that would resemble a chronological resume for each Highly Qualified Women, standardizing the data collected for further analysis. Information on HQW's Career Path's was gathered in the survey using a series of compound conditional branching logic. Compound Branching is a questionnaire design technique that utilizes multiple skip patterns to ensure that respondents are asked only questions that apply to them, and the routing of the respondent is dependent on the answers to these questions (Anderson-Knott, 2008). The programming of these questions was completed through the programming of Boolean logic statements (ex. If answer to question one = (a) skip to question #). This survey programming provided a framework that enabled the career data of the respondents to be gathered in a way that was ready for comparison purposes, creating a standardized work history for each respondent.

An outline of the career path questioning is outlined in Figure 4. At the end of this questioning hierarchy respondents were directed through the same model of questioning for each subsequent career position.

Figure 4: Career Pathway Questioning Model



3.3.2. *Survey Questionnaire Design - Workplace Culture*

Due to the challenges in defining a workplace culture, it has typically been studied within organizations using a case study approach. In 1998, Hofstede recognized some specific limitations in researching culture from a questionnaire approach, specifically he found that due to the subjective nature of workplace culture, and the tendencies for researchers to impose their own interpretations onto already subjective phenomenon; that questionnaires are less than ideal in studying workplace culture; and often result in a study of workplace satisfaction.

To mediate this challenge in this research study, the context of workplace culture derived from the open-ended answers in the questionnaire, was supported by a specific definition of inclusive workplace culture within McLean's 2003 Framework.

McLean found that inclusive workplaces are defined by some universal key workplace cultural elements including:

- Cultural norms and values that support positive relations between men and women;
- A freedom from stereotyping about women's and men's roles and occupations;
- Conditions (work schedules, job titles, physical environment) that are inclusive of both men and women;
- A strong 'critical mass' of women, usually 30 per cent or more throughout the organization;
- Opportunities for advancement; and
- An emphasis on reducing sources of unnecessary stress such as harassment and work-family conflict

(McLean, 2003, p.3).

This framework was developed for the use by the Federal, provincial and territorial ministers responsible for the status of women, for private sector employers to develop

workplace cultures that attract, retain and promote women in high-growth industry sectors that are facing labour shortages (McLean, 2003). This framework was used in this research study, and specifically respondents were asked to define their organization as inclusive by indicating their level of agreement with specific indicators of an inclusive culture (McLean, 2003).

3.4. Targeted Communication to Women in Mining

A communication strategy was developed for the dissemination of this questionnaire to maximize the number of respondents. This included:

- A contact list of industry members and key associations.
- A tactical communication plan that encompassed a broad range of communication tools including; email, presentation of research, and social media tools.

Highly Qualified Women were targeted for this research by sending communications out to a key contact list of industry members and associations. These contacts were developed from the researchers work in the Canadian mining industry, and web search tools. This list was then reviewed by the research committee for further recommendations. Key associations and contacts are as follows⁷;

- Women in Mining Canada,
- The Mining Industry Human Resources Council,
- Canadian Universities Alumni Associations,
- The Mining Association of Canada,

⁷See Appendix A for the complete communication strategy and contact associations.

- National registries – Professional Engineering Associations,
- Prospector and Developers Association of Canada,
- Canadian Institute of Mining,
- AMEBC, and
- Engineers Canada.

These national organizations and associations have databases of members and contacts within the mining industry, and communication about the survey was sent out to the individual associations' contacts and members via mass email, Linked In, websites, and e-newsletter. Women and men who received this communication were encouraged to forward the information about the research onto HQW within their professional networks. The survey was live from September 25, 2011 – October 28, 2011.

All relevant information regarding the research, researcher, and confidentiality of data was included in all communication going out to potential participants (Appendix A). The questionnaire was accessible online through a secured website, and there was no incentive given to survey respondents. Information on the purpose of the research, and the confidentiality of the data was re-iterated to participants in the opening webpage of the questionnaire. This was done to ensure that all participants were thoroughly aware of the research, the purpose of the questionnaire and the use of the data prior to their participation. Completing the questionnaire was clearly indicated as consent to being a part of this research.

3.5. Data Analysis

The quantitative research was conducted through the analysis of completed survey data for the generation of statistics. This was conducted using a combination of the survey software analysis tools provided by Survey Monkey and downloading the raw data into Excel, calculating descriptive statistics and preparing histograms and tables to illustrate the findings.

The career pathways were coded using a three variable coding system as shown in

Table 1.

Table 1 Example of Career Path Coding

| Respond. | Age | DEGREE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----------|-------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 68600 | 25-34 | MASCME | 211 | 211 | | | | 112 | | | | | | |
| 79184 | 25-34 | BBA | 171 | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 | | |
| 29546 | 45-54 | BASCME | 311 | 311 | 311 | | | 322 | 322 | 322 | 322 | 322 | 322 | 322 |
| 34096 | 25-34 | MSES | 111 | 111 | 111 | 112 | 112 | 112 | | | | | | |
| 37509 | 35-44 | BS | 171 | 171 | 171 | 171 | 152 | 152 | | | | | | |
| 40244 | 25-34 | MA | 211 | 211 | 211 | 211 | 211 | 211 | | | | 172 | 172 | |
| 40322 | 25-34 | BSG | 211 | 211 | | | | | | | | | | |
| 44968 | 25-34 | BBA | 151 | 151 | 151 | 151 | | | | | | | | |
| 62101 | 35-44 | BA | 151 | 151 | 151 | 151 | 151 | | | | | | | |
| 66668 | 25-34 | BASCGE | 311 | 311 | 311 | 311 | 311 | 311 | 311 | | | | | |
| 71972 | 35-44 | MA | 151 | 122 | 122 | 122 | | | | 133 | 133 | 133 | 133 | |

Each respondent's career was coded based on the category of the work environment, the type of career position and the years worked in the career position. For example, respondent 68600 in Table 1 is a HQW between the ages of 25-34 with a Masters of Applied Science in Mining Engineering, her first career position was in the field in a Professional - Technical and/or Scientific Role (PTS) for two years, she then took a three year break from

the industry, and then returned to worked in a PTS role in a corporate work environment.

For complete coding legend and examples see Appendix B.

Once coded the career path data was normalized, and reviewed for trends. Two key career path tendencies were revealed, described as the 'The Specialist' and 'The Corporate' in the Key Findings. Models of these career pathways were generated by running the specific three digit job codes as indicated in Table 1 through a series of excel functions to generate descriptive statistics on the specific job code within the respondents' data. The frequency of the specific job codes (modes) were utilized to determine the most common career position for CP1-CP4, and the average years in the specific career position was also determined for both the Specialist and the Corporate respondents. These positions are illustrated in the Specialist and Corporate Career Models in Figure 17, and Figure 21 respectively.

To contextualize the career pathway findings, and the descriptive statistics generated from the closed answered questions, open-ended questions were developed, and then analyzed using a content or text analysis framework. Content Analysis is a quantitative research technique, and it is the systematic, objective, quantitative analysis of message characteristics (Neuendorf, 2002, p.1). Frequency lists were generated from the text using the survey software, and a coding scheme and method for application of codes was developed. The coding dictionaries developed for coding were based on the frequency lists generated from the survey software. This is referred to as emergent coding (Neuendorf, 2002, p.129).

The Frequency Diagrams illustrate the most prevalent words and phrases used by the respondents (Appendix C).

From these frequency diagrams a review of the actual responses was conducted, and key theme's and topics emerged from the data. A dictionary of terms was developed, based on these key themes and topics. This dictionary was then used to guide the coding of the data (Appendix C).

3.6. Survey Limitations and Bias

This survey was pre-tested to develop and critique the wording of the questions, and the reliability of the survey software. Despite these measures taken, surveys have inherent issues with regards to the design and the interpretation of the data is subject to the researcher's biases (Lavrakas, 2008). Table 2 outlines some of the key issues to consider within the research design and analysis.

Table 2 Identified Survey and Research Limitations

| Research Bias Term | Definition of Term | Application in Research Study |
|---------------------------|---|---|
| Recency or Primacy Effect | Tendencies of respondents to select either the primary items on a list or the last items on a list of options (Holbrook, 2008). | Respondents were provided with detailed and extensive lists of options throughout the survey, and there selections could have been subject to recency effect. |
| Respondent Fatigue | Well-documented phenomenon that occurs when survey participants become tired of the survey task and the quality of the data provided begins to deteriorate (Ben-Nun, 2008, p. 73) | Due to the length of the HQW survey, respondents may have provided less information on the career experiences as their motivations to participate deteriorates. |

4. Survey Results

Responses were received from 171 subjects; the completion rate was 88.9% - with 153 completed surveys. Three of the subjects were male and their responses were removed from the analysis; five respondents were not HQW as per the definition for this research, their responses were also removed from this analysis.

The number of HQW respondents used in the analysis was 163. These respondents indicated that they were HQW as per the research definition and had worked in the Canadian mining industry in a career position for a minimum of one year.

5. Analysis

5.1. Sample Size

At the time of the 2006 Census, the total number of people employed as HQW in the Canadian mining industry was approximately 4,100⁸. Based on the Census number, this research sample represents approximately 4% of HQW working in Canadian mining industry.

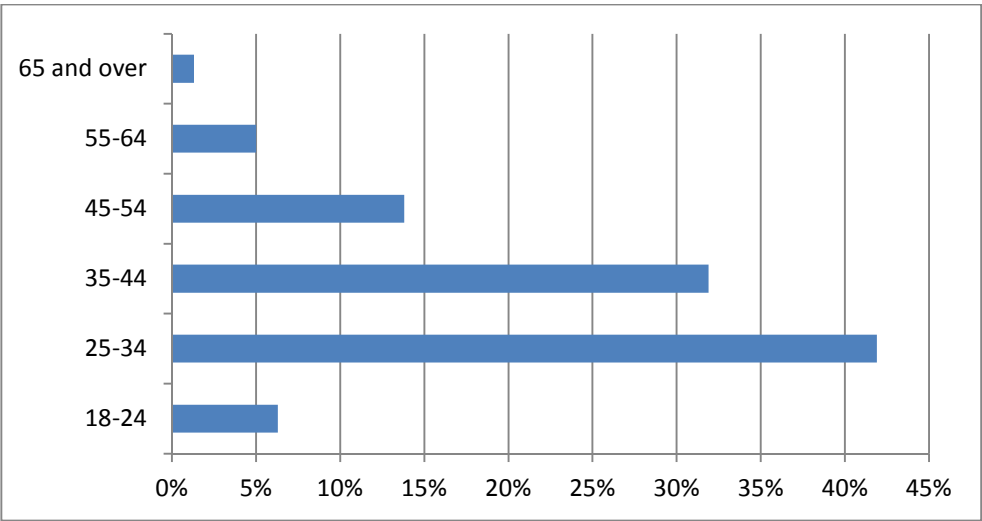
5.2. Demographics of Respondents

5.2.1. *Age*

Figure 5 shows the age demographics that were represented by the survey respondents. The largest number of respondents were between the ages of 25-34, with 41.9% of the total respondents falling within this range.

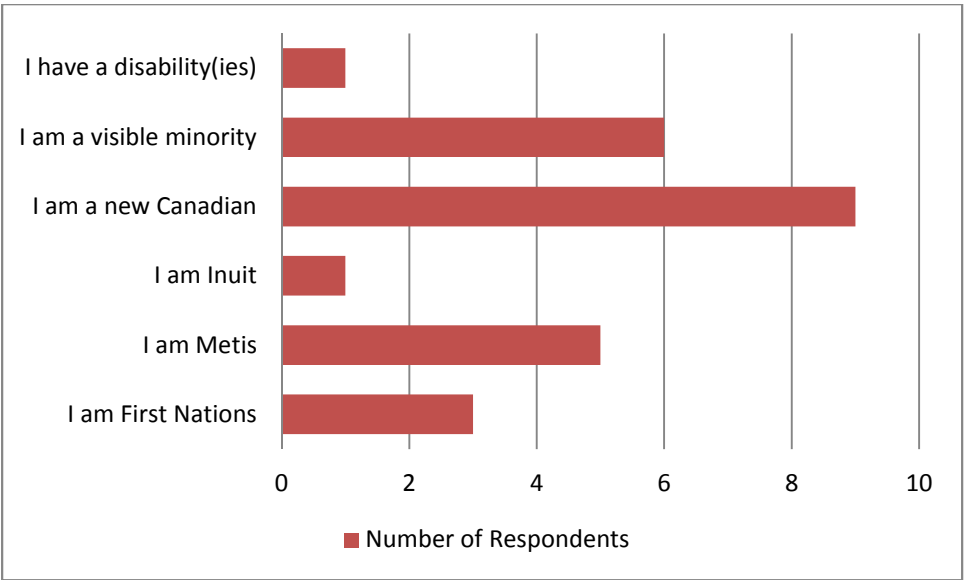
⁸ This was based on the 2006 Census data estimate of 24,800 knowledge workers in the Canadian mining industry, and that 16.6% of these workers were women (Mining Industry Human Resources Council, 2011b).

Figure 5: Age Range of HQW Survey Participants



5.2.2. *Underrepresented Groups*

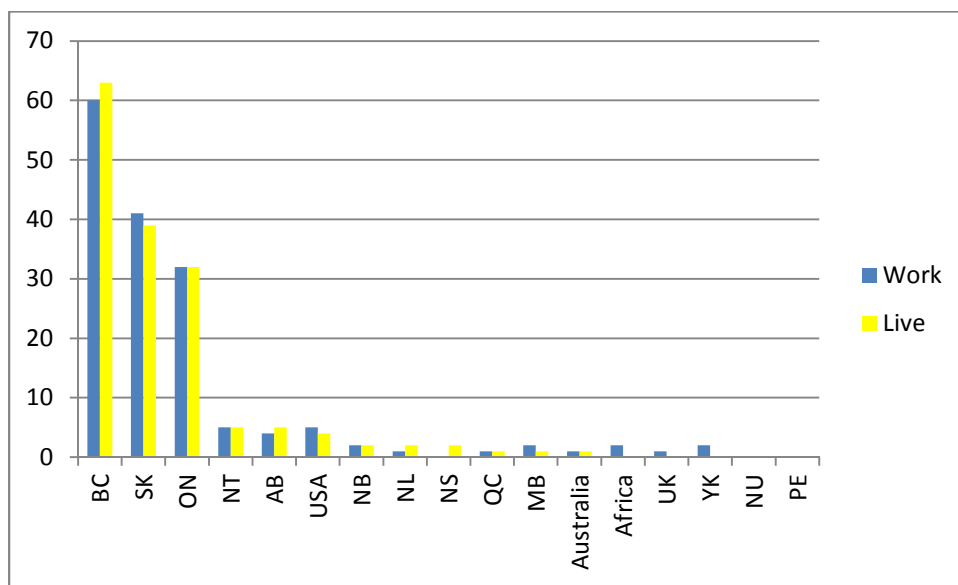
Figure 6: Underrepresented Groups other than Gender



Twenty four respondents identified themselves as part of the underrepresented groups listed in Figure 6. This group of women may face multiple employment barriers as a result of their gender, and their identification as a member of another underrepresented group.

5.2.3. *Location*

Figure 7 Comparison of Survey Respondents ‘Work’ and ‘Live’ Locations



The survey respondents predominately worked and or lived in the provinces of British Columbia, Saskatchewan, and Ontario, with limited representation from the remaining provinces and territories. This survey was offered only in English, and this may have contributed particularly to the underrepresentation of Quebec respondents. Figure 7 displays a comparison of HQW’s working and living locations, as indicated more women live

in BC, than work there, and more women work in Saskatchewan than live in Saskatchewan. These discrepancies are thought to be a reflection of the remote working locations, and potentially cross border labour flows. HQW working in some provinces in remote camps may live out of province from the mining operations.

5.3. HQWs Educational Background

Highly Qualified Women for the purpose of this research were defined as women who have completed a Bachelor's degree and above. This was communicated to respondents at the beginning of the survey to ensure the respondents were a part of the appropriate target population prior to commencing the survey. When asked about their educational background respondents indicated a variety of different educational disciplines, and levels of post-secondary education completion (Appendix B).

Of the respondents who answered questions on their educational profile, 65.8% highest level of education was a Bachelor's degree, followed by 30.4% of respondents with a Master's degree, and 3.1% of respondents who hold a doctorate. 86.5% of the respondents completed their post-secondary education in Canada, and the remainder of the respondents completed their post-secondary education outside of Canada.

Figure 8 illustrates the variety of different degrees that respondents had completed. Many universities and colleges have different names for the degrees given, so respondents were asked to indicate their degree by name in an open-ended question, and then the

responses were categorized into the discipline categories outlined in Table 3.

Figure 8 Respondents Educational Qualifications

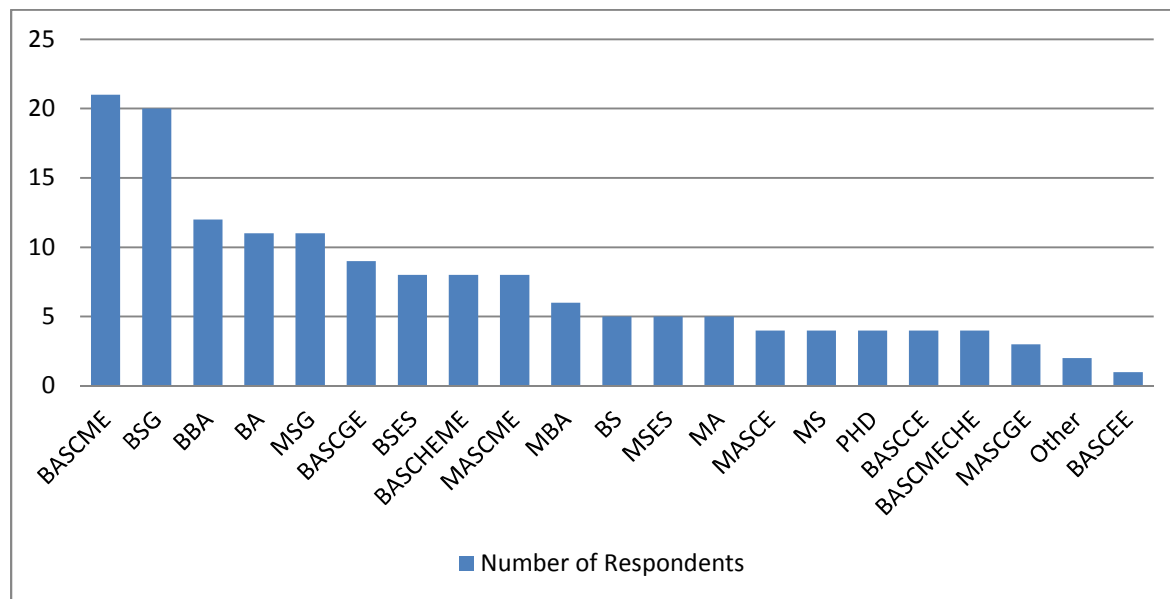


Table 3 Educational Program Codes

| | |
|--|-----------|
| Bachelor of Applied Science - Mining Engineering | BASCME |
| Bachelor of Science - Geology | BSG |
| Bachelor of Business | BBA |
| Bachelor of Arts (all disciplines) | BA |
| Masters of Science - Earth Science/Geology | MSG |
| Bachelor of Applied Science - Geological Engineering | BASCGE |
| Bachelor of Science - Environmental Sciences | BSES |
| Bachelor of Applied Science - Chemical Engineering | BASCHEME |
| Masters of Applied Science Mining Engineering | MASCME |
| Masters of Business Administration | MBA |
| Bachelor of Science (other than Geology) | BS |
| Masters of Science - Environmental Science | MSES |
| Masters of Arts (all disciplines) | MA |
| Masters of Engineering (other than geology and mining) | MASCE |
| Masters of Science (other than Geology) | MS |
| PhD - Metals and Materials Engineering | PHD |
| Bachelor of Applied Science - Civil Engineering | BASCCE |
| Bachelor of Applied Science –Mechanical Engineering | BASCMECHE |
| Masters of Applied Science - Geological Engineering | MASCGE |
| Bachelors of Applied Science - Environmental Engineering | BASCEE |

As indicated in Figure 8, a Bachelor of Applied Science in Mining Engineering and a Bachelor of Science in Geology were the most prevalent educational qualifications with 13.5% and 12.9% respondents respectively. The most prevalent engineering disciplines were mining engineering, geological engineering, and chemical engineering. The study of environmental science within either engineering or a scientific discipline was indicated by 9.7% of the respondents. The most prevalent completed post-secondary education above Bachelors was a Masters in Geology, 7.1% of the respondents completed this specific degree.

Outside of engineering and science, the most common disciplines were Business/Commerce, and Arts. These three disciplines categorized 21.9% of the respondent's education. In comparison, 76.8% of the respondents had education in science and/or engineering fields.

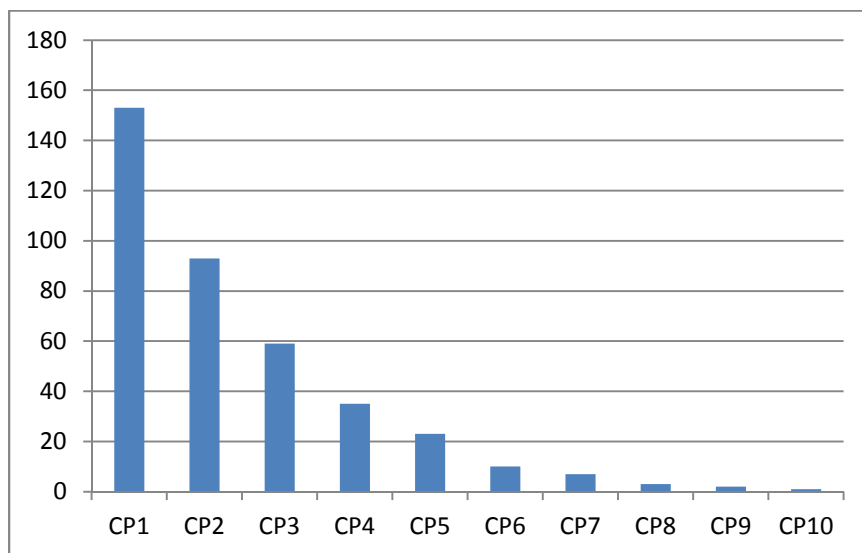
5.4. HQWs Career Path Responses

The survey respondents were given the opportunity to provide information on up to ten mining career positions chronologically. The number of career positions varied for each respondent based on; the respondents' age; the amount of career mobility exhibited and whether they left the mining industry for a period of time. The number of positions described could also be attributed to survey fatigue, if a respondent did not provide

complete information on their career path. Inclusively, the respondents' mining careers spanned from 1977-2011, and represented over 1184 years of career experience.

Figure 9 illustrates that 153 respondents provided information on one career position in the mining industry (CP1). Respondents' first career position in the mining industry was described as CP1, and their current position was described by CP1 or greater, depending on the number of positions they had held in their career. If respondents had held more than ten career positions, they were asked to indicate their current or most recent career position in the tenth career position series of questions.

Figure 9 HQWs - Number of Career Positions



For each career positions respondents were asked to provide career details on the following variables:

- **Organization Type:** *Major Mining Company, Junior Mining Company, Exploration, Government, Education, Association, Not for Profit, Consulting Firm, Self Employed.*
- **Years Worked:** *1960 – 2012.*
- **Country Worked:** *Canada, USA, Mexico, Australia, India, Asia, Europe, etc.*
- **Work Environment:** *Corporate Office/Headquarters, Mine Operations/Production Site, In the Field, Worked from Home/Personal Office Space.*
- **Position Level:** *President/CEO, Executive Director, and/or Senior Management, Middle and Line Management/Supervisor, Professional – Technical and/or Scientific, Professional-Admin, Legal, HR, Finance, etc., Technical and Skilled Trades, Labour, Service, and Production, Clerical and Support.*

5.4.1. ***HQWs Career Backgrounds***

Of the HQW that responded to the survey, 92.5% indicated that they were currently working in the Canadian mining industry. The remainder were not working (1.3%), retired (1.3%) or working in other industries (5.0%). Eight respondents indicated they are currently working in other industries, two were working in Oil and Gas, five were working in mining but outside of Canada, and one is working as a business or professional consultant.

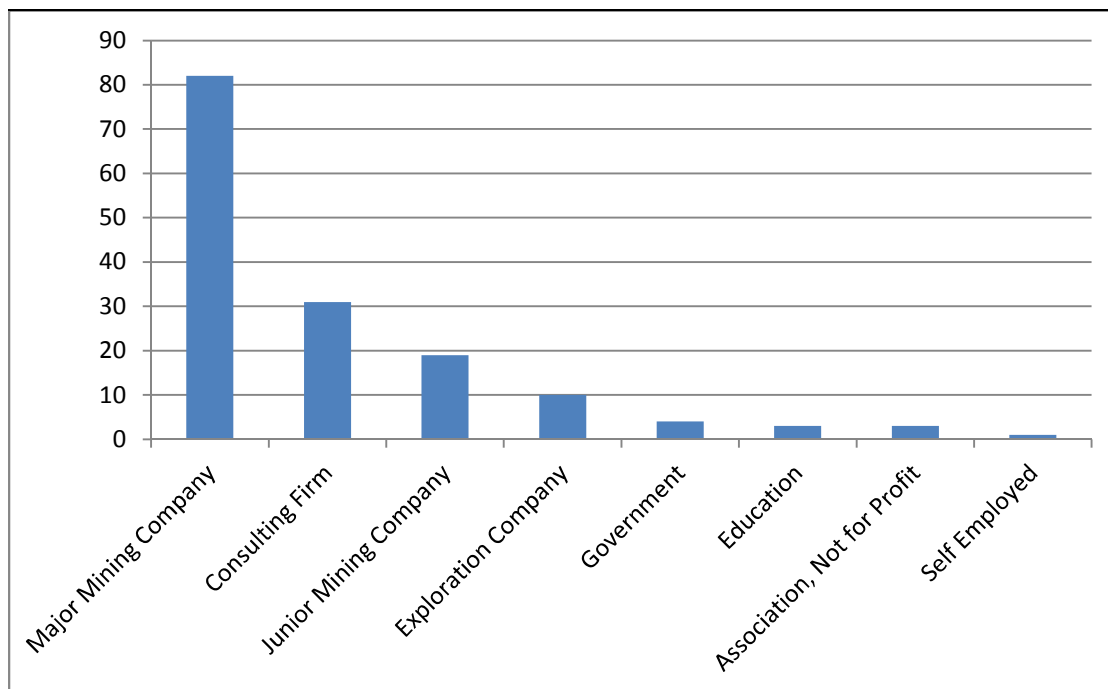
5.4.2. ***First Career Position Outside of the Canadian Mining Industry***

When asked about their first career position, 37.1% indicated that their first career position was not in the mining industry. Of those who indicated their first career position was not in the mining industry, the majority of these respondents first career position was in Canada, in a corporate setting, but the type of industry varied.

5.4.3. *First Career Position in the Mining Industry*

153 of the respondents provided information on their first mining career position, and 62.9% of the respondents had their first career position in the mining industry in Canada. When asked where the respondents worked and the level of the career position they predominately worked in corporate settings in professionals technical or scientific roles for major mining companies as seen in Figure 10.

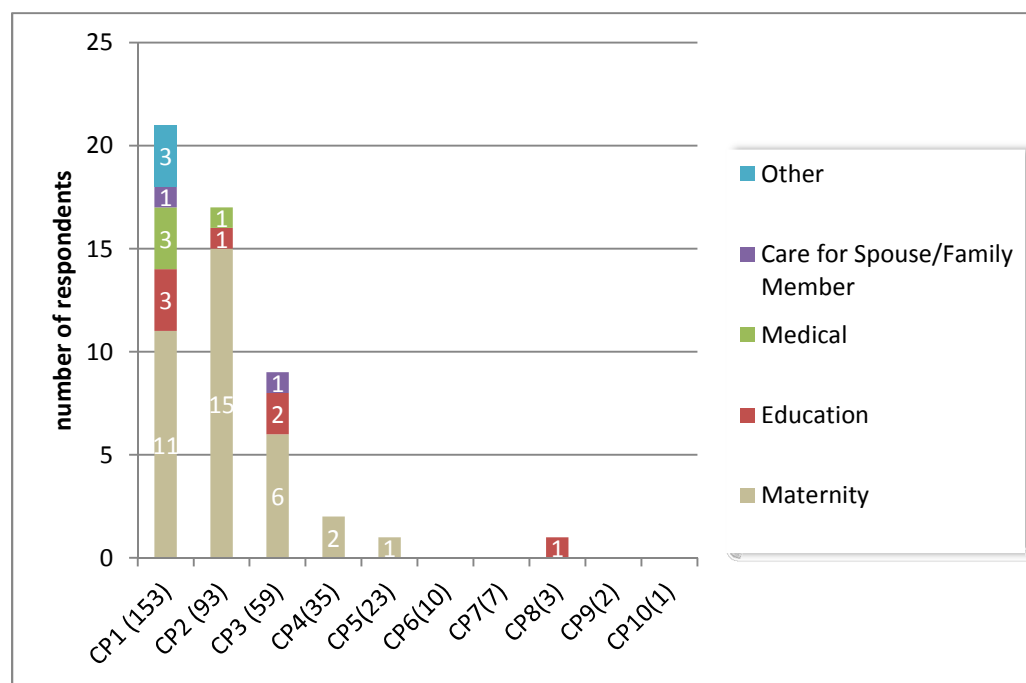
Figure 10 HQWs First Mining Career Position - Mining Organization Type



5.4.4. *'Leave of Absence' and 'Returning to Work'*

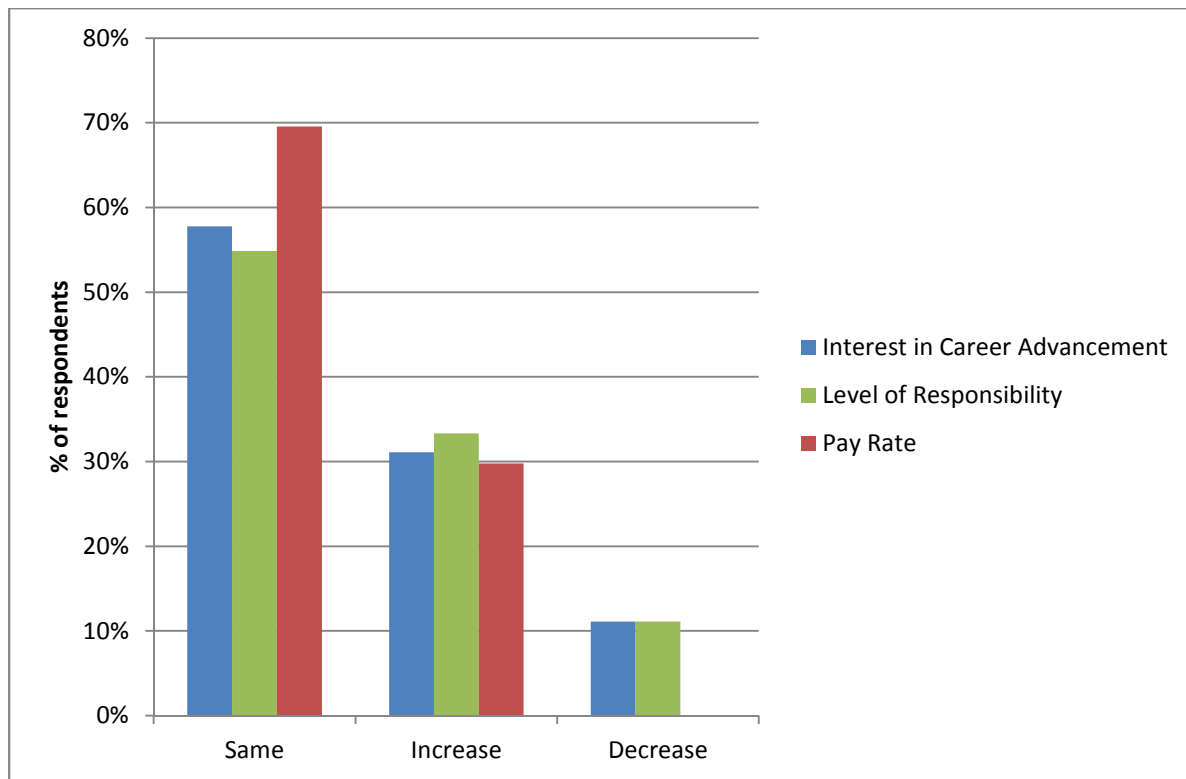
Through the survey HQW were asked to provide information on leave of absence (LOA) during their career paths. Of the LOAs taken by the respondents, 70% of them were for Maternity/Paternity leaves. The remainder of the LOAs were taken for 'Education', 'Care for Spouse', 'Medical' and 'Other' reasons. Figure 11 illustrates that the majority of the maternity or paternity leaves occurred during the respondents' first and second career position. This can be attributed to the relative age of the respondents and subsequent 'stage of life' during the respondents' first and second career positions.

Figure 11 HQWs Leave of Absence over Career Positions⁹



⁹ The numbers indicated on the x axis of Figure 11 should be interpreted as Career Position 1, Career Position 2, etc. and the number in brackets indicates the total number of respondents who provided career information on that specific career.

Figure 12 Return to Work - Change in Pay, Responsibility, and Interest in Career Advancement



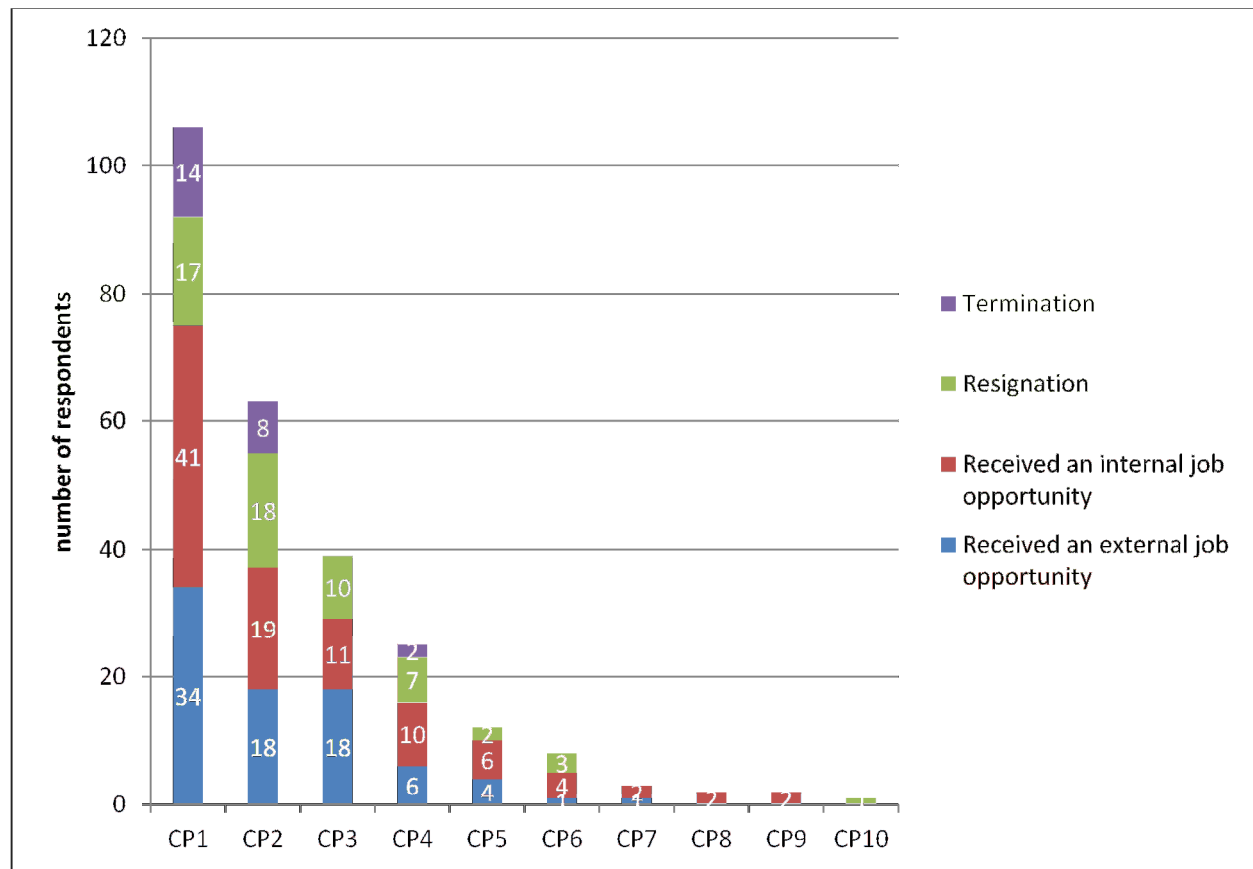
As seen in Figure 12, the majority of HQW respondents returned to work after their LOA's with similar levels of responsibility (55%), pay rate and the same interest in their career advancement. Less than 12% of women experienced a decreased interest in their career advancement when they returned to work, and 31% specified an increased level of interest in their career advancement after they returned from leave of absences.

5.4.5. **HQWs Retention**

Why do HQW leave their positions in the mining industry? To answer this question, respondents were asked to categorize their reasons for ending employment as; resignation, termination, external job opportunity, or received an internal job opportunity. This was completed for each subsequent career position identified by the respondent.

As illustrated in Figure 13, receiving an internal job opportunity was the most common reason for women to end a career position throughout the course of their mining career. When comparing the results from all of the career positions, HQW were more likely to accept an external offer in their first three career positions, indicating earlier career mobility among respondents.

Figure 13 HQWs Reasons for Career Movement over Career Path



5.4.5.1. HQW's Motivations for Career Movement

After categorizing their reason for ending employment, respondents, were then asked to identify the key motivating factor that led them to leave their job or to take on a new role. To respect the confidentiality of the participants, respondents who indicated that they were terminated were not asked for further information.

Table 4 HQW's Motivations for Career Movement

| Reason for Career Movement | Key Motivation | *% of Respondents |
|---------------------------------|-------------------------------------|-------------------|
| Resignation | Lack of Job Satisfaction | 21% |
| | Poor work/life balance | 16% |
| | Lack of opportunity for advancement | 14% |
| | Lack of job security | 10% |
| | Work Culture was inhospitable | 9% |
| | Work Location was too remote | 9% |
| | Lack of job flexibility | 7% |
| | Personality conflicts | 7% |
| | Retirement | 5% |
| | Under compensated | 3% |
| | Work was too demanding | - |
| External Job Opportunity | Work Location | 29% |
| | Opportunity for advancement | 27% |
| | Work Culture | 16% |
| | Better compensation | 15% |
| | Interesting projects | 11% |
| | More Flexibility | 2% |
| Internal Job Opportunity | Opportunity for advancement | 68% |
| | Interesting Projects | 23% |
| | Better Compensation | 5% |
| | Better work location | 3% |
| | More Flexibility | 1% |

As illustrated in Table 4, lack of job satisfaction and poor work-life balance were the primary reasons HQW resigned from their mining career positions. HQW accepted external

job opportunities based on work location and opportunity for advancement. In contrast, better compensation was indicated as the key reason for less than 15% of the respondents when they accepted an external job opportunity.

Although work location was a key reason for accepting external opportunities during HQW's first career position, 'opportunity for advancement' becomes proportionally more important to HQW as their careers progressed.

Internal career opportunities were consistently accepted by HQW respondents during their career path, because of the opportunity for career advancement. Conversely, 'better compensation', was selected only 10% of the time as the dominant reason for accepting an internal opportunity. Opportunity for advancement becomes proportionately less important, as HQWs career progress while 'interesting projects' becomes more important later in HQW's careers.

5.5. Career Trends – Determining Career Paths of HQW

The survey responses generated a significant amount of data on the respondent's career paths. The survey was programmed using the career path questioning model indicated in Figure 3, and this generated a chronological and standardized timeline of career information for each of the respondents. At the conclusion of the survey, this data was normalized and reviewed for trends. The respondents' highest education qualification was added to their Respondent ID to categorize the career paths by educational qualification.

After reviewing the coded and normalized data, two key career tendencies were revealed. The first observation was that the majority of the respondents (101) started their mining career in a Professional-Technical and/or Scientific (PTS) role, and from an initial scan of the data, these respondents' career pathways remained fairly specialized and consisted of multiple PTS roles in the industry. These respondents were labeled 'the Specialists' and they tended to be in "high level professional or technical work, rather than managing other people who deliver this work" (Hirsh, 2006, p. 1).

The remainder of the respondents (52) had a more diverse career pathway but tended to work in corporate roles and progressed vertically within their job role. For example, respondents in this category may have started in a Professional Business role but then moved into a mid-level management or supervisory role, and in some cases executive roles. These respondents were labeled 'the Corporates'.

5.5.1. ***Career Path – 'The Specialist'***

Of the respondents who answered questions on their career path, 65% of them started their careers in a Professional – Technical and/or Scientific role (PTS), and these respondents have been termed 'The Specialists'.

The Specialists had a range of 1-27 years of career experience in the mining industry with a mean score of 7.8 years. The majority of the Specialists (64%) started their career at a mine operations site or in the field, compared with 33% who started their careers in

Corporate or personal office work environments. Their educational qualifications varied, but were most commonly represented by either a degree in engineering (47%) or a degree in geosciences (27%).

Although the majority of Specialists started their career in a mine site or operation, as shown in Table 5, the number of Specialists working in the field or at a mine site drastically declines as their careers progress and they move more towards a corporate office or home work environments.

Table 5 Specialist Career Path Work Environments

| Work Environment - Career Path Characteristics | % of Specialist respondents |
|---|------------------------------------|
| First Career Position in Field or Mine Operations | 64% |
| First Career Position in Corporate or Personal office | 33% |
| Last Career Position in Corporate or Personal Office | 52% |
| Last Position in Mine/Field | 47% |
| Last Position in Corporate or Personal Office (Total CPs>1) | 42% |
| Last Position in Mine/Field (Total CPs>1) | 21% |

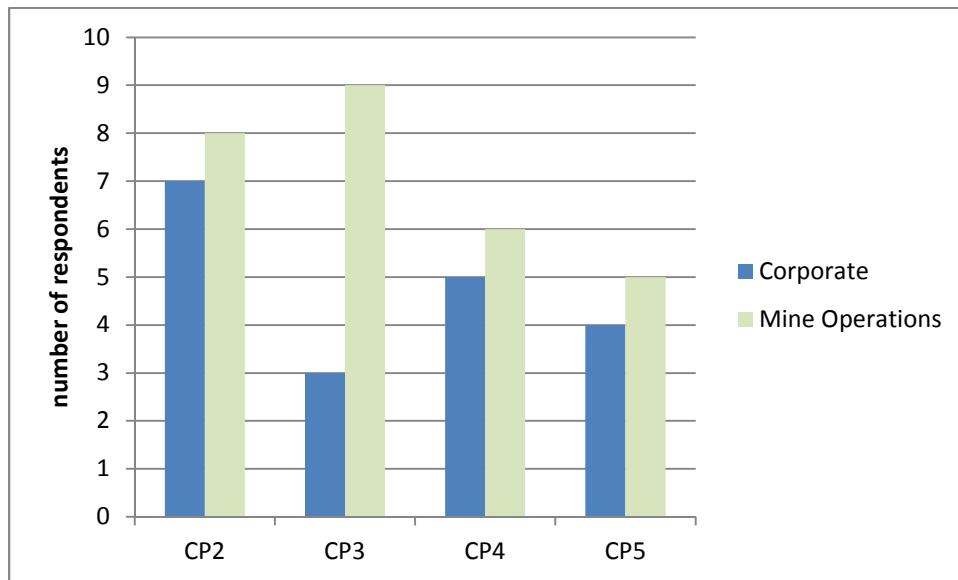
5.5.2. *Specialist Career Descriptive*

31% of the Specialists took time away from the mining industry, and of those who took career breaks from the mining industry, they left on average for 3.8 years, with the range being from 1-17 years, and the mode being one year away from the industry.

101 respondents started their career in PTS roles, but only 9% held an executive level position during their careers, and only 26% held a middle level management role or higher during their career. Specialists who reached middle level management roles or higher,

predominately moved into these roles in their second career position (CP2)¹⁰, and the majority of these positions were located at a mine site as shown in Figure 14.

Figure 14 Management and Executive Roles as Indicated by HQW Specialists



The women who worked in these management positions had a breadth of educational backgrounds including engineering, geosciences, business and arts disciplines.

Specialists' careers can be summarized by the following characterizations:

- first mining career position in a PTS role;
- work in a PTS role for the majority of their mining career path;
- work in a field role or in mine operations, but as their career progressed they tended to move into a Specialist role and to a lesser extent worked from home or from a personal office space;

¹⁰ CP1, CP2, CP3, CP4, etc. are the abbreviations used to represent career position one, career position, two, etc.

- work in PTS roles throughout their career path, i.e. they move from PTS role to another PTS role, and rarely diverge or make horizontal shifts in their career into other career fields; and
- Their industry career is stable; illustrated by very few career breaks from the industry.

5.5.3. ***Specialist Career Model***

As a result of the relative ages of the survey respondents, there was a diminishing amount of data for the advanced years of HQWs careers. To identify trends in the data a career map for the Specialists respondents was generated based on the flow of respondent's career paths from career position one through career position four. This map is illustrated in Figure 15. Although a variety of career pathways were indicated by the respondents, the map illustrates that the most common career pathway among the respondents consisted of consecutive PTS roles from career position one through four. Secondly, of the respondents who worked in management for their second career position they tended to remain in management roles for their third and fourth position, but there wasn't a significant indication of movement into executive roles.

In order to develop a more comprehensive Specialist Career Path Model, the respondents' career data was coded based on the following three variables for each position they held;

- Work Environment
- Job Position
- Career Position

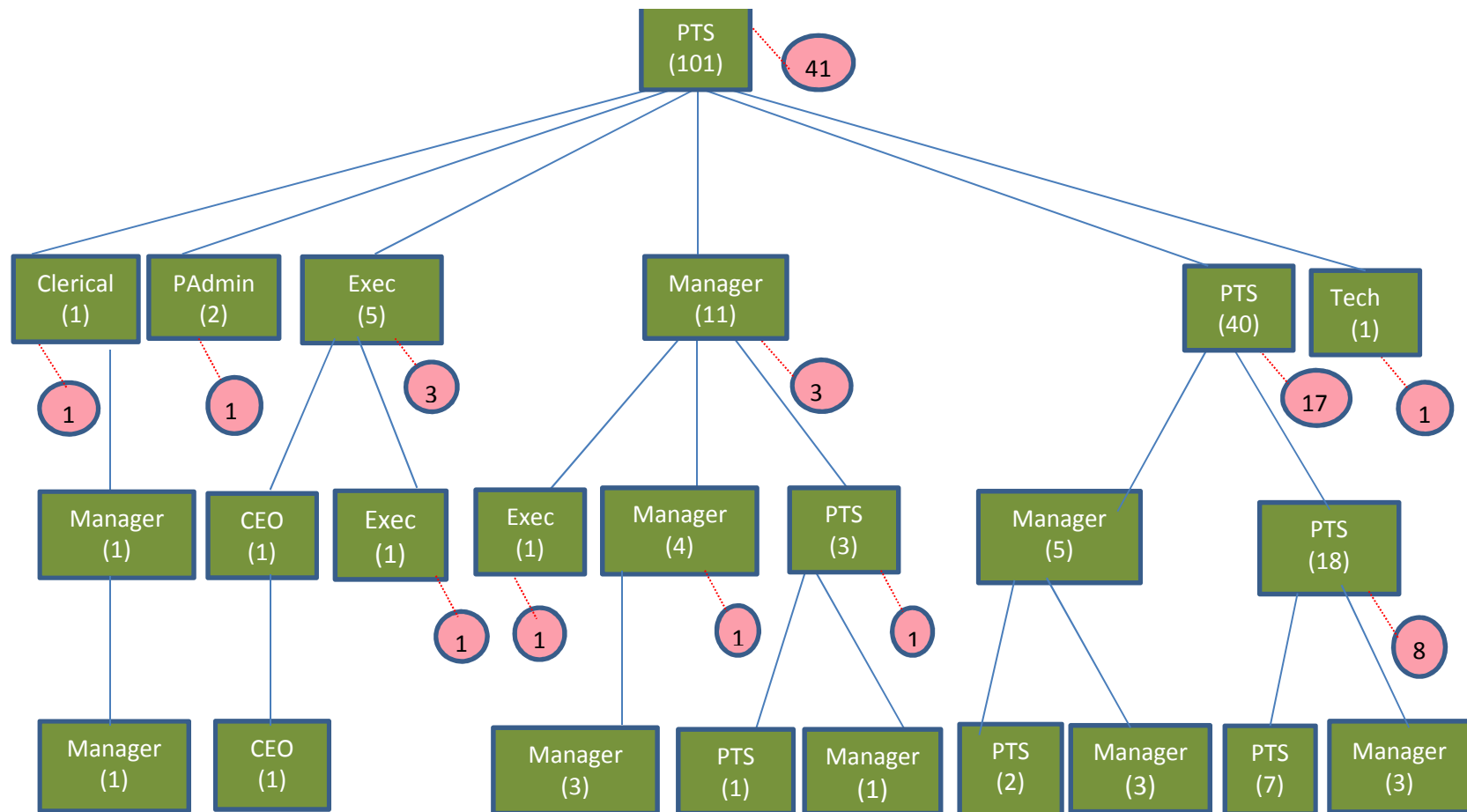
Numerical job codes were then applied to the data based on these variables, and an excel model was developed to identify the characteristics of each of the specific job codes within the data. Examples of this coding can be seen in Table 1 and in Appendix B.

The most prevalent job codes were identified by calculating the modes for each job code within the data. The range of years and average number of years spent within the specific jobs were also computed, and the standard deviations and confidence intervals were generated to test the reliability of the averages for each career position. Figure 16 shows the outputs and characteristic associated with the most prevalent job codes found within Specialists career paths.

These outputs were then reviewed and summarized in the career pathway illustration in Figure 17. Each career position in this model represents the most frequent career position articulated by the respondents with regards to job title, work environment, and the average length of time the respondents stayed in the specific role.

As indicated by the career pathway map (Figure 15), Specialists career paths varied; however, the career model illustrated in Figure 17 identifies the most frequent career positions that were expressed by the Specialist respondents for CP1, CP2, CP3, and CP4. Figure 17 serves as a summary of the careers expressed by the Speciliast respondents.

Figure 15 Specialist Respondents Career Path Map CP1-CP4



Tech = Technical and Skilled Trades,
Labour = Labour, Service, and Production
PAdmin = Professional-Admin, Legal, HR, Finance, etc.
Clerical = Clerical and Support

Legend

PTS = Professional – Technical and/or Scientific
Manager = Middle and Line Management/Supervisor
Exec = Executive Director, and or Senior Management
CEO = CEO/President


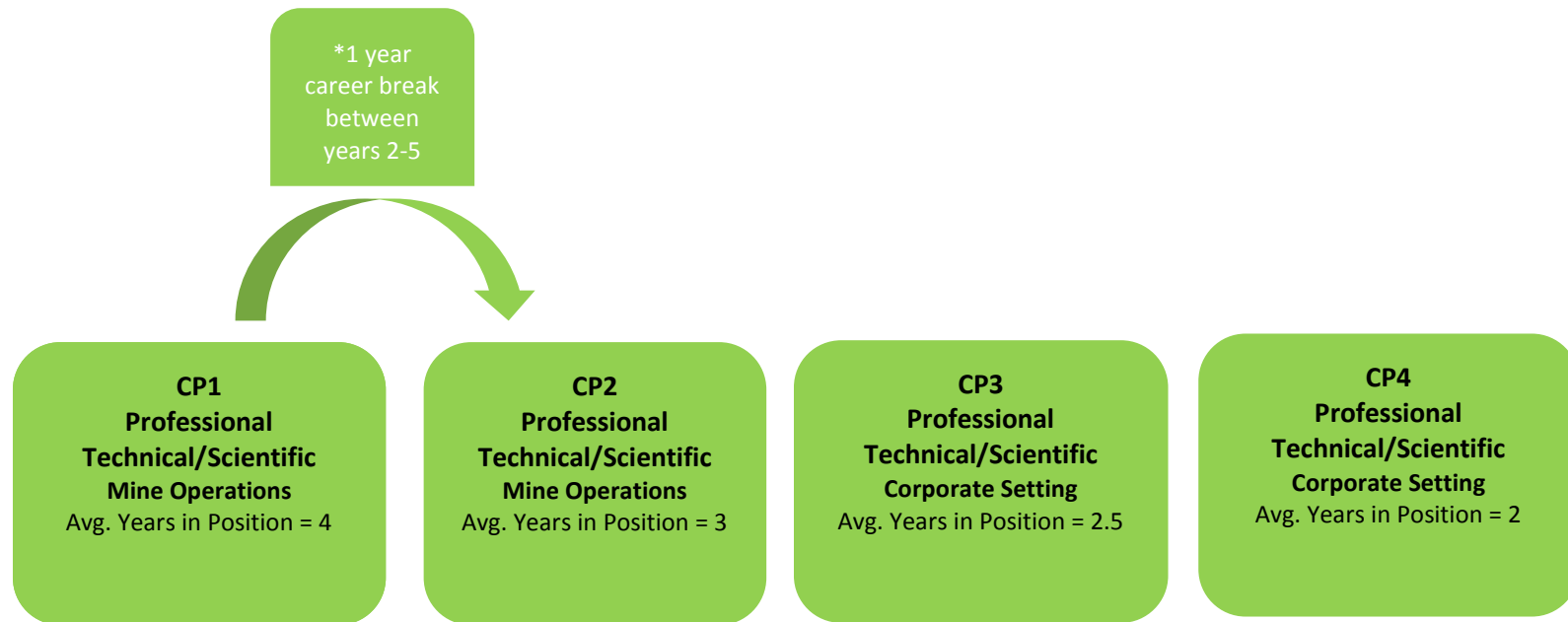
 = number of respondents who's career path information ends at the connected job role
 (3) = number of respondents in the job role

Figure 16 Specialist Respondents Job Code Outputs

| Career Position | CP1 | CP1 | CP1 | CP2 | CP2 | CP2 | CP2 | CP2 | CP3 | CP3 | CP4 | CP4 | CP4 | CP4 | CP4 |
|--|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|---------|---------|-------|
| Job Role | PTS | PTS | PTS | PTS | PTS | PTS | Manager | Exec. | PTS | PTS | PTS | PTS | Manager | Manager | Exec. |
| Work Setting (Corporate=C, Mine Operations=M, Field=F) | C | F | M | C | F | M | M | C | C | M | C | M | C | M | C |
| Job Code | 111 | 211 | 311 | 112 | 212 | 312 | 322 | 132 | 113 | 313 | 114 | 314 | 124 | 324 | 134 |
| Mode (years) | 3 | 2 | 2 | 1 | 3 | 2 | 5 | N/A | 2 | 1 | 2 | N/A | N/A | 3 | N/A |
| Median (years) | 4 | 2 | 2 | 2 | 3 | 3 | 5 | 10 | 2 | 3 | 2 | 4.5 | 3 | 3 | 3 |
| Average (years) | 3.94 | 3.13 | 4.08 | 3.40 | 3.20 | 3.39 | 4.29 | 9.33 | 2.64 | 4.78 | 2.00 | 4.50 | 2.67 | 3.00 | 3.00 |
| Min (years) | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 3 |
| Max (years) | 12 | 10 | 22 | 15 | 5 | 6 | 7 | 16 | 6 | 21 | 3 | 7 | 4 | 5 | 3 |
| Mode (job code) | 31 | 31 | 38 | 15 | 5 | 18 | 7 | 3 | 11 | 9 | 7 | 2 | 3 | 6 | 1 |
| standard Deviation | 2.29 | 2.13 | 4.38 | 3.81 | 1.48 | 1.79 | 1.80 | 7.02 | 1.69 | 6.24 | 0.58 | 3.54 | 1.53 | 1.41 | N/A |
| Sum (years) | 122 | 97 | 155 | 51 | 16 | 61 | 30 | 28 | 29 | 43 | 14 | 9 | 8 | 18 | 3 |
| 95% Confidence | 0.8075 | 0.7481 | 1.3935 | 1.9299 | 1.3001 | 0.8255 | 1.3330 | 7.9480 | 0.9984 | 4.0771 | 0.4277 | 4.8999 | 1.7285 | 1.1316 | N/A |
| 50% Confidence | 0.2779 | 0.2574 | 0.4796 | 0.6641 | 0.4474 | 0.2841 | 0.4587 | 2.7352 | 0.3436 | 1.4031 | 0.1472 | 1.6862 | 0.5948 | 0.3894 | N/A |

Figure 17 Specialist Career Path Model CP1-CP4



*29% of Specialist respondents took a career break from the industry.

From the respondents data the most common career for Specialists can be summarized by the following:

- Start career at a mine in a PTS role, stay for 4 years;
- Second position is in a mine in a PTS role for 4 years;
- Third position is in a Specialist role for 2.5 years in a corporate work setting; and
- Fourth position is in a Specialist PTS role for 2 years in a corporate work setting.

Figure 17 illustrates that Specialists career path tends to start in a PTS role within a mine operations, and then move towards PTS roles in corporate settings. If a Specialist took a break from her mining career, this break was for one year and occurred between years two and five of her career. If we remove the work environment variable for CP4 there is slightly greater number of respondents working in a management capacity than PTS roles as shown in Figure 15; however the most common position held by respondents in their fourth position remains a corporate PTS role as indicated in Figure 17.

5.5.4. ***Career Path – ‘The Corporates’***

Although the most common career path as indicated by the respondents was categorized as ‘the Specialists’. A second career trend did emerge from the data. These were the respondents who did not start their career in a PTS role, and frequently their career paths consisted of roles in the corporate mining environment, and/or roles in

management that was not preceded by a PTS career position. These women were termed ‘The Corporates’ and embodied 34% of the total respondents.

The Corporates had a range of 1-26 years of career experience in the mining industry with a mean of 7.6 years of career experience in the mining industry. The most common first mining career position for the ‘Corporates’ was a Professional – Admin, Legal, HR, or Finance. The majority of these roles were held in a corporate organizational setting. ‘Corporates’ had a variety of educational backgrounds with 48% of these respondents having a business or arts related degree, and 46% of the respondents holding a degree in the sciences, geosciences, and/or engineering. The remaining respondents’ degrees were categorized as other. The most common degree held by Corporates was a BBA or MBA, together accounting for 31% of the degrees held.

As illustrated in Table 6 Corporates work in a variety of mining work environments, but predominately hold positions in corporate environments and personal office spaces. Corporates tended to start their career in a corporate environment, and similarly to the Specialists, the further along they are in their career the less likely they are to be working in the field or mine operations.

Table 6 Corporate Career Path Work Environments

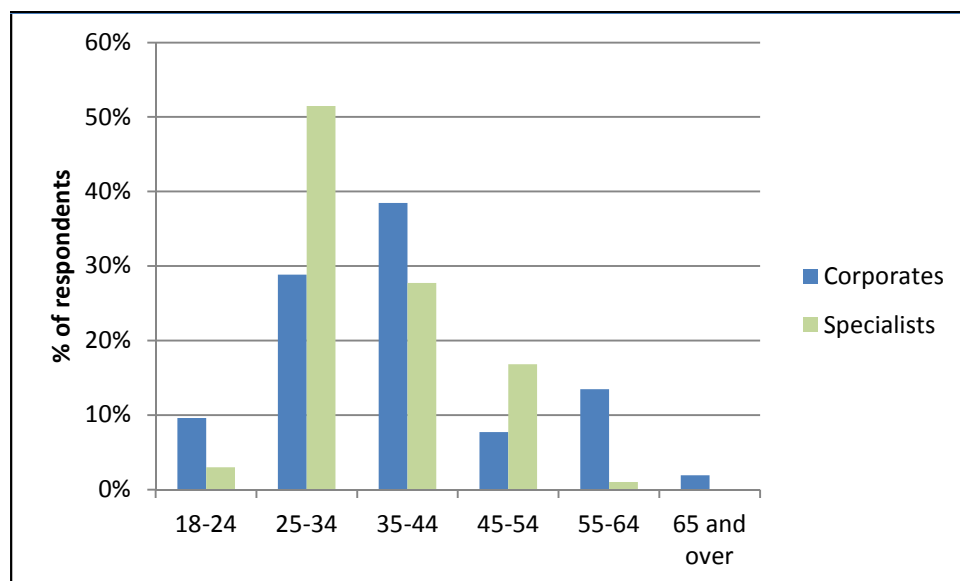
| Work Environment - Career Path Characteristics | % Corporates |
|---|--------------|
| Only worked in Corporate/Personal office | 49% |
| First Career Position in Corporate or Personal office | 54% |
| Last Career Position in Corporate/Personal Office | 63% |
| Last Position in Mine Operations/Field | 37% |

5.5.5. ***Corporate Career Descriptive***

27% of the Corporates took time away from the mining industry. The time away from the mining industry ranged between 1-20 years, and the median number of years away was four.

52% of the Corporates have had a middle level management role or higher and 27% of these women have held senior management roles or higher. The women in 'Corporates' career paths tended to be older than women represented by the Specialist career path as shown in Figure 18.

Figure 18 Age Range of 'Specialists' and 'Corporates'



Of the Corporates who reached middle level management roles or higher, 28.9% started their career in mining in a role of management. These management roles were not found exclusively in corporate mining settings, 44% of these positions were in mining

operations and field work environments, while 56% were in corporate mining or home office environments.

Respondents termed as Corporates shared common features within their career paths. These can be summarized by the following characterizations;

- Corporates tended to start in Clerical or Professional Administrative or Business roles and move towards Management or Executive roles;
- Corporates with science or engineering backgrounds tend to start their career in a mid-level or line management position;
- Corporates showed more vertical movement in their career pathways than Specialists;
- Just under half of the Corporates have spent their entire career path to date in a corporate mining setting;
- Over half of Corporates have held a management role or higher in the mining industry, and these were held in corporate/home office work environments and in mine operations and field environments;
- They moved progressively to roles located in corporate/home office work environments as they progressed along their career path;
- Corporates tended to be older than Specialists; and
- Their industry career is stable; illustrated by very few career breaks.

5.5.6. ***Corporate Career Model***

As illustrated in Figure 9, there was a diminishing amount of data accumulated for the advanced years of HQWs careers, and the limitation in the data was more extensive when looking at the Corporates. To identify trends in the data, a career map for the Corporate respondents was generated. This model is based on the movement of the respondent's careers from career position one through career position four. This map is illustrated in Figure 19. Compared to the Specialist respondents, Corporates demonstrated more

diversity in their career pathways and within each career position. The most common career pathway for Corporate respondents consisted of starting their career in a Professional Administration, Business or Finance role and moving into consecutive supervisory or mid-level management roles. The map also illustrates Corporates demonstrated more movement towards positions of greater role authority as they progressed through their careers.

To develop a more comprehensive Corporate Career Path Model, the Corporate respondents' career data was coded based on the following three variables for each position they held;

- Work Environment
- Job Position
- Career Position

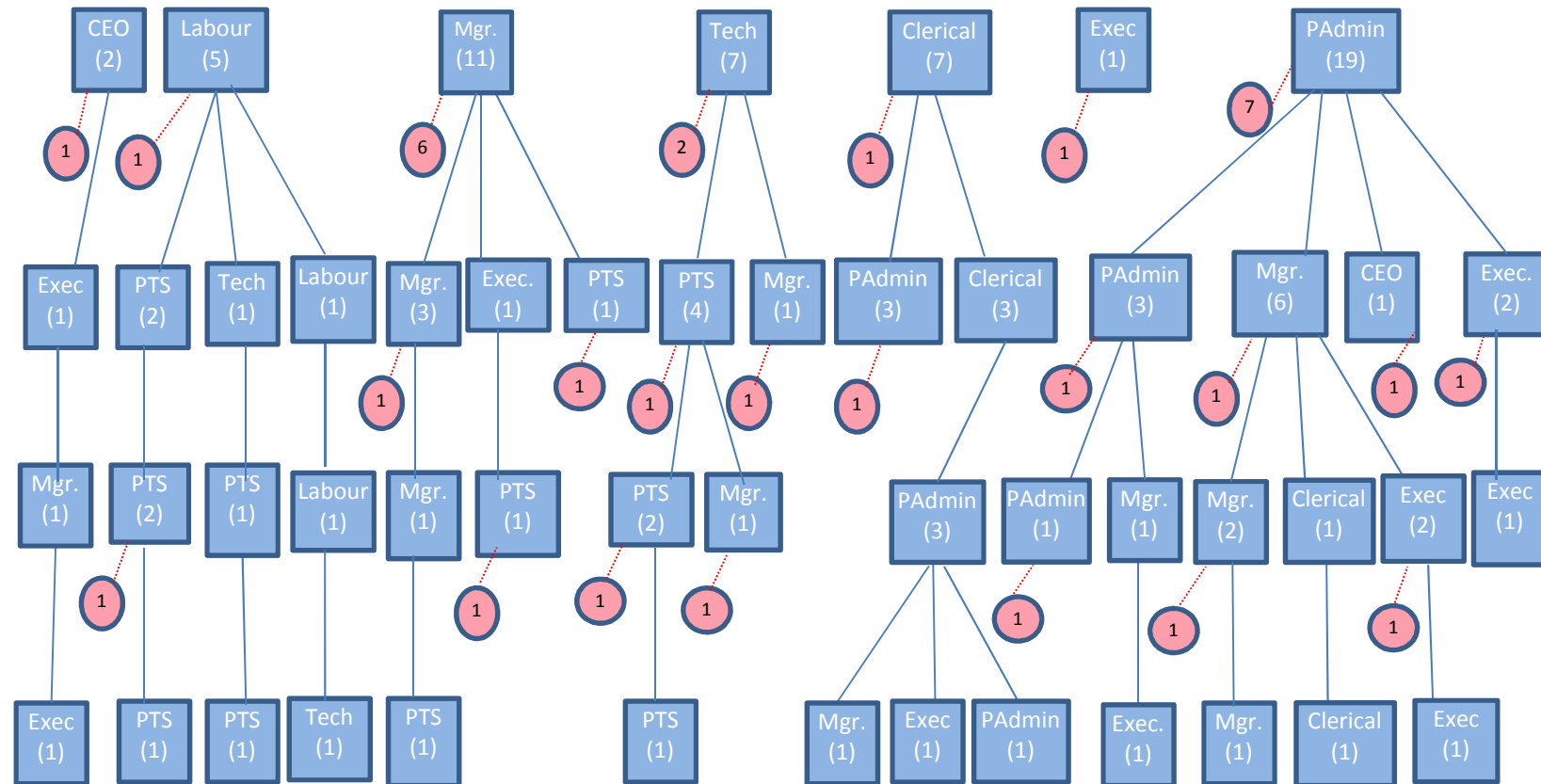
Consistent with the analysis for the Specialist respondents, numerical job codes were applied to the data based on these variables, and an excel model was developed to identify the characteristics of each of the specific job codes within the data. Examples of this coding can be seen in Table 1 and in Appendix B.

The most prevalent job codes were identified by calculating the modes for each job code within the data. The range of years and average number of years spent within the specific jobs were also computed, and the standard deviations and confidence intervals were generated to test the reliability of the averages for each career position. Figure 20

shows the outputs and characteristic associated with the most prevalent job codes found within Corporates career paths.

These outputs were then reviewed and the most common job codes and their characteristics were summarized into the career path model illustrated in Figure 21. This model illustrates the most frequent job codes for CP1 through to CP4. Each career position in this model represents the most common career position articulated by the respondents with regards to job title, work environment, and the average length of time the respondents stayed in the specific role.

Figure 19 Corporate Respondents Career Path Map CP1-CP4



Legend

PAdmin = Professional-Admin, Legal, HR, Finance, etc.,

Clerical = Clerical and Support

Labour = Labour, Service and Production

(1) = number of respondents who's career path information ends at the connected job role

(3) = number of respondents who worked in the job role

PTS = Professional – Technical and/or Scientific

Mgr. = Middle and Line Management/Supervisor

Exec = Executive Director, and or Senior Management

CEO = CEO/President

Tech = Technical and Skilled Trades

Figure 20 Corporate Respondents Job Code Outputs

| Career Position | CP1 | CP1 | CP1 | CP1 | CP1 | CP2 | CP2 | CP2 | CP3 | CP3 | CP3 | CP4 | CP4 |
|---|--------|----------|---------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|
| Job Role* | PA | Clerical | Manager | Manager | Trades | Manager | PA | Manager | PA | Manager | Exec | Manager | Exec |
| Work Setting (Corporate=C, Mine Operations = M, Field = F) | C | C | C | M | M | C | C | M | C | C | C | C | C |
| Job Code | 151 | 171 | 121 | 321 | 361 | 122 | 152 | 322 | 153 | 123 | 133 | 124 | 134 |
| Mode (years) | 2 | 1 | 2 | 1 | 1 | 2 | 1 | #N/A | 2 | 3 | 3 | 1 | #N/A |
| Median (years) | 2 | 2 | 2 | 1.5 | 1 | 2.5 | 1 | 5 | 2 | 2.5 | 3 | 1.5 | 2.5 |
| Average (years) | 2.81 | 2.20 | 4.20 | 2.75 | 1.75 | 3.17 | 2.80 | 4.67 | 2.75 | 2.25 | 3.3333 | 2.5000 | 2.5000 |
| Min (years) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 2 |
| Max (years) | 9 | 4 | 9 | 7 | 4 | 6 | 9 | 7 | 6 | 3 | 4 | 6 | 3 |
| Mode(job code) | 16 | 5 | 5 | 4 | 4 | 6 | 5 | 3 | 4 | 4 | 3 | 4 | 2 |
| standard deviation | 2.0726 | 1.3038 | 3.5637 | 2.8723 | 1.5000 | 1.9408 | 3.4928 | 2.5166 | 2.2174 | 0.9574 | 0.5774 | 2.3805 | 0.7071 |
| Total years of experience from respondents | 45 | 11 | 21 | 11 | 7 | 19 | 14 | 14 | 11 | 9 | 10 | 10 | 5 |
| 95% Confidence | 1.0156 | 1.1428 | 3.1237 | 2.8148 | 1.4700 | 1.5529 | 3.0616 | 2.8478 | 2.1730 | 0.9383 | 0.6533 | 2.3328 | 0.9800 |
| 50% Confidence | 0.3495 | 0.3933 | 1.0750 | 0.9687 | 0.5059 | 0.5344 | 1.0536 | 0.9800 | 0.7478 | 0.3229 | 0.2248 | 0.8028 | 0.3372 |

***Job Role definitions**

PA=Professional-Admin,Legal, HR, Finance role

Clerical = Clerical and Support role

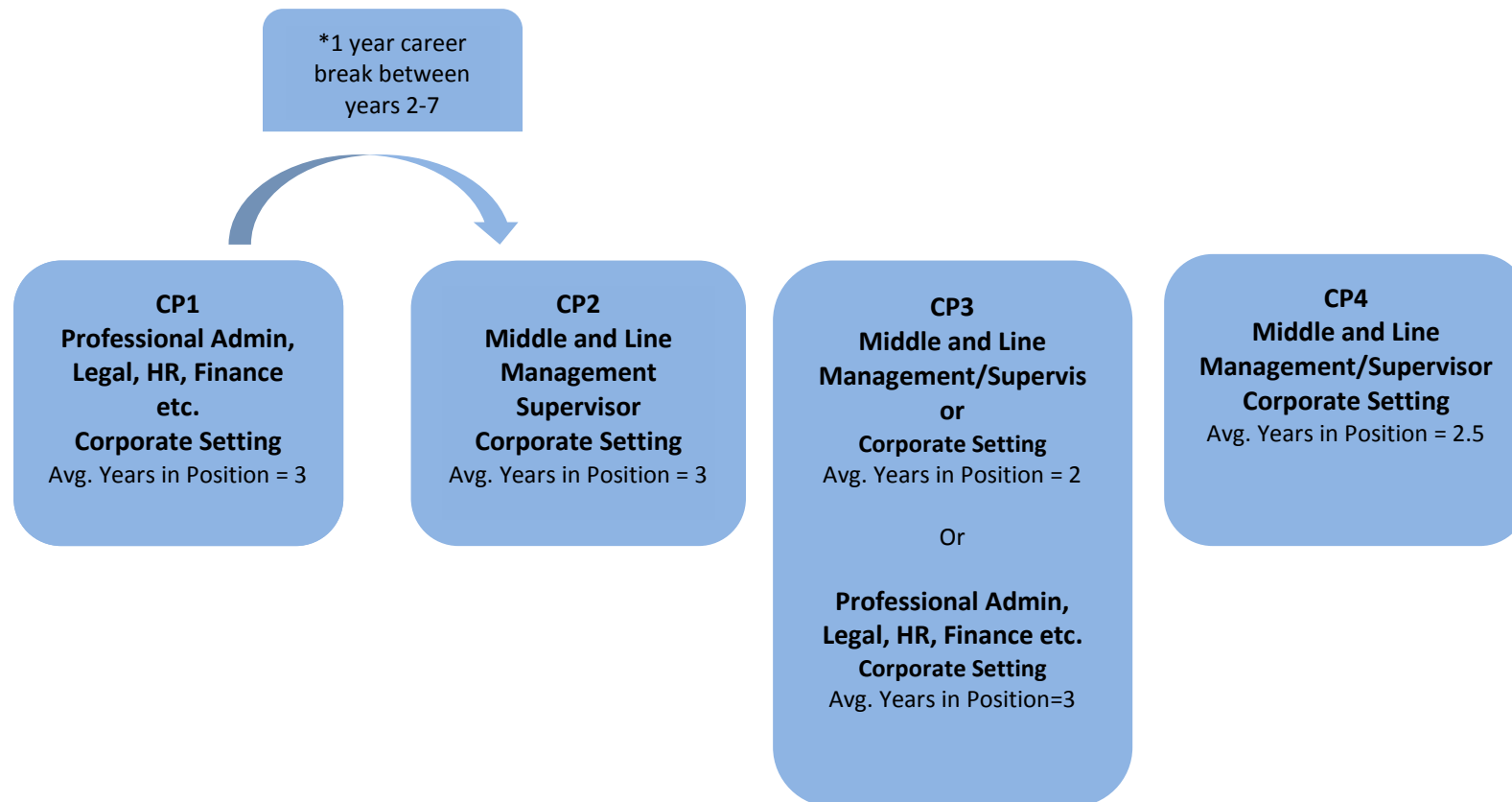
Trades = Technical and Skilled Trades role

Manager = Middle and Line Management/Supervisor role

Exec = Executive Director, and/or Senior Management role

PTS = Professional-Technical and/or Scientific role

Figure 21 Corporates Career Path Model CP1-CP4



- 25% of HQW Corporates took Career breaks during their mining Career path

Figure 21 illustrates that the Corporate's career paths tended to start in a Professional Administrative or Business role, and then the respondents indicated movement into management roles. These positions were dominantly held in a corporate work environment. As shown in Figure 21, during the Corporates third career positions, two job codes were indicated as the most frequently held positions by the respondents. If a Corporate was to take a break from her mining career this break tended to last for one year and occurred between years 2 and 7 of her mining career.

5.6. The Leaders - HQW in Senior Management

As indicated by Figure 17 and Figure 21 respondents' careers did not display systematic progression into management and executive roles. Even as HQW's careers progressed they would often move from professional roles into middle level management and then back to professional roles without a clear pathway of advancement.

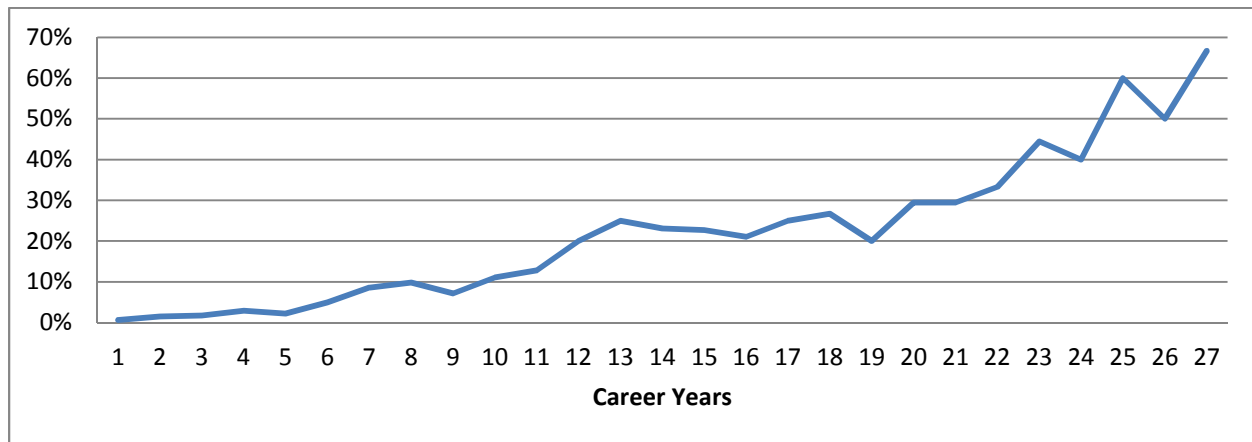
There were some respondents who did reach senior leadership roles within their career. Specifically, twenty-four of the survey respondents, or 16% of the total respondents who provided career information, indicated they had reached a senior leadership position within their mining career.

These positions include:

- President/CEO – 3% of total respondents; and
- Executive Director, and/or Senior Management – 14% of total respondents.

Not surprisingly, women are more likely to work in an executive role as their career develops over time, as shown in Figure 22.

Figure 22 Percentage of HQW in Senior Management Positions over Career Path



Of the women who provided information on their careers the first women to reach an executive or senior management role was in 1996. All women who reported that they worked as 'Presidents/CEOs' were self-employed or working for junior companies. 'Executives, Vice Presidents and/or Senior Managers' tended to work in more traditionally dominated female job roles such as HR, Administration, Communications or Marketing. There were relatively few examples of women in non-traditional female senior management roles such as engineering, geoscience, and operations. HQW who worked in senior management roles predominately had educational backgrounds in non-science disciplines such as arts and business.

The survey respondents who indicated they were currently working in a senior management role (21) were asked what attributes, tools and resources contributed to their career advancement.

“Ability to communicate at all levels; supportive husband; effective active personal development; accessing networking opportunities when made available; outgoing and questioning attitude to work; being prepared to be wrong; being prepared to take on responsibility; believing in myself (I am as good as or better than the next (woman))”
(Senior Management Respondent, 92).

As summarized by respondent 92, self-efficacy, skill, and access to networks were key themes indicated by HQW working in a senior management capacity. Senior managers attributed their career advancement to five key career attributes as indicated by the Table 7 frequency analysis.

Table 7 Senior Managers Career Advancement Attributes – Content Frequency

| Key Word | Frequency |
|-------------|-----------|
| Skills | 25% |
| Ability | 15% |
| Hard Work | 15% |
| Mentors | 15% |
| Thick Skin | 10% |
| Willingness | 10% |

In summary, current HQW senior managers saw the importance of personal skill, ability, hard work, and willingness as key aspects that led to their career success. Externally they saw the importance of mentors and network to other senior leaders.

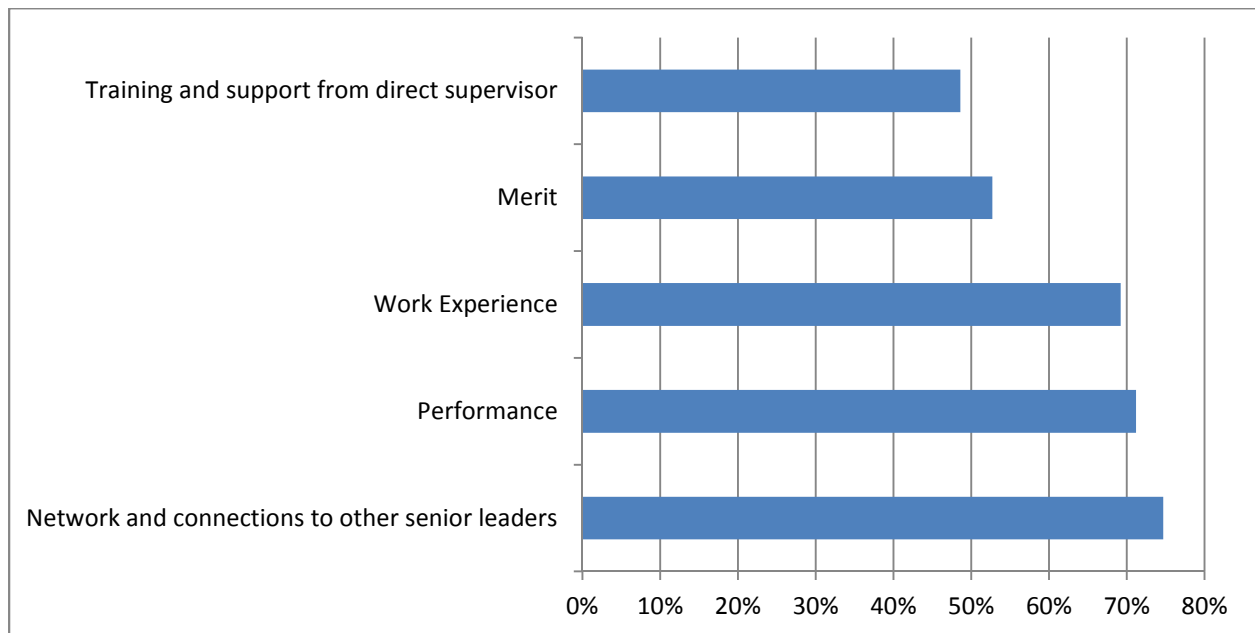
“My own interest and tenacity about pursuing a career in my field have been critically important. I also found that contacts are playing an increasingly important role as I advance in my career... I also engage in regular professional development opportunities.”
(Respondent 59).

As well as developing a thick skin to cope with the prevailing workplace culture.

“Having been through engineering prepared me for the more "collegial" attitudes that prevail (read: boorish) in the mining industry and helped me build a thick skin...”
(Respondent 153).

HQW perceive workplace promotions in the mining industry as predominately a factor of network and connections to senior leaders, followed by performance and work experience. Training and support from direct supervisor was the least important factor indicated by the respondents (Figure 23) for promotions in mining organizations.

Figure 23 ‘How are people promoted in mining organizations?’



As one respondent articulated;

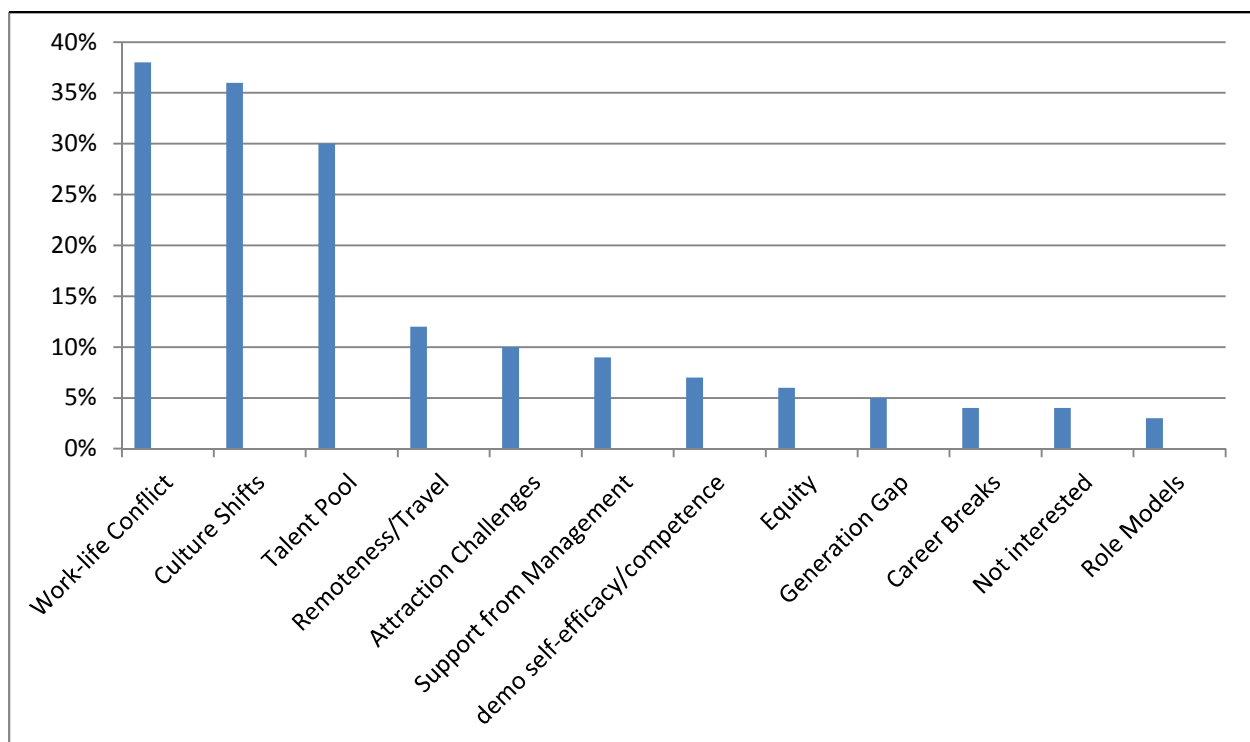
“If you know people at the Corporate level you have an advantage”

(Respondent, 30).

5.7. Absence of Women in Leadership

In this research, all respondents were asked in an open ended question: *Why there were so few women in leadership roles in the mining industry?* A content analysis of their responses was performed based on the coding dictionary found in Appendix C. Figure 24 illustrates the frequency of specific themes that were found within the responses.

Figure 24 ‘Why are there so few women in leadership roles in the mining industry?’



One hundred and twenty-five respondents provided open-ended content in response to the question in Figure 24. The primary content themes in the responses as indicated in the table were;

- **Work-Life Conflict**– *there are few women in senior leadership roles because of the challenges in balancing these positions and balancing family life, work-life is recognized as a challenge for both genders, although compounded for women, due to traditionally higher demands at home.*
- **Culture-Shift** - *there are few women in senior leadership roles because the industry is male dominated, and workplace cultures within mining are not inclusive to women's advancing to leadership roles, and performing in leadership roles.*
- **Talent Pool** – *women's career advancement into the leadership roles is reflective of the number of women in the current talent stream, there are few women in the post-secondary mining specific programs, and within mining organizations.*

The respondents attributed the lack of women in leadership to a variety of different factors. Primarily they indicated that women were not represented in leadership roles because of work-life conflict. Secondly, the exclusive nature of the workplace culture (indicated in Figure 30 as 'cultural shift') has created barriers to leadership roles for women. One respondent attributed the lack of women in senior leadership roles as women's isolation from both informal networks, and as a result of taking time away to raise a family.

"The primary reasons seem to be taking time off throughout career to raise family (which subsequently means those women have less experience/less of a network than men who have not taken the time off), and the exclusion of women from senior leadership by men who are already in those roles. The informal support and networking that occurs in the mining industry is very exclusive to women"

(Respondent, 83).

In contrast, about 30% of the respondents specified that there is a lack of women in the leadership roles in mining because of the small labour pool of women to select from.

“I think, traditionally, mining has been a 'man's' field, and the senior roles are given to those with the experience most applicable to the role. I think as the pool of highly qualified, experienced women increases, we will see more women move into these roles”
(Respondent, 61).

5.8. Career Barriers to Advancement and Retention

All HQW respondents were asked about career barriers faced by women in the mining industry, and their level of agreeance with specific career barrier statements. Using a seven point Likert Scale Table 8 illustrates the distribution of respondents.

As indicated in Table 8, most HQW agreed, somewhat agreed, or strongly agreed that women are often excluded from informal networks in the mining industry. HQW also saw that stereotypes of women’s abilities persist, and that women’s advancement is not a priority in the industry. These stereotypes may also extend beyond the mine operation and infiltrate the business and work relationship with other industrial organizations. As one respondent writes;

“Although I have not been in the industry long, I feel that some female managers are not taken as seriously as male managers by subcontractors (heavy equipment operators, drilling companies) that are generally fields dominated by male employees”
(Respondent, 85).

The respondents tended to agree that women lack mentorship, role models, and are often faced with inhospitable cultures in the mining industry. As one respondent indicated the remote nature of the work can exasperate these issues;

“Remote locations. Some people feel women can't hack it in camps and/or resent the changes the presence of women in these locations has brought about. Also there is a perceived attitude that they don't have to be as politically correct in camp (i.e. women should just "suck it up" if they find it difficult to adjust to camp life). I've been subjected to comments, verbal attacks, etc. that would never happen in a corporate office setting yet seems to be perfectly acceptable in a camp setting”

(Respondent,103).

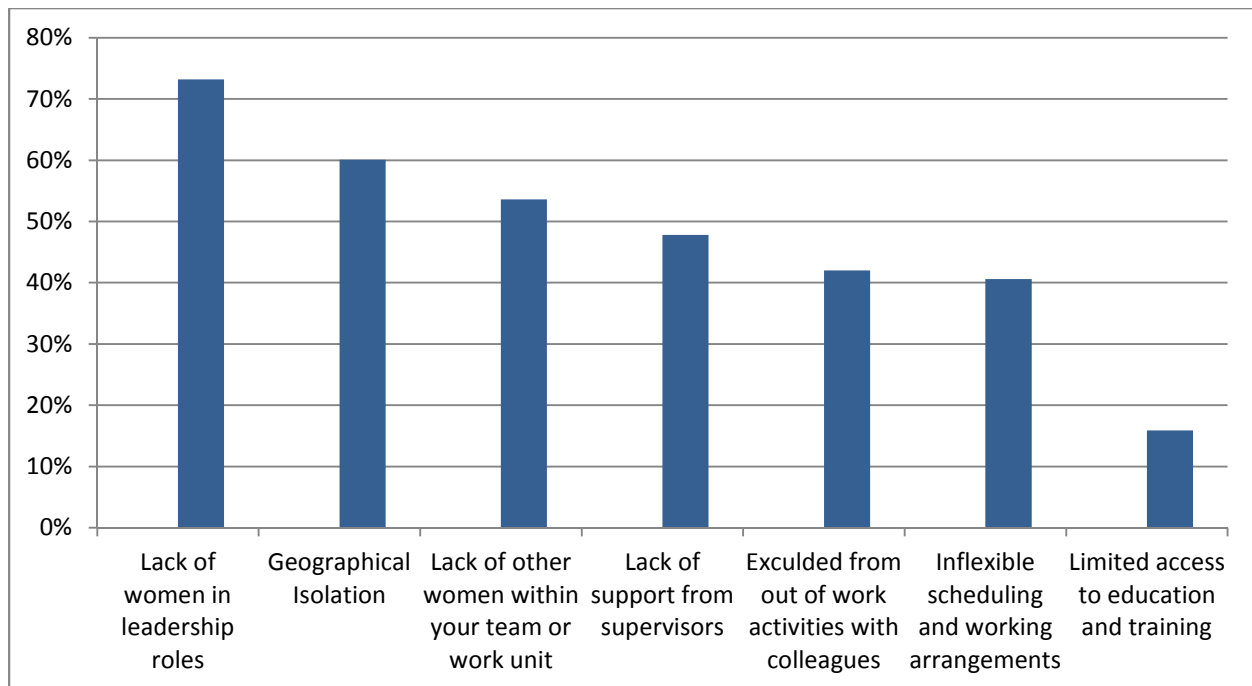
Most respondents also agreed that women's development in the industry has been slowed by their commitment to family responsibilities. Respondents predominately disagreed that women do not wish to advance in the industry, or lack leadership abilities to advance in the industry.

Table 8 HQW's perception of Career Barriers in the Canadian Mining Industry

| The following statements represent career barriers that women may face in the Canadian mining industry. Please indicate your level of agreeance with each statement. | | | | | | | |
|--|----------------|-----------------------------|-----------------------------|---------------------------|-----------------------------|-----------------------------|-----------------------------|
| | Strongly Agree | Agree | Somewh at Agree | Neither Agree or Disagree | Somewhat Disagree | Disagree | Strongly Disagree |
| Women in the Canadian mining industry are often excluded from informal networks. | 8.8% (13) | 19.7% (29) | 24.5% (36) | 15.6% (23) | 15.6% (23) | 11.6% (17) | 4.1% (6) |
| Stereotypes about women's abilities and roles exist in the Canadian mining industry. | 12.9% (19) | 29.9% (44) | 27.2% (40) | 8.8% (13) | 14.3% (21) | 6.8% (10) | 0.0% (0) |
| Women's advancement in the industry is not a priority for CEO's/Senior Leaders in the Canadian mining industry. | 9.5% (14) | 26.5% (39) | 22.4% (33) | 15.0% (22) | 15.6% (23) | 10.9% (16) | 0.0% (0) |
| Women have a lack of professional role models in the Canadian mining industry. | 14.3% (21) | 24.5% (36) | 27.9% (41) | 12.9% (19) | 12.2% (18) | 7.5% (11) | 0.7% (1) |
| Women's advancement in the Canadian mining industry has been slowed by their commitment to personal or family responsibilities. | 17.0% (25) | 32.0% (47) | 25.9% (38) | 14.3% (21) | 3.4% (5) | 6.8% (10) | 0.7% (1) |
| Women receive less mentoring than men in the Canadian mining industry. | 13.6% (20) | 19.7% (29) | 19.0% (28) | 17.0% (25) | 18.4% (27) | 10.2% (15) | 2.0% (3) |
| Women are often faced with inhospitable organizational cultures in the mining industry. | 8.8% (13) | 20.4% (30) | 28.6% (42) | 12.2% (18) | 12.2% (18) | 15.0% (22) | 2.7% (4) |
| Women lack awareness of organizational politics in the Canadian mining industry. | 3.4% (5) | 10.2% (15) | 19.0% (28) | 13.6% (20) | 23.8% (35) | 23.1% (34) | 6.8% (10) |
| Women do not get enough opportunities for challenging assignments in the mining industry. | 2.7% (4) | 11.6% (17) | 18.4% (27) | 15.6% (23) | 22.4% (33) | 24.5% (36) | 4.8% (7) |
| Women lack effective leadership styles for the Canadian mining industry. | 0.0% (0) | 2.0% (3) | 6.8% (10) | 5.4% (8) | 12.9% (19) | 27.9% (41) | 44.9% (66) |
| Women have less of a desire to advance to a senior level in the mining industry than men. | 1.4% (2) | 3.4% (5) | 12.9% (19) | 15.6% (23) | 13.6% (20) | 32.7% (48) | 20.4% (30) |

In conjunction with the Likert Scale analysis shown in Table 8, respondents were asked if they had ever experienced specific workplace challenges in their mining career. As indicated in Figure 25, the primary workplace challenge that HQW have experienced in their mining careers was a lack of women in leadership roles (experienced by 73.2% of HQW surveyed) followed by geographical isolation experienced by 60.1% of the women surveyed. Coinciding with other findings, 42% of women have been excluded from out of work activities with colleagues (ex. golfing, pub nights, etc.). The workplace challenge that was experienced by the fewest number of HQW surveyed was access to education and training.

Figure 25 HQWs Perceptions of Workplace Challenges



In summary, when considering the variety of career barriers articulated by the respondents the responses can be categorized within three key spheres of influence;

HQWs Sphere – *the areas of influence that HQW have over their own careers*

- HQW need to actively demonstrate confidence, skill, knowledge and leadership to advance into leadership roles in the industry;
- Women need to mentor and be advocates for their own career and the careers of other women in the industry; and
- Women need to adapt to the current workplace culture, i.e. gain a ‘thick skin’ when needed.

Industry Sphere – *the areas of influence that the mining industry has over careers of HQW*

- The industry has a responsibility to address subtle and observable actions of discrimination and exclusive workplace culture that have created barriers to women’s advancement in the mining industry;
- Industry needs to promote more women; and
- The Industry needs to be more strategic about accessing the talent stream of HQW, and increasing opportunities for women in mining.
- The Industry needs to address the work/life conflict that women face, and need to invoke were operationally viable more flexible workplace practices.

Societal Sphere – *the areas of influence that society has as whole over the careers of HQW in mining*

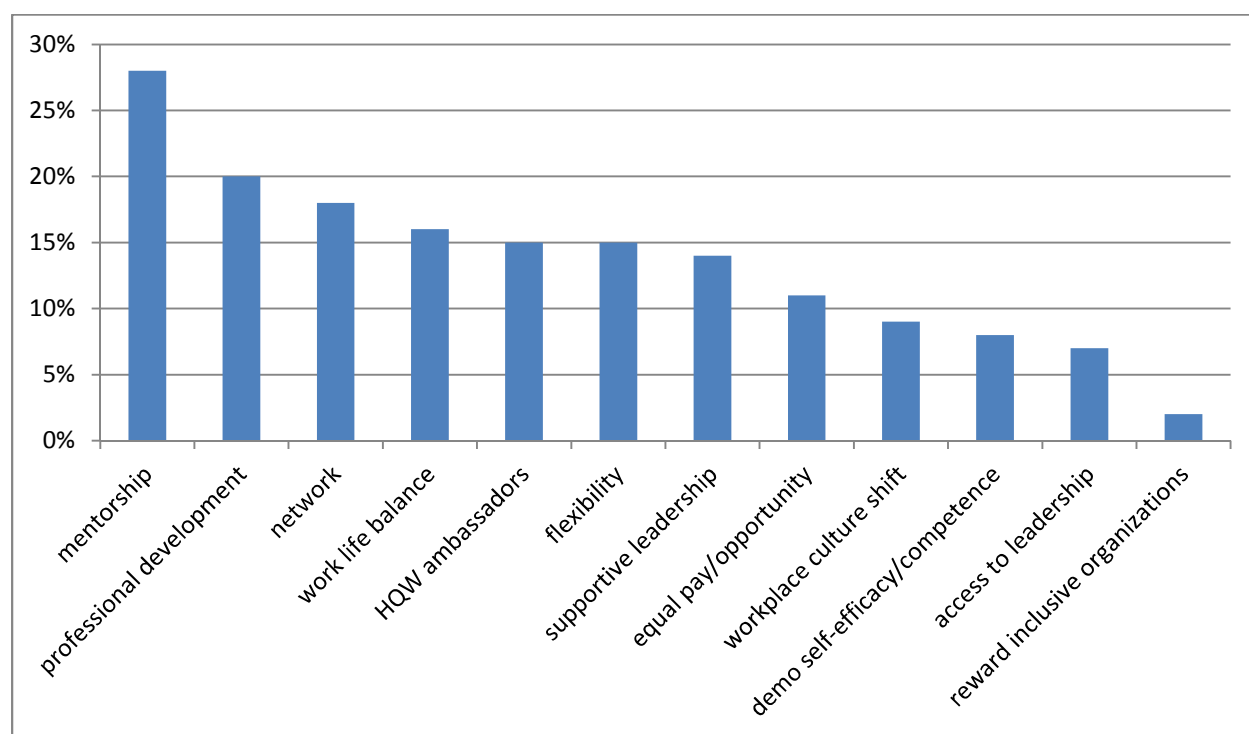
- Women in Canadian society continue to hold the role of primary caregiver.
- Socialization of girls and young women steer them from careers in the mining industry.
- The talent stream of women in traditional mining disciplines such as science and engineering needs to grow in order for stronger representation to be established in mining organizations.

Both the work-life balance issue and the workplace cultural issues can be categorized as within the Industry Sphere, and in this case the industry has significant level of responsibility in removing these barriers for women.

5.8.1. Removing Barriers

Respondents were also asked in the open-ended questions *in your opinion, what can be done to support women's career advancement in mining?* This question generated 102 responses that were reviewed and categorized based on the coding dictionary indicated in Appendix C. Figure 26 is a representation of the frequency of the content themes within the respondents' answers.

Figure 26 'How to support women's career advancement?'



Mentorship was indicated most frequently by HQW as a way to support career advancement of women in the industry. Access to education and training was not indicated as a challenge for HQW throughout the survey; however, the importance of professional

development was indicated by 20% of the respondents. As one HQW illustrated the professional development training could include both HQW and current leadership;

“Leadership training for women specifically; have companies aware of looking at women to promote; have companies understand the benefit to having women in leadership roles”
(Respondent,39).

Respondents also indicated the importance of the current networks available for women within the industry and to expand the current reach of networks accessible to HQW. On a micro level this can be done within each mining organization,

“Network with the women that are in your organization. Support younger women that are new to the company or role. Continued success will build confidence and knock down stereotypes and barriers”
(Respondent, 98).

In summary, the respondents provided extensive amounts of content on removing career barriers within mining workplaces. Although specific content themes were identified, the vast majority of respondents indicated that removing career barriers will require focus from multiple stakeholders on a variety of initiatives.

5.9. Workplace Culture

5.9.1. *Inclusive Workplace Evaluation*

This questionnaire asked specific questions to gain HQWs perspectives on workplace culture. Adapting the McLean's 2003 workplace inclusivity indicator, questions were tailored specifically for the Canadian mining industry.

Table 9 HQW's Perceptions of Mining Workplace Inclusivity

| Workplaces that are inclusive have common characteristics. Select all statements that are true for your current/most recent mining workplace. | % of respondents that agreed |
|--|-------------------------------------|
| Access to education and training opportunities are equal for both genders | 87.60% |
| The work conditions (work schedules, job titles, physical environment) are inclusive of both men and women; | 77.90% |
| The physical working conditions (equipment, clothing, shower, and toilet facilities are appropriate for men and women | 76.60% |
| At my organization - opportunities for advancement are based on knowledge and skills; | 68.30% |
| Supervisors and Senior Leaders in my organization support women and men equally | 64.10% |
| At my organization there is no stereotyping about women's and men's roles and occupations; | 48.30% |
| There is an emphasis on reducing sources of unnecessary stress such as harassment and work-family conflict | 46.90% |
| At my organization there are family friendly work policies and there is no stigma associated in using these policies. | 42.10% |
| At my organization there is a strong 'critical mass' of women, usually 30 per cent or more throughout the organization; | 35.20% |

As shown, 87.6% of HQW identify that the access to education and training opportunities are equal for both genders, and this was the highest inclusivity characteristic as ranked by the HQW respondents. Secondly, the physical environment in where HQW conduct their work is found to be appropriate for both genders.

In contrast, only, 35.2% of HQW indicated that their current workplaces had a critical mass of women throughout the organization. Less than half of the women surveyed indicated that their workplaces are emphasizing reduction in unnecessary stress such as harassment and work-family conflict, and less than half of the organizations have family friendly work policies that lack stigma in using the policies. As well, less than half of the HQW surveyed perceived their workplaces as having no stereotyping associated with men's and women's roles in mining organizations.

5.10. Summary of Key Findings

In summary the results of this research and analysis uncovered the following key findings:

- **HQW want to advance in their careers.** HQW strongly indicated their interest in furthering their career development and advancement throughout the survey responses. Their interest in career advancement was consistent or increased after they returned from leaves, and their predominant reason for accepting new positions was for career advancement opportunities.
- **HQWs careers are stalled.** Both Specialists and Corporates will work in professional roles or mid-level management roles, but there is no trend within the data that indicates a progression into executive or senior management roles over the course of HQWs careers. This indicates that HQW are facing a glass ceiling in mining organizations.
- **More Training may not be the answer–** HQW indicated that training and educational opportunities are available to them, and are equally available to men and women. Although this study did not evaluate the effectiveness of training, it does indicate that HQW do not see disparity between men and women receiving training in mining organizations.
- **HQW are shut out of informal mining networks.** HQW are excluded from informal networking in organizations, and within the sector, and there is a strong perception

that promotions and advancement occur through these networking opportunities. If this true, women will not gain parity until they are able to access these networks, or these networks become less of a tool for career advancement.

- **Mining workplace culture is not inclusive to women.** Although the more blatant or litigious areas of discrimination have been reduced in the industry. Implicit bias and subtler forms of workplace exclusion persist. On a series of inclusivity factors, HQW respondents indicated that organizations are lacking a 'critical mass' of women, stereotypes about women's job roles remain, and gender neutral language is not the norm in mining workplaces. As well, HQW did not perceive mining organizations as focused on the removal of unnecessary stress caused by work-family conflict and harassment.
- **HQW see mentorship and flexible work practices as key to their success in the industry.** HQW are seeking mentorship and work life balance. This is consistent with previous women in mining research findings, and should be part of strategic initiatives taken by organizations that want to increase the advancement and retention of HQW.

6. Discussion

6.1. Career Trends

The results of the career path analysis revealed two key career pathways amongst the respondents. These career paths were categorized as 'The Specialist' and 'The Corporate'.

'The Specialist' career pathway was characterized by multiple professional scientific and technical positions, with limited movement into more senior roles from career position one through career position four. In contrast 'The Corporates,' careers were more diverse but were characterized by more vertical movement within the career path and professional administrative roles moving into mid-level management. It was found that neither 'Corporates' nor 'Specialists' systematically progressed into senior management and executive roles.

Although the career paths had distinct trends, together they indicated that HQW are not advancing into senior leadership roles in the industry in a systematic fashion, and that they rarely move above middle management positions in the industry. For HQW working in Specialist roles, these issues may be compounded as knowledge workers employed in Specialist roles are often faced with a glass ceiling. This glass ceiling is exemplified by organizations that have increasing opportunities for management related roles, and relatively limited opportunities for Specialists (Hirsh, 2006).

Consistent with the Women in Mining 2009 findings, women in executive or senior management roles trended towards traditional job roles such as Human Resources and

Administration (Women in Mining Canada, 2010). Within the survey sample, 16% of the respondents indicated they were currently working in a senior management role in the mining industry, and of the women who indicated they were CEO's, all of the women worked for personal businesses in the mining industry. This indicates that the most senior roles held by the respondents were likely self-determined.

Similarly to previous women in mining studies in Canada and Australia, respondents were predominately within the 25-34 year age range (BC Mineral Exploration and Mining Labour Shortage Task Force, 2011; Women in Mining Canada, 2010; Minerals Council of Australia, 2005). The career mapping of both the Specialists and the Corporate respondents illustrated the respondents careers over the course of four career positions, and represents twelve years of career progression. Likely a result of the respondents dominant age range, the amount of career data from the respondents significantly declined after the fourth career position, and was therefore not included in the development and analysis of the career maps.

The time frame which is represented by the career path models, is a crucial point within women's careers. It was found that women were more likely to leave their current position for external opportunities during their first three career positions. Respondents were also most likely to take a career break from the industry during year two and seven of their career. This demographic is at a critical stage within their career, susceptible to career attrition. This was supported by Fouad & Singh, 2011 study of female engineers, and MiHR's 2011 study of knowledge workers, and Hewlett, Buck Luce, Shiller, & Southwell 2005 study

of Highly Qualified Women in business, indicating the need for the mining industry to act quickly to ensure the retention of this group of HQW.

6.2. Where are the Women?

The reasons for the absence of women in the mining industry have been previously attributed to a variety of factors, as seen in the literature. Andrew's 2009 study of women apprentices in non-traditional occupations found that women emphasized the need for women themselves to adapt and not on the work culture needing to change (Andrew, 2009). There is still an emphasis on women's responsibility to prove themselves fit for the work and able to fit into it, as the concept of employability and performance is identified as gender neutral (Andrew, 2009). This internalization of responsibility was indicated by some respondents as their need to build a thick skin in order to perform within current mining workplaces. More implicitly it was framed as;

"Women tend to take time off for family and this limits their ability to move up"

(Respondent, 131).

This framing overlooks the universality and persistence of the gender barriers that have been identified in the mining industry. This highlights the incongruity within the industry as to where responsibility lies with regards to diversity issues, and an overall need for a joint strategy to mitigate these challenges. A strategy that removes barriers for women to

succeed in mining and exploration, and one that provides women with the tools and resources to advance in the industry.

In support of the qualitative findings on the descriptions of HQW's career pathways, a content analysis was performed to contextualize the barriers to career advancement, retention and the impact of workplace culture on HQWs careers in the mining industry.

A fundamental distinction that emerged from the open-ended content provided by the respondents was in the way respondents framed their answers by either externalizing or internalizing the responsibility for the current challenges in retention and advancement. Two views were found in the responses: women themselves were responsible for the development and advancement of their careers, or organizations or the mining industry had a responsibility to foster career development and retention of HQW. This externalization or internalization of responsibility can be described by the concept of 'Locus of Control'. Locus of Control is the extent individuals feel they have control over events that directly impact or affect them. Individuals "with external control feel there is no personal control of outcomes, while people with internal control anticipate that they have control over the outcome of their efforts" (Spears, 2007). Furthermore, respondents framed their answers to the open-ended questions based on the belief that the barriers or challenges mentioned would require either action by HQW, action by mining organizations or broader societal changes as indicated by the following comment;

"Perhaps not enough women studying to become Mining Engineers. Just look at what toys people buy for boys and girls! How can we expect to have more female engineers - when most girls are given "girlie toys" and are expected to act like "girls".

When girls are allowed to cry and boys are not! The problem is society and the different expectations on boys and girls - from young age! Even teachers treat boys and girls differently. My son's teacher told him one day that boys toys are so much cooler than girls toys! My youngest one is only 6 yrs old - and I can already hear him say things like "Girls can't do that!", I don't teach him that - I'm a mining engineer for crying out loud!"

(Respondent, 12).

With reference to the cultural shift, many respondents wrote about the maleness of the mining industry culture, and referenced it as an old boys club, this can be seen as an

"Emphasis on male leadership models that do not necessarily work for women. lack of access to informal networking opportunities (hockey teams, fishing, golf,...)"

(Respondent, 131).

HQW may face a secondary stall in their career progression as their ability to work in leadership roles may be more closely evaluated than their male counterparts.

"...women must typically prove that they can do the job prior to being given the role and men are given the role as they "will grow into it""

(Respondent, 145).

In summary, women's absence in the industry was attributed to a wide variety of factors, and changes to prevailing attitudes in society and education were seen as key reasons women have not entered the industry. HQW's absence in leadership was identified by the respondents as the result of a smaller talent stream, but predominately identified as a reflection of current work-life balance, and workplace cultural challenges in the industry (Figure 24).

6.3. Opportunity for Advancement

HQW want to advance their careers. This was reinforced as 'Opportunity for Career Advancement' was the most common reason for women to leave their first mining employment position and accept a new job position. HQW accepted internal job opportunities throughout their career (from their first position – to their most current) most often for 'the opportunity for advancement'. When asked their reason for accepting the internal offer, compensation, flexibility, work location, and interesting projects were all secondary to the advancement opportunity presented by the new position.

Further supporting these findings, 78.7% of HQW indicated they would accept a more senior role in their current organization if the compensation, benefits, and career development support were fair. Finally, over 70% of the respondents expressed a continued or increased interest in their career advancement when they returned from Leave of Absences' throughout their career path. This has important implications for organizations that may be making assumptions about career interest for women after they have returned from maternity leave. In this case, emerging work-life conflict and implicit bias are the career barriers, and not HQW's interest in their career advancement.

6.4. Work Life Balance

In both the barrier identification survey questions and open-ended questions, work life conflict was identified by many respondents as a key barrier to HQWs advancement and retention in the industry.

"I don't know any mother who would want to leave a young child at home for weeks at a time to go to work. I don't know what can be done to accommodate but someone needs to try"

(Respondent 13).

This finding is consistent with what was found in previous women in mining research studies (Women in Mining Canada, 2010; Minerals Council of Australia, 2005; BC Mineral Exploration and Mining Labour Shortage Task Force, 2011).

Work life conflict can have significant negative consequences for workers, and organizations as employees try to balance increasing demands from both their personal and professional life. A multitude of consequences can occur during work-life conflict: a decrease in productivity, increasing absenteeism, and affects an organizations ability to recruit and retain top performers (Hoganson, 2011). The issue of maintaining work-life balance is ongoing, but it is linked with organizations ability to provide flexible working environments; including flex days, and compressed work schedules (Hoganson, 2011). Although not suitable for all positions, or tasks flexible work environments generally require organizations to move away from the belief that someone needs to be in the work environment physically at a set time to have the highest productivity levels (Hoganson, 2011).

6.4.1. ***Flexibility***

Coinciding with the identified work life conflict that HQW are experiencing is the discussion of more flexible working arrangements within operations, corporate, and field work environments. The mining industry faces unique challenges in that the work location and the shift nature of mining operations create a challenging environment to invoke more flexible work practices. However, as the mining industry engages with increasing levels of technology both in business communications and within mining operations, growing levels of flexibility with regards to work, and travel requirements will be feasible. This flexibility has clearly been indicated as part of regaining work life balance both by the respondents and in previous research.

In 'Off Ramps and On-Ramps', the researchers found 64% of the women surveyed cited flexible work arrangements as being either extremely or very important to them, and highly qualified women found flexibility more important than compensation (Hewlett, Buck Luce, Shiller, & Southwell, 2005). The mining industry has often focused on compensation as the key driver for attracting and retaining candidates; however, as indicated by the respondents to this survey compensation or under compensation is rarely the reason that HQW leave current career positions, or accept new roles. Issues of flexibility, work-life balance and opportunity for advancement were consistently indicated by the respondents as their reasons for making a career move. This indicates that mining organizations should be focusing more of their resources into programs and initiatives to enhance work-life balance and employee development and less on increasing salaries and compensation.

6.5. Reflections on Workplace Culture

Consistent with previous women in mining research this study found gendered barriers within workplace cultures in the Canadian mining industry (Women in Mining Canada, 2010; BC Mineral Exploration and Mining Labour Shortage Task Force, 2011; Minerals Council of Australia, 2005).

This research used McLean's 2003 model of inclusive workplace culture to identify the specific aspects of the mining workplace culture that were problematic. Respondents were asked to identify their workplace culture on a variety of different parameters resulting in a more intricate understanding of the particular aspects of workplace culture within organizations that are causing exclusion. These questions pertained to their most recent work experience to ensure that the perceptions illustrate current workplace climates in the mining industry.

From the analysis workplace culture in the Canadian mining industry is problematic for HQW, and there are multiple barriers to gender inclusivity that have been articulated by the respondents. Summarized by one respondent;

"There's still a glass ceiling in the industry. There's a lack of female role models. Women engineers get stereotyped into a certain role (i.e. senior engineer or chief engineer) but never progress passed these roles to an executive position unless it's into the human resources stream. Women's technical skills are undermined by lack of company-wide support for women in the industry"

(Respondent, 71).

In support of this, respondents indicated that the more overt forms of exclusivity have been rectified in most mining environments. Work conditions, physical facilities and access to training and education were generally recognized as inclusive to both men and women;

however, the more implicit and subtler forms of bias persist. These subtler forms of discrimination exist in stereotypes about women's roles in organizations, and exclusion from informal networks as indicated in Table 8. The exclusion from informal networks is particularly problematic because HQW respondents saw 'network and connection to senior leaders' as the leading determinant of promotions in the Canadian mining industry as seen in Figure 23.

7. Moving Forward - Advancing and Retaining HQW

7.1. The Role of Mining Industry Employers

It is recognized that career choices are influenced from a very early age. Personal beliefs, social and cultural norms, parents, educators, media, and peers all influence ones career development decisions. Specifically, this research study focused on the career experiences that HQW have once they have begun their career in the Canadian mining industry.

The relationship between the employer and employee largely dictates the employee's advancement within the specific organization and industry. In this case, the subjects have selected the mining industry as a career at some point in their career path, and it is at this time that the actions of the employer become significant influencers to the career development pathway of HQW. Thus the recommendations that follow are geared towards mining industry employers, and are framed as implementation strategies that they can be utilized to remove barriers to HQW careers that are within their organizations.

From a human resources perspective, we can learn from organizations and industries that have utilized traditional sources of labour and then adapted to attract non-traditional labour through changing policy and organizational development.

How do we foster career development and advancement for HQW in the Canadian mining industry?

In order to foster career development and advancement for HQW in the Canadian mining industry, respondents indicated key areas of focus for industry employers. Figure 26 illustrates the different content themes that were specified in the HQW responses to open-ended question “What can be done to support women's career advancement in mining?” The responses to the questions were reviewed and categorized based on the coding dictionary indicated in Appendix C.

Mentorship was indicated most frequently by HQW as a way to support career advancement of women in the industry. Most respondents referred to a preference for female mentorship,

“Network with the women that are in your organization. Support younger women that are new to the company or role. Continued success will build confidence and knock down stereotypes and barriers”

(Respondent, 98).

However the challenge in expanding professional networks in a male dominated industry was articulated by one respondent.

“I'm not a big fan of gender-specific professionalism, but I think in the mining industry, which is so male-dominated, it's a good thing for women to be able to discuss similar concerns and mentor each other”

(Respondent, 54).

As the industry is male dominated it will be important for both men and women in senior leadership roles to mentor HQW to build capacity, and for male mentors to champion the inclusion of women in the industry. Mentorship goes far beyond a one-on-one relationship, and mentors in positions of leadership should actively engage with their organization in initiatives that foster career advancement for minority groups (Thomas,

2001). Furthermore, the participation of both men and women in the development of HQW will provide access to broader informal and formal professional networks that are currently dominated by men. Illustrated in Table 8, HQW perceive access to informal networks as a significant factor in promotions within the mining industry, and as found in Figure 28, 42% of respondents have indicated that they have been excluded from informal networking activities during their mining career.

HQW indicate that professional development opportunities are important for HQW's career advancement in the industry. However, as illustrated in the research findings, HQW did not see the access to more formal education and training as a key issue for their advancement in the industry. Instead, professional development opportunities, leadership training, networking and negotiation training should be the focus of training efforts.

The success of these strategies will largely be determined by the ability of mining organizations to address the underlying workplace cultural barriers indicated by the respondents. Mining employers are strongly recommended to address current workplace culture barriers prior to instigating programs or policies geared at advancement and retention of HQW. In other words, without the foundation of an inclusive workplace culture, mentorship, professional development and other initiatives will not eradicate the underlying gender biases that exist within the industry.

7.2. Strategy for Advancement and Retention of HQW

It is recommended that mining organizations develop an organizational strategy that is linked to current best practices. These strategies should include who is to be involved within the organization; metrics and goals to measure the program's effectiveness; and training for organizational members to ensure the strategies are put to action.

It is recognized that no singular initiative will remove all barriers for HQW within the mining industry; however, organizations that are actively managing diversity, and particularly the integration of HQW will be more prepared to weather the labour challenges ahead. Inclusive organizations benefit from a greater breadth of labour sources, and can use inclusivity as a competitive employment tool, one that attracts, develops and retains the best candidates from all potential sources of labour.

Applying a specific HQW strategy to address the diversity related challenges within an organization is a perplexing task for even the most robust organization. This challenge is exasperated when we consider that many organizations in the mining industry are small exploration and junior companies that do not have corporate infrastructure to support resource-intensive workforce strategies. It is with this in mind that the following strategic recommendations have been made, as they are generally less resource intensive and utilize available diversity resources.

7.2.1. ***Building HQW Inclusive Organizations***

The following serves as a guide for mining and exploration organizations that are interested in building a more HQW inclusive organization. The reasons to enact these strategies is within the recognition of the advantages of a more diverse workforce throughout organizational hierarchies, and the acknowledgment of the need to engage with a larger labour pool to meet the workforce demands within the industry today, and increasingly into the future.

It is recommended that these initiatives be included into a broader diversity strategy, comprised of inclusive practices to enhance diversity from all under-represented groups in the industry. These recommendations are specific to HQW and are based on the research findings indicated in this study.

Developing an inclusive organization is not an HQW issue - but a company issue. Ensuring a broad range of working functions, including individuals with legitimate organizational power, and the engagement of both men and women will be crucial to the success of the initiative. Building an inclusive organization requires senior leaders within and outside of the human resource function to actively support and engage in its development. Once this has been established a thorough analysis and strategy can be developed. The guide outlined in Table 10 is a tool for mining organizations interested in increasing their organizations capacity to advance and retain HQW. It serves as a guide for initial evaluation and supports the development of a HQW advancement and retention strategy.

Table 10 Advancing and Retaining HQW: A Guide for Organizations

| Advancing and Retaining HQW: A Guide for Organizations | | |
|--|--|---|
| <i>This is a tool for organizations interested in increasing their organizations capacity to advance and retain HQW. It serves as a guide for initial evaluation and supports the development of a HQW advancement and retention strategy.</i> | | |
| WORKPLACE ANALYSIS | Action | Related Research Findings |
| | Determine where the HQW are in your Organization <ul style="list-style-type: none"> Identify current gender gaps within your organizational hierarchy and across working groups. <ul style="list-style-type: none"> Questions to guide analysis: <i>Where do women work in our organization? What type of positions? How long do they stay in those positions? When do they advance? Are there certain areas of the organization that have no or very few women? Where are the women leaders in our organization?</i> Engage HQW in your organization in this process. If there are no HQW in your organization, engage with other women in your organization, and reach out to women in mining networks in your area, post-secondary schools, and national organizations to start building your network. | <i>HQW's careers are stalled. Although HQW work in professional roles or mid-level management roles, there is no trend within the data that indicates a consistent progression into executive or senior management roles.</i> |
| | Evaluate your Workplace Culture <ul style="list-style-type: none"> Utilize a workplace culture tool to evaluate the current workplace culture within your organization (Appendix D). Articulate the areas that are creating specific barriers to HQW's Create a forum for open dialogue about workplace cultural challenges in your organization and provide training on workplace culture. Empower and reward the employee identification and displays of inclusive behaviours, and the identification and removal of behaviours that are exclusive within the workplace. Ensure accountability at all levels and all workplaces within the organization. Develop an HQW Inclusive Workforce Strategy <ul style="list-style-type: none"> Using a strategic analysis tool such as 'SWOT' or 'Balanced Scorecard' determine the current state and objectives for your organization, with respect to advancement and retention of HQW. <ul style="list-style-type: none"> Questions to guide analysis: <i>What are the organizations areas of strengths in advancing and retaining HQW? What areas need improvement, and what are the opportunities for further inclusivity within the organization? What are our objectives, and how will we measure success?</i> | <i>HQW indicated that mining organizations are not inclusive to women. Removing stereotypes about women's roles, building a critical mass of women at all levels of the organization, removing stress caused by harassment and work-family conflict, and using gender neutral language are all areas needing focus (Table 9).</i> |

| ADVANCEMENT & RETENTION INITIATIVES | Action | Related Research Findings |
|-------------------------------------|---|--|
| | Review and Rectify Internal Hiring Processes <ul style="list-style-type: none"> Determine how internal promotions/hiring decisions are made in your organization, and evaluate for any inherent bias. <ul style="list-style-type: none"> Questions to guide analysis: <i>Are informal networks opportunities key to our promotions, hiring? Are HQW included in these activities? Are we actively considering HQW for internal advancement opportunities?</i> | <i>HQW indicated they are excluded from informal networking in organizations, and within the sector, and there is a strong perception that promotions and advancement occur through these networking opportunities.</i> |
| | Employee Development Plans/ Organizational Succession Plans <ul style="list-style-type: none"> This can be conducted in a variety of ways, but the key aspect is that you have a good concept of not only where HQW are in your organization, but where they would like to see their career advance in your organization. This can be supported by a more thorough skill and knowledge analysis to see where individuals are being underutilized, and where leadership training and/or other resources can bridge gaps. | <i>HQW want to advance their careers in mining. Their interest in advancement was consistent or increased after they returned from leaves, and their predominant reason for accepting new positions was for career advancement opportunities.</i> |
| | Mentorship Programs <ul style="list-style-type: none"> Mentorship can be integrated in the employee development plan and can be developed within the organization or use external mentorship programs (Appendix D). HQWs mentorship can include men and women, and should involve members in leadership. | <i>HQW are seeking mentorship, and see it as key to their retention and advancement in the Industry. Engaging both men and women in the mentorship of HQW will build access to networks and leadership.</i> |
| | Work-Life Balance <ul style="list-style-type: none"> Consider implementing or piloting Flexible Work Practices (Appendix D), in challenging work environments, mine operations, and in the field. Use technology to alleviate geographic isolation. Ensure reliable access to external communication in remote locations. Evaluate telecommuting, and consider tools such as video conferencing that can alleviate the need for the worker to be on site. | <i>Less than half of the HQW respondents perceived their current organization as removing sources of unnecessary stress caused by work-life conflict. HQW perceive work-life conflict as a key barrier to the number of women in leadership roles.</i> |

8. Conclusions

The Canadian mining industry is facing challenging times. The Industry has a shrinking pool of highly qualified workers, and despite other industries moving towards gender parity, the mining industry has remained male dominant. In order to significantly change the gender disparity that exists in the industry, and to capitalize on a larger and more diverse labour pool, Highly Qualified Women are facing a glass ceiling, and they need to be vertically integrated into mining organizations. Highly Qualified Women are an important segment of the mining workforce as they represent current and potential leaders in the industry.

This research has examined Highly Qualified Women's career development pathways within mining organizations, and issues affecting the advancement and retention of women in the industry. The design of this research was guided by three overarching objectives;

- Model the career pathways of HQW in the Canadian mining industry
- Investigate HQW's perspectives on barriers to career advancement, retention and the interaction of workplace culture in the Canadian mining industry.
- Provide recommendations to industry on strategies to increase the advancement and retention of HQW in the mining industry.

A survey was chosen as the primary methodology for data collection, as it was deemed the best fit methodology for gaining socio-demographic and career information needed to model HQW's career paths. The survey used both qualitative and quantitative approaches to data collection.

HQW were asked to complete a survey which provided detailed information on their career development patterns, and their perceptions of workplace culture and issues of advancement and retention. The survey was well received with 153 completed surveys, and detailed open ended responses from the majority of respondents. The survey respondents were given the opportunity to provide information on up to ten mining career positions chronologically. The number of career positions varied for each respondent based on; the respondents' age; the amount of career mobility exhibited and whether they left the mining industry for a period of time. This created data from each respondent that resembled a chronological resume of their career development path.

From the responses, the career data was analyzed and revealed two key HQW career pathways in the mining industry – categorized as 'The Specialist' and 'The Corporate'. Although the career paths had distinct trends, together they indicated that HQW are not advancing into senior leadership roles in the industry in a systematic fashion, and that they rarely move above middle management positions in the industry. 16% of the total respondents indicated they were currently working in a senior management role in the mining industry, and these respondents specified the importance of personal skill, ability, hard work, and willingness as key aspects that led to their career advancement. Externally they saw the importance of mentors and network to other senior leaders.

HQW revealed a strong interest in advancing their career within the mining industry. HQW also indicated that their interest in career advancement was consistent or increased upon their return from a leave of absence.

The respondents also indicated that access to more training may not be the answer for HQW. Although this study did not look at the effectiveness of training programs, HQW respondents did not see a disparity between men and women access to training within mining organizations. HQW did indicate that they are excluded from informal networks in organizations in the industry, and there was a strong perception that advancement is linked to access to networks and senior leaders.

This research sought to investigate the specific aspects of workplace culture that are problematic for women in the mining industry, based on consistent previous sector studies indication that workplace culture is a barrier to women's employment. Respondents of this study specified that workplace culture in the Canadian mining industry continues to be problematic for women and cultural barriers to their advancement and retention remain. Although the more severe forms of gender discrimination may be diminishing, the more challenging workplace cultural issues that are impeded in implicit bias, and subtler forms of discrimination persist in the industry.

Although the challenges identified with regards to workplace culture, and work-life balance, are significant, HQW identified many ways in which organizations and the industry can remove these barriers. Within these challenges, exist great opportunities to engage HQW more thoroughly into the industry. In order to retain and engage HQW, mining organizations should evaluate specific and current workplace cultural barriers that are inhibiting women's growth in their specific organization and in the sector, and actively

engage in retention and advancement strategies that will utilize HQW to their full potential.

A guide for advancing and retaining HQW (Table 10) was developed based on the results of this research and the specific responses received from HQW.

9. Recommendations

9.1. Limitations

The use of a survey as the key research methodology enabled a wide distribution of the research, but had limitations with regards to the depth of understanding of the issues surrounding workplace culture. A qualitative research study centering on HQWs experiences and perceptions of mining workplace culture may provide a greater depth and context to these and previous research findings. It is recommended that future research on workplace culture utilize interviews and focus groups in data collection to develop the findings.

There were some indications from the respondents that the limitations in the survey design as a result of the survey software restricted respondents interested in providing further information to support their selections in the survey. For example, under the reasons for resignation, education or training and development were indicated by two respondents, but there was no place for respondents to select or expand on this. Due to the limitations of the survey software and the applied questionnaire logic it was not always possible to allow respondents to select 'other' and provide a text response.

9.2. Future Research

The respondents of this research provided an extensive amount of candid and detailed commentary on workplace advancement and retention themes facing women in the mining industry. Although this content was utilized to contextualize the workplace culture, and career barrier evaluation, there is excellent potential for further content analysis of this data that would surely yield a more comprehensive analysis of the data.

This research was conducted as an initial survey of HQW in the Canadian mining industry, and their perceptions of work in the Industry. Focus groups or in-depth interviews may provide further context on issues of workplace culture, and barriers to career advancement and retention now that a more generalized base line data has been collected through survey method.

This research and previous studies have looked at the issues surrounding gender in the mining industry from the perspectives of women in the industry. Previous research has indicated that gendered experience has largely been discussed as “white women’s experiences” (Berdahl & Moore, 2006, p. 427), and that minority women are often left out of the equation, despite increased risk of workplace barriers or challenges (Berdahl & Moore, 2006). There is significant opportunity to investigate the advancement and retention challenges as faced by Aboriginal HQW, HQW of visible minority and other diversity perspectives.

To provide further insight into the gender imbalance there exists an opportunity to integrate both genders into this discussion. The career pathways for the respondents,

illustrated in Figure 17 and Figure 21, provided a framework that summarized the respondents career progressions in the industry. In addition, gender based discrepancies could be acknowledged by comparing the career development pathways of Highly Qualified Women and men. This would identify significant points of attrition or underutilization, allowing organizations to align strategic initiatives to advance and retain Highly Qualified Women.

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APPENDIX A - SURVEY AND SURVEY COMMUNICATION



UNIVERSITY OF BRITISH COLUMBIA

NORMAN B. KEEVIL Institute of Mining Engineering

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Research Title: Highly Qualified Women and the Canadian Mining Workplace

Principal Investigator:

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Department of Mining Engineering

Norman B Keevil Institute of Mining Engineering



Co-Investigator:

Courtney Hughes (nee Bush)

Graduate Student - Master of Applied Science

Department of Mining Engineering,

Norman B Keevil Institute of Mining Engineering



To whom it may concern:

I am contacting you with regards to a research project on the career experiences of **Highly Qualified Women in the Canadian mining workplace**. This research is being undertaken as the thesis requirement for a Masters of Applied Science in the Mining Engineering Department at UBC. This letter serves as an invitation to participate in the research project and an overview of the research objectives and the process for participation in the study.

Definitions and Research Objectives: The purpose of this study is to obtain information about Highly Qualified Women's careers in the mining industry. Highly Qualified Women for the purpose of this research are defined as women who have **obtained a Bachelor's degree or higher education**.

For the purpose of this research, 'The Canadian mining industry' is defined as organizations or individuals that work on some aspect of the mining lifecycle within Canada, including: exploration; extraction and processing of minerals and metals; closure and reclamation of mining lands; and organizations or individuals which support these activities through consultation or other service offerings.

The objectives of the research are as follows:

- Define the career and educational profiles of Highly Qualified Women who work or formerly worked in mining in Canada;
- Identify the specific influences and barriers to the career advancement and retention of Highly Qualified Women in the mining industry;
- Define Highly Qualified Women's perceptions of workplace cultures within the mining industry.

Methodology: To gain the information, a survey will be offered in English to Highly Qualified Women who have worked, or are currently working in a Canadian mining workplace. This survey will take approximately 30 minutes to complete. **The survey will be available online from September 26, 2011 - October 21, 2011.**

Confidentiality: The survey is entirely confidential, and the data generated from the completed surveys will be compiled into aggregate statistics to preserve the privacy of the individuals participating. Subjects will not be identified by name in any reports of the completed study. This data will not be disclosed to third parties for any further use. The research results will be available to members of the public.

The online survey company is hosted by Survey Monkey which is located in the USA and is subject to U.S. laws. In particular, the US Patriot Act which allows authorities access to the records of internet service providers. This survey or questionnaire does not ask for personal identifiers or any information that may be used to identify you. The web survey company servers record incoming IP addresses of the computer that you use to access the survey but no connection is made between your data and your computer's IP address. If you choose to participate in the survey, you understand that your responses to the survey questions will be stored and accessed in the USA. The security and privacy policy for the web survey company can be found at the following link: <http://www.surveymonkey.com/privacypolicy.aspx>.

Contact for concerns about the rights of research subjects:

If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598 or if long distance e-mail to RSIL@ors.ubc.ca.

If you have any questions about the research please feel free to contact Courtnay Hughes (nee Bush) or Dr. Malcolm Scoble.

If the questionnaire is completed, it will be assumed that consent has been given.

Thank you in advance for your participation!

Sincerely,

Courtney Hughes

Sample Recruitment e-mail message for participants

Good Morning,

I am contacting you from the UBC Mining Engineering Department – I am a current graduate student completing research on the work experiences of **Highly Qualified Women in the Canadian Mining Workplace working in the fields of Science, Engineering and/or Technology**. If you are a women with a Bachelor's degree or higher and are currently working or have previously worked in mining workplace –in Science, Engineering and/or Technology - we are interested in hearing from you!

Please click on the link below to begin the survey. As well we appreciate you forwarding this link to Highly Qualified Women that you know who are working or have worked in mining in Canada in the Science, Engineering and/or Technology. Completing the survey will take approximately 20-40 minutes.

(LINK TO SURVEY WILL BE INSERTED HERE)

Information on Confidentiality and rights of the Research Subjects:

This survey is completely voluntary and entirely confidential, and the data generated from the completed surveys will be compiled into aggregate statistics to preserve the privacy of the individuals participating. Subjects will not be identified by name in any reports of the completed study. This data will not be disclosed to third parties for any further use. This survey is being conducted as part of a graduate thesis requirement for a Masters in Applied Science at the University of British Columbia. This research will be available to members of the public.

Contact for concerns about the rights of research subjects:

If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598 or if long distance e-mail to RSIL@ors.ubc.ca.

If you have any questions about the research please feel free to contact Courtnay Bush or Dr. Malcolm Scoble.

Thank you in advance for your participation!

Courtnay Hughes (nee Bush)

Highly Qualified Women in the Canadian Mining Workplace Questionnaire

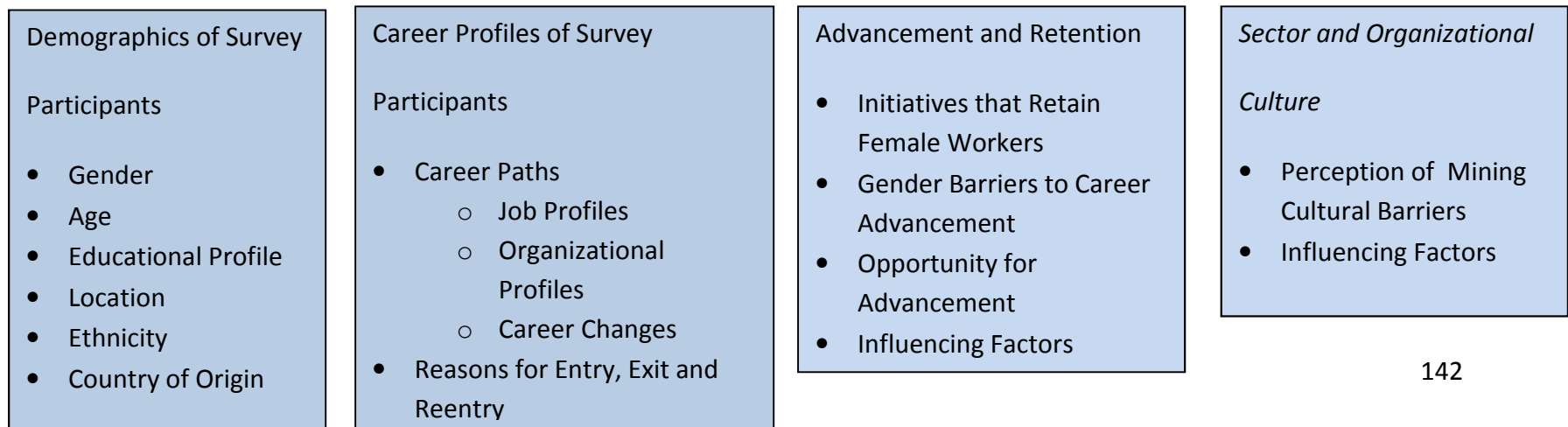
This survey is intended for women who are working (or who have worked) in the Canadian Mining Industry, and have obtained a post-secondary bachelor's degree or higher.

For the purpose of this research, 'THE CANADIAN MINING INDUSTRY' IS DEFINED AS organizations or individuals that work on some aspect of the mining lifecycle within Canada, including: exploration; extraction and processing of minerals and metals; closure and reclamation of mining lands; and organizations or individuals which support these activities through consultation or other service offerings.

This survey will take approximately 30 minutes to complete, and should be completed in one session. (You may log in more than once - but your previous session will not be saved).

This research is being undertaken as part of the thesis requirement for a Masters of Applied Science at the University of British Columbia. The data generated will be compiled into aggregate statistics to preserve the privacy of participants. If you have any questions about the research, or would like a paper copy - contact: Courtney Hughes (nee Bush) at cbush@interchange.ubc.ca. If you have any concerns about your rights as a research subject, contact the UBC Office of Research Services at 604-822-8598 or RSIL@ors.ubc.ca. Thank you in advance for your interest in this research, and for taking the time to complete the survey.

The following serves as a visual map of the questions contained within the survey:



Highly Qualified Women in the Canadian mining industry Questionnaire

DEMOGRAPHICS

1. What is your gender?

- Male
- Female

2. What is your age range?

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65 and over

3. Where do you live?

- Province/Territory (drop down menu), City/Community (fill in the blank)
- Outside of Canada (details location)
- Do not wish to answer

4. Where do you currently work?

- Province/Territory(drop down menu), City/Community (fill in the blank)
- Outside of Canada (details location)
- Do not wish to answer

5. Please indicate if any of the following statements apply to you:

- I am First Nations,
 - Drop Down – What First Nation(s) do you identify with? *Fill in the blank or I do not wish to answer*
- I am Inuit
- I am Métis
- I am a new Canadian (5 or less years in Canada) Drop Down – What is your country of origin? *Fill in the Blank*
- I am a visible minority
- I have a disability(ies) If yes (drop down) Physical, Learning, Other – *Fill in blank or I do not wish to answer*

EDUCATION

6. Chronologically list the post-secondary educational qualifications you have completed - *(this will be prompted through a series of questions in the online format that will gather the information below – using Drop Down boxes where possible)*

| Type of Educational Qualification | Name of Degree/Diploma or Certificate ex. Bachelors of Science | Area of Specialization/major/etc. ex. Electrical Engineering | State/Province/Country of Institution |
|--|---|---|---------------------------------------|
| <i>Drop Down</i> <ul style="list-style-type: none"> • <i>College or</i> • <i>Technical</i> • <i>Certificate or Diploma</i> • <i>Bachelors</i> • <i>Masters</i> • <i>PhD</i> • <i>Other – Specify:</i> | <i>College or Tech</i> <ul style="list-style-type: none"> • <i>Fill in Blank</i> <i>Bachelors</i> <ul style="list-style-type: none"> • <i>Bachelor of Arts</i> • <i>Bachelor of Science</i> • <i>Bachelor of Business/Commerce</i> • <i>Bachelor of Applied Science</i> • <i>Bachelor of Engineering</i> • <i>Other –Specify</i> <i>Masters</i> <ul style="list-style-type: none"> • <i>Same as Bachelors</i> | Fill in the Blank | |

EMPLOYMENT

7. Are you currently working in the Canadian mining industry?

- Yes
- No

8. If yes, what type of organization do you work for?

- Major Mining (Company with >1000 employees worldwide)
- Junior Mining (Company with <1000 employees worldwide)
- Exploration Company
- Government
- Education
- Association, Not for Profit
- Consulting Firm
- Self employed
- Other – Please specify (fill in the blank)

9. In your current position, where do you spend the majority of your work time?

- At a mine operation/production site
- At a Corporate office
- In the field (ex. exploration site, surveying)
- Working from home or at personal office space

10. What is your position title?

- President, CEO
- Executive Director, and Senior Management
- Middle and Line Management/Supervisor
- Professional – Technical and/or Scientific
- Professional – Administration, Legal, HR, Finance, etc.
- Technical and Skilled trades
- Labour, service, and production
- Clerical and support
- Other—Please specify (fill in the blank)

11. Was your first Career Position* in the Mining Industry?

- Yes
- No

**Career Position is defined as your first full time employment lasting more than 6 months.*

12. If answer is no, Please specify the last position you worked in prior to your first position in the mining industry?

| Industry | Organization Type | Occupation Title | Employment Dates |
|--|--|------------------|------------------|
| Drop Down Selections Manufacturing Forestry Oil and Gas Retail Public Service Finance/Legal Business or Professional Consulting Health Transportation IT/Communications Other: | Drop Down Selections Corporate Setting or Industrial Setting Other: Location – Canada, International Size – number of employees | | |

13. Complete a chronological list of your Employment History by Occupational Title - starting with your first position in the Mining Industry
(these questions will be incorporated into the online format to generate information for the following chart)

| Occupation | Organization | Start and End date | During this employment did you take a leave of absence? | Why did your employment in this position come to an end? |
|---|--|------------------------|--|---|
| <p>Level of the Position</p> <ul style="list-style-type: none"> • President, CEO • Executive Director, and/or Senior Management • Middle and Line Management/Supervisor or • Professional-Technical and Scientific • Professional – Administration, Legal, HR, Finance, etc. • Technical and Skilled Trade • Labour, Service, and Production • Clerical and Support <p>Position Title (Fill in the Blank)</p> | <p>Drop Down Menus</p> <p>Location</p> <ul style="list-style-type: none"> • Canada • USA • Mexico • South America • Australia • Africa • India • Asia • Europe • Other <p>Type of Organization</p> <ul style="list-style-type: none"> • Major Mining Company(>1000 employees worldwide) • Junior Mining Company (<1000 employees worldwide) • Exploration Company | <p>Drop Down dates</p> | <ul style="list-style-type: none"> • Yes/No <p>If Yes what was it for? (Check all that apply)</p> <ul style="list-style-type: none"> • Mat (multiple boxes) • Pat • Medical • Care for Spouse/Family member • Education or other training • Other <p>When I returned to work.... my position was:</p> <ul style="list-style-type: none"> • The same • Different • If different – higher in the organization/same level/ decreased level <p>my level of</p> | <p>Drop Down choices to fit theory</p> <ul style="list-style-type: none"> • Termination • Resignation (Select reason) <ul style="list-style-type: none"> ○ Retirement ○ Lack of Job Satisfaction ○ Under compensated ○ Lack of opportunity for advancement ○ Lack of job security ○ Lack of job flexibility ○ Personality conflicts ○ Work culture was inhospitable ○ The work location was too remote ○ Didn't have a good work/life balance ○ Work was too demanding • External Opportunity (Select Reason) <ul style="list-style-type: none"> ○ Better compensation ○ Flexibility ○ Work Location |

| Occupation (continued) | Organization (continued) | Start and End Date | During this employment did you take a leave of absence? (continued) | Why did your employment in this position come to an end? (continued) |
|------------------------|---|--------------------|--|---|
| | <ul style="list-style-type: none"> • Government • Education • Association, Not for Profit • Consulting Firm • Self-employed • Work Environment • Corporate Office/Headquarters • Mine Operations/Production Site • In the field(ex. Exploration site, surveying) • Worked from home/personal office space | Drop Down Menu | responsibility was: <ul style="list-style-type: none"> • Same • Reduced • Increased my pay rate Pay Rate <ul style="list-style-type: none"> • Was the same • Was less • Was higher | <ul style="list-style-type: none"> ○ Work culture ○ Opportunity for advancement ○ Interesting projects • Internal Opportunity(reason for accepting) <ul style="list-style-type: none"> ○ Opportunity for advancement ○ Interesting projects ○ Better compensation ○ More flexibility ○ Better work location |

14. The following statements represent potential barriers to career advancement and retention that women face in the Canadian mining industry. Please indicate if you Strongly Agree (STA), Agree (A), Somewhat Agree (SOA), neither agree nor disagree (NAD), Disagree (D), Somewhat Disagree (SOD) or Strongly Disagree (STD) with each statement. *(Question adapted from Catalyst study Wellington, Kropf, and P. Gerkovich, 2003 of Female Execs and CEOs from Fortune 500 companies)*

- Women in the Canadian mining industry are often excluded from informal networks.
- Stereotypes about women's abilities and roles exist in the Canadian mining industry.
- Women's advancement in the industry is not a priority for CEO's/Senior Leaders in the Canadian mining industry.
- Women have a lack of professional role models in the Canadian mining industry.
- Women's advancement in the Canadian mining industry has been slowed by their commitment to personal or family responsibilities
- Women receive less mentoring than men in the Canadian mining industry.
- Women lack awareness of organizational politics in the Canadian mining industry.
- Women are faced with inhospitable organizational cultures in the mining industry.
- Women do not get enough opportunities for challenging assignments in the mining industry.
- Women have less of a desire to advance to a senior level in the Canadian mining industry than men.
- Women lack effective leadership styles for the Canadian mining industry.
- Other – Please Specify:

Senior Leadership Questions

15. In your current or most recent mining career position, are there women working in *senior leadership roles in the organization?

*Senior Leadership refers to individuals at the higher levels of an organizations structure. Senior leaders are responsible for the strategic direction of an organization. Position titles vary in different organizations, but often senior leaders have titles such as CEO, Executive Director, Executive Team, Director, or Senior Manager.

- Yes,
- No,
- I don't know
- *If yes, are you part of the senior leadership* in your organization?*
 - Yes
 - No
- *If yes, how many people report to you?*
 - None
 - 1-10
 - 10-50
 - 50+

16. Looking back on your career what tools/resources/personal skills were most influential to your career advancement?

(Open Ended Response).

17. If you were offered a more senior role in your organization would you accept it?

- Yes – if the compensation, benefit, and career development support were fair
- No – I am not interested in pursuing a more senior role at this time
- I don't know
- Other: -

18. Workplaces that are inclusive have common characteristics. Select all statements that are true for your current/most recent mining workplace.

- At my organization there is no stereotyping about women's and men's roles and occupations;
- The work conditions (work schedules, job titles, physical environment) are inclusive of both men and women;
- At my organization there is a strong 'critical mass' of women, usually 30 per cent or more throughout the organization;
- At my organization - opportunities for advancement are based on knowledge and skills;
- There is an emphasis on reducing sources of unnecessary stress such as harassment and work-family conflict
- The language used at work is gender neutral; (i.e. mancarrier, manpower are not the norm)
- The physical working conditions (equipment, clothing, shower, and toilet facilities are appropriate for men and women
- Supervisors and Senior Leaders in my organization support women and men equally
- Access to education and training opportunities are equal for both genders
- At my organization there are family friendly work policies and there is not stigma associated in using these policies.

19. At any time in your mining career, have you experienced any of the following barriers?

- Scheduling flexibility in working arrangements
- Geographical Isolation
- Lack of support from supervisors
- Lack of other women in leadership roles
- Lack of other women within your team or work unit

- Excluded from out of work activities with colleagues (ex. golfing, pub nights, fishing trips, hockey, etc.)
- Life Choices (where I want to live, other)
- Limited access to education and training

• Other: _____

20. From your experience working in the Canadian mining industry, how are people promoted in mining organizations? Select all that apply.

- Luck
- Merit
- Performance
- Work Experience
- Training and support from direct supervisor
- Network and connections to other senior leaders

21. In your current organization, do senior leaders have different educational and career backgrounds?

- Yes, there are many different ways to arrive in a senior leadership role in my organization, and our senior leaders have varied career and educational backgrounds.
- No, there are limited ways to arrive in a senior leadership role in my organization; our senior leaders tend to have very similar career and educational backgrounds.
- I don't know
- Not applicable

22. What do you think the industry can do to ensure qualified women stay in the mining industry?

(Open-ended)

23. In your opinion, what can the mining industry do to support women's career advancement in mining organizations?

(Open-ended)

24. Why do you think there are so few women in senior leadership or executive roles in the mining industry?
(Open-ended)

25. Looking back on your career what tools/resources/support helped or would have helped you advance in your career?
(Open-ended)

26. Please use this space to any additional comments.
(Open-ended)

If you are interested in receiving the findings of this report please indicate your email address:

(Fill in the blank)

Thank you for completing this survey.

END OF SURVEY

Table 11 Survey Questions and Associated Findings and Figures

| Survey Questions | Topic of Question and Analysis | Associated Findings |
|-------------------------|--|----------------------------|
| 1-5 | Demographic Information, age, location, gender | Figure 5-7 |
| 6 | Education Information | Figure 8, Table 3 |
| 7-12 | Start of Mining Career and Career Background | Section 5.4.1 Figure 10 |
| 13 | Career LOA and | Figure 11-13, Table 4 |
| 13 | Career Map and Trends overtime | Table 5-6 Figure 14-21 |
| 15-16 | Senior Leadership | Figure 22, Table 7 |
| 20 | Promotions | Figure 23 |
| 14, 19 | Career Barriers | Table 8, Figure 25, 26 |
| 18 | Work Culture | Table 9 |
| 24 | Why so few women leaders? (content analysis) | Figure 24 |
| 22-25 | Barriers to Retention and Advancement (content analysis) | Section 5.8 |
| 22-25 | Recommendations for Organizations (content analysis) | Figure 35 |

Table 12 Survey Communication Strategy

| Activity | Date of Action |
|--|----------------|
| Research Presentation MiHR Board Meeting (Vancouver) | 22-Feb-11 |
| BC WIM Presentation (Vancouver) | 08-Sep-11 |
| Soft Launch – Email Survey Link to Key Contacts – Test Site | 23-Sep-11 |
| Launch – Email Contact Database (Survey Link, Research Info) | 26-Sep-11 |
| Post to Key Industry Linked - in pages (CIM, PDAC, WIM) | 26-Sep-11 |
| Post on MiHR News Feed | 26-Sep-11 |
| CIM News Feed | 26-Sep-11 |
| PDAC News Feed | 26-Sep-11 |
| Reminder Email - Email Contact Database | 05-Oct-11 |
| Re-post to relevant industry Linked-in Pages (CIM, PDAC, WIM) | 06-Oct-11 |
| Engineers Canada email to 'WIE Committee' and 'WIE Advisory Group' | 06-Oct-11 |
| MiHR E-newsletter Blast (600 Industry subscribers) | 18-Oct-11 |
| AMEBC News | 19-Oct-11 |
| Survey Closes | 21-Oct-11 |
| Follow up Communication Contact Inquiries | Ongoing |

APPENDIX B - DATA AND ANALYSIS

Career Path Coding Legend

Job Position Coding

| | |
|------------|--|
| RED = 4 | President, CEO |
| ORANGE = 3 | Executive Director, and/or Senior Management |
| YELLOW = 2 | Middle and Line Management/Supervisor |
| GREEN = 1 | Professional - Technical and/or Scientific (PTS) |
| BLUE = 5 | Professional - Admin., Legal, HR, Finance, etc. |
| PURPLE = 6 | Technical and Skilled Trades |
| GREY = 8 | Labour, Service, and Production |
| PINK = 7 | Clerical and Support |

Work Environment Coding

- 1 Corporate Office
- 2 In the field (ex. Exploration site, Surveying)
- 3 Mine Operations/ Production Site
- 4 Worked from home/personal office space

Career Position Number

- 1 Position One
- 2 Position Two
- 3 Position Three
- 4 Position Four
- 5 Position Five

Example Coding

Work Environment, Job Position, Career Position

| | |
|-----|--|
| 213 | PTS role working in the field, third career position in respondents career path |
| 114 | President, CEO role working in a Corporate Office, fourth career position in respondents career path |

APPENDIX C - CONTENT ANALYSIS

Why do you think there are so few women in senior leadership or executive roles in the mining industry?

Attracted **Balance** Believe Break Canada Career Path
Challenging **Children** Corporate Dominated
Family Commitments Group
Harder for Women Increasing **Limited Mining** Not
Interested Not Necessarily **Old Boys**
Club Perception Pool **Promoted Roles Senior**
Leaders Team **Think**

What do you think can be done to ensure highly qualified women stay in the mining industry?

Care Corporate Culture Education Ensure Equal
Family Flexible Given Going Highly Qualified
Women Individual Issue Leadership Mentoring Merit Mini
ng Opportunities Positions Promotions Raise
Roles Staff Successful Support Treat Work Life
Balance Workplaces

In your opinion, what can be done to support women's career advancement in mining?

Advancement Allow Child Care Commitment Educational
Equity Exist Fair Family Female
Flexible Geared Help
Women Industry Level Mentoring
Mentorship Mining Network Opportunities
Responsibility Roles

Looking back on your career what tools/resources/personal skills were most influential to your career advancement?

Ability Hard Job Mentors Skills Thick Skin Willingness

Open-ended Questions Coding Dictionary

113. Why do you think there are so few women in senior leadership or executive roles in the mining industry?

- **Demonstrate Competency and Self-efficacy** – *there are few women in senior leadership roles in the mining industry because there are few women that are demonstrating the required competencies for these positions, and men have more self-efficacy than women.*
- **Career Breaks** – *there are few women in senior leadership roles because of the career inertia that occurs from career breaks taken often for family.*
- **Generation Gap** – *there are few women in senior leadership roles in the mining industry because of a generation gap characterized by the loss of women in the industry in the late 90s economic downturn.*
- **Work-Life Conflict**– *there are few women in senior leadership roles because of the challenges in balancing these positions and balancing family life, work-life is recognized as a challenge for both genders, although compounded for women, due to traditionally higher demands at home.*
- **Support from Management** – *women’s career advancement is dependent on supportive leaders in the organizations in which they work.*
- **Talent Pool** – *women’s career advancement into the leadership roles is reflective of the number of women in the current talent stream, there are few women in the post-secondary mining specific programs, and the number decreases as we move through organizational hierarchies.*
- **Culture shift/Old Boys Club/male networks/men don’t want to work for women** - *there are few women in senior leadership roles because the industry is male dominated, and workplace cultures within mining are not inclusive to women’s advancing to leadership roles, and performing in leadership roles.*

- **Remoteness/travel** – *travel can provide a significant challenge for women, and to gain the experience required for a senior leadership role, and to perform in a senior leadership role travel is required.*
- **Equity issues** – *there are few women in senior leadership roles in the mining industry because of work equity challenges, including opportunity and pay.*
- **Attraction challenges** – *young women are not encouraged to enter the industry, perception barriers.*
- **Role Models** – *women are not advancing in the industry because of a lack of female roles models in leadership roles.*
- **Not Interested** – *women are not advancing in leadership roles because they simply aren't interested in them.*

115. In your opinion, what can be done to support women's career advancement in mining?

- **HQW Ambassadors** – *HQW should be visible in the industry, acting as ambassadors to encourage women's involvement in the industry.*
- **Reward Inclusive Orgs** – *organizations that are supportive of women's career advancement should be rewarded.*
- **Access to leaders** – *to advance women need access to the senior leaders in their organizations and within industry.*
- **Workplace Culture Shift** – *women's career advancement is dependent on a workplace culture shift from the current male dominate industry.*
- **Flexibility** – *women's career advancement is dependent on employers providing flexible work environments and work schedules.*
- **Mentorship** – *women's career advancement is dependent on the development of mentorship relationships with mentors within the industry.*

- **Network** – *women's career advancement is dependent on networking within industry events, associations, and within their own organizations.*
- **Equity issues**– *women's career advancement is dependent on their ability to access equal pay and job opportunities as men.*
- **Professional development** – *women's career advancement is dependent on acquiring professional development training.*
- **Demonstrate Competency and Self-efficacy** – *women's career advancement is dependent on self-efficacy and their own ability to demonstrate competency in the industry.*
- **Supportive Leadership** – *women's career advancement is dependent on supportive leaders in the organizations in which they work.*
- **Work life balance** – *women's career advancement is dependent on their ability to balance both work and life, and organizations support of employees' pursuit of work-life balance.*

APPENDIX D - HQW ADVANCEMENT AND RETENTION RESOURCES

Resources Advancement and Retention

Mentorship Resources

- Virtual MineMentor Program <http://minementor.acareerinmining.ca/en/>
- Women in Leadership <http://www.womeninleadership.ca/about/the-programs/mentorship-program/>
- West Coast Women in Engineering <http://wwest.mech.ubc.ca/>

Flexible Workplaces

- Workplace Flexibility a Guide for Employers <http://familiesandwork.org/3w/tips/downloads/companies.pdf>
- CCOHS guide to Flexible Work arrangements <http://www.ccohs.ca/oshanswers/psychosocial/flexible.html>

Building an Inclusive Workplace Culture

- Mining for Diversity: Employers Guide to Attract, Recruit, and Retain a Diverse Workforce http://www.mihr.ca/en/publications/resources/MiningForDiversityKit2_english.pdf
- Creating a Workplace that Attracts, Retains and Promotes Women <http://www.gnb.ca/0037/report/workplacethatwork-e.pdf>

Networks

- Canadian Coalition of Women in Engineering, Science, Trades and Technology <http://www.ccwestt.org/>
- Women in Mining Canada <http://www.wimcanada.org/welcome.html>
- Westcoast Women in Engineering, Science and Technology <http://wwest.mech.ubc.ca/>