AMENDMENTS TO NATIONAL INSTRUMENT 43-101 WITH RESPECT TO INDUSTRIAL MINERALS

by

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Abstract

Third party compliant reporting standards govern how mining companies must disclose technical information concerning their mineral assets. These reporting standards apply to any public issuer. Mineral Resources and Mineral Reserves (MRMR) are critical in the determination of the mineral asset base as well as the market value of a mining company. Moreover, companies must present a qualifying technical report in accordance with existing reporting standards as a necessary step, required by lenders and financial institutions. This is a required step prior to finalizing any financial deal publicly or, in some cases, privately. This research examines issues with public reporting specifically as it involves industrial minerals and the challenges this sector faces getting the same recognition as other mineral commodities by the approving institutions. Different perspectives with regard to main elements of the reporting standards are presented. The efficiency of reporting standards is reviewed based on the findings of the interviews. These findings prepare the ground for further discussion on what needs to be improved, and how these changes could be achieved.

Industrial mineral companies are facing serious challenges in terms of gaining capital. They have to compete not only with other mining companies working with other mineral commodities, but also with all public companies in other industries that are seeking investment dollars. A better understanding of the investment community's decision making process and improvements to communication with investors increases the probability of gaining investment capital. This research examines the main indicators that investors review to evaluate an industrial mineral project. These indicators include MRMR that are the principal basis for the value of any mining company, the reputation of the management team which is built over time in a succession of achievements, and finally cost structure and future cost of development which are crucial to the future prosperity of company. This research further provides insight into the invisible link between public reporting of industrial minerals and investor confidence. The analysis presented here is based on 34 interviews conducted with experts from Canada, Australia, the UK, South Africa, and the USA.

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List of Acronyms

CIM	Canadian Institute of Mining, Metallurgy, and Petroleum
CP	Competent Person
CRIRSCO	Combined Reserves International Reporting Standards Committee
CSA	Canadian Securities Administrators
GDP	Gross Domestic Product
IPO	Initial Public Offering
JORC	Joint Ore Reserve Committee
MRMR	Mineral Resource and Mineral Reserve
NI 43-10	National Instrument 43-101
PERC	Pan European Reserves and Resource Reporting Committee
QP	Qualified Person
SAMREC	South African Code for the Reporting of Exploration Results, Mineral Resource, and Mineral Reserves
SME	Society for Mining, Metallurgy, and Exploration
U.S SEC	U.S Securities and Exchange Commission
VC	Venture Capitalists

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Dedication

To Fereshteh Hadjian and Bahram Mohseni, my parents.

And

To Fahimeh Raja, love of my life.

1 Introduction

1.1 Research Overview

Industrial minerals play a significant role in our daily life and the Canadian economy. This can be clearly illustrated by their regular usage in nearly every economic activity in Canada, including agriculture, manufacturing, and construction, among many others. The diversity of industrial minerals, both in terms of the different types of minerals involved and the number of markets they serve, also make them extremely important to the growth of Canada's economy. It has been suggested that the degree of involvement by a country in trade and production of industrial minerals can be used as an indicator to measure the maturity of a country in terms of industrialization (Highely, 2001). In Canada, industrial minerals companies always face serious challenges in acquiring investment dollars, as potential investors are not able to properly evaluate industrial mineral projects for investment purposes.

Before mining companies can finalize any financial deal publicly, or in some cases privately, most financial institutions require mining companies to prepare a qualifying technical report that addresses mineral estimates and exploration results. Estimates of mineralization are categorized into two categories: mineral resource and mineral reserve (MRMR). The classification of MRMR is based on geological confidence, technical feasibility, and economic viability under reasonably forecasted cost and price structures. MRMR estimates are extremely important because they are critical in the determination of mining companies' financial results as well as their initial mineral asset base.

Mining companies must present their qualifying technical reports in accordance with existing reporting standards. The primary goal of these standards is to provide a minimum

standard for disclosure of scientific and technical information in mineral projects. It also serves other purposes such as establishing definitions (e.g. mineral resource and mineral reserve), as well as outlining technical report requirements. These standards cover factors such as content, timeline, and necessary checks that must be in place to ensure that technical and scientific disclosures are based on information prepared by a Qualified Person (QP). Moreover, these standards were developed to ensure that there is a standard procedure for issuing technical reports that create a fair basis for comparison of different mineral projects.

National Instrument 43-101 (NI 43-101) is the Canadian reporting standard developed by the Canadian Securities Administrators (CSA). NI 43-101 indicates how mining companies must release scientific and technical information regarding their mineral project(s) to the public in all possible formats, including oral statements, written documents, websites, and conference presentations (CSA, 2005b). In the mining community, many believe that the Bre-X Minerals Ltd. story contributed significantly to development of NI 43-101 and it was developed to restore the credibility of the metals sector. NI 43-101 provides a minimum standard for disclosure of scientific and technical information in mineral projects in an effort to eliminate regulatory, industry, and investors concerns with objectionable reporting practices in the metal sector.

1.2 Statement of the Problem and Research Approach

Currently, reporting standards are directed at metals with a heavy focus on geology and exploration. This is because exploration and geologic information plays a significant role in MRMR estimation of both base and precious metals. Preparing technical reports and complying with reporting standards, however, has been and continues to be a challenge for industrial mineral companies, as geology and exploration are relatively straightforward and the least

important factors in the economic evaluation of industrial minerals. This is particularly the case for small and medium sized companies.

Without proper reporting standards, it is difficult and time consuming to prepare an appropriate qualifying technical report that covers critical economic aspects of an industrial mineral project. This becomes problematic since the primary goal of qualifying technical report is to provide thorough and reliable information for investors and their professional advisors to make a sound investment decision. Inappropriate reporting standards also generate significant inconsistency across qualifying technical reports in the industrial minerals sector. This makes it quite difficult for the investment community to understand and interpret the technical reports of industrial minerals. Without proper knowledge and understanding of a mineral project, investors cannot appropriately evaluate risks involved in investing in an industrial mineral project. Consequently, the industry appears risky to them. This creates hesitation for investors and financial institutions looking to invest in the industrial minerals sector. Taking into account the severe competition that exists in terms of acquiring investment dollars, the inappropriate public reporting of industrial minerals reduces the probability of securing capital dramatically.

Although there are a few publications about NI 43-101 and public reporting of mineral projects (Stephenson et al. 2008; Weatherstone 2008; Miskelly, 2003), industrial minerals have not received any attention in the literature on public reporting. Because of this, the intent of this research is to review the efficiency of public reporting standards for industrial minerals, and to address the inefficiencies through highlighting what needs to be improved and how these changes could be achieved. Rather than limiting the discussion to NI 43-101, this research also reviews the Canadian Institute of Mining, Metallurgy, and Petroleum (CIM) Definition

Standards, CIM Best Practices, and stakeholders perceptions of the public reporting of industrial minerals.

The specific research question of this thesis asks: "**how can we improve the public reporting of industrial minerals for different stakeholders?**"

This research question itself is broken down into four specific objectives:

- To identify the main elements of MRMR estimation for industrial minerals.
- To understand and analyze difficulties and issues that different stakeholders of the sector are facing, in terms of either preparing qualifying technical reports or understanding and interpreting them.
- To develop recommendations for improvements to public reporting with respect to industrial minerals.
- To analyze the effect of public reporting of industrial minerals on indicators investors use in evaluating a project.

To answer these questions, different perspectives with regard to the main elements of public reporting and reporting standards for industrial minerals were gathered through 34 semi-structured interviews with different stakeholders of the industrial minerals sector. This allowed insight into the deficiencies that exist in the public reporting pertaining to industrial minerals and to third party compliant reporting standards. Research participants included qualified persons, ore reserve committees, professional investment advisors, senior-level company mangers, exchange managers, investors, and regulators from Canada, Australia, the UK, South Africa, and the USA. Findings of the interviews prepared the ground for further discussion on what needs to be improved, and how these changes could be achieved.

1.3 Summary

Qualifying technical reports could potentially provide a tool that facilitates the acquisition of capital to further advance industrial mineral projects. More than ever, technical reports are used as a reliable information source in the mineral project evaluation process for investment purposes. The preparation of technical reports and compliance with reporting standards seem to be challenging for industrial mineral companies. This is because most of the reporting standards, including the NI 43-101, have a strong emphasis on exploration and geology as a means to determine MRMR validity. This, as a respondent QP for industrial minerals stated, is a "false approach" for industrial minerals, which is why "those instruments don't work; and it won't work because that particular market does not work that way". Conversion of mineral resources to mineral reserves for industrial minerals heavily depends on having a buyer and a market. During this research project it became clear that the current reporting standards do not provide the necessary standards and guidelines for developing effective qualifying technical reports. As an interviewed mining expert from a financial institution stated, "what the investors get in industrial minerals [reporting] is a false sense of security" because technical reports are addressing some of the risks; however, "they are not addressing the relevant risk". Improvements in the public reporting of industrial mineral are therefore required.

The following five chapters of this thesis are organized as follows:

Chapter Two demonstrates the importance of industrial minerals for Canada's economy, highlights the necessity of improving the industrial minerals sector, reviews different pathways for mining companies to raise their required capital, analyzes key indicators in the decision-making process for investing in a mineral project, highlights the importance of qualifying reports and reporting standards for the investment community decision making process, and presents the

content and context of qualifying reports, reporting standards, and reporting environment in Canada, Australia, the UK, the USA and South Africa.

Chapter Three discusses the research methodology used in this work. The qualitative research design, data collection, and the approach for analyzing the collected data are described. The limitations and difficulties encountered during the research are also discussed.

Chapter Four reviews the efficiency of reporting standards and regulatory codes in terms of public reporting of industrial minerals based on the findings of the interviews. Different perspectives with regard to the main elements of the reporting standards and regulatory codes are presented. Finally, this chapter prepares the ground for further discussion on what needs to be improved, and how these changes could be achieved.

Chapter Five includes two main sections. The first section discusses results and findings of interviews with respect to public reporting of industrial minerals public reporting. The second section analyzes investors decision-making process with respect to industrial mineral investments and provides insight into the invisible link between public reporting of industrial minerals and investor confidence. Chapter Six presents recommendations for improvement of industrial minerals public reporting. These recommendations are based on the gathered information through interviews.

Chapter Seven is composed of a summary of the thesis, the potential applied and theoretical contributions of the research, and makes recommendations for future research. Finally, it presents the author's concluding thoughts.

2 Current Situation

This chapter has five main objectives. The first objective is to demonstrate the importance of industrial minerals for Canada's economy, and to highlight the necessity of improving industrial mineral sector. The second objective is to understand different pathways for mining companies to raise their required capital. The third objective is to review key indicators in investors decision-making process for investing in a mineral project, and to highlight the importance of qualifying reports and reporting standards for the investment community decision making process. The fourth objective is to introduce, the content and context of qualifying reports, reporting standards, and reporting environment in Canada, Australia, South Africa, the USA, and the UK. The fifth objective is to determine where, if any, deficiencies exist in reporting standards concerning industrial minerals.

The chapter is composed of the following sections: section 2.1 reviews industrial minerals, industry structure of industrial minerals, and their contribution to Canada's economy, section 2.2 and 2.3 describe different pathways for mining companies to gain capital, and associated difficulties, and section 2.4 to 2.12 explain different reporting standards for public reporting of MRMR and exploration information and their impact on financial statements of mining companies, how they address industrial minerals, and a comparison between the reporting standards with more emphasis on industrial minerals. Although there is literature on NI 43-101 and public reporting of minerals in general, industrial minerals have received very little attention in the literature on public reporting. In these sections, the three most cited references on public reporting of minerals by authorities Stephenson et al. (2008), Weatherstone (2008), and Miskelly (2003), are frequently used to provide the ground for discussion on public reporting of industrial minerals.

2.1 Background

2.1.1 Industrial Mineral Definition and Types

About sixty commodities are considered as industrial minerals. Jeffery describes these materials as “building blocks of our way of life” (Jeffery, 2006: 3) that are used in almost all aspects of human industrial activity including manufacturing, agriculture, and construction, among many others.

Earth scientists have yet to develop a universal definition for industrial minerals. A widely used definition for an industrial mineral is “any rock, mineral, or natural occurring substance of economic value, exclusive of metal ore, mineral fuels, and gemstones: one of the non-metallics” (Bates, 1975: 3). This definition includes very diverse minerals from low value high tonnage to high value low tonnage (e.g. sand and gravel, potash, kaolin, talc, and bentonite).

In general, industrial minerals are classified based on their consumption and use, into two main groups: chemical minerals and physical minerals (Kline, 1970).

Chemical minerals are sources for chemical elements or components (Kline, 1970). For example, salt and lime are the primary sources for calcium, sodium, and chlorine. Chemical industrial minerals are classified into a further five subcategories as shown in **Error! Reference source not found.**.

Chemical Industrial Minerals	
Market Segment	**Major Minerals**
Chemical raw Materials	Salt, phosphate, soda ash, sulfur
Fertilizer raw materials	Phosphate, sulfur, potash
Chemical process aids	Salt, lime, salt cake
Ceramic raw materials	Sand, soda ash, fire clay
Metallurgical fluxes	Lime, sulfur, fluorspar

Table 2.1 Major Types of Chemical Industrial Minerals (after 2006: 61)

Among these five groups, the raw materials for fertilizers such as phosphate, sulphur, and potash characterize almost 90% of the trade for chemical industrial minerals in the world (Harris, 2006: 62). The second largest subcategory is chemical process-aid minerals. Their main consumption is in water treatment. The third largest subcategory is ceramic raw material, of which sand, soda ash, and fire clay are the main minerals in this subcategory. All chemical minerals share one common characteristic: these minerals are marketed on the basis of chemical content and degree of purity (Freas, 1994; Williams-Stroud and Searls, 1994). Therefore, chemical minerals are very similar to commodities that are sources for products with highly substitutable raw materials at comparable price. Minerals (e.g. lime, sulfur) that are used for metallurgical fluxes are a good example.

Physical minerals are valued for their performance specifications (Kline, 1970). Although chemical compatibility with the end product is inevitable, physical minerals are generally used to improve the properties and value of the end products (Harris, 2006). For these minerals meeting general market specification in most cases is not adequate, and an industrial mineral producer should be able to meet the specific end-user requirements, and the end-user, in most cases, is the one who determines the required specifications. The main physical specifications requested by end users for physical minerals include; particle size, brightness, particle shape, colour, absorption, hardness, electrical conductivity, and specific gravity (Jeffery, 2006: 5). Harris (2006: 61) further subcategorizes physical minerals into the following: structural minerals, performance minerals, process aids minerals and absorbents, and foundry minerals.

Physical Industrial Minerals	
Market Segment	**Major Minerals**
Structural minerals	Sand and gravel, crushed stone
Performance minerals	Kaolin, calcium carbonate, talc, mica
Process aids and absorbents	Attapulgite, bentonite, barites, diatomite
Foundry Minerals	Industrial sand, bentonite, zircon

Table 2.2 Major Types of Physical Industrial Minerals (after Harris, 2006)

The most significant physical mineral subcategory is structural minerals in terms of value in trade and market size (Morgan and Highely, 2001). These minerals include sand and gravel, and crushed stones, and they are mainly used in construction industry. Because of wide availability and low unit value of these minerals, transportation cost is often the major proportion of the delivered price. Resource close to markets, therefore, is more likely to be suitable for extraction (Harben, 2002). All physical minerals, except for structural minerals, tend to have smaller markets than chemical minerals (Morgan and Highely, 2001).

Performance minerals include kaolin, calcium carbonate, talc, and mica. These minerals are considered the most technically complicated industrial minerals in terms of processing (Harris, 2006). Process aid minerals and absorbents are minerals that are mainly consumed for suspension purposes and drilling fluids because of their suspension and fluid loss control properties. These minerals include attapulgite, bentonite, barites, and diatomite (Elza and Murray, 1994; Mills, 2006).

2.1.2 Contribution of Industrial Minerals to Canada's Economy

The importance of industrial minerals to the Canadian economy can be clearly illustrated by their regular usage in nearly every economic activity in Canada (Morgan and Highley, 2001). Their diversity in terms of the different types of minerals involved and the number of markets that they serve make them extremely important to the growth of Canada's economy. It has been

suggested that the degree of involvement by a country in trade and production of industrial minerals can be used as an indicator to measure the maturity of a country in terms of industrialization (Highely, 2001).

The value of the Canada's major industrial minerals imports and productions in 2007 is shown in Figure 2.2. This figure highlights two important points: the importance of structural minerals and fertilizer raw materials in terms of value in trade, in particular aggregates and potash, and the major contribution that industrial minerals contribute to our Gross Domestic Product (GDP).

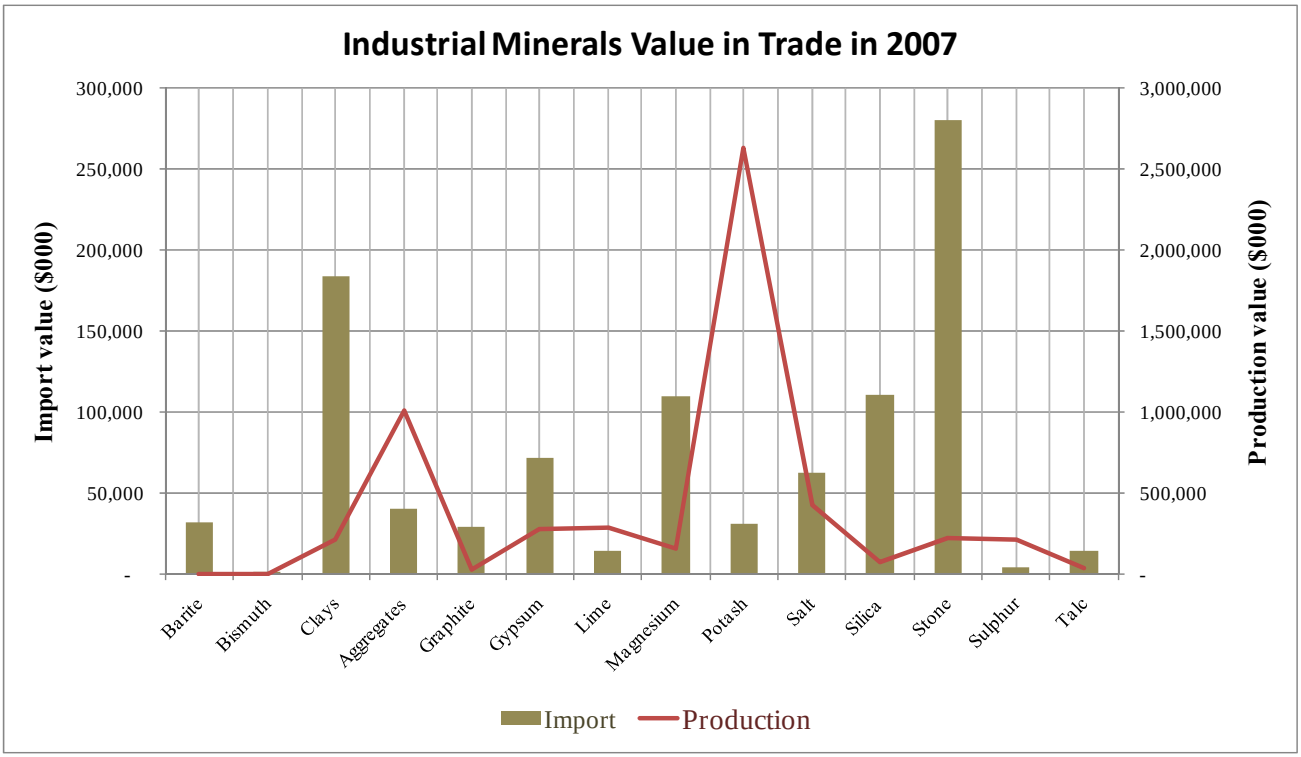

Figure 2.1 The Value of Canada's Industrial Minerals Imports and Productions during 2007 (Dumont, 2009; Stone, 2009; Panagapko, 2009)

GDP is defined as the total value of output for a specific industry minus the required intermediate value for the production over a specific period of time that is normally the calendar year for a country. According to Industry Canada Statistics (2009: 4), annual GDP in the

industrial minerals sector of Canada has increased from $4.3 billion in 1998 to $5.7 billion in 2008; this $1.3 billion increase in GDP from 1998 to 2008 represents a 2.8% total annual growth rate for Canada. The annual percentage increase in GDP is often proportionate to the overall economic growth for a country (Hirschey and Pappas, 2005). Thus, $130 million annual growth made by industrial minerals clearly indicates that how significant industrial minerals are to Canada's economy. This industry contributes significantly to the local and national economy through chains of demands. Increase in the overall level of economic activity directly provides employment for 52,883 workers (Canadian Industry Statistics, 2009: 2). Additionally, industrial minerals are considered basic raw materials for the manufacturing of value added products. Value of these products can be several times the cost of the raw material where the industrial mineral(s) itself is an essential component of that industrial process.

Enhancing the contribution of industrial minerals to Canada's economy is essential. This growth, however, cannot be achieved without a combination of external factors. These factors include the application of labour, equipment, and capital to mine industrial minerals and convert them into saleable products. Different stakeholders of the industrial mineral sector seek to benefit from improvements in this sector. Industrial mineral companies expect to make profit, investors expect to receive a reasonable return on their investment, employees earn income, governments receive tax revenue, and communities benefit from enhancements in economic activity through an increase in demand for services and goods (Morgan and Highley, 2001).

2.2 Industry Structure

In general, large international companies and small local companies characterize the industrial minerals sector.

Small industrial minerals companies are predominantly privately held companies. Individuals that prefer to keep the company closely held in terms of ownership start most of these companies. These companies are often family operated and mostly active in only one or two aspects of the industrial minerals business. Their market is concentrated in local or regional markets that large international companies do not cover. Clayburn Industrial group, for example, has been in the refractory business since 1905, and is a privately owned industrial minerals company located in Abbotsford, British Columbia (BC). Clayburn mines fire clays from Sumas Mountain and owns manufacturing plants in BC. This company produces facebrick and structural clay products used in the construction industry in BC and Alberta.

Small industrial mineral companies are valued based on their products' marketability, whereas small base and precious metal companies are valued based on their mineral resource. In other words, industrial minerals operations need to find a market first and work backwards as opposed to base and precious metal companies that need to have a deposit and then work towards the market.

Large international industrial mineral companies are mostly publicly listed companies. Their structure consists of five major groups: exploration, mine operation, processing, marketing, and logistics. Large international companies are involved in almost all stages of the industrial minerals business, starting from identifying deposits to delivering final products to their customers. They offer a wide range of products that can be sold locally, nationally, and internationally. Imerys , for example, is a multibillion dollar company that operates 112 mines and handles 29 different industrial minerals (Imerys, 2009: 1). Imerys operating mines are located in different parts of the world, including Europe, Asia, North America, and South America. This company identifies the appropriate deposits, operates mines, runs large processing

centers that are capable of providing physical and chemical properties required by customers, handles marketing, and deals with logistics.

In contrast to classic large mining companies, which usually focus on extraction, large international industrial minerals companies tend to focus on processing and marketing.

The toughest challenge that industrial mineral companies face is gaining capital for future expansion and growth. It seems that there are different reasons for not getting enough attention from the investment community. As predicting cash flows is difficult for industrial minerals, financial institutions would ask for a contract in place or at least an indicator that demonstrates good understanding of market in a particular region (Tinsley, 1992). This becomes problematic for small industrial mineral companies because they cannot provide such an indicator before getting into production. Investors and their professional advisors also cannot properly assess industrial mineral projects since the qualifying reports don't properly address risks involved in industrial mineral projects. Considering the importance of industrial minerals to Canada's economy, it is essential for economic growth of Canada to address this issue. As a result of this challenge, many small operations were forced to close down, and the market faces fewer internationally controlled larger operations. In the next chapters, this research examines this issue in more details.

2.3 Different Pathways for Mining Companies to Gain Capital

This section explains the actual process of raising capital for industrial mineral companies and further examines a qualifying technical report as a required step toward obtaining capital. The main pathways to gain capital for all different type of companies include equity, quasi-equity, or a combination of both from private placement, venture capital, bank debt, and public offerings (Brigham and Ehrhardt, 2003).

In general, a mining company evolves through three stages: an exploration company, a development company, and an operating company. Based on the stage that a mining company is at and the company's risk profile, one or two of these pathways are applicable to them. These will be discussed further in the next sections.

2.3.1 Private Equity or Quasi-Equity

Most of the companies, including industrial minerals companies, often start life by raising money through family and friends (LSE, 2008) while offering stakes in their business in return. This method of fund raising is usually applicable to exploration mining companies. If an exploration company needs money on a large scale for further and more thorough exploration activities, often these financial sources are limited and not sufficient. Therefore, they have to turn to outside sources of capital.

The first round of external financing often comes through a private placement of equity to one or a few individual investors. Considering the high risk that the investors are taking, they expect to receive stock and in some case a seat on the board of directors in return for their investments (Brigham and Ehrhardt, 2003).

In general, investors cannot sell their securities to the general public in any type of market, unless they comply with Securities Administrators rules of the country. In Canada, for example, Canadian Securities Administrators (CSA) indicates that securities' rules even apply to certain private placements that involve public disclosure (CSA, 2005). Therefore, if a mining company tends to raise money privately, it might require complying with qualifying report standards. For instance, if a company raises funds under an offering memorandum before getting publicly listed, CSA rules apply and the company is certainly required to file a qualifying technical report (CSA, 2005).

Although there are a few large private industrial mineral companies in US that have managed to raise money privately, there are more effective ways for gaining capital on a large scale: through banks as debt, risk-tolerant venture capitalists, or through public capital markets.

2.3.2 Venture Capital

In many cases for industrial mineral companies, the resource of individual investors are not sufficient and they have to turn to a venture capital fund which typically raises money from a relatively small group of primarily institutional investors, including pension funds and corporations (Brigham and Ehrhardt, 2003). Venture Capitalists (VCs) are usually knowledgeable in mining. They often screen hundreds of companies, and fund a portfolio of around a dozen companies. Senior exploration companies usually turn to VCs for gaining their required capital (Tinsely, 1992). The risk associated with investment at this stage is still relatively high because these companies are not in production and predicting cash flows is difficult. Therefore, one of the necessary steps for mining companies toward gaining capital through venture capitals is preparing a qualifying technical report. The primary goal of this qualifying technical report is to provide thorough information for VCs in order to make a sound investment decision.

It is worth noting that VCs are hesitant to invest in industrial minerals sector as opposed to base and precious metals sector because unlike the base and precious metals, this qualifying technical report does not provide detailed and useful information for VCs. As a result, small industrial mineral companies have to turn to public markets for raising funds. This can lead to severe challenges, which will be reviewed in the next section.

2.3.3 Bank Debt

The stage at which senior lenders such as banks become involved with lending or advancing finance to a mining company is referred to as the 'bankable feasibility' stage. To reach this level, a mining company must be either at development stage or production stage. Banks rarely fund exploration companies.

In general, banks rely heavily on mineral reserve estimates and bankable feasibility studies in evaluating a mineral project (Amos and Breaden, 2001). A bankable feasibility study includes a detailed mineral reserve, engineering mine plan, and thorough cash flow model that contains all economics in which the capital cost estimates are based on detailed supplier quotes (Morley et al., 1999). The basis of such a study is a technical report validating the proposed project mineral reserve and resource. Regardless of size of a mining company, the bankable feasibility study must be prepared and published in accordance with a reporting standard, as discussed in the next sections.

The level of profit margin and probability of losing money measures risk for a given bank. In a banker's view, different categories of mineral resource and mineral reserve are considered as risk categories. The proven mineral reserve is the safest category and is the only acceptable basis for lending (Amos and Breaden, 2001). In some cases, however, banks initially evaluate a project based on reserve and a certain percent of conversion of resource in order to demonstrate the upside potential of a mineral project (Santini et al, 2006). If profit margins are sufficiently high and the probability of losing money is low, the project is considered low risk. On the other hand, when a bank is dealing with a project with technical issues and uncertainties in MRMR estimates, the project is considered high risk (Tinsely, 1992).

Mineral reserve is also the main indicator in determining the size an interest rate of a loan (Goldsmith, 2002). Mineral reserve has direct impact on the mine life and this impacts the total value, which is the basis for lending in any industry (Brigham and Ehrhardt, 2003). If the ore body is regular and there are enough proofs for continuity, the interest rate is lower than when a bank is dealing with a relatively complicated ore body and questionable continuity (Morley et al., 1999).

In order to get to the bankable feasibility study stage for industrial minerals, banks require a company to report where their products have been shipped (Santini et al, 2006). As predicting cash flows is difficult for industrial minerals, banks would ask for a contract in place or at least an indicator that demonstrates good understanding of market in a particular region (Santini et al, 2006). They also ask for a detailed report on transportation costs because they are typically the most significant component of the final cost.

2.3.4 Initial Public Offering and Listing with Exchanges

Exchanges usually provide different ways for taking a company public, including Initial Public Offering (IPO), Reverse Takeover (RTO), Capital Pool Company (CPC) and other paths customized by different exchanges (TSX, 2009).

Canada, United Kingdom (UK), and Australia are considered the world's major mining markets (Ferron, 2009). Canada is the largest mining market, by far, and UK ranks the second. The world major mining markets and their requirements in terms of public reporting of MRMR are explained in reporting environment of each country in next sections.

2.3.5 Fund Raising and Industrial Minerals Companies

Raising money through private equity or quasi-equity has been an effective way for industrial mineral companies; however, this source of funding is limited and in most cases not

sufficient for expansion and growth. This is why currently there is good number of privately held industrial minerals companies in Canada.

Industrial minerals companies have been facing serious challenges in terms of gaining VCs attention for potential investments. VCs are hesitant to invest in industrial minerals sector as opposed to base and precious metals sector because they can't properly assess industrial mineral projects through existing tools, including qualifying technical reports. These tools don't provide detailed and useful information for VCs.

Banks have not got involved with lending or advancing finance to industrial minerals companies as much as they have got involved with advancing finance to metal mining companies. There are a few reasons for that including size of the industrial minerals companies, and banks mining experts difficulties in assessing industrial mineral projects. As predicting cash flows is difficult for industrial minerals, banks would ask for a contract in place or at least an indicator that demonstrates good understanding of market in a particular region (Tinsley, 1992). This becomes problematic for small industrial mineral companies because they can't provide such an indicator before getting into production, and their size also is usually smaller than the size of a company that banks might be interested in for finance purposes. Bank experts also cannot properly assess industrial mineral projects since the qualifying reports don't properly address risks involved in industrial mineral projects.

Industrial minerals companies have had limited success in terms of raising money in public market mostly due to difficulties investors and their professional advisors are facing in the evaluation of industrial mineral projects. There are also other issues, including the investment community's overall view of industrial minerals, high technical level of industrial mineral projects, and general rate of return of investment in industrial minerals. The overall view of the

investment community is that industrial minerals are less appealing or "unfashionable" investment sector than metal sectors investments. They also think that the industrial minerals industry is generally a more difficult business to understand than other mining sectors. This research examines the root causes of these issues, and recommends solution for them where possible in the chapter Five.

2.4 Mineral Resource, Mineral Reserve, and Importance of Public Reporting of MRMR

Estimates of mineralization are classified into two categories: mineral resource and mineral reserve (MRMR). The classification of MRMR is based on geological confidence, technical feasibility, and economic viability under reasonable forecasted cost and price structures.

The Mineral resource definition in CIM Definition Standards is as following

> "a mineral resource is a concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics, and continuity of a mineral resource are known, estimated or interpreted from specific geological evidence and knowledge." (CIM, 2005: 4)

Based on geological assurance, mineral resources are classified into three categories: inferred, indicated, and measured (CIM Ore Reserve Committee, 2005). As geological confidence increases, inferred resource converts to an indicated resource, and possibly develops into measured resource (JORC, 2004).

A mineral reserve is "the economically mineable part of a Measured or Indicated Mineral resource demonstrated by at least a Preliminary Feasibility Study" (CIM, 2005: 5). The supporting study, that leads to estimate of mineral reserve, must consider detailed and adequate

information regarding mine planning, metallurgy and processing, economic and any other relevant factors (PERC, 2009a).

Mineral reserves are classified into two categories: probable mineral reserve and proven mineral reserve (CIM Ore Reserve Committee, 2005). Probable and proven mineral reserve are respectively part of the indicated mineral resource and measured mineral resource which are economically minable and supported by at least a Preliminary Feasibility Study (SAMREC, 2007). The supporting study for estimate should demonstrate that the economic extraction of the deposit can be justified in case of probable mineral reserve, and is justified in case of proven mineral reserve (JORC, 2004).

Figure 2.5 illustrates the relationship between different resource and reserve categories:

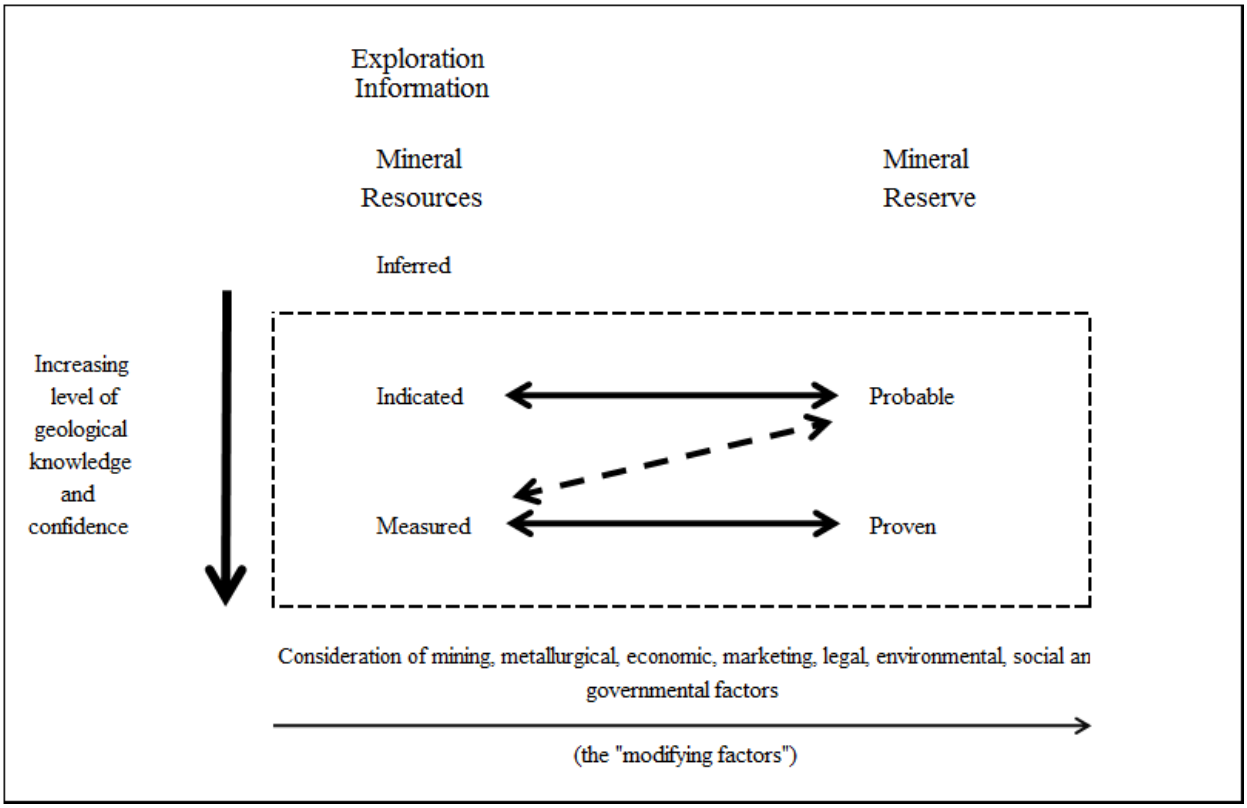

Figure 2.2 Relationship between Mineral Resource and Mineral Reserve (CIM Ore Reserve Committee, 2005: 7)

MRMR are critical in the determination of mining companies' financial results as well as their initial mineral asset base. It is, therefore, extremely important how mining companies estimate and report their MRMR to the public.

Third party compliant reporting standards govern how mining companies must disclose their technical information concerning their mineral assets. This reporting standard applies to any issuer that discloses information to the public (CSA, 2005a). For instance, when a mining company raises money via private placement, the company is required to comply with reporting standards if the investors are not part of the family and close friends (CSA, 2005a). Another example is that if a company raises funds under an offering memorandum before getting publicly listed, the company needs to comply with reporting standards (CSA, 2005a). Preparing a qualifying technical report has proven to be a necessary step, required by lenders and financial institutions before finalizing any financial deal publicly or privately. As a result, the importance of reporting standards has been increasing and will continue to do so in the future.

Most of the reporting standards have a strong emphasis on exploration and geology as a means to determine MRMR validity. This is because exploration and geology information play a significant role in MRMR estimation of base and precious metals. This research reviews the main elements of MRMR estimation for industrial minerals and evaluates if the current approach of reporting standards are applicable to industrial minerals.

The competition for gaining investment dollars for industrial minerals companies is very intensive since they compete not only against other mining companies in other sectors, but also against all companies in other industries that are seeking for investment dollars. Unfortunately, the mining industry is considered a high-risk industry, mostly because of fluctuation in commodity prices and exchange rates and poor performance of some mining companies who are

not able to deliver what they promised (Miskelly, 2004). The mining industry also requires large amount of capital that decreases investment opportunities (Miskelly, 2004). Therefore, better understanding of investment community decision-making process improves the probability of gaining the required capital (Miskelly, 2004).

There are three main investment factors that investors consider while making their decision regarding a mineral project: Confidence, Credibility, and Consistency, (Miskelly, 2004). Appropriate standards and guidelines for public reporting of industrial minerals lead to producing reliable public reports that provide necessary information for investors to make a balanced investment decision (PricewaterhouseCoopers, 2003). This ultimately increases confidence for investors in industrial minerals companies by improving their credibility. Better standards and guidelines could also generate more comparable reports on similar projects that lead to improvement in the consistency factor (PricewaterhouseCoopers, 2003). This would help investors around the world to become more educated and familiar with the industrial minerals sector over a short period of time.

Over the course of last nine years, the world has been witness to stronger reporting standards (Weatherstone, 2009). This has positively affected the base metal and precious metals sectors and increased confidence in the eyes of investors (Miskelly, 2004; Weatherstone, 2009). This research intents to develop recommendations for improvement of public reporting of industrial minerals, to review the benefits of the improvements, and to confirm if they affect industrial mineral in a positive way in terms of gaining investors confidence.

2.5 Different Reporting Standards for Public Reporting of MRMR

Over the course of the last ten years, interest in enhancing the public reporting standards of MRMR and Exploration Information has dramatically increased internationally (Miskelly and

Rendu, 2003). Motivations for this interest include intensive international competition for gaining available investment funds (Stephenson and Miskelly, 2000), mining industry's history of attracting deceitful promoters such as Bre-X Minerals Ltd. (Vaughan and Felderhof, 2005), and the success of the JORC code in Australia (Stephenson, 2003).

Section 2.6 to 2.12 review different reporting standards for public reporting of MRMR and exploration information, how they address industrial minerals, and a comparison between them with more emphasis on industrial minerals.

2.6 National Instrument 43-101

National Instrument 43-101 (NI 43-101) is a standard developed by Canadian Securities Administrators (CSA) that indicates how issuers must release scientific and technical information regarding their mineral project(s) to the public in all possible formats, including oral statements, written documents, websites, and conference presentations (CSA, 2005b). According to CSA (2005: 2) "an issuer is any entity that issues a security" and "securities include interests in properties, profits, earnings and royalties".

CSA is a forum of the securities regulators of 13 provinces and territories of Canada, and its main goal is to simplify and harmonize the Canadian capital markets (British Columbia Securities Commission, 2008). All members of CSA have adopted NI 43-101. CSA first released NI 43-101 on October 2001 as a replacement of National Policies 2-A and 22 (CSA, 2005a). The latest version of the NI 43-101 was released on December 2004 and it came into effect on December 30, 2005 (CSA, 2005b).

2.6.1 Principles and Goals of NI 43-101

The main goal of NI 43-101 is to provide a minimum standard for disclosure of scientific and technical information in mineral projects . It also serves other purposes such as establishing

definitions (e.g. Mineral resource and mineral reserve), outlining technical report requirements such as content, when to file, site visit, and ensure that technical and scientific disclosures are based on information prepared by a Qualified Person (QP). A QP is an engineer or geologist with a minimum of five years experience which is relevant to the subject that he/she is going to work on (CIM Ore Reserve Committee, 2005). This individual should also be a licensee or member fellow of a recognized professional association such as the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC). Moreover, NI 43-101 was developed to ensure that there is a standard procedure for issuing technical reports that creates a fair basis for comparison of different mineral projects.

2.6.2 Reporting Environment in Canada

NI 43-101, standards of disclosure for minerals projects, plus Form 43-101F1 and Companion Policy 43-101 CPP demonstrate necessary contents of a technical report (CSA, 2005a).

Toronto Stock Exchange (TSX), Canada's senior stock exchange, and Toronto Stock Exchange Venture (TSX-V) are the two primary Canadian Exchanges. Depending on the level of business activity of a company, it can be listed on Tier 2, the entry level of TSX Venture, and then transfer to TSX Venture Tier 1, TSX Non-exempt Development Stage or Producing, TSX Non-exempt Senior Producer, or TSX Exempt (Ferron, 2009).

Minimum Listing Requirements	TSX-V TIER 2	TSX-V TIER 1	TSX Non-exempt Development Stage	TSX Non-exempt Senior Producer	TSX Exempt
Comply with NI 43-101	Required	Required	Required	Required	Required
Comprehensive NI 43-101 Technical Report completed by a QP	Not required, however a geological report is required	Not required, however a geological report plus a feasibility study with positive cash flow are required	Up to date comprehensive technical report is required	Up to date comprehensive technical report is required	Up to date comprehensive technical report is required
Working Capital, Finical Resources and Net Tangible Assets	Adequate Working Capital and Financial Resources including: Work program + 12 mos. General & Administration cost + 12 mos. Property payments +$100,000 unallocated	Adequate Working Capital and Financial Resources including: Work program + 12 mos. General & Administration cost + 12 mos. Property payments +$100,000 unallocated, plus **$2 million** net tangible assets	Minimum $2 million working capital, plus **$3 million** net tangible assets	Adequate funds to bring the property into commercial production, plus enough fund to support all the capital expenditure, plus **$4 million** net tangible assets	Minimum **$7.5 million** net tangible assets

Table 2.3 Listing Requirements for Mining Companies (after T. V. TSX, 2009)

Table 2.3 shows the TSX and TSX-V minimum listing requirements for mining companies. Both TSX and TSX-V require mining companies to disclose their information regarding their mineral projects in compliance with Securities Laws, Exchange Requirement, NI 43-101, and CIM Best Practices (TSX Venture, 2005). In addition to the shown listing requirements for mining companies, TSX mandates industrial minerals companies to present one or more contracts in place with potential customers (TSX, 2005). This seems to be a serious challenge for industrial mineral companies, medium size companies in particular, because it is very difficult to get customers to write a contract before getting a developer to write a contract. There are a number of medium size industrial mineral companies that meet all listing requirements of the exchanges except a sales contract. This research examines whether or not this listing requirement is extraneous.

NI 43-101 incorporated, by reference, CIM definition standards that were prepared by The Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Standing Committee on

Reserve Definitions (TSX Venture, 2005). These Definition Standards provide general definitions and guidelines for the reporting of Exploration Information, and MRMR in Canada (CSA, 2005a). It also outlines the requirements for being recognized as a QP, and how they are responsible (CIM Ore Reserve Committee, 2005).

Figure 2.3 shows the relationship among different stakeholders of NI 43-101 as explained in this section.

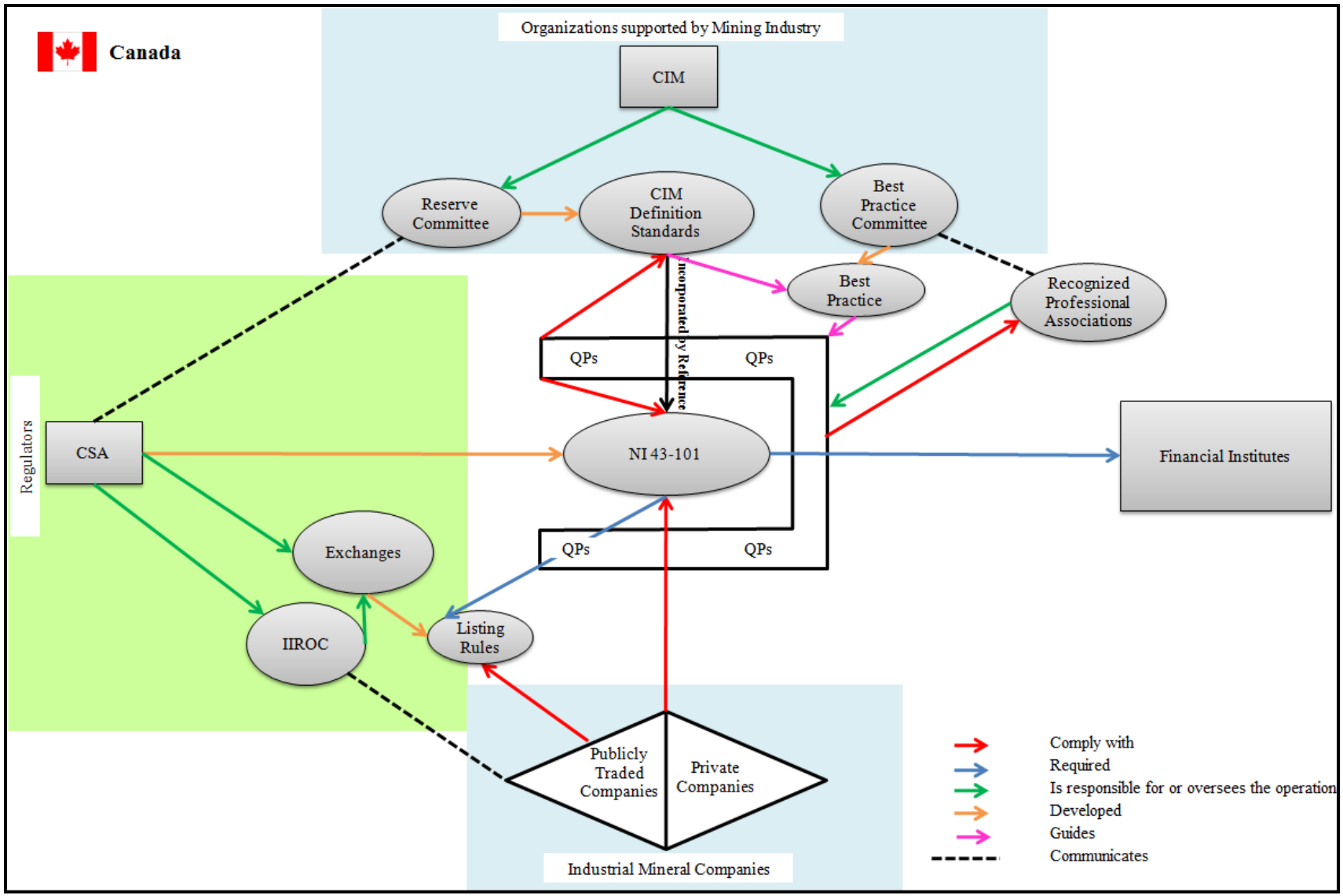

Figure 2.3 Relationship among different Stakeholders of NI 43-101(after Stephenson et al., 2008)

2.6.3 NI 43-101 and CIM Definition Standards with respect to Industrial Minerals

NI 43-101 is the Standard of Disclosure for mineral projects where CSA (2005: 2) defines a mineral project as:

> "any exploration, development or production activity, including a royalty interest or similar interest in these activities, in respect of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals".

Similar to all other mining companies, industrial mineral companies must comply with NI 43-101 and file a technical report for a mineral project on each property that is material to the issuer. Additionally, it is stated in the CIM Standard Definitions that QPs should be guided by the Estimation of mineral resource and mineral reserve Best Practice Guidelines for Industrial Minerals (CIM Ore Reserve Committee, 2005). By far, CIM Best Practices contains the most detailed guidelines for industrial minerals compare to the JORC and other regulatory codes.

It is stated in the CIM Best Practice that General guidelines and main estimation factors of the CIM Best Practice are applicable to industrial minerals; however, QPs must pay specific attention to value of products and market principles in their assessments (CIM Ore Reserve Committee, 2003).

Mullins et al. developed the industrial minerals section of CIM Best Practice in 2003, and made the following recommendations:

- Market evaluation for MRMR estimation requires QPs to conduct a very detailed market study while bearing in mind difficulties of gaining market share for industrial mineral companies, including high technical barriers to entry and relatively small market for some industrial minerals. Industrial mineral deposits are significantly different from metallic deposits and even amongst themselves. Customers'

requirements for industrial mineral projects are based on chemical and physical specifications of the product. An industrial mineral may have potential market in more than one industry. Evaluation of marketability of an industrial mineral requires significant laboratory tests in order to determine physical and chemical specifications of the mineral. Moreover, Location in most cases is extremely important, and a rich industrial mineral deposit may not be viable in terms of economics because the deposit is located far from the potential customers.

- Mineral resource and mineral reserve estimations are heavily based on the professional judgment of the QPs where the critical factors for estimations include physical and chemical characteristics of the mineral, geological occurrence of the mineral, and finally relationship between properties of the mineral and potential markets.

These recommendations seem to be useful and general enough to be applicable to all industrial minerals. There are, however, concerns with NI 43-101 and CIM Standards and Guidelines with respect to public reporting of industrial minerals. These concerns are as follows:

First, considering the significant characteristics differences between industrial minerals and other sectors, a QP for industrial minerals requires not only an understanding of geology, mining techniques, and process technology, but also of markets that the material is used in, the particular process that is required to meet the market requirements, and logistic costs. Therefore, it is worthwhile to re-examine QPs definition and the experience relative to an industrial mineral project. Additionally, the provided recommendations in CIM Best Practiced for industrial minerals are only guidelines and QPs do not have to necessarily follow them, therefore, they may not be as effective as if they were mandatory. By developing more specific standards and

definitions for industrial minerals, stakeholders may be better equipped to prepare and/or interpret reports for industrial mineral projects.

Second, NI 43-101 has a strong emphasis on exploration and geology as a means to determine MRMR validity. It is important to review the main elements of MRMR estimation for industrial minerals and to evaluate if the current approach of reporting standards is applicable to industrial minerals. It is also worth highlighting the main modifying factors for industrial minerals and how they differ from base and precious metals.

Third, conversion of mineral resources to mineral reserves for industrial minerals heavily depends on having a buyer and markets. NI 43-101, however, does not provide standards for reporting of marketing information. This research examines the consequences of these issues and provides recommendations to deal with them in the Chapter Four and Five.

2.7 The JORC Code

The Joint Ore Reserves Committee (JORC), originated in 1971, is the responsibility of Australasian Institute of Mining and Metallurgy (AusIMM), Mineral Council of Australia (MCA), and Australian Institute of Geoscientists (AIG) (JORC, 2004).

JORC released the first edition of the JORC code, Australasian code for reporting of mineral resource and ore reserves, in 1989 (Stephenson and Miskelly, 1998). The main reason for originating the JORC code was regulatory, industry, and public concerns with objectionable reporting practices with respect to nickel in West of Australia in 1960s (Stephenson, 2000). The JORC code has been improved and revised proactively since 1989, and the latest version was published in 2004 (JORC, 2004).

Immediately after the first version of the JORC code, Australian Stock Exchange (ASX), the main exchange in Australia, and AusIMM appended the JORC code as one of the ASX

listing requirements and institute code respectively (Stephenson 2000). Australian Securities and Investment Commission (ASIC), the sole securities regulator in Australia and administrated by the Federal Corporations Act., oversights the ASX operation (Stephenson et al., 2008). ASX listing requirements are not rules; however, ASIC has the right to necessitate publicly listed companies to follow ASX listing rules (Stephenson et al., 2008).

It should be noted that the JORC is the most successful regulatory code for public reporting of mineral projects in terms of adoption by mining companies around the world (Siy, 2009). Almost fifty percent of the large mining companies that held more than 85% of market capitalization in 2008 adopted the JORC code (Siy, 2009).

2.7.1 Purpose and Principles of the JORC Code

The main purpose of the JORC, like other reporting regulatory codes, is to outline minimum standards for reporting of MRMR and exploration information, and to ensure that mining public reports on these topics include all essential information that investors and their professional advisors require for their decision making (Stephenson, 2003).

The JORC code has three main principles: Transparency, Materiality, and Competence. “Transparency” demonstrates that all necessary information should be presented in a plain-language format that does not mislead the reader (Stoker, 2003). “Materiality” states that the report should contain all relevant information that investors and their professional advisors would realistically require for making a balanced decision regarding the presented material by mining companies (Stephenson, 2003). “Competence” strictly requires that the report should be developed under supervision of a Competent (Qualified) Person (Stephenson, 2001). A Competent Person must be a Member of the AusIMM, AIG or a Recognized Overseas Professional Organization (ROPO) (JORC, 2004). A Competent Person must also have five

years of relevant experience regarding the mineral project that he or she exercises his or her professional judgment (JORC, 2004). Figure 2.4 shows the relationship among different stakeholders of the JORC code as explained in this section.

2.7.2 JORC and Industrial Minerals

It is stated in the JORC code "industrial minerals can be considered to cover commodities such as kaolin, phosphate, limestone, talc etc" (JORC, 2004: 14). The JORC code briefly covers public reporting of MRMR and Exploration Information for industrial minerals. Clause 44 of the code is specifically dedicated to industrial minerals, and it clearly states that the main principles and goals of the JORC code apply to industrial minerals (JORC, 2004), This clause further explains that main estimation factors, including cut-off grade and mining dimensions and continuity, for MRMR estimation of industrial minerals are as the same as other types of deposits.

Stephenson and Lee (2003: 2) make a valid point that characteristics differences between industrial minerals and other sectors should not create a notion that the JORC code is not applicable to industrial minerals because the original requirements for a Mineral resource and mineral reserve to have "reasonable prospects for eventual economic extraction" and "Modifying Factors" still apply. The JORC code, however, does not provide any standards for reporting key indicators in industrial minerals evaluation, including market location, marketability of the product, and chemical and physical specification of the product. In addition to the concerns that exist for NI 43-101 and CIM Standards and Guidelines with respect to industrial minerals, the definition of industrial minerals in the JORC code does not seem appropriate. It is not clear if a mineral is an industrial mineral or not.

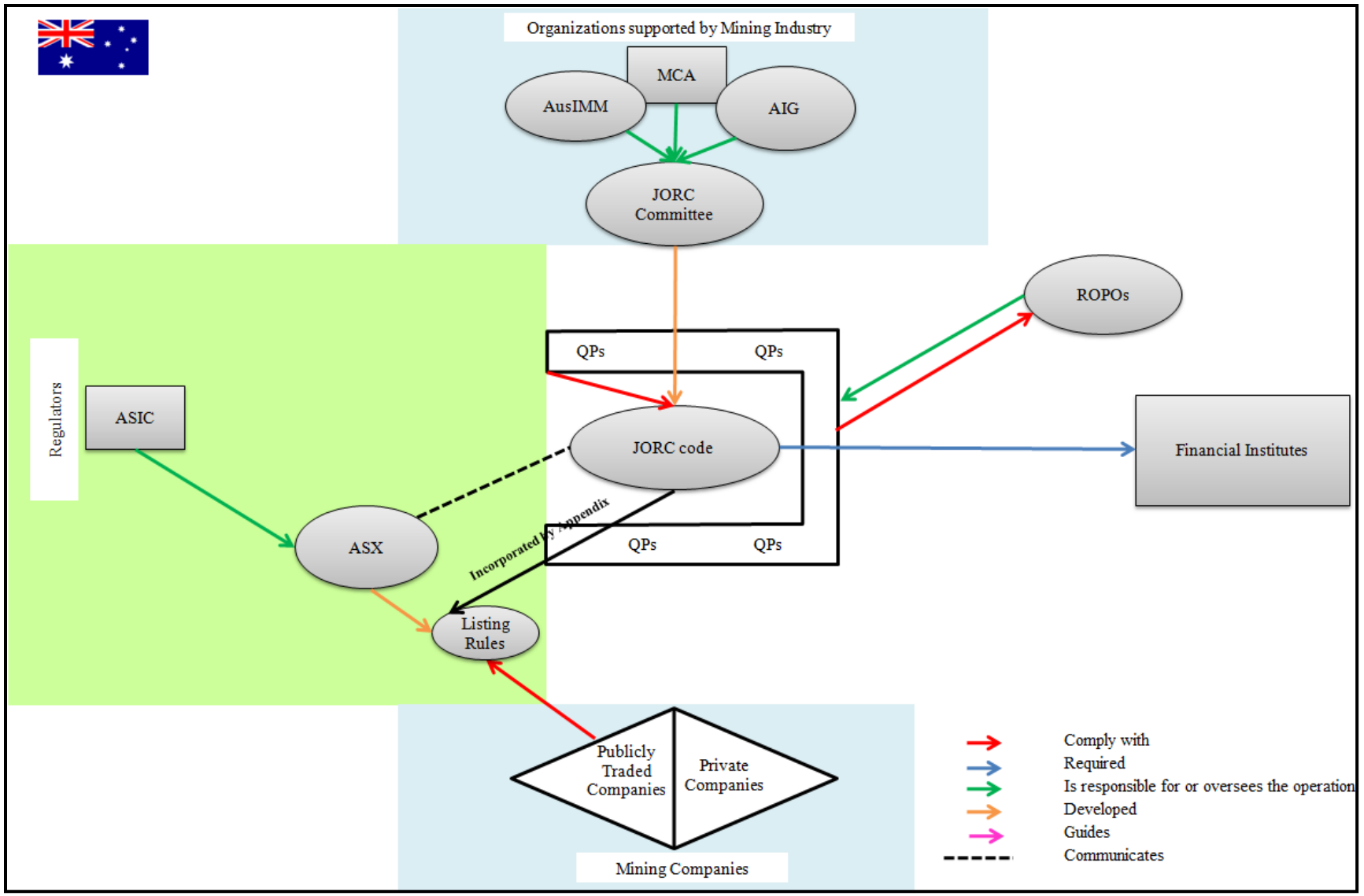

Figure 2.4 Relationship among different Stakeholders of the JORC Code (after Stephenson et al., 2008)

The public reporting standards and guidelines package in Australia and Canada are very similar and are 90 to 95 % compatible. The recommendations that this research makes for improvement of industrial minerals public reporting, therefore, are also applicable to the JORC code.

2.8 The SAMREC Code

International improvements in public reporting of MRMR, the Noble Minerals Ltd case during the late 1990s, and concerns about inappropriate communications between mining and investment communities were the main reasons for compiling the South African Code for the reporting of exploration results, mineral resource, and mineral reserves (the SAMREC code) (Camisani-Calzolari, 2004). The code has been updated several times. The most recent version of the code was released in 2007 (SAMREC, 2009). The principles and goals of the SAMREC code are almost identical to those of the JORC code and other regulatory codes. The code provides minimum standards for public reporting of MRMR and Exploration Information and indicates that the report, prepared by a QP(s), must contain all required information for the investors and their advisors. The SAMREC code is "applicable to the reporting of all styles of solid mineralization or economic deposit" (SAMREC, 2007: 4).

2.8.1 South Africa Reporting Environment and Industrial Minerals

The SAMREC code was prepared by the South African Mineral resource Committee (SAMREC) and the South African Mineral Asset Valuation Committee (SAMVAL), which formed a joint committee called the SSC (SAMREC, 2007). The Southern African Institute of Mining and Metallurgy (SAIMM), together with the Geological Society of South Africa (GSSA), are responsible for SCC. Johannesburg Stock Exchange (JSE), the main exchange in South Africa, incorporated the SAMREC code into section 12 of the JSE Listing Requirement

(Camisani-Calzolari, 2004). Financial Services Board (FSB) of South Africa is an independent institution that oversees JSE operations. Its main goal is to support and maintain a healthy financial investment environment in South Africa (FSB, 2009).

The SAMREC code is very similar to the JORC code. It, however, does not provide a specific section or clause for industrial minerals; it also does not define industrial minerals. In addition to the specific section for industrial minerals, the potential changes to the JORC code that this research recommends are applicable to the SAMREC code.

Figure 2.5 illustrates the relationship among the different stakeholders of the SAMREC code as explained in this section.

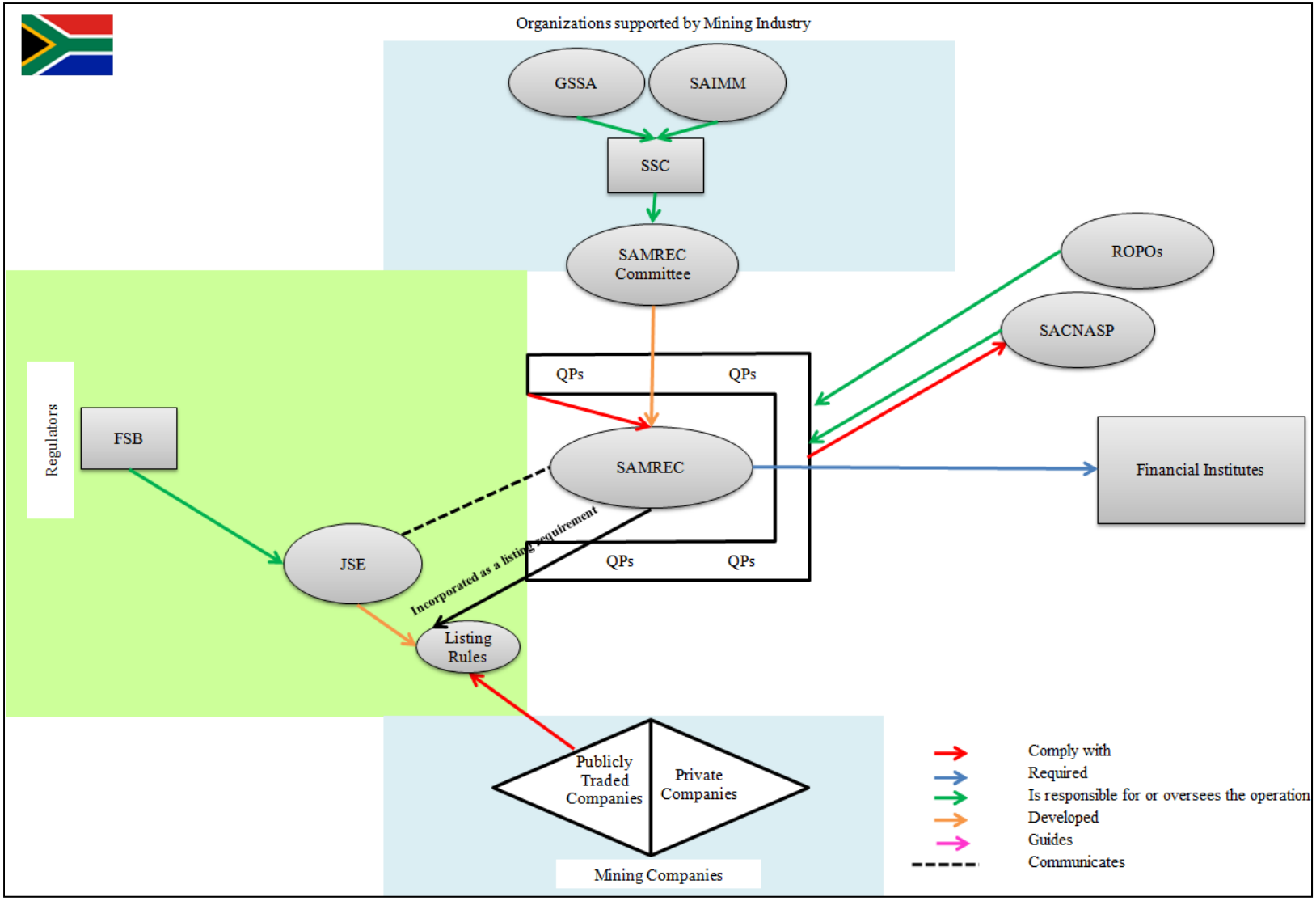

Figure 2.5 Relationship among different Stakeholders of the SAMREC Code

2.9 SME Guide for Public Reporting of MRMR

In 1989, The Society for Mining, Metallurgy, and Exploration (SME) Inc. created Working Party 79 to establish guidelines for public reporting of Exploration Results and MRMR (SME, 2007). This Working Party developed a subcommittee that published their first guidelines called *A Guide for Reporting Exploration Information, Resource, and Reserves* (SME, 2007). In 1996, SME converted Working Party 79 to a standing committee, called SME Resource and Reserves Committee (SME, 2007). In 2004, SME created SEC Reserve Working Group in order to reflect the U.S Securities and Exchange Commission's (U.S SEC) requirements and recommendations into the SME Guideline for Public Reporting of MRMR (SME, 2007). The final version of the SME Guide was published in 2007.

2.9.1 US Reporting Environment

The SME Guide is very similar to the JORC code in terms of the structure and terminology. SME has incorporated U.S SEC recommendations into the latest version of the SME Guide. The U.S. SEC, however, does not recognize the SME Guide (Miskelly and Rendu, 2003). The U.S. SEC publicly traded mining companies must comply with SEC Industry Guide 7, 'Description of Property by Issuers Engaged or to Be Engaged in Significant Mining Operations', and SEC staff interpretations of this Guide (Vaughan and Felderhof, 2002).

The SME Guide's main goal is to recommend minimum standards for the reporting of MRMR and Exploration Information for either public or private purposes (SME, 2007). Alternatively, the SEC main goal is to protect investors and to create fair environment for investors in securities markets (SME, 2007). In addition to Transparency, Materiality, and Competence the principles of the SME Guide also include Consistency between financial and technical reports, and Consistency between financial markets (SME, 2007).

Consistency between financial and technical reports principle suggests that financial reports should take into account MRMR as major indicators. Consistency requires that reasonable commodity prices, exchange currencies, and other important parameters to be considered while estimating MRMR (SME, 2007). Consistency between financial markets principle suggests that global mining companies should be consistent in terms of reporting to different financial markets (SME, 2007)

SEC heavily relies on Industry Guide 7 for public reporting of MRMR and Exploration Information. This Guide was developed more than 20 years ago and has never been updated. Guide 7 states that "the Guide applies to all public mining entities and their public disclosures pursuant to the rules of Regulation S-K" (Vaughan and Felderhof, 2005: 6).

The main differences between the SEC Industry Guide 7 and other regulatory codes are as followings:

- Mining companies are not allowed to report mineral resource and the guide clearly states that any estimate except those for proven or probable reserves must not be disclosed.
- Estimates must be supported by a feasibility study, except in Canada and Australia where they must also be supported by a prefeasibility study.
- There is no requirement for QP and/or QPs' signature on the report.
- Unlike Canada and Australia that reasonable forward looking prices determined by the management team can be used in the estimates, SEC allows companies to only use the last three years average price of the commodity or the price that is indicated in the company's contract.

2.9.2 The SME Guide and Reporting of Industrial Minerals

Clauses 65 to 68 of the SME Guide are dedicated to industrial mineral MRMR reporting. The Guide identifies industrial minerals as minerals that are sold based on their chemical and physical specifications and their marketability (SME, 2007). The Guide also provides a few examples for industrial minerals, such as borates, talc, kaolin, and aggregates (SME, 2007).

The Guide clearly states that principles the SME Guide apply to industrial minerals and main factors for industrial minerals MRMR estimates are as the same as those for other type of minerals (SME, 2007). SME guide addresses a few issues that other reporting standards including the JORC code and NI 43-101 do not. For instance, the SME Guide identifies the main modifying factors for industrial minerals as transportation costs, location, marketability of the products, level of competition, and quality. This Guide also deals with the issue of balancing the transparency and materiality with the confidentiality through recommending that disclosure of assumed price is not necessary when it threatens the shareholders' interest. For instance, in a market with an intensive competition, disclosing the price is not appropriate where it might cause loss of competitive advantage (SME, 2007). This guide, however, does not provide any standards for reporting of marketing information. Moreover, the fact that SEC does not recognize this guide reduces the effectiveness of the guide because publicly traded mining companies are not required to comply with this guide.

Figure 2.6 illustrates the relationship among different stakeholders of SME Guideline for public reporting of MRMR as explained in this section.

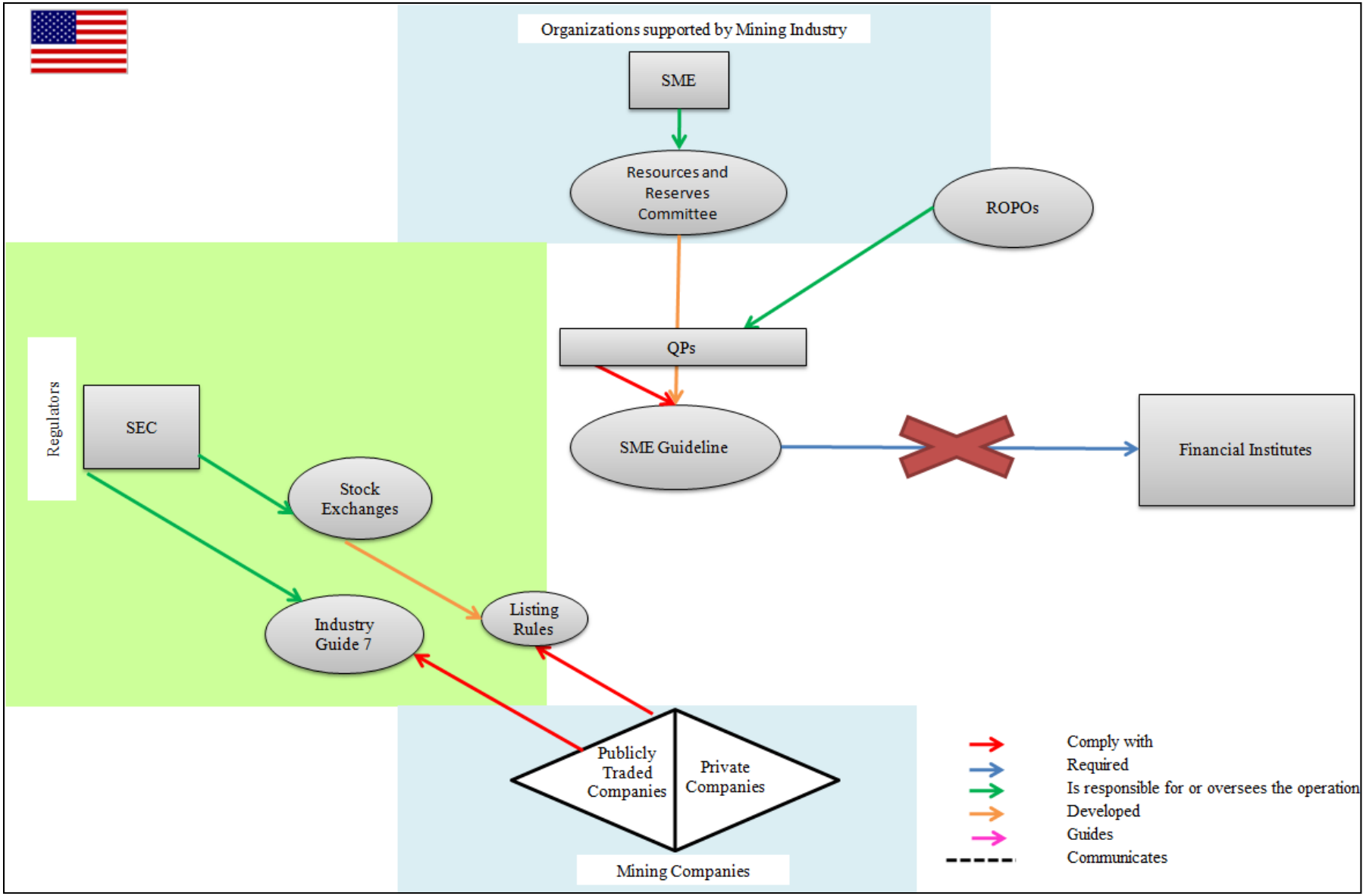

Figure 2.6 Relationship among different Stakeholders of the SME Guide (after Stephenson et al., 2008)

2.10 CRIRSCO and MRMR Reporting

In 1994, the Council of Mining and Metallurgical Institutes (CMMI) formed CMMI Mineral Definitions Working Group that was renamed in 2001 as Combined Reserves International Reporting Standards Committee (CRIRSCO) (Weatherstone, 2008). The CRIRSCO consists of representatives from National Reporting Organizations (NROs) that developed guidelines and reporting codes for public reporting of MRMR in different countries (Miskelly and Rendu, 2003). These representatives are from Canada (CIM Reserve Committee), Australia (JORC), UK (PERC), USA (SME), South Africa (SAMREC), Chile (Mineral resource Committee of the Institute of Mining Engineers of Chile), and Russia (PERC) (Stephenson and Weatherstone, 2006).

2.10.1 Goals and Principles of CRIRSCO

The main goals of CRIRSCO are to develop international standards for the definition, estimation, and public reporting of MRMR (Miskelly and Rendu, 2003). The need for universal terminology and standards, which could create a common language across the world, was the strongest motivation for developing CRIRSCO (Miskelly and Rendu, 2003). This need has dramatically increased because of the ongoing globalization of the mining industry and the impact of minerals on the investment community around the world (Weatherstone, 2008).

In 1999, the United Nations Economic Commission for Europe (UN-ECE) made an agreement with CRIRSCO to incorporate CRIRSCO's MRMR definitions into UNFC (Weatherstone, 2008). Experts view this agreement as a turning point for CRIRSCO that gave it true international status (Stephenson and Weatherstone, 2006). Reporting standards in country members of CRIRSCO are very similar and 90 to 95% compatible.

This characteristic allowed CRIRSCO to develop into an international template for reporting of MRMR and exploration results (Stephenson and Weatherstone, 2006). Principles of CRIRSCO are identical to those of the JORC code and include Transparency, Materiality, and Competence (Stephenson and Weatherstone, 2006).

2.10.2 CRIRSCO and MRMR Reporting of Industrial Minerals

Clauses 44 and 45 of CRIRSCO address public reporting of industrial mineral MRMR. CRIRSCO recognizes industrial minerals as minerals that are sold based on their chemical and physical specifications and their marketability (CRIRSCO, 2006b). Through examples such as borates, talc, kaolin, and aggregates, CRIRSCO identifies industrial minerals (CRIRSCO, 2006b). This definition as it stands does not seem to be appropriate for industrial minerals since it does not clearly identify what industrial minerals are.

A few guides are provided in these clauses that are identical to those provided in the clause 44 of the JORC code, Reporting of Industrial Minerals Mineral Exploration results, Mineral resource, and Ore Reserves.

Similar to SME guide, CRIRSCO addresses a few issues that other reporting standards including the JORC code and NI 43-101 do not, including identifying the main modifying factors for industrial minerals as transportation costs, location, marketability of the products, level of competition, and quality. CRIRSCO does create similar concerns with public reporting of industrial minerals, including not providing any standards for reporting of marketing information. Figure 2.7 illustrates the relationship between different stakeholders of CRIRSCO as explained in this section.

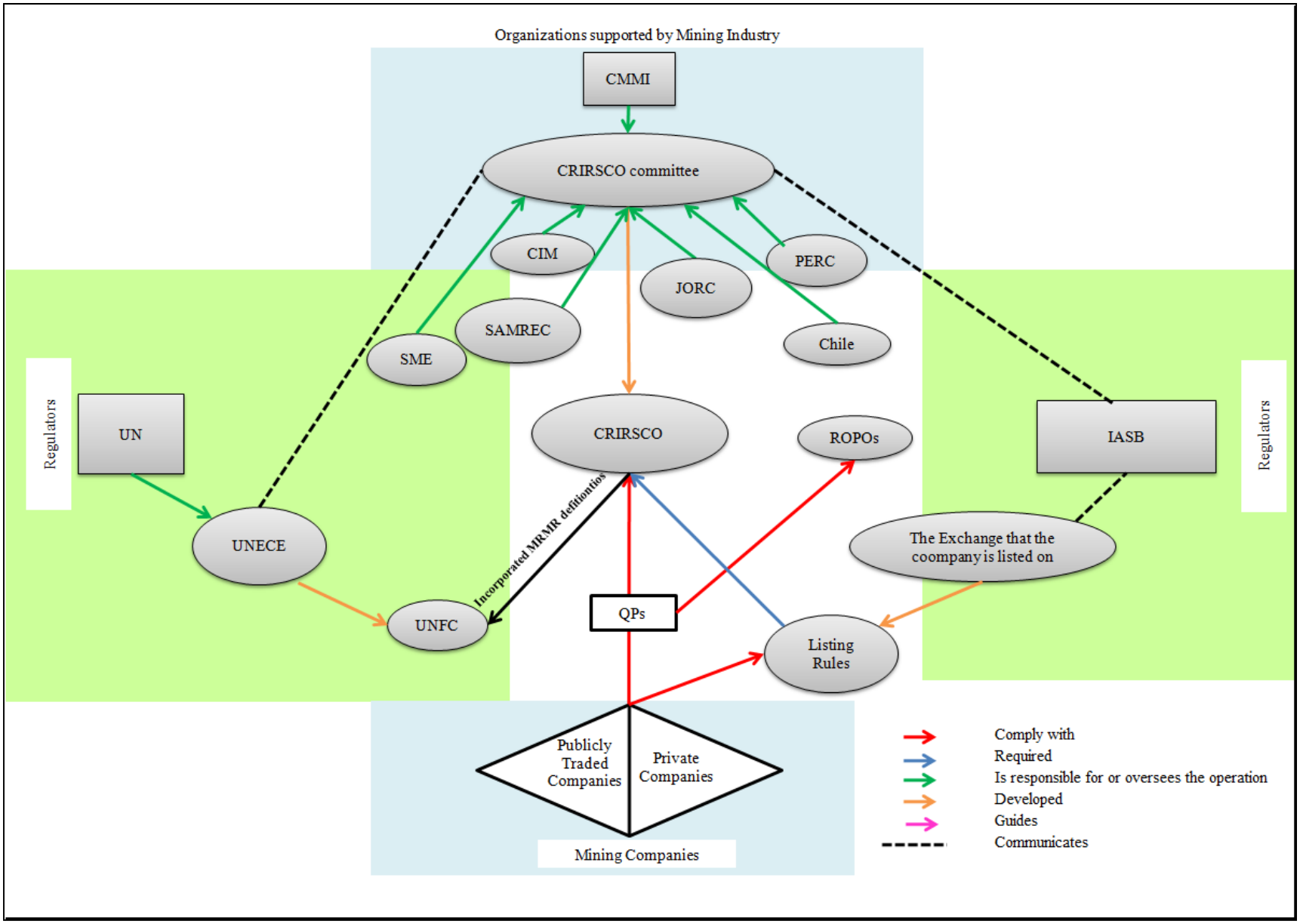

Figure 2.7 Relationship among different Stakeholders of CRIRSCO

2.11 The PERC Code and Reporting of MRMR

The Council of the Institute of Mining and Metallurgy (IMM) in UK developed definitions for MRMR in 1991 through its Reserve Committee (PERC, 2009a). A few years later, the Reserve Committee of the IMM became part of a broader organization called Pan European Reserves and Resource Reporting Committee (PERC) (PERC, 2009b). The PERC has developed the PERC Code for reporting of exploration results and MRMR in UK, Ireland and other European countries (PERC, 2009a). In summary, PERC is the European version of the JORC code, the SAMREC code, and the CRIRSCO code (PERC, 2009b). PERC standard definitions are the same, or not different in terms of material, as those international definitions (PERC, 2009b). The goals and principle of the PERC code are also identical to those of the JORC code.

2.11.1 Reporting Environment in UK

The PERC consists of representatives from major mining companies in different sectors including industrial minerals, aggregates and coal, the investment community, and professional accreditation organizations including the Geological Society of London (GSL), the Institute of Materials, the Minerals and Mining (IoM3), the Institute of Geologists of Ireland (IGI), and the European Federation of Geologists (EFG) (PERC, 2009a). While the PERC code is applicable in the UK, Ireland and other European countries, only the UK's reporting environment is the focus of this section.

The London Stock Exchange (LSE), one of the oldest stock exchanges in the world, consists of four markets Main Market, Alternative Investment Market (AIM), Professional Securities Market (PSM), Specialist Fund Market (SFM) (LSE, 2009). LSE Main Market and AIM host many national and international mining companies. AIM is considered the world's

leading market for junior and small companies (AIM, 2007). The UK Listing Authority (UKLA) oversees LSE operation and reviews LSE listing rules (Miskelly and Rendu, 2003).

LSE and AIM require mining companies to prepare a Competent Person's Report (CPR) regarding the assets and liabilities of the company (AIM, 2009; LSE, 2006). The CPR must be based on a QPs' work and in accordance with a Standard, which could be one of the following: the CIM Best Practices, the JORC code, the SAMREC code, and the PERC code (AIM, 2009; LSE, 2006). AIM also obliges mining companies to disclose technical and scientific information regarding their mineral project(s) in compliant with one of the Standards (AIM, 2009). LSE and AIM do not separate industrial minerals from other minerals in terms of listing requirements.

Table 2.4 illsutrates LSE Main Market listing requirements for mining companies.

Minimum Listing Requirements	Primary Listing of Shares	Secondary Listing of Shares
Minimum Market Capitalization of £700,000 for equity and £200,000 for debt	Required	Required
Production of a prospectus	Required	Required
Admission to trading on the Main Market	Required	Required
A minimum of 25% of the shares must be in public hands	Required	Not-required
3 year trading record	Required	Not-required
Clean annual report	Required	Not-required
Clean working capital statement	Required	Not-required
3 year revenue earning record art least 75% of the business	Required	Not-required

Table 2.4 LSE Main Market Listing Requirements (after LSE, 2006)

AIM listing requirements for mining companies are quite similar to those of TSX Venture Tier 2; however, there is no requirement for minimum size of a mining company in order to be listed on this exchange (AIM, 2007).

2.11.2 PERC and Public Reporting of Industrial Minerals

Clauses 45 to 48 of the PERC code are dedicated to industrial minerals MRMR public reporting. Very similar to the SME Guide and CRIRSCO, this code does not clearly define industrial minerals; instead it recognizes industrial minerals as the minerals that are sold based on their physical and chemical specifications and marketability (PERC, 2009a).

Clause 45 of the code indicates that main principles and goals of the code apply to industrial minerals (PERC, 2009a). This clause further explains that some chemical analyses may not be relevant and QP(s) must use key estimation indicators, which are case specific, in conjunction with the other industry guidelines and their professional judgment as the basis of reporting (PERC, 2009a). The code values industry guidelines, but does not allow them to overrule the code for the purpose of public reporting under any circumstances (PERC, 2009a).

Clause 48 of the code addresses how industrial mineral companies should deal with the disclosure of sensitive information. The code states “In certain cases commercial sensitivity may prevent the publication of quality parameters, but in such cases this should be clearly justified in the report” (PERC, 2009, 23). The remaining guides of the PERC code for public reporting of industrial minerals are identical to those of the JORC code, therefore, the same concerns regarding public reporting of industrial minerals that exist for the JORC code, exist for the PERC code. Figure 2.8 illustrates the relationship among different stakeholders of the PERC code as explained in this section.

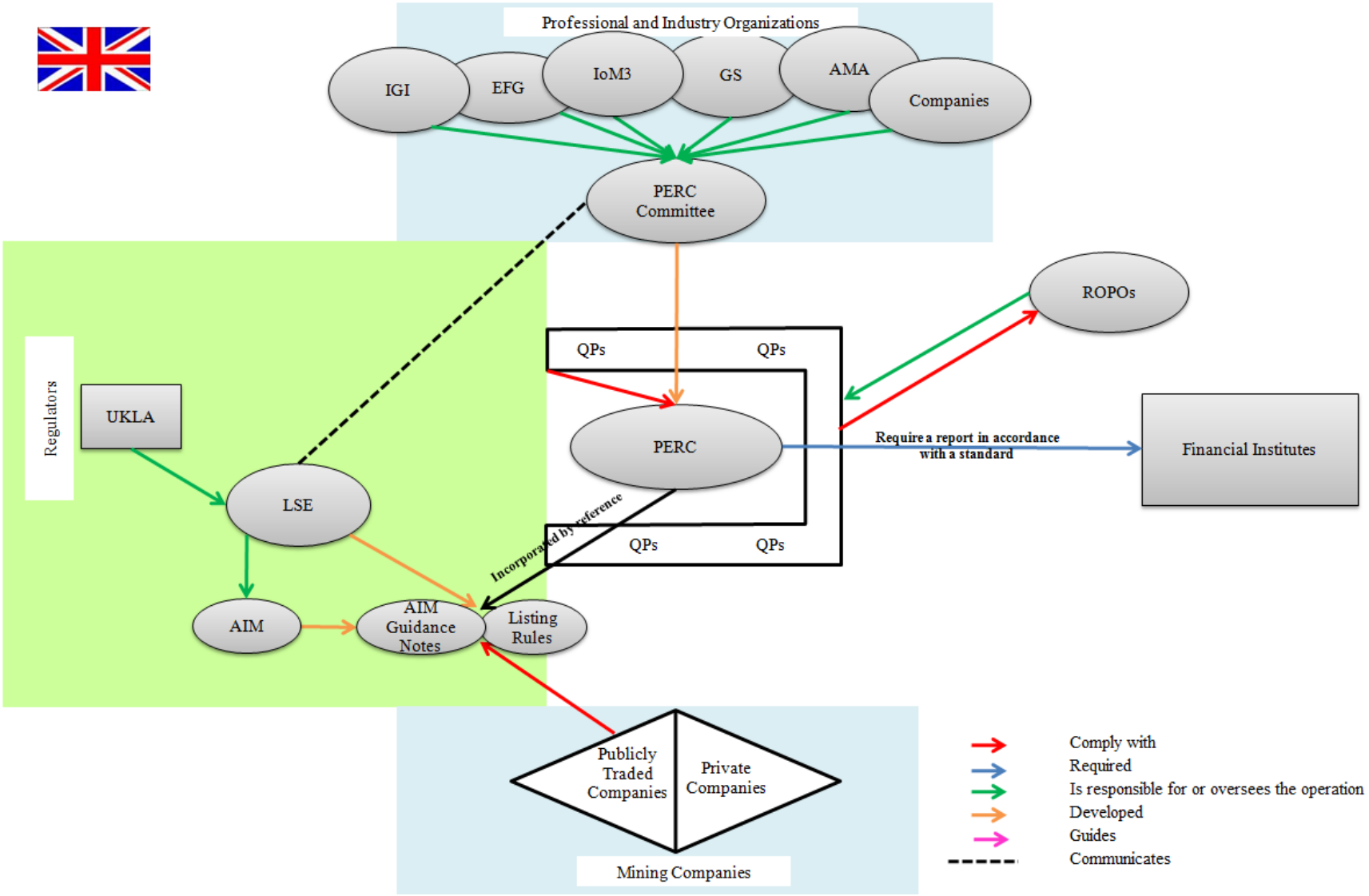

Figure 2.8 Relationship among different Stakeholders of the PERC code (after Demecheleer, 2008)

2.12 Reporting Standards and Industrial Minerals

This section reviews various reporting standards with a specific focus on industrial minerals. It also presents the existing differences between various reporting standards for all minerals. Reporting standards in country members of CRIRSCO are very similar and are 90 to 95 % compatible in general and also with respect to industrial minerals. There are differences, however, between these standards because each addresses their public reporting with respect to its host country regulatory requirements (Weatherstone, 2007). These differences are extensively explained in previous sections, and summarized in Table 2.5.

Criteria	Australia	Canada	South Africa	UK/Europe	USA - SME	USA - SEC
Defining Industrial Minerals	X	√	X	P	P	X
Qualified (Competent) Person Requirement	√	√	√	√	√	X
Specific Clause for Industrial Minerals	√	√	X	√	√	X
Setting Guidelines for Reporting of Industrial Minerals	√	√	X	√	√	X
Reporting of Mineral Resource Allowed	√	√	√	√	√	X*
Inferred Resources are Allowed in Economic Studies	√	X*	√	√	√	X
Outlining Necessary Contents of Market studies for a Mineral Project	X	X	X	X	X	X
Level of study required for Mineral Reserves	1	2	2	2	1	3
Reporting Standard Recognised by National Regulator	√	√	√	√	X	√
Balancing the Transparency and Materiality with the Confidentiality	X	X	√	√	√	X
The Requirement for Providing a Contract in place	X	√	X	X	X	√

Level of study
1 = appropriate assessments and studies as determined by QP
2 = pre-feasibility study - expected (UK/Europe) or required (Canada)
3 = feasibility study for new projects

√ = yes
X = no
X* = allowed in certain restricted circumstances
P = partially

Table 2.5 Comparison between Reporting Standards

Almost all of reporting standards, except the SAMREC code, indicate the extra clauses that need to be followed when dealing with an industrial mineral. However, Industrial minerals have been defined differently in various reporting standards and guidelines. This becomes a confusing issue for stakeholders of the sector because it is not clear if a mineral is an industrial mineral, or not.

All the reporting standards identically define a QP and require their involvement and supervision in preparation process of technical reports. Considering the significant characteristics differences between industrial minerals and other sectors, a QP for industrial minerals requires not only an understanding of geology, mining techniques, and process technology, but also of markets that the material is used in, the particular process that is required to meet the market requirements, and logistics costs. Therefore, it is worthwhile to re-examine the definition of QP and the experience relative to an industrial mineral project. Additionally, by developing more specific standards and definitions for industrial minerals, stakeholders may be better equipped to prepare and/or interpret reports for industrial mineral projects.

MRMR definitions and their classifications are conceptually identical in all standards. They have, however, different policies with regard to disclosure of different categories of MRMR. The CIM Standards and the SME Guide would allow reporting of exploration information only if it is clearly stated that the reported estimates are conceptual (CIM Ore Reserve Committee, 2005; SME, 2007). The SAMREC code, the PERC code, the CRIRSCO standards, and the JORC code would not allow reporting of exploration information (CRIRSCO, 2006b; JORC, 2004; PERC, 2009a; SAMREC, 2007), unless the Exploration Information includes sufficient material for investors balanced judgment (Vaughan and Felderhof, 2005)

The SEC and the CIM require inferred mineral reserve to be excluded from the basis of economic evaluations, while other standards allow disclosure of inferred mineral reserve when caution is exercised with its full disclosure (Vaughan and Felderhof, 2002). Except the SEC Guide 7, other Standards would allow reporting of Mineral resource. One of the differences between these standards is the level of study required for Mineral reserve estimates (Vaughan and Felderhof, 2005). These levels are summarized in the Table 2.5.

All the reporting standards put a strong emphasis on exploration and geology as a means to determine MRMR validity. It is important to review the main elements of MRMR estimation for industrial minerals and to evaluate if the current approach of reporting standards is applicable to industrial minerals. It is also worth highlighting the main modifying factors for industrial minerals and how they differ from base and precious metals. Although, conversion of mineral resources to mineral reserves for industrial minerals heavily depends on having a buyer and markets, rreporting standards do not provide details for reporting of marketing information.

As explained in this chapter, there are significant differences between industrial minerals sector and metals sector. The metals sector deals with a clear market supported by metals exchanges, and qualifying technical reports can be used as a good tool to communicate with potential investors. Industrial minerals sector, however, deals with much more complicated market and in some cases evaluation of a deposit is not about mining as much as it is about marketing. It is extremely important to prepare a technical report that not only covers critical economic aspects of an industrial mineral project, but also is presented in a way that is easy to understand for the most significant target audiences of technical reports, investors. It is, therefore, important to understand what style of reporting connects better with investors. This

research examines the introduced concerns in this section and deals with them through providing recommendations in the Chapter Four and Five.

3 Methodology

3.1 Introduction

This chapter discusses the research methodology used in this work. The qualitative research design, data collection, and the approach for analyzing the collected data are described. The limitations and difficulties encountered during the research are also discussed.

3.2 Research Design (Qualitative Research Vs. Quantitative Research)

The research conducted in this thesis is considered qualitative. In general, the term qualitative research in the scientific community refers to any form of research that generates findings without the use of statistical experiments or other quantification means (Strauss and Corbin, 1994). Qualitative research is, as Denzin and Lincoln (1994: 2) define it, a form of inquiry that "cross cuts disciplines, fields and subject matters", interprets "phenomena in terms of the meanings that people bring to them", and is "a situated activity that locates the observer in the world" to study things in their natural settings. Denzin and Lincoln (2008: 4) add that qualitative research is a "set of interpretive material practices that make the world visible", and is a process that evolves the world into "a series of representations" (e.g. recordings, memos, photographs). In contrast, deductive reasoning characterizes quantitative researche. These studies put emphasis on quantities, measurement, and developing relationships between variables. Ragin (1987) states that quantitative researchers deal with many cases that include a few variables, whereas qualitative researchers often deal with a few cases involving many variables.

There were convincing reasons to employ qualitative approach for this research, including the need for studying individuals in their natural settings and incorporate the various views and backgrounds of those individuals.

One reason a qualitative approach was employed is because of the nature of the primary research question, "how to improve public reporting of industrial minerals for different stakeholders". As Creswell (1998: 17) notes, a qualitative research question often begins with a '*how'* or a '*what',* "so that initial forays into the topic describe what is going on". Quantitative questions more often ask '*why*' and tend to develop a relationship between variables or cause and effect.

Where the identification of variables is not possible and theories are not available to explain reasons for a problem, as Rennie (2006) recommends, qualitative research is more useful than quantitative. There are not many publications available on public reporting of industrial minerals. Thus, it needs to be discussed with individuals ("research subjects") in detail in order to identify the drivers and variables associated with public reporting for the industrial minerals sector.

To identify the difficulties and issues associated with preparing, reading, and interpreting industrial minerals public reports, different stakeholders who deal with these reports regularly should be interviewed. Qualitative research allows for the study individuals in their natural settings, allowing for the most realistic representation of the challenges people face in the industry with respect to the public reporting of industrial minerals.

As Eisner (1991) states, one should only choose qualitative research when there are a satisfactory number of stakeholders with different points of view that help the researcher to collect extensive data. As shown in section 3.3.1 there is indeed an adequate number of experts with different points of view and background.

3.3 Data Collection Methodology

There are different methods for collecting qualitative data, including observation (e.g. field work) and interviews. The researcher, only through interviews, could know valuable experiences and opinions of the industrial minerals stakeholders. Keeping the ‘saturation’ concept of qualitative research in mind, the researcher conducted 34 semi structured with different stakeholders of the industrial minerals sector to gain insight into the different aspects of the research topic. All the interviews were voice recorded, and transcribed to keep a record of each conversation and to create a consistent interview text.

An interview can be formed in three ways: structured, semi-structured, and unstructured. In this research, semi-structured interviews, where a list of questions, was prepared for this purpose were conducted for data collection. The order of the questions varied and particular questions were removed or added based on the subject’s area of expertise. Interview questions are available in Appendix C. The interviews were on average about 60 minutes in length. In some cases where the interviewees felt that more discussion was needed on some questions and/or a specific topic, the interviews were extended up to 90 minutes.

Within the qualitative research concept of ’saturation‘ is considered as a sign of when to stop the data collection. A category is considered saturated when no new information seems to emerge during coding, that is, when no new properties, dimensions, conditions, actions/interactions or consequences are seen in the data. This statement, however, is a matter of degree. In reality, if one looked long and hard enough, one would always find additional properties or dimensions. There always is that potential for the ’new‘ to emerge. Saturation is a matter of reaching the point in the research where collecting additional data seems counterproductive; “the ’new‘ that is uncovered does not add that much more to the explanation

at this time." (Strauss and Corbin, 1998:136). Charmez (2006:113) states "categories are saturated when gathering fresh data no longer sparks new theoretical insights, nor reveals new properties of your theoretical categories". Because of time limitation, conducting 15 to 20 interviews were initially proposed, however, saturation was not achieved after the first 20 interviews, and the researcher ultimately conducted 34 interviews.

3.3.1 Recruiting the Subjects of Research

In the data collection phase of the research, the researcher had to decide about his research subjects and their recruitment. Collected data is more reliable if the researcher takes all the stakeholders opinions and perspectives into account. Diversity of study participants is a significant component of the qualitative research (Glaser, 2001). The researcher, therefore, did his best to consider different stakeholders who may have valuable ideas and different points of view regarding the study. Based on his knowledge and experience, and the advice of his supervisors, the researcher categorized his potential subjects in to seven categories, as shown in table 2.1.

Subjects were identified through the UBC Mining department's industry contact list, mining conferences, Canadian Institute of Mining, Metallurgy, and Petroleum (CIM) Vancouver branch luncheons, and Edumine® short courses. Most of the research participants were identified after conducting the first five interviews from the list that those interviewees provided for the researcher.

Categories	Canada	Australia	U.K	USA	South Africa	Total
Qualified Persons (Competent Persons) - Industrial Minerals Consultants	4	3				7
CIM Ore Reserve Committee, the JORC code committee, The PERC code committee, The SAMREC committee, and CRIRSCO members	1	2	1		2	6
Professional advisors for financial institutions and Investors	2	1	1			4
Senior-level Mangers and presidents of industrial mineral companies	3	2	2	1		8
TSX and TSX-Venture managers in mining sector	3					3
Leading experts in geology and mining of industrial minerals from academia	1			3		4
CSA Mining Technical Advisory and Monitoring Committee	2					2
Total	16	8	4	4	2	34

Table 3.1 List of the Research Participants

The researcher sent a letter to the potential interviewees explaining the purpose and voluntarily nature of the research and asked them to participate in the study. The interested experts were contacted by email and/or phone in order to arrange an interview time and location. Those interviewees who were in British Columbia were interviewed face-to-face at their offices, and the rest of them were interviewed through phone

3.3.2 Challenges of Recruiting Subjects

Most of the interviewees are very busy and are away on business trips for a significant portion of the year. This posed a significant challenge to the researcher to recruit research participants. Several different approaches were taken to make and keep contact with the

interviewees, including emails, phone calls, talking to them in person by stopping by their offices, and asking help from interviewed experts for the initial contact while considering the interviewees' need for privacy.

After the initial contact the researcher tried to encourage the subjects to participate in the research. It was important in this phase of the research to gain the interviewees' trust so that they felt comfortable in sharing their valuable thoughts and knowledge with the researcher.

To overcome barriers, the researcher approached the potential subjects through people that the subjects do know and do trust. For the first five interviews, he contacted the subjects that he knew and already developed a relationship with them. For other subjects, he asked the interviewees who had recommended those subjects if they can contact their recommended subjects. Contacting the potential interviewees through other experts was effective and assisted the researcher to at least get a chance to talk with the potential interviewees.

For the purpose of scheduling an interview with the subjects that got familiar with the research, the researcher went back to their background and tried to find links between his research and their experience.

Introducing the impact that their participation in this research will have in improvement of the industrial minerals sector was quite effective. Moreover, the researcher was extremely conscious to allow the subjects to take their time and respond to the researcher's requests and questions at their convenience. Charmaz (2000) recommends developing professional relationships with interviewees is a necessary step in encouraging them to share their valuable personal experiences.

In summary, the key to success in this phase of the research was creating trust, attracting the subjects' attention, and gaining higher level of trust by developing a professional relationship with them.

3.3.3 Conducting Individual Interviews

As mentioned above, the research subjects are mostly experts in their field (from the seven categories listed in section 3.3.1) in Canada and in some cases in the world with more than 25 years of experience. The preparation process was a lengthy process as the researcher needed to review the subjects' background, search on the area of their expertise, and review technical topics that might arise during the interviews.

To comply with UBC Behavioral Research Ethics Board (BREB) policies, the subjects were asked to sign a consent form. Some of the interviewees, however, were not comfortable with signing that form and asked the researcher: "Why do you need my signature?" In these cases, the researcher would spend as much time as needed to explain about the research topic and its ethical issues. In all of the interviews, the subjects gladly signed the consent form after brief explanations.

For the researcher, the most challenging part of conducting interviews was starting the interviews. At that moment, a two way conversation had to be set up between the interviewee and the interviewer (Schwandt, 2001). The researcher employed different approaches for different individuals because they have different personalities in terms of communication (Kvale, 1996).

As mentioned previously, a list of questions was prepared for the interviews. Depending on the subject and their background and expertise, however, a few changes were applied in the questions. Appendix C shows different questions that were asked in the interviews.

Kvale (1996) discusses different type of interview questions that should be apply into interview in order to have a coherent interview, including introducing questions, follow-up questions, and probing questions, structuring questions, and interpreting questions. The researcher applied these questions to his interviews, for example, when the interviewees were asked “What are the recommended methods for Mineral Resource and Mineral Reserve (MRMR) estimation for industrial minerals?” the follow up question was “can you give me an example please?”; the probing questions was “Can you please explain more?”; the interpreting question was “Can we generalize this method to a group of industrial minerals then?”.

The researcher transcribed almost every interview before starting another interview because the phase of transcribing provided valuable insight that improved the researcher’s expertise in subsequent interviews. It also helped the researcher to improve interviewing skills as he could review and hear what he had said during the interview. For instance, he could learn when he had to start and finish a specific question or when to change the order of the questions for specific category of experts in order to conduct the interview more fluently and to avoid repeated answers.

Kvale (1996: 147) explains, “A good interviewer is an expert in the topic of the interview as well as in human interaction”. Moreover, experience plays a significant role in conducting interviews. The researcher improved his skills and learned better techniques by practicing in real interview situation, and it ultimately helped the researcher to conduct better interviews.

3.4 Analyzing Collected Data

From the very first interview, the researcher employed data management as Creswell (1998) emphasizes on it in which a new folder was created anytime that a new interview was conducted. All related materials were pasted to the new folder, including the interview’s

recorded voice electronic files, transcriptions, memos, interview questions, signed consent form and so forth.

In the next step, the researcher went through the transcripts several times while listening to the interviews in order to get general sense of the interview. As Charmaz (2006) advises, the researcher started writing short notes and memos on margin side of the transcript, in some cases highlighted a sentence, phrase, or word that seemed important. He did the memo writing twice for each interview to ensure that he has not missed any important points. Meanwhile, he was looking carefully for phrases and/or words that the interviewees have exercised in order to explore metaphors. Following the memo writings and finding metaphors, the researcher scanned the whole transcript and memos to find major ideas and themes of the interviews. This led to initial categorizing in which a few number of categories were formed and relevant data were located into the categories. The researcher looked for supporting data for each category. Figure 3-1 shows the outlined process above.

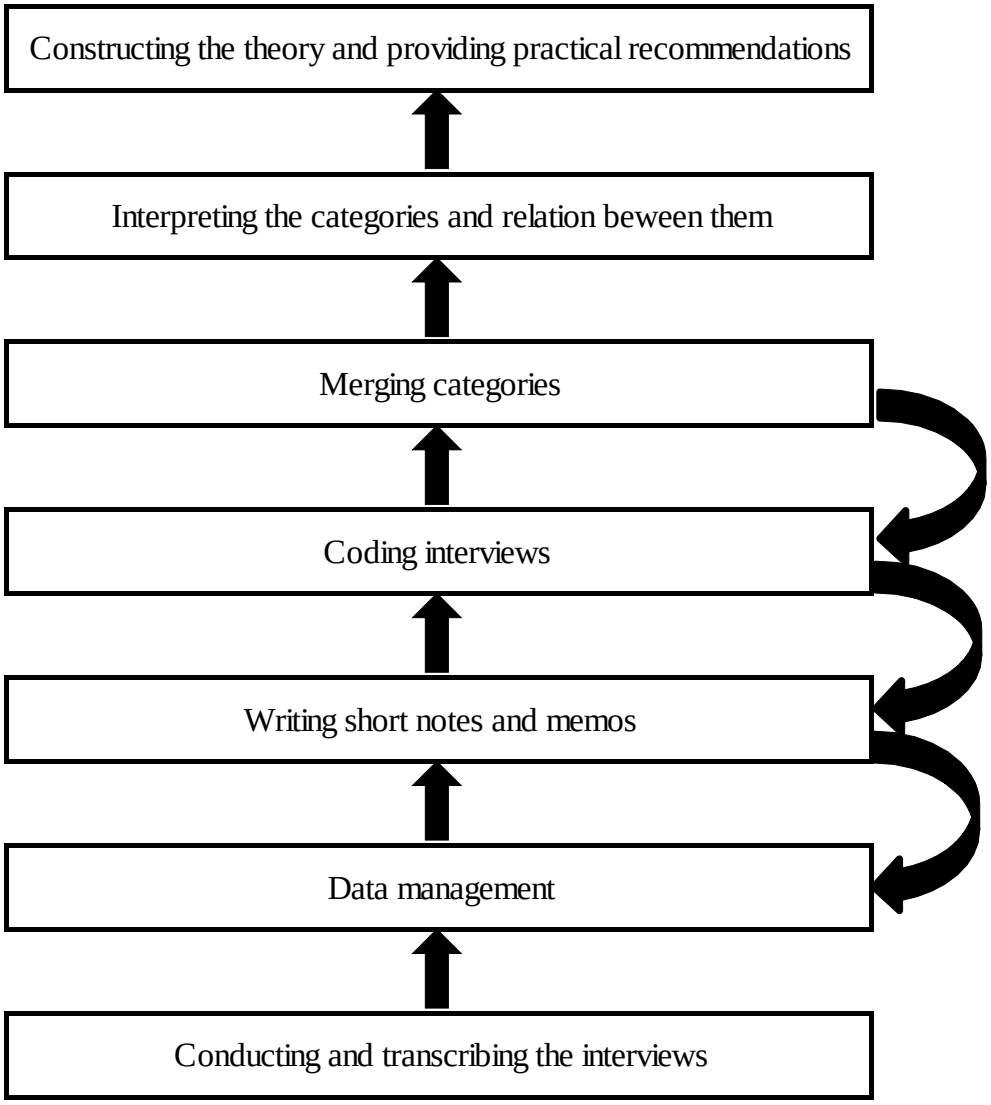

Figure 3.1 Process of Constructing a Theory

Once again, the researcher went through the transcripts and compared different categories with each other and reduced the number of the categories by merging two or three categories and creating a new one. About ten categories emerged that cover the main points of the interviews. In the next step, the researcher interpreted, collected, and categorized data in order to either extract a recommendation for a specific case or come up with a solution for a particular problem. These prepared the ground for Results and Discussion chapters.

3.5 Ethics

This research has received an approval from Behavioral Research Ethics Board (BREB) of the University of British Columbia (UBC). A copy of the approval is provided in Appendix D. The researcher did not disclose the identity of the research participants. In results and discussion chapters, when referencing to the research participants was required, the respondent was recognized by the category that they belong to.

The interviewees, while or after conducting the interviews, raised a few concerns and questions. First, almost all of the interviewees asked what the researcher would do with the information that they have shared with him. In some cases, they asked if they see the results of the research before they get published. The researcher tried to address this concern by promising to send the transcripts back to the interviewees and ensure that they receive a copy of the researcher's interpretation of the data before publishing them.

Second, the researcher was asked if he would include research participants' names in the research publications. In the classic situation, the researcher is obligated to present findings in the manner that the participants are not identifiable (TCPS, 2005). The researcher, however, could not find the answers from the TCPS's tutorial; therefore, he contacted the Behavioral Research Ethics Board (BREB) of the University of British Columbia. He was advised that he is allowed to include research participants' names in the research publications as long as the participants signed the consent form and are agreed to include their names in the research.

The third concern was how the researcher would reference an idea or solution that was given by more than one participant. The researcher referenced the ideas to whoever has mentioned that idea. If more than one participant mentioned one specific idea, the researcher would reference that to all of the participants who mentioned that idea.

Only once, the researcher faced a very difficult issue where one of the potential interviewees mentioned that the information that he is going to share would cost him $30,000 to $40,000 since no one else has that knowledge and this type of information is proprietary to him. The researcher called off this interview. For the remaining interviews, the researcher reminded all the potential interviewees that their participation is thoroughly voluntarily and they can withdraw from the research at any time.

4 Results and Findings

4.1 Introduction

Standards and regulatory codes for public reporting of Mineral Resource and Mineral Reserve (MRMR) and Exploration Results govern how mining companies disclose their technical information concerning their mineral assets. MRMR are critical in determining a mining company's financial statements (Goldsmith, 2002). In addition, before mining companies can finalize any financial deal publicly, in some cases privately, most of financial institutions require mining companies to prepare a qualifying technical report that addresses MRMR estimates and Exploration Results. This qualifying report must be in accordance with one the reporting standards and/or regulatory codes.

The competition for gaining investment dollars for industrial minerals companies is very intensive since they not only compete against other mining companies in other sectors, they also compete against all companies in other industries that are seeking investment dollars. Therefore, a better understanding of investment community decision making process by industrial mineral companies and improvements in communication with investors through technical reports increase the probability of gaining capitals.

The analysis presented here is based on 34 interviews conducted with the following group of experts: Qualified Persons, CIM Ore Reserve Committee, the JORC code committee, The PERC code committee, The SAMREC committee, CRIRSCO members, professional advisors for investment community in mining sector, senior-level mangers and presidents of industrial mineral and other mining companies, TSX and TSX-Venture managers in mining sector, Canadian mining regulators, investors, and CSA Mining Technical Advisory and

Monitoring Committee. These experts are from Canada, Australia, the UK, South Africa, and the USA, with quite diverse experiences in terms of type of work and time spent in the industry.

Semi-structured one on one interviews were conducted for data collection. A list of questions was prepared for this purpose; however, the order of the questions varied and particular questions were removed or added based on the subject's area of expertise. The length of the interviews was about 60 minutes, in some cases however, the interviews lasted up to 90 minutes since the interviewees felt that more extended discussion was essential on some questions and/or a specific topic.

This chapter reviews the efficiency of reporting standards and regulatory codes in terms of public reporting of industrial minerals based on the findings of the interviews. Different perspectives with regard to main elements of the reporting standards and regulatory codes are presented. Finally, this chapter prepares the ground for further discussion on what needs to be improved, and how these changes could be achieved.

4.2 Definition of Industrial Minerals

Almost all of reporting standards, except the SAMREC code, indicate the extra clauses that need to be followed when dealing with an industrial mineral. However, Industrial minerals have been defined differently in various reporting standards and guidelines. This becomes a confusing issue for stakeholders of the sector because it is not clear if a mineral is an industrial mineral, or not. In the CIM Best Practice Guidelines for industrial minerals, an industrial mineral is defined as "any rock, mineral, or natural occurring substance of economic value, exclusive of metal ore, mineral fuels, and gemstones: one of the non-metallics" (Mullins et al, 2003, 1). The JORC code (2004, 14) states that "industrial minerals can be considered to cover commodities such as kaolin, phosphate, limestone, talc etc" while other reporting standards, including SME

guide, and CRIRSCO, recognize industrial minerals as minerals that are sold based on their chemical and physical specifications and their marketability (CRIRSCO, 2006, SME, 2007).

This issue becomes even more complex when a company wants to get publicly listed on an Exchange. The Toronto Stock Exchange (TSX), for example, has an extra listing requirement for industrial mineral companies that mandate them to present one or more contracts in place with potential customers. Therefore, it is important to know if a mineral is industrial mineral or not.

This issue was raised during interviews of several stakeholders of industrial minerals worldwide. Most of the interviewees asked to explain further what the researcher meant by industrial minerals. The CIM definition for industrial minerals was quoted for them. Three different responses were received: the first group believed the definition was appropriate and suggested that it is broad enough to cover industrial minerals; the second group advised that the definition is exclusionary rather than inclusionary which, as one of the respondents said, ”is a very poor way to define a term”. They commonly suggested that it is not possible to define industrial minerals because of their very diverse physical and chemical specifications. They further suggested that the best way to define industrial minerals is to provide a list of minerals that are considered industrial minerals. The third group of interviewees also did not agree with the CIM definition, but differed from group two in that they defined industrial minerals as minerals that are sold based on their marketability regardless of their geological occurrence.

4.3 Qualified Persons (QPs) and Industrial Minerals

The Qualified Person concept is one of the main pillars of reporting standards for any mineral project. A president of an industrial mineral company interviewed by the researcher added that QPs’ work is important in the sense that “his or her opinion will be used to create

evaluation for a mining company". If the QPs' opinion is wrong in any way it may lead to miss-representation or suspension of the evaluation. According to CIM Definition Standards (2005: 2):

> "A Qualified Person means 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 or licensee in good standing of a professional association."

An experienced QP (respondent) stated a QP for industrial minerals requires not only an understanding of geology, mining techniques, and process technology, but also of markets that the material is used in, the particular process that is required to meet the market requirements, and logistic costs. Therefore, it is worthwhile to re-examine the definition of QP and the experience relative to an industrial mineral project.

The following questions were posed to the interviewees with respect to QPs:

- "How do you define QP in industrial minerals sector?
- Is the current definition of QP sufficiently general to meet industrial minerals' requirements?"

Three different responses were received: the first group consist of QPs and managers of industrial mineral companies. They believed that there is too much emphasis on geology and exploration for being able to evaluate MRMR. A manager of an industrial mineral company (respondent) suggested that the QP should have qualifications from business point of view and "relies on technical experts, engineers, and geologists to tell him/her if the process is appropriate or if the resource is there". This group also thinks that the five years experience is not enough and the QP should be required to have more experience.

The second group are from organizing committees of reporting standards. They believed that the QPs definition is a very generic definition. They suggested that the definition appropriately addresses that the person must belong to a certain type of recognized organization and needs to have at least five years of relevant experience with the commodity that the person is dealing with. They pointed out this definition is applicable to all minerals. A CRIRSCO member (respondent) added it is up the person "to acknowledge that if he or she has skills or access to that knowledge to be able to claim that he or she is a QP". Moreover, a team of people, with different sets of skills, must be involved in the evaluation process. This team could include people who may not have appropriate qualifications set by the reporting standards, however, the repost is signed by a QP who reviews the reports and accepts the responsibilities. CIM Definition Standards also encourages QPs to seek advice when they don't have the necessary qualifications (CIM, 2005).

The third group are regulators and advisors to the investment community. This group believed that the definition is adequate. A regulator added, however, that it could be helpful to point out that for MRMR estimations some relevant experience is required in marketing industrial minerals "or any commodity that is not in [an] exchange market". They suggested adding a line or paragraph in the guidelines that some marketing experience is required for MRMR estimations.

4.4 Exploration, Geology, Modifying Factors, and MRMR estimation

Most of the reporting standards, including the NI 43-101, have a strong emphasis on exploration and geology as a means to determine MRMR validity. This is because exploration and geology information play a significant role in MRMR estimation of base and precious

metals. This section reviews the main elements of MRMR estimation for industrial minerals and evaluates if the current approach of reporting standards are applicable to industrial minerals.

It is apparent there are two main differences between industrial minerals and base and precious metals exploration. First, base and precious metals exploration requires experts to look for one chemical element like zinc or gold. In exploration for industrial minerals, as a geology professor stated, “experts are looking for a composition of chemical elements that creates a mineral with unique chemical and physical specifications”. The second difference is, as this same geology professor explained, is that industrial mineral “experts do not usually do exploration for industrial minerals”. Most deposits are found “when someone was looking for base and precious metals “.

Modifying factors are the factors that convert mineral resources to mineral reserves. The JORC (2004, 5) code states that Modifying Factors “include[s] mining, metallurgical, economic, marketing, legal, environmental, social and governmental considerations”. This section highlights the main modifying factors for industrial minerals and how they differ from base and precious metals.

These following questions were posed to the interviewees with respect to modifying factors:

- “What do you think about MRMR estimations for industrial minerals?
- What are the modifying factors for industrial minerals?
- How are these different from those of base and precious metals?”

Respondents to these questions are divided into three main groups: the first group are mainly QPs for industrial minerals sector; the second group are dominantly from ore reserve

committees of various countries; the third group consist of people who work for large mining companies or are employed as professional advisors for investors.

The first group all believed that MRMR estimates for industrial minerals are significantly different from those of metals. As one QP stated in this group, most industrial minerals "may have more than three reserve calculations entirely based on who the end user is going to be". For example, kaolin can be used as filler in different industries, including paper, rubber, and ceramic with very different specifications; therefore, experts are dealing with more than one reserve calculation. This first group stated that a QP must evaluate a deposit from a producer's point of view. As the QP interviewee illustrated during the interview, the evaluation and the test that an expert would run depend entirely on the potential customer required physical and chemical specifications or the potential industry itself". In the ceramic industry, for example, manufacturers may use a unique blend of three to five different clays. Therefore, for mineral reserve estimation purposes, the clays of individual deposits have no value, except, as one interviewee said, when "they are blended in certain ways".

Another QP of the first group stated that the amount and type of information required by QPs for assessing industrial mineral deposits are quite diverse. For example, very few samples of construction minerals could verify "the geological consistency" required by a QP and, in most cases, that is enough to generate numbers for mineral resources. For resource estimation of limestone, calcium carbonate, and raw materials for cement, however, experts may need to run many different analyses on physical and chemical properties of a mineral. One QP from Australia explained "in general, geology and exploration are fairly straight forward and tend to be the least important factors in assessing whether or not an industrial mineral deposit is economic". All industrial minerals require a valid and up-to-date market study for MRMR

estimations. For mineral resource estimation, experts don't often do a full market study; having a conceptual market for the mineral, and a rough idea of major costs, such as transportation and mining, is adequate to complete mineral resource estimates.

This first group generally defined modifying factors for industrial minerals as "the ability to meet the specific technical requirements of customers". If the technical requirements of a customer are not met, a QP cannot up-grade mineral resources to minerals reserves, and an industrial mineral company will subsequently need to prove that they have a reasonable capacity to develop markets. Therefore, for mineral reserve estimation of most of industrial minerals, very detailed market studies are required. Other modifying factors are as the same as those of metal deposits and must be considered during the conversion of resources to reserves.

The second group are dominantly from ore reserve committees of various countries. This group believed that the principles of MRMR estimations for industrial minerals are absolutely identical to any other deposit that experts are dealing with. A JORC member stated that "geology and the mining methods are very diverse, and emphasizing on the differences is not the correct way to approach MRMR estimations". They suggested that all current reporting standards can be interpreted and used for industrial minerals.

The second group explained that the modifying factors, as listed in reporting standards, are applicable to industrial minerals. The only difference is which factors are particularly important. A PERC member said marketing is a significant modifying factor for industrial minerals and point out that "it is also very important to diamond, iron ore, nickel, and so forth". This respondent emphasized, however, "marketing should not rank on the top of the list of modifying factors". A JORC member (respondent) suggested "it is up to the QP to judge and/or have the experience to judge" which modifying factor is the key for conversion of mineral

resource to mineral reserve. This group strongly believed that QPs' judgements and opinions must be relative important components of the conversion of mineral resource to mineral reserve.

The third group consisted of people who work for large mining companies or are employed as professional advisors for investors. This third group added a further dimension to the second group's sentiments, by suggesting that the principles of MRMR estimations for industrial minerals are absolutely identical to any other deposit that experts are dealing with. However, QPs should move away from the single deterministic estimate where a mineral resource is classified as measured, indicated, and inferred. Rather than developing one number, ranges of probabilities would be better in dealing effectively with uncertainties in a sophisticated way. They recommended this change for all mineral estimations, not just industrial minerals. They believed that it is for the benefit of all stakeholders in the mining industry to be open and transparent about uncertainties in estimating MRMR. The third group all agreed that there is no need to make rules for MRMR estimation; rather, the emphasis should be on addressing the uncertainties in the modifying factors and taking a risk based approach for MRMR estimation.

4.5 Market Studies and Associated Challenges for Industrial Minerals

Conversion of mineral resources to mineral reserves for industrial minerals heavily depends on having a buyer and markets. An interviewed QP in the industrial minerals sector stated an industrial mineral deposit could be "an excellent deposit form technical point of view", but it could be non-economic because there is no market for the product; therefore "it is only a geological occurrence". An interviewee and JORC member illustrated this point by an example in Mongolia where the biggest aggregate deposit in the world is located; however, it is not an economic deposit because it is too far from any potential customers. The researcher asked participants about the differences between industrial minerals market and metals market. A well-

known industrial minerals expert from USA stated that industrial minerals often tend to have a highly limited regional market. This respondent also mentioned that there is no terminal market for most of industrial minerals and they tend to be highly substitutable. Therefore, industrial minerals are often sold on delivered cost basis. An interviewed QP for industrial minerals concluded, “these differences dramatically increase the level of competition intensity for industrial minerals”.

A Canadian QP (respondent) stated that meeting general market specification in most cases is not adequate, and an industrial mineral producer should be able to meet the specific customer requirements. Even for fairly well commoditized industrial minerals, such as talc and gypsum, the chemical and physical specifications that a particular buyer requires might be quite different than those specifications that an industrial mineral producer is able to achieve. An interviewed QP from the UK stated that, in some cases, understanding customers’ specifications is challenging because “customer’s raw materials are often quite propriety”. An experienced expert who teaches industrial minerals courses in Colorado School of Mines added “the whole users’ world is built on a product identification system”, and in many cases customers often are not familiar with the scientific name of the mineral that they have been consuming for many years which makes it more difficult to for the industrial minerals companies to understand what customers need. Moreover, customers usually have long-term contracts with suppliers. Thereby, even if a company has the capability of achieving required specifications, the market development process is quite time consuming.

Another challenge for industrial mineral companies, medium size companies in particular, is the extra listing requirement of proving that a sales contract is in place. This is directly related to marketing and some of exchanges and regulators require it. There are a

number of medium size industrial mineral companies that meet all listing requirements of the exchanges except a sales contract.

Most of respondents, with the exception of regulators, were in favour of losing the listing requirement. They stated that this listing requirement does not seem appropriate since it is almost impossible to get customers to write a contract before getting a developer to write a contract, because, in most cases, the company has not started development yet. An interviewed PERC member commented, “it is a chicken and egg situation”. Respondents also suggested that for marketing purposes, an industrial mineral company needs to have a comprehensive prospectus report to indicate that the company will get a sales contract. This idea has been effective in the UK, and Australia, and there is no indicator to suggest that it would not be effective in Canada or the USA. An interviewee of a medium size industrial mineral company said that regulators once told them that the company met all the requirements to get listed on the TSX, except for having a sales contract in place. The company was not approved because of this despite the fact that the company had received a few letters of intent from potential customers. Those letters specified that if the company were able to produce the product, potential customers would stand ready to purchase a set amount of tonnes per year. If a company meets other listing requirements and a QP has indicated that there will be markets for their products, then industrial minerals company should be able to exercise their right, like all other industries and all this listing requirement does is delay in fund raising process. The respondent further stated that if a company meets other listing requirements and a QP has indicated that there will be markets for their products, then an “industrial minerals company should be able to exercise their right”, like all other industries, and the only thing “ this listing requirement does is delay in fund raising process”.

4.6 Balancing the Materiality and Transparency with the Confidentiality of the Reports

Materiality and transparency are two main principles of all reporting standards for a mineral project. These principles require mining companies to disclose sufficient unbiased information that enables investors and their professional advisors to make sound investment decisions. This becomes an issue with public reporting of industrial minerals since, as an interviewed QP stated, the complexities that many industrial minerals have in terms of the relationship between chemical and physical properties of the mineral and the market requirements are such that "it is extremely difficult to disclose the information to the public in a meaningful manner without disclosing significant amount of propriety information". Such difficulties are not associated with base and precious metals.

The following question was posed to the interviewees:

- "How do we balance the materiality and transparency of the report with confidentiality of the (sale) contracts for industrial minerals?"

An interviewed QP from the UK explained that some industrial mineral companies would be "reducing or destroying their competitive edge" by disclosing prices, contracts that they have, total tonnage produced, total tonnage sold, who their customers are, and even some financial information. Disclosing prices, for example, might do damage to a company because the competitors might use that as a privilege to maybe offer a better price and take their market away. A manager of a large mining company (respondent) shared their concern that in some cases an industrial mineral company may be dealing with a number of customers who are competitors with each other with different products and specifications; by disclosing information about the contracts and production, "the company contradicts the confidentiality of the all industry because everybody knows what the company is selling to others".

Responses have been categorized into three main groups. The first group are mainly managers of small and medium industrial mineral companies. This group stated that materiality and transparency is a difficult issue and has caused serious concerns. They commonly stated that even if a company stays away from quoting the average price per tonne when they have revenue and production, people could simply back calculate and figure out what the selling price of the material is. This group prefers to not disclose this type of information; however, they thought it is extremely difficult to get around it.

The second group are mainly from large mining companies. Respondents of this group all suggested that confidentiality in industrial minerals is extremely important; however, it is not only limited to industrial minerals and is true for other sectors because of customers. They further stated that they had very little problem with reporting in terms of confidentiality as they don't publicly report details of individual contracts. They aggregate the quantities of the materials, and just report the amount of a mineral that was sold. They would not indicate to whom they sold it or what particular specifications the material had. Moreover, they do not report details of individual contracts because they do not consider it materiality to the investors.

The third group are mostly regulators and those who are in organizing committee of reporting standards. They mentioned that they work back and forth with the issuer to determine how material some information might be to them. They further explained that there are two main types of materiality: one that is material enough that requires a qualifying technical report, and the second that causes serious stock transaction such as when disclosing information to the public doubles the worth of a stock.

One interviewed regulator stated that evaluating materiality of information is a case by case process and there is neither "a general rule applies to it"; nor is there "a written guideline for

it". It is up to the officers dealing with the company to determine the materiality. Regulators suggested that if a mining company genuinely believes that disclosing such information damages the company, they can file "a confidential material change report" with the security commission, and if the information is regarded as sensitive, an exemption can be applied.

4.7 Classifying Industrial Minerals and MRMR Evaluation

The research participants commonly agreed that industrial minerals are diverse and, in some cases, too technical to be properly understood. Also, there are not many experts in this field that causes difficulties for companies and investors to find QPs with appropriate expertise. By developing more specific guidelines and definitions for industrial minerals, stakeholders may be better equipped to prepare and/or interpret reports for industrial mineral projects. With respect to this issue, the following question was given to interviewees: Should the reporting standards classify industrial minerals in a number of groups in order to make a suggestion of how to proceed with MRMR evaluation?

There were arguments in favour of subdividing; there were also stronger arguments in favour of not subdividing. Interviewees who were in favour of subdividing the categories believed that developing more specific recommendations would help to improve public reporting of industrial minerals. This would be particularly helpful in facing challenges in MRMR estimation and marketing studies. A few respondents in this group suggested the categorizing of industrial minerals could be based primarily on geology, while others suggested that it should be based on markets or the end users. An interviewed QP from USA suggested that chemical minerals follow "the same traditional approach with metals", but performance minerals must be evaluated on case-by-case basis since their characteristics are diverse. Kaolin, for example, is often evaluated by trial and error experimentation, based on product properties and what

potential customers require. A QP respondent suggested, “it is not practical to statically treat performance minerals information”; therefore, these minerals should be treated differently.

The second group of respondents to this question stated that the geology and the mining methods are quite diverse; however, the principles of MRMR estimations are absolutely identical to any other deposit that experts are dealing with. They believed that there should not be standardized approaches and/or recommended methods for estimating of MRMR. They would be hesitant to be restricted or to have a prescriptive methodology to classify or analyze any industrial mineral deposit. The second group strongly suggested that the proper way to deal with MRMR estimation is to hire capable QPs with appropriate skills and knowledge.

4.8 Private vs. Public

There are industrial minerals companies that prefer to stay private. The most commonly quoted reason for this, as explained in previous section, is the false perception that companies and QPs have with respect to disclosing sensitive information. A QP respondent stated that “they think by going public they have to disclose everything to the public; therefore, they might lose their competitive edge”. Another reason for the preference to stay private it is that some industrial mineral mines are small enough that outside funding is not required. A manager (respondent) of an industrial mineral company explained that going public often requires a lot of work, time, and resources, and is also “a big commitment for the management team of a company”. The same respondent further stated, “legal processes are costly, complicated, and lengthy”. These would be problematic for a new industrial mineral company. As a result, many companies tend to be hesitant to go public.

On the other hand, there are significant advantages for industrial mineral companies to go public, including access to public markets, potential increase in liquidity that allows founders to

harvest their investment, and reducing management team reliabilities (Brigham and Ehrhardt, 2003).

An interviewed expert from Canada believed that “there are neither formulas, nor written rules in terms of when or if an industrial mineral company should go public”. Managers of industrial mineral companies must put carefully consider whether they would really benefit by going public or staying private. Every situation is unique and depends on many factors, including the management team future strategies and goals and availability of capital.

4.9 Private Sector and MRMR Reporting

Reporting MRMR estimates in accordance with one of the reporting standards is required by exchanges and regulators for all publicly traded mining companies. Perhaps should also apply to private industrial mineral companies. Privately held industrial mineral companies tend to not report MRMR. An interviewed mining expert in financial institutions sees this as a significant difficulty that financial institutions are facing for evaluating these companies. The same respondent explained “without those qualifying reports, investors do not have enough and appropriate information to make a balanced investment decision”. A JORC member (responded) further added “not reporting MRMR properly provides a very strange picture of a company”. The same respondent pointed out that this issue also becomes problematic during acquisitions or mergers since there could be a case where “one of the involved companies has never bothered to do a detailed resource and reserve estimate”.

Preparing a qualifying report on MRMR for industrial mineral companies indirectly adds value to them. As an interviewed manager of an industrial mineral company explained that they actually learned in the process itself, and “in a way it forced us to be more diligent and to make

good business decisions". An experienced expert believed "many failures occur because of lack of discipline in calculating reserves and reporting things like that".

There are three types of companies in terms of reporting. The first group are private companies which complying with reporting standards is not mandatory. The second group are standard publicly traded mining companies listed on stock exchanges. These companies must have proper public disclosure in accordance with reporting standards. And the third group is international companies that hold mineral properties in countries that they are not publicly listed in those countries. Rio Tinto, for example, is an international mining company that is not listed in TSX, but holds resources and reserves in Canada. All the three groups share one common requirement: reporting resources and reserves to the government. An interviewed QP and PERC member stated that reporting MRMR to the government is significant because "government needs that statistical basis for the resource planning… they need to know the long term future of their minerals industries and what they can expect ...to do for the taxes and so on". By not receiving these reports, significant information is missing from the government database.

Every industrial mineral company must disclose their assets in one way or another. Additionally, as a QP (respondent) suggested "it would be beneficial to them [private companies] to prepare 43-101 reports". This is especially true if they want to expand and are looking for outside funding since preparing a qualifying technical report is a required step before finalizing any financial deal. The same respondent further stated "I think if those regulations and different aspects of them were better understood maybe more companies even if they are private, in industrial minerals business would be willing to prepare a NI 43-101 report". Another respondent added "by using the same system and standards, everybody [private and public companies] uses the same terminology, and the overall consistency of reporting increases dramatically."

4.10 Style of Reporting and Type of Information Provided

One of the concerns raised while interviewing research participants, especially those from investment community, was the style of technical reports. Investors are the most important target audiences of technical reports; therefore, it is important to understand what style of reporting connects better with investors and is user-friendlier.

These questions were posed to the research participants:

- What are the issues with the current style of reporting?
- What style of reporting provides the most useful information for the reader?

There is a point at which adding detail to technical reports can go too far. An interviewed mining expert from a financial institution stated, “they [technical reports] are ridiculous...so detailed; and so long that no one would read it”. Too much detail can easily confuse an average person in the public who may not know about that commodity. Additionally, the same participant explained, “people don’t have so much time to read through the documents”. One interviewed regulator and CRIRSCO member added that “people tend to write for their peers” as opposed to the public, and they forget who “their audiences” are. An interviewed mining expert from a financial institution said, “some of the materials in the technical reports are probably extraneous and probably tend to turn off the investors for reading the full report”. The same respondent further illustrated their point with explaining “climate and whole lot of other things that take quite a few pages are in the reports that are not really essential to making an investment decision”. The respondent also suggested that “maybe just reducing the mass” would be a good way to make the report more user-friendly.

An interviewed mining expert from a financial institution stated that “what the investors get in industrial minerals [reporting] is a false sense of security” because technical reports are

addressing some of the risks; however, “they are not addressing the relevant risk”. This respondent explained further “[NI] 43-101 is designed to look at the standardized mineral projects… standardized mineral risk, but industrial mineral projects have industry specific risks that are not addressed in [NI] 43-101”. As explained in previous sections, risks associated with industrial mineral projects are different, not necessarily higher than those of metal deposit. One of these risks is the risk associated with markets. One interviewed regulator stated “I would ask industrial minerals companies to add explanations about the marketing”; explaining and addressing risks that are specific to industrial minerals help different stakeholders of industrial minerals to understand the sector better, and “that is up to them [companies] to educate their readers”.

One interviewed SAMREC member believed “protecting yourself as a QP” is what drives QPs to generate reports which are too long and wordy. QPs put in as much explanation as they think that might be needed to protect their own position. The same respondent also stated that “it is hard to blame QP for doing that”, but at the same time it is very difficult for anyone, investors in particular, “to wave through reports”. A solution for this problem is to write a strong executive summary that is approved by the QP who prepared the report to ensure that it fairly represents their point of view. As a result, as an interviewed mining expert from a financial institution stated, providing “a certain guideline” on how to produce an executive summary is essential. A QP for industrial minerals added that it is also really useful “to have a glossary that explains technical terms.

Choosing the reporting style is a very project specific and, as an experienced QP (respondent) stated, depends on “what stage of the project you are at” and/or “the focus of the company into some extent”. The reports must be transparent and QPs must ensure that they cover

all aspects of the project. An interviewed QP for industrial minerals said “it is useful to standardize the way QPs write technical reports because such a template would make it easier for non-technical audiences to understand the reports”. One QP (respondent) argued, “we should not force QPs to take the tick box approach” to address everything, “you won’t get the materiality and transparency indeed”. The same respondent believed that every project requires a QP that has the skills and experiences to evaluate the project and prepare the technical report because by the “tick box approach”, it is almost impossible to be comprehensive with the list, and “someone would say that thing is not on the list and I don’t have to disclose”.

4.11 Does the Industrial Minerals Sector Require a Separate National Instrument?

As mentioned in the previous sections, there are significant differences between industrial minerals sector and metals sector. The metals sector deals with a clear market supported by metals exchanges (e.g., London Metals Exchange), and qualifying technical reports can be used as a good tool to communicate with potential investors. Industrial minerals sector, however, deals with much more complicated market and in some cases evaluation of a deposit is not about mining as much as it is about marketing. The following questions were posed to the interviewees with respect to these issues:

- Are the current reporting standards efficiently applicable to industrial minerals?
- Or we need a new reporting standard specifically designed for industrial minerals?”

Preparing technical reports and complying with reporting standards seem to be challenging for industrial mineral companies; small and medium size companies in particular. An interviewed manager of an industrial mineral company stated that “the 43-101 [report] was the biggest start holders...the biggest stop”, the same respondent explained, “it took us a lot of

effort, time, and resources, and it was a lot bigger than what we anticipated". A QP for industrial minerals (respondent) stated, "analysis of purely geologic terms is a false approach", which is why "those instruments don't work; and it won't work because that particular market does not work that way."

The same respondent added that "two or three very large players who would be very happy not to have other players coming in" control the industrial minerals market. When necessary skills and tools to evaluate and assess the viability of industrial mineral deposits are not widely available, the competition intensity raises for new companies that try to enter to the competition. An interviewed QP stated that qualifying technical reports "can be employed as an effective tool to evaluate an industrial mineral project", and not having appropriate standards for preparing those reports, only "helps two or three larger companies". This group believed that a new set of rules for evaluation and public reporting of industrial mineral sector is necessary.

On the other hand, a group of the research participants who are a CRIRSCO member and/or work for large international companies pointed out that although industrial mineral companies have difficulties complying with the reporting standards, an improved reporting standard can be applied to any type of mineral. An interviewed CRIRSCO member stated that "the difficulty is the industry sector is not used to thinking of that way", otherwise the reporting standards are generic enough to cover industrial minerals. The same respondent brought in to oversee disadvantages of having a different set of standards for industrial minerals and not "act in the same way as other sectors". The main disadvantage for the industrial mineral sector is that financial institutions are already familiar with reporting standards and they use reports by QPs as quality insurance. The same respondent believed "this is why fund raising has become easier for [metal] mining companies". The respondent further illustrated their point by providing an

example: one of the biggest problems that mining companies have from China and Russia “is going to financial institutions in the West...for funding their mining project in their country”; they cannot express their mining projects in the same way that “we used to do in a western code”. Moreover, western fund managers and financial institutions “understand the reporting standards now” and “they understand the differences between the resource and reserve and can make judgement on risk of any funding or investment”. The respondent concluded, “not adopting consistent codes for all minerals under all circumstances has quite a significant down side.”

4.12 Investors Mental Model with respect to Investment in Industrial Mineral

Investors in the industrial minerals sector are not limited to mining industry only; they also invest in other industries. As discussed in section 2.4, the competition for gaining investment dollars for industrial minerals companies is very intensive since they not only compete against other mining companies in other sectors; they also compete against all companies in other industries that are seeking investment dollars. Therefore, a better understanding of investment community decision making process by industrial mineral companies and improvements in communication with investors through technical reports increases the probability of gaining capitals.

As mentioned in section 2.4, there are three main investment factors, including confidence, credibility, and consistency, that investors consider while making their decision regarding investing in a mineral project (Miskelly, 2004).

The following questions were posed to the interviewees:

- How investors evaluate a mineral project?
- What are the indicators for the evaluation?
- How can we improve consistency, credibility, and confidence?

An interviewed professional advisor for investors in mining industry stated “an investor looks at three main indicators” to evaluate a mineral project: MRMR, cost structure and future cost of development, and the management team. The most important aspects are MRMR because they are the main assets of any mining company. Investors are also keen to have a good understanding of current and future mining costs. The third component is the management team’s reputation, which is built over time in succession of repetitive achievements. These indicators are addressed in this section with respect to the three main investment factors.

The respondents commonly agreed that public reporting of industrial minerals is inconsistent in Canada and around the world. Even though the reporting standards in different countries are very similar, it is difficult to compare and contrast two similar projects from, for example, Canada and Australia; this problem can exist even within one country. An interviewed PERC member added, in some countries like China “there is no requirement in reporting standards about what QP has to disclose, and how they should disclose it”. Therefore, every company around the world has different information that makes it difficult for investment community to understand the sector. A mining expert from a financial institution (respondent) stated, “the opportunity for global investors to properly compare companies around the world is currently not existed”.

An interviewed professional advisor for investment community in mining sector suggested that the starting point should be an “improvement in the overall consistency of the reports around the world”. The same respondent explained we need a global reporting standard, “substantially upgraded from the current standards”, which everyone complies with.

Preparing a qualifying technical report is a necessary step, required by lenders and financial institutions, before finalizing any financial deal publicly or privately. An interviewed

mining expert from a financial institution stated that a QP in preparing a qualifying report plays a significant role in improving the credibility of a company that owns a mineral project. A manager of an industrial mineral company (respondent) also stated “preparing a qualifying technical report itself is a really valuable process” for industrial minerals companies, small and medium size ones in particular. The same respondent said that preparing the qualifying technical report “shows investors that there is a due diligence process” and “the third party, the QP, has reviewed everything”. It also helps the management team to learn different aspects of their business before going to investors

One respondent from financial institutions stated, “a strong management team with proven track record improves credibility dramatically”. A team that is committed to principles and dedicated to “self regulation” of their company; the same respondent further reminded the Bre-X story and added “unfortunately, one Bre-X does more damage than one thousand well reported companies”. One respondent from an international mining company believed that a strong management team develops a good relationship with financial institutions that ultimately helps in improving the credibility of a mining company. The same respondent added, “nothing would ever provide credibility greater than achieving results” and delivering what the management team has promised to lenders and investors.

An interviewed mining expert from a financial institution from the UK provided two approaches for improving the credibility: a long term and a short term approach. The first, long term approach, requires mining companies to be transparent and fully honest with different stakeholders of the sector. The second, short-term approach, asks industrial mineral companies to try not to over promise in desperation to raise money and instead try to “be realistic in terms of what is required and what will be achieved”.

With respect to confidence, an interviewed manager of MRMR estimation group in an international mining company stated that the main barrier for industrial mineral companies to raise funds is “general lack of familiarity of financial institutions with industrial minerals sector”. The same respondent added, “there are not enough experts in financial institutions to understand industrial minerals to take a risk, or recommend that it is worth taking the risk”. The fact is that there is an invisible link between investor knowledge and confidence. The higher the knowledge level regarding an industry, the more positive investor attitudes seem to be. Without proper knowledge, investors cannot appropriately evaluate risks involved in investing in an industrial mineral project; therefore, the industry appears risky to them.

Being transparent in reporting and providing enough material also enhance credibility that leads to higher investors confidence. An interviewed mining expert from a financial institution in Canada stated, “one of the common mistakes that industrial mineral companies make is reporting historic costs to the public”. The same respondent believed potential investors are keen to see future mining and development costs, instead of the historic costs because “future prosperity is what matters to them”.

One of the ways to improve the situation, as an interviewed mining expert from a financial institution in Australia suggested, is to educate the investors in the mining industry on the risks involved in industrial mineral projects and the potential financial rewards. These can be achieved through improvements in consistency of the technical qualifying reports that elevate knowledge of the investors, and educate them over time. The same respondent explained that “by familiarizing investors with the industrial minerals sector, cycles and the volatility involved in this business, industrial minerals companies can promote reasonable expectations” which would

avoid having un-happy investors because of the mining business cycles. This ultimately improves investor confidence in industrial minerals

5 Discussion

5.1 Introduction

As discussed in section 2.4, third party compliant reporting standards govern how mining companies should disclose technical information concerning their mineral assets. This reporting standard applies to any issuer that discloses information to the public (CSA, 2005a). Mineral Resources and Mineral Reserves (MRMR) are critical in the determination of mining companies' financial results (Goldsmith, 2002). Moreover, preparing a qualifying technical report is a necessary step, required by lenders and financial institutions, before finalizing any financial deal publicly or, in some cases, privately. As a result, the importance of reporting standards has been increasing and will continue to do so in the future.

The initial hypothesis of this research was to improve National Instrument (NI) 43-101with respect to industrial minerals in order to answer the research question, *how to improve public reporting of industrial minerals*? After completing the research, however, it became clear that NI 43-101 is only one of several components that need to be improved for proper public reporting. In addition to the NI 43-101, the Canadian Institute of Mining, Metallurgy, and Petroleum (CIM) Definition Standards, CIM Best Practices, and stakeholders' perception of the public reporting need to be improved in order to enhance public reporting of industrial minerals.

This chapter consists of two main sections. The first discusses results and findings of interviews with respect to public reporting of industrial minerals public reporting. The second section analyzes the mental model of investors with respect to industrial minerals investment and provides insight into the invisible link between public reporting of industrial minerals and investor confidence.

5.2 Public Reporting of Industrial Minerals

Different reporting standards and guidelines have different approached in terms of defining industrial minerals as explained in section 4.2. This becomes a confusing issue for stakeholders of the sector because it is not clear if a mineral is an industrial mineral, or not. This issue was raised during interviews of several stakeholders of industrial minerals worldwide. It became clear that most of the interviewees do not have a common definition for industrial minerals since interviewees often asked to explain what the researcher meant by industrial minerals. It is for the benefit of all reporting standards to incorporate a universal definition for industrial minerals since it provides a common ground for different stakeholders of the industrial minerals sector.

The QP concept is one of the main pillars of reporting standards for any mineral project. Although it is conceivable that there are situations, as explained in section 4.3, where a QP evaluating an industrial mineral project should not be necessarily an engineer or geoscientist, the definition of QP seems to be sufficiently general to handle industrial minerals. It would be useful to add a paragraph to the CIM Definition Standards that states the relevant experience required for a Qualified Person (QP) in industrial minerals.

All regulatory codes and NI 43-101 have a strong emphasis on exploration and geology as a means to determine MRMR validity. Exploration for industrial minerals, as discussed in section 4.4, is not as important as it is for base and precious metals. The current guidelines and standards properly address exploration for industrial minerals.

Geology for industrial minerals tends to be relatively straightforward. All industrial minerals, however, require a valid and up-to-date market study for MRMR estimations. For mineral resource estimation, experts do not often do a full market study; having a conceptual

market for the mineral, and a rough idea of major costs, such as transportation and mining, is adequate to complete mineral resource estimates.

Modifying factors, as explained in section 4.4, are the factors that convert mineral resources to mineral reserves. Most of the interviewees from Canada were not familiar with the term “modifying factors” because unlike the JORC code, neither CIM Definition Standards nor NI 43-101 defines modifying factors. This term, however, is used in the “figure 1” of CIM Definition Standards (CIM, 2005: 7).

The two key components in the conversion of mineral resources to mineral reserves for industrial minerals are securing buyer(s) and the state of markets because without them any industrial mineral is only, as explained in section 5.4, a geological occurrence. Market studies are particularly important and are the most important modifying factor. For mineral reserve estimation of most of industrial minerals detailed and comprehensive market studies are required.

NI 43-101 and regulatory codes do not direct QPs as to how a market study must be carried out for a mineral deposit, nor do they provide standards for how QPs must report marketing information. Completing a comprehensive market study for a given mineral reserve is quite challenging, as explained in section 4.5.

Mining companies rarely match their forecast; they generally either beat it, or underperform it. Those companies that are in production would outperform or underperform their forecast usually because of the fluctuation in prices of commodities. Developing companies, however, often make unreasonable promises to raise money since they are competing with other companies for the same dollars; therefore, by nature, they likely to underachieve their forecast. In addition to not matching forecasts by mining companies, QPs provide a single

deterministic estimate for the investors in terms of MRMR estimates, and they poorly address risks associate with the estimates. This leads investors to wrong conclusion since investors tend to take MRMR estimates as facts, not estimates, and use them as basis for their financial analysis. Investors, in general, are sensitive to risk, and when the risk involved in MRMR estimation are not properly explained for them, they cannot properly evaluate the risk associated with the investment. This creates the notion that the mining industry is a risky industry.

Industrial minerals are diverse and, in some cases, too technical to be understood by the general public. There are not many experts in this field which makes finding QPs with appropriate expertise difficult for companies and investors. Without being prescriptive, providing general broad guidelines for MRMR estimation and market studies could be in benefit of the sector. These recommendations, however, should not be in competition with the CIM standards or other standards, and QPs should be able to exercise their expertise and use whatever method that they think is appropriate; otherwise these recommendations will meet resistance by the industry.

Reviewing the responses with respect to balancing materiality and transparency with the confidentiality of the reports, three aspects are worth to highlight: the size of companies, lack of industry knowledge of confidentiality, and understanding how to balance transparency with confidentiality.

The size of companies plays a significant role in evaluating what material is and what is not. The larger the company, the easier it is to deal with confidentiality issues. A small company trying to raise funds might need to disclose some contractual information to the funding agencies; however, they should do that in private, and there should not be requirement for that

information to be public. On the other hand, large companies like Rio Tinto and BHP Bulletin, as explained in section 4.6, report their industrial mineral projects to the public with no problem.

There is a lack of general knowledge in the industrial mineral industry about what materiality is and the options that they have to deal with the confidentiality issue. This has created the following false perception for industrial mineral companies: *if a company reports publicly, the company has to disclose sensitive information and that would damage the company by losing its competitive advantage*. This false perception has caused many industrial minerals to stay private, despite their immediate financial needs. There are no formulas or written rules in terms of when or if an industrial mineral company should go public. While taking into account the advantages and disadvantages of going public for an industrial mineral company, managers of industrial mineral companies must carefully consider whether they would really benefit by going public or staying private. Every situation is unique and depends on many factors, including the management team future strategies and goals and availability of capital.

Investors are the most significant target audiences of technical reports. It is, therefore, important to ensure qualifying technical reports are prepared for the right audiences. The current technical reports, as discussed in section 4.10, are mostly too long and too technical to be properly understood by the investment community. On the other hand, QPs who prepare technical reports should be able to freely exercise their expertise and write as much as they feel is necessary. In addition, choosing the reporting style is a very project specific. It depends on, as explained in section 4.10, the stage that a company is at and the focus of the company. We should not, therefore, dictate how QPs write technical reports.

Every industrial mineral company, as discussed in section 4.9, must disclose their assets, MRMR, in one way or another. In the author's view, it is particularly beneficial to privately-held

industrial mineral companies to report their MRMR in accordance with the reporting standards. This should not only help them to be better understood by the investment community, but also improve the overall consistency of public reporting.

There are significant differences, as explained in section 4.4, 4.5, and 4.11, between industrial minerals sector and metals sector. Preparing technical reports and complying with reporting standards seem to be challenging for industrial mineral companies; small and medium size companies in particular. It seems logical to conclude that the current reporting standards and guidelines are not appropriate for public reporting of industrial minerals.

5.3 Investors Mental Model with respect to Investment in Industrial Minerals

This section, based on the findings of this research, analyzes the mental model of investors with respect to industrial minerals investment and provides insight into the invisible link between public reporting of industrial minerals and investor confidence. It is important, as discussed in section 2.4, to understand how investors think and make an investment decision with regard to a mineral project. This seems, however, to be difficult due to subjective nature of making investment decision (Grable, 2000).

A mining company, as discussed in section 2.3, evolves through three stages: exploration, development, and operating. Based on the stage that a mining company is at and the company's risk profile, mining companies are dealing with different target audiences, investors in particular. These investors have different characteristics in terms of maximum level of the risk that they would take, risk tolerance, and their expected rate of return on their investment. The importance and influence of the three main investment indicators, including MRMR, cost structure, and the management team, also vary based on the stage that a mining company is at and the target audience.

For junior and start-up industrial mineral companies, as explained in section 2.3.1, the first round of funding comes from family and friends, while the first round of external financing often comes through a private placement of equity to one or a few individual investors. Companies at this stage present higher risk since they don't have cash flows, future costs are not completely determined, and their future prosperity depends heavily on mineral resources rather than mineral reserves. Investors tend to take the highest level of risk which leads to higher level of expectations in terms of investment rate of return. At this stage, MRMR seem to be the most important investment indicator for potential investors. Individual investor would, in most cases, spend fair amount of time analyzing and evaluating the company's assets, plans and potentials in the case that they are interested in investing in a particular industrial mineral project. Providing reliable and enough information for investors, therefore, is the key in this process. Although preparing a qualifying technical report in accordance with reporting standards is not fully mandatory at this stage, it is proved to be helpful for gaining investors trust, external investors in particular. Qualifying reports are helpful because they address MRMR, future assets of a mining company, in a standardized manner.

In many cases for industrial mineral companies, as explained in section 2.3.2, the resources of individual investors are not sufficient and they have to turn to a venture capital fund. Venture Capitalists (VCs) screen hundreds of companies, and often fund a portfolio of around a dozen companies. The risk associated with investment at this stage is still relatively high. The industry or the sector that VCs will choose to invest in usually is not predetermined; instead they look for valuable projects with relatively significant returns and are willing to take higher risks. VCs are usually knowledgeable in mining. Their knowledge, however, is limited to base and precious metal sector. As a result of that, Industrial minerals companies facing a difficult

challenge at this stage, and the possibility of gaining funds through VCs is relatively low. One of the main reasons for this is that industrial minerals contain different set of risks, not necessary higher risk, compared to metals sector, and industrial minerals companies have been reluctant to address this issue. Additionally, some experts believe that industrial mineral projects involve more complicated technical concepts compared to metal sector. They are, therefore, more difficult to be understood.

Enhancements in communications with VCs would improve the situation. This can be achieved through preparing qualifying technical reports in accordance with reporting standards which is also a required step at this stage. Communication with investors through public reports has become popular more than ever; therefore, it is beneficial to the industrial minerals companies to prepare technical reports that target right audiences.

Although cost structure and credibility of the management team of an industrial mineral company are important, MRMR seem to be more important factor because investors are looking for future prosperity. It is worth mentioning that mining companies at this stage tend to over promise or overvalue their assets in desperation to raise money. This will damage the credibility of the sector significantly. Industrial minerals companies, therefore, are better off by being realistic in terms of their assets, future goals and achievements.

In general, banks become involved with lending or advancing finance to a mining company, as discussed in section 2.3.3, when companies are either at development stage or production stage. Most of the banks, large banks in particular, have built an in-house mining expertise in their system, or retain the services of well known consulting firms. These groups include experts with many years of experience in the mining industry; however, they are not familiar with industrial minerals as much as they are with metals.

The main barrier for industrial mineral companies to raise funds, as discussed in section 4.12, is lack of familiarity of financial institutions with industrial minerals sector. Banks rely on their internal or external mining experts to make an investment decision regarding a mineral project. When banks mining experts have low knowledge regarding industrial minerals, their attitudes toward investment in the sector would not be positive. This is because they cannot properly evaluate risks involved in investing in an industrial mineral project; therefore, the industry appears risky to them. Improving the level of industrial minerals knowledge by bank mining experts is the first and main step for gaining funds.

Inconsistency in public reporting of industrial minerals, as explained in section 4.12, has significantly contributed to lack of knowledge in financial institutions. There are several reasons, as discusses in section 5.2, for inconsistency in public reporting of industrial minerals, including not having appropriate reporting standards available, and adopting non-standard terminologies by QPs. These issues will be overcome through improvement in reporting standards and consistent reporting by companies.

Mineral reserves are the key in the evaluation process, and are also the main indicator in determining the size an interest rate of a loan. Bank mining experts conduct a detailed risk assessment in which different categories of mineral resources and mineral reserves are considered as risk categories. Banks are usually the most conservative financial institutions in terms of taking risks. The level of profit margin and probability of losing money measure risk for them. Even though banks rely on QPs for equity raising or private placements, they still do certain level of due diligence. For lending purposes, banks usually have a much more in depth engagement process in which they use their own mining experts to do a very thorough review of what the QPs have reported.

As discussed in section 4.5, predicting cash flows is difficult for industrial minerals. Banks are; therefore, keen to see a contract in place or at least an indicator that demonstrates good understanding of market in a particular region. Providing appropriate proofs that indicate an industrial mineral company will be able to sell their products is the key at this stage. Bank experts also ask for a detailed report on transportation costs because they are typically the most significant component of the final cost.

The management team of an industrial mineral company that seeks external funds needs to develop a good relationship with banks in order to improve the credibility of the company. This relationship with financial institutions and credibility of the management team will be improved by delivering what the management team has promised to lenders and investors, and achieving results. Additionally, being transparent in reporting and providing enough material enhances credibility that leads to higher investor confidence. It is, therefore, crucial to provide a valid qualifying report that properly addresses MRMR, and cost structure of the company. Here is where the required knowledge can be gained.

A mining company at any stage can become a publicly traded company if they meet minimum requirements of that specific public market that they want to get listed on. Depending on the level of business activity of a company, as explained in section 2.6.3, they can be listed on different divisions of public markets. As the level of business activity rises, the listing requirements and rules become tighter.

In public markets, industrial minerals' target audiences include investors with wide ranging expertise. Qualifying technical reports are the main source of information for investors, and must provide necessary information for investors and their professional advisors. Preparing qualifying technical reports are not only mandatory for all publicly traded mining companies, but

also are beneficial to the companies themselves. They improve the credibility of the company since they show potential investors that there is a due diligence process reviewed by a QP. These reports also help the management team to learn different aspects of their business. Connelly and Knuth (1999) suggested that the way that information is presented influences the extent that audiences understand and respond to risk. It is, therefore, important to provide enough information for the investors in a right format and plain language in which it targets the right audience based on the stage that the company is at.

These reports could also be used by industrial minerals sector to educate investors on the mining industry, risk involved in industrial mineral projects, and potential financial rewards through consistent reporting. These elevate knowledge of the investors, and educate them over time. By educating investors, industrial minerals companies can promote reasonable expectations that ultimately lead to higher investor confidence in industrial minerals and help the sector in long term.

Inappropriate public reporting by industrial mineral companies is one of the reasons for not getting enough attention from the investment community. There are other factors that have contributed to this problem, including the investment community's overall view of industrial minerals, high technical level of industrial mineral projects, and general rate of return of investment in industrial minerals. The overall view of the investment community is that industrial minerals are less appealing or "unfashionable" investment sector than metal sectors investments. They also think that the industrial minerals industry is generally a more difficult business to understand than other mining sectors.

There is a false perception that makes investors hesitant to invest in the industrial minerals sector. This perception suggests that this sector is not able to produce high investment

returns. Economic theories suggest that expected value of taking risk determines a choice between a risky investment and sure investment (Mellers et al, 1999). Investors are typically risk averse in gain situations. In the loss situations, where high risk is associated with the investment, investors seek higher investment returns (Thaler et al, 1997). In general, the mining industry, as discussed in section 2.4, is characterized by high investment risks; therefore, some investors are looking for significant returns on their investment to compensate for taking on the higher risks. Investors, however, think that this sector is not associated with high investment returns. One of the research participants from a financial institution suggested that this notion was due to not knowing enough people who have financially benefitted through investing in industrial minerals sector. This would, therefore, eliminate a group of investors that are willing to take on the necessary higher risks. All of these factors have contributed to the false perception that makes investors hesitant to invest in this sector.

A few interviewees from financial institutions believed that investors have low interest and limited time to understand industrial minerals. For instance, when one interviewee was asked about why financial institutions in-house mining groups do not include experts with industrial minerals skills, the interviewee stated that it is hard to justify such groups. They mostly think the amount of revenue that can be generated is relatively low, the risk involved is relatively high, and the cost of having specialized team that can do the evaluation on small sector of an industry is high. Only 25% of the research participants from financial institutions and investment community thought that industrial minerals companies properly communicate with investors and financial institutions on a regular basis, where as 75% of the research participants from industrial minerals sector thought that they do a thorough job in that regard. It is, therefore, possible to

state that the communication with the investment community needs to be improved by the industrial minerals companies.

In a nutshell, any industrial mineral company at any stage and with any size that seeks investors dollars requires gaining investor confidence. This research suggests that improvement in public reporting of industrial minerals affect industrial mineral in a positive way in terms of gaining investor confidence and changing the current perception of the sector. The investment community overall perception of industrial minerals, however, is consist of changeable sections and un-changeable sections. The changeable sections include risky appearance of the sector, investors' low knowledge of the sector, and high technical level of the industrial mineral projects. These can be improved, as discussed in section 4-12, by enhanced public reporting and more effective communication with investors. The unchangeable sections include "unfashionable" feature of investment in industrial minerals, and overall low investment rate of return. These are difficult or almost impossible to be changed. It seems reasonable to state that there is an invisible link between investor confidence and public reporting of industrial minerals.

6 Recommendations

6.1 Introduction

This chapter presents recommendations for improvement of industrial minerals public reporting. These recommendations are based on the gathered information through interviews and include:

- Creating a universal definition for industrial minerals
- Explaining what the relevant experience is for industrial minerals
- Emphasizing on the importance of an up-to-date market study, and required level of its confidence for evaluation of MRMR
- Adding definition of modifying factors
- Identifying key modifying factors for industrial minerals
- Adding a section in NI 43-101 that provides standards for reporting of market studies
- Including a section in NI 43-101 that requires QPs to address the risk involved in their estimates and provides a standardized format in which the risk needs to be reported
- Providing general broad guidelines for MRMR estimation and market studies
- Removing the listing requirement of stock exchanges for industrial mineral companies that mandate them to provide a sales contract in place
- Dealing with issue of balancing the transparency and materiality with the confidentiality

- Adding a specific section to NI 43-101 that provides standards for writing an executive summary
- Finally encouraging privately held industrial mineral companies to report their MRMR in accordance with the reporting standards.

6.2 Recommendations for Improvement of Industrial Minerals Public Reporting

It is for the benefit of all reporting standards to incorporate a universal definition for industrial minerals since it provides a common ground for different stakeholders of the industrial minerals sector. This new definition needs to be a combination of the listed definitions in section 4.2. The proposed definition is,

'*any rock, mineral, or natural occurring substance of economic value, exclusive of metal ore, mineral fuels, and gemstones; these minerals are often sold based on their chemical and physical specifications and their marketability. These minerals also are distinguished on the basis of volume and grade*'.

In addition, a list of minerals that are considered industrial minerals should be provided in the appendix. This list needs to be revised on a regular basis to ensure validity of the list.

Experts tend to recognize CIM Definition Standards as the first and main reference for definitions used in qualifying technical reports. CIM Definition Standards, however, does not include the definition of industrial minerals. This definition, therefore, will be more effective if it is incorporated into the CIM Definition Standards itself, rather than the CIM Best Practice Guidelines.

An explanation is required to provide a clear idea about who can be a QP for industrial minerals. The proposed explanation is"

'*a QP for industrial minerals requires not only adequate experiences with geology, mining techniques, and process technology, but also with markets that the material is used in, the particular process that is required to meet the market requirements, and logistics costs'*.

It would be useful adding the definition of modifying factors to both CIM Definition Standards and NI 43-101 in order to create consistent reporting standards worldwide since it is a commonly used term in other reporting standards worldwide. The two key components in the conversion of mineral resources to mineral reserves for industrial minerals are securing buyer(s) and the state of markets because without them any industrial mineral is only, as explained in section 5.4, a geological occurrence. Market studies are particularly important and are the most important modifying factor. For mineral reserve estimation of most of industrial minerals detailed and comprehensive market studies are required.

Being prescriptive in terms of how a QP must complete a market study for an industrial mineral deposit does not seem to be appropriate because every deposit is unique and requires different marketing techniques. NI 43-101, however, must provide standards that mandate QPs to present and report market studies in the same format. This change needs to be incorporated into NI 43-101.

In qualifying technical reports, the emphasis must be on addressing the uncertainties in the modifying factors and taking a risk based approach for MRMR estimation. It is for the benefit of all stakeholders to add a section into NI 43-101 that requires QPs to address the risk involved in their estimates and provides the format in which the risk needs to be reported.

Through this research it became clear that if an industrial mineral company meets other listing requirements and a QP has indicated that there will be markets for their products, then there is no reason to mandate the company to provide a sales contract. Providing a

comprehensive prospectus report to indicate that the company will get a sales contract and/or receiving letters of intent from customers might encourage regulators to remove this requirement.

A stronger communication by the regulators is required to reverse the wrong perception with regarding balancing materiality and transparency with confidentiality. Perhaps wording should be added in the NI 43-101 and other reporting standards that indicate companies have such an option to discuss the issue with the regulators. There is not a black and white resolution for balancing the transparency and materiality with the confidentiality issue, and all the stakeholders should consider the entire context. No company should give away any competitive information or trade secrets, but giving prospective investors enough information will validate the business.

We should not dictate how QPs write technical reports. A recommendation for solving investors' problem with long and complicated technical reports is to write a strong executive summary that is approved by the QP who prepared the report. This is to ensure that it fairly represents their point of view. A specific section needs to be added to NI 43-101 that provides standards for writing an executive summary. It is also beneficial to the readers to provide a glossary in technical reports that explains technical terms.

It seems logical to conclude that the current reporting standards and guidelines are not appropriate for public reporting of industrial minerals. The author, however, rejects the notion that new sets of standards and guidelines are required because of the differences between industrial minerals and metal sector. Financial institutions are already familiar with reporting standards and they use QPs' qualifying reports as quality insurance that has made fund raising process simpler for mining companies. Introducing new standards creates inconsistent technical

reports with other mining sectors that make it more complicated for the investors. Moreover, diversity of the commodities reminds us to keep the standards on relatively high level. Incorporating the recommendations outlined in this chapter will assist improving public reporting of industrial minerals.

7 Conclusions

7.1 Introduction

Third party compliant reporting standards govern how mining companies must disclose technical information concerning their mineral assets. These reporting standards apply to any public issuer. Mineral resources and mineral reserves (MRMR) are critical in the determination of financial results of mining companies as well as their initial mineral asset base. Moreover, companies must present a qualifying technical report in accordance with existing reporting standards as a necessary step, required by lenders and financial institutions. This is a required step prior to finalizing any financial deal publicly or, in some cases, privately. Industrial mineral companies are facing serious challenges in terms of gaining capital. They have to compete not only with other mining companies working with other mineral commodities, but also with all public companies in other industries that are seeking investment dollars.

Qualifying technical reports could provide a tool that facilitates the gaining capital process. During this research project it became clear that the current compliant reporting standards do not provide the necessary standards and guidelines for developing effective qualifying technical reports. An improved reporting standards, therefore, is essential.

The following chapter is composed of a summary of the thesis, the potential applied and theoretical contributions of the research, and makes recommendations for future research. Finally, it presents the author's concluding thoughts.

7.2 Thesis Summary

The objective of this research was to improve public reporting of industrial minerals. This work required input from stakeholders of industrial minerals sector with different points of view with respect to the research topic. These stakeholders include Qualified Persons, Ore Reserve Committees, professional advisors for the investment community in mining sector, senior-level mangers of mining companies, exchange managers in mining sector, investors, and regulators from Canada, Australia, the UK, South Africa, and the USA.

The research question was, "how to improve public reporting of industrial minerals for different stakeholders?". In order to answer the research question, semi- structured interviews were employed and about 15 different questions, as shown in Appendix A, were posed to the research participants.

The logic behind the interviews was to figure out difficulties and issues that different stakeholders of the sector were facing in terms of either preparing qualifying technical reports or understanding and interpreting them. This provided insight into deficiencies existing in the third party compliant reporting standards.

The initial answer to the research question was to improve National Instrument (NI) 43-101with respect to industrial minerals. After completing the research, however, it became clear that NI 43-101 is only one of several components that need to be improved for effective public reporting. In addition to the NI 43-101, the Canadian Institute of Mining, Metallurgy, and Petroleum (CIM) Definition Standards, CIM Best Practices, and stakeholders' perception of the public reporting need to be improved in order to enhance public reporting of industrial minerals. A list of proposed improvements is provided in section 5.2.

A better understanding of the investment community decision making processes and improvements in communication with investors will increase the probability of gaining capital.

This research examines the main indicators that investors review to evaluate an industrial mineral project. These indicators include MRMR that are the principal basis for the value of any mining company, management team's reputation which is built over time in a succession of achievements, and finally cost structure and future cost of development which are crucial to a company's future prosperity.

All these three indicators contribute to increasing investor confidence for investing in industrial mineral sector. This research provides insight into the importance and influence industrial minerals public reporting in increasing investor confidence. In other words, there is an invisible link between public reporting of industrial minerals and investor confidence.

7.3 Practical and Scholarly Contributions of the Research

The valuable contribution of this research involves development of recommendations for improvement of public reporting with respect to industrial minerals. It reviews the efficiency of reporting standards in terms of public reporting of industrial minerals, addresses the inefficiencies through highlighting what needs to be improved, and suggests how these changes could be achieved. Different stakeholders of the industrial minerals sector are expected to benefit to some extent from this research.

Preparing qualifying technical reports in accordance with one of the reporting standards is required by exchanges and regulators for all publicly traded mining companies. This, however, is not mandatory for privately held mining companies in most cases. This research points out the value of preparing qualifying technical reports for all industrial mineral companies regardless of whether it is mandatory or not. It has two main advantages for industrial mineral companies. First, it eases the difficulties that financial institutions are facing for evaluating industrial mineral projects through providing enough and reliable information for investors and their professional

advisors for making a balanced investment decision. This increases the probability of obtaining investor dollars for the industrial minerals sector. Second, it indirectly adds value to industrial mineral companies since it forces the companies to be more diligent and make better business decisions. The government also benefits from consistent reporting by mining companies since it provides the statistical basis for their resource planning.

While preparing qualifying technical reports, Qualified Persons (QPs) face serious challenges in complying with reporting standards. This is due to geology/exploration-focused nature of the reporting standards. This research will facilitate the qualifying technical reports preparation process through recommendations provided in section 5.2. These recommendations aim to improve reporting standards with respect to industrial minerals that ultimately helps QPs to prepare better qualifying technical reports. This can become even more important if when the demand for industrial minerals increases, but experts' skills and knowledge are in short supply. Industry will benefit from this the most.

For regulators and CIM Ore Reserve Committee members, this research provides insight into what difficulties and issues different stakeholders of industrial minerals sector are facing during preparing, reading, or interpreting industrial minerals public reports. Currently, complying with the reporting standards is quite frustrating for the industry because the standards are customized to metals with focus on geology and exploration that are the least important factors for industrial minerals. Reporting standards, therefore, are more reliable and practical for this sector if the regulators and CIM Ore Reserve Committee take the stakeholders' thoughts and comments into account. Doing so will increase the credibility of the reporting standards in the eyes of industrial mineral companies, privately held in particular, and likely decrease the general frustration with reporting standards.

This research also contributes to improvement of industrial minerals public reporting in other countries, including Australia, South Africa, the U.K, and the USA. As explained in section 2.10, despite the differences in reporting environment of the mentioned countries, their reporting standards are 90-95 % comparable. The developed recommendations in this research, therefore, are applicable to their reporting standards.

Despite the importance of the qualifying technical reports to industrial mineral sector, there are very few publications on this topic. This research highlights the importance of the topic through representing effects of qualifying technical reports on the industrial minerals sector, and deficiencies of reporting standards with respect to industrial minerals. These will, hopefully, persuade industrial mineral companies to invest in this type of research that ultimately encourages the academia to pay more attention to the topic. This will prepare the ground for future work.

7.4 Recommendations for Future Research

In the previous chapters, the research demonstrates a need to add sections to reporting standards. These sections provide standards and guidelines for preparing and reporting market studies, and writing executive summaries. This research, however, does not provide the details for these standards. Developing those sections will be essential and requires a significant amount of time since feedbacks from different stakeholders of the sector need to be collected, analyzed and incorporated into the standards. This will complement this research and will add value to the reporting standards.

As explained in section 4.5, QPs often provide a single deterministic estimate for the investors in terms of MRMR estimates, and they poorly address risks associate with the estimates. These have led the investment community to the wrong conclusion that the mining

industry is a risky industry since investors tend to take MRMR estimates as facts, not estimates, and use them as basis for their financial analysis. One issue worth of examination is that how QPs can stay away from a single deterministic estimate for MRMR, and present their estimates in ranges followed by full explanation of risks associated with the estimates. Additionally, a practical method to transfer these ranges to proper basis for investor financial analysis needs to be explored. These need to be examined for mining industry in general, not just the industrial minerals sector.

As explained in section 5.2, inappropriate public reporting by industrial mineral companies is one of the reasons for the lack of attention to industrial minerals from the investment community. There are other factors that have contributed to this problem, including the investment community's overall view of industrial mineral. The perception is consisting of risky appearance of the sector, high technical level of the industrial mineral projects, "unfashionable" feature of investment in industrial minerals, and overall low investment rate of return. As stated in section 5.2, the risky appearance of the sector and investors' low knowledge of the sector will be improved through enhancements in public reporting of industrial minerals. The latter two components of the perception, however, need to be investigated in details to figure out the root causes, and to develop recommendations for improving the situation.

One of the outcomes of this research is that the communication between industrial mineral companies and financial institutions needs to be improved significantly since only 25% of the research respondents from the investment community believed that industrial minerals companies properly communicate with investors on a regular basis, whereas 75% of the research respondents from industrial minerals sector thought that they do a thorough job in that regard. A

future research perhaps can be conducted to evaluate the communication in details, and to provide effective suggestions for improving it.

7.5 Concluding Thoughts

Lack of financial support from investors for industrial minerals companies has caused serious problems for these companies. These issues include losing market to a few international companies, and disability of industrial mineral companies to expand their operation and market share. This research identifies qualifying technical reports as one of the key components of financial institutions decision making regarding an investment in a mineral project and the need to improve public reporting of industrial minerals company. Investors and financial institutions are not able to properly assess industrial mineral projects because the qualifying technical reports do not contain necessary information for the evaluation process. One of the main barriers that industrial mineral companies are facing for preparing appropriate technical reports is that the current reporting standards and guidelines do not adequately address industrial minerals.

This research has identified inefficiencies in public reporting of industrial minerals and presents guidelines for improvement of reporting standards and guidelines. These, however, will not be enough to improve the situation for industrial minerals companies. Their participation and willingness to report properly to the public, investors in particular, play a great role in that regard.

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9 Appendices

Appendix A. Initial Recruitment Letter

Hi (name of the interviewee),

This is Pooya, a masters student with Mining department of University of British Columbia, Vancouver, Canada.

I believe your contribution to our research will be extremely important as of course your current involvement with industrial mineral projects, your valuable experience, and I was also advised by (name of the person who recommended the potential interviewee) and my supervisors in Mining department to contact you.

I summarized our research as following:

The goal of this research is to develop recommendations for improvement of National Instrument 43-101 (NI 43-101) in order to address current issues and difficulties of industrial minerals Mineral Resource and Mineral Reserve (MRMR) and exploration information public reporting. (It should be noted that these recommendations will ultimately be applicable to other regulatory codes, including but not limited to JORC, CRIRSCO, PERC, SAMREC and etc.).

Objectives of this research are to collect information regarding the followings:

- Consequences of inconsistent MRMR and exploration information public reporting in industrial minerals sector.
- Industrial minerals' market dynamic and structure, and associated market study challenges.
- Different methods of industrial minerals MRMR estimation that have been practiced in industry
- Effects of factors that are less applicable to metallic mineral deposits for MRMR report preparation, including particular physical and chemical characteristics; mineral quality issues; market size; the level of the producers' technical applications knowledge; market concentration; and transportation costs
- Difficulties that Qualified Persons are facing during the NI 43-101 preparation
- Barriers of gaining capital and reasons for reluctance of financial institutions to invest in industrial minerals sector
- Barriers for growth in industrial mineral sector
- Examine in more detail the conflict between publicly listed companies and private companies with respect to disclosure
- Legal process of acquiring and/or developing an industrial mineral project and associated issues

An extensive literature review has been compiled on the topic, "Development of recommendations for improvement of National Instrument 43 101 with respect to

Industrial Minerals", in which I have tried to review related publications in order to compare and contrast some of the regulatory codes, to review revolutions of those codes, to figure out how each code addresses industrial minerals, and finally to find out about the issues with MRMR and exploration information reporting in industrial minerals sector.

The third and current step of our research would be interviews. A "semi-structured" interview will be designed in which a list of questions will be asked; however, the order of questions could vary and particular questions could be removed or added based on whether the subject is one of the following:

- Qualified Persons who have practiced NI 43-101 (or any other regulatory code) and/or been involved with MRMR report preparation
- CIM Ore Reserve Committee, the JORC code committee, The PERC code committee, The SAMREC committee
- Professional advisors for financial institutions in mining sector, especially in industrial minerals sector.
- Senior-level Mangers and presidents of industrial mineral companies
- Toronto Stock Exchange (TSX) managers in mining sector.
- Toronto Stock Exchange (TSX)-Venture managers in mining sector.
- Individual and independent investors who have invested in mining and particularly in industrial minerals sector
- CSA Mining Technical Advisory and Monitoring Committee

Here are the potential questions that I have extracted from the literature review and my research so far, and I may or may not use them for this particular interview:

- Has he/she ever been involved in preparation of a NI 43-101 report as a qualified person?
- What are the recommended methods for MRMR estimation for industrial minerals?
- What are the methods for evaluating an industrial mineral project? How can we standardize the evaluating process?
- Is it possible to classify industrial minerals in a number of groups that we can make suggestions about how to proceed with evaluation of deposits in terms of quantity and grade?
- How can we classify industrial minerals in categories that can be treated with different general approaches?
- How do we define QP in industrial minerals sector? Is it different from the general definition? Is the definition of qualified person sufficiently general to meet industrial minerals' requirements?
- What are the modifying factors for industrial minerals?
- How can we adopt standards of ultimate industries (end users) to the NI 43-101? Is it helpful?
- How do we balance the Materiality and Transparency of the report with confidentiality of the (sale) contracts?

- Which style of reporting would provide the most useful information for the reader (in order to gain investors' confidence)?

Hopefully, after interviews we would have stakeholders' thoughts and suggestions/recommendations on the topic.

It is worthwhile mentioning that we have received the financial support from Mathematics of Information Technology and Complex Systems (MITACS).

Your participation is extremely valuable for us and we do appreciate your time. Please feel free to contact me if you have any questions or inquiries. It should be noted that your participation in our research is thoroughly voluntarily, and you may withdraw at any time.

You may also find information regarding my supervisors and myself by clicking on the following links:

Dr. Michael Hitch: http://www.mining.ubc.ca/MHitch.html

Dr. Scott W. Dunbar: http://www.mining.ubc.ca/SDunbar.html

Dr Bern Klein: http://www.mining.ubc.ca/BKlein.html

Pooya Mohseni: http://graduate.mining.ubc.ca/index.php?q=user/60

Regards,
Pooya

Appendix B. Consent Form

Principal Investigator:

The principal investigator of this research is Dr. Michael Hitch from the Mining Engineering Department of UBC. You may contact him at mhitch@mining.ubc.ca or (604) 827 5089.

Co-Investigator:

The co-investigator is Pooya Mohseni, MASc student with Mining department of the University of British Columbia. You may contact him at pmohseni@mining.ubc.ca or (778) 855-7724

Purpose:

The goal of this research is to develop recommendations for improvement of National Instrument 43-101 (NI 43-101) in order to address current issues and difficulties of industrial minerals Mineral Resource and Mineral Reserve (MRMR) and exploration information public reporting.

Study Procedures:

With your permission and at your convenience, an interview will be scheduled. Then the co-investigator will come to your workplace and conduct the interview, take notes, and record the interview by an audio recording device. The interview is a "semi-structured" interview in which a list of questions will be prepared and sent to you well before the interview; however, the order of questions could vary and particular questions could be removed or added based on the direction you may choose. Each interview is expected to last about one hour.

Confidentiality:

All the audio tapes will be kept in a locked cabinet in the principal investigator's office. Interview transcripts and researcher's notes will be kept as password protected computer files. Moreover, the identities of the subjects will not be disclosed and published and will be kept absolutely confidential.

Contact for information about the study:

If you have any questions or inquiries regarding the research project, please don't hesitate to contact Dr. Michael Hitch or Pooya Mohseni (see contact information above).

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.

Consent:

Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time.

Your signature below indicates that you have received a copy of this consent form for your own records.

Your signature indicates that you consent to participate in this study.

_____

Subject Signature Date

_____

Printed Name of the Subject signing above

_____

Researcher Signature Date

_____

Printed Name of the Researcher signing above

Appendix C. Samples of Interview Questions

Where the interviewee was a Qualified Person who has prepared NI 43-101 reports for industrial minerals, following questions were asked

1. Has he/she ever been involved in preparation of a Ni 43-101 report as a qualified person?
2. What are the recommended methods for Mineral Resource and Mineral Reserve (MRMR) estimation for industrial minerals?
3. What are the methods for evaluating an industrial mineral project? How can we standardize the evaluating process?
4. Is it possible to classify industrial minerals in a number of groups that we can make suggestions about how to precede with evaluation of deposits in terms of quantity and grade?
5. How can we classify minerals in categories that can be treated with different general approaches?
6. How do we define QP in industrial minerals sector? Is it different from the general definition? Is the definition of qualified person sufficiently general to meet industrial minerals' requirements?
7. What are the “modifying factors” for industrial minerals?
8. How can we adopt standards of ultimate industries (end users) to the NI 43-101? Is it helpful?
9. How do we balance the Materiality and Transparency of the report with confidentiality of the (sale) contracts?
10. Which style of reporting would provide the most useful information for the reader (in order to gain investors' confidence)?

In the case that the subject was a president of an industrial mineral company, the following questions were asked:

1. How do we define QP in industrial minerals sector? Is it different from the general definition? Is the definition of qualified person sufficiently general to meet industrial minerals' requirements?
2. What were the modifying factors for your MRMR estimation?
3. How did you adopt your market study into the NI 43-101?
4. What was the biggest challenge for your company for reaching to where you are in terms of communicating with your potential investors through NI 43-101?
5. The NI 43-101 report as a tool for communicating with shareholders has become quite lengthy, do you think you need to change the way that you report?

6. Who are audiences of your NI 43-101 report? Do you consider who you are reporting to while preparing the NI 43-101 report?
7. Why have you decided to list your company as a publicly traded company?
8. What was the key success to your company for raising capital?
9. What are the differences between the financial resources for industrial minerals and other sectors?

Appendix D. Ethics Approval Certificate

The University of British Columbia
Office of Research Services
Behavioural Research Ethics Board
Suite 102, 6190 Agronomy Road, Vancouver, B.C. V6T 1Z3

CERTIFICATE OF APPROVAL - MINIMAL RISK

PRINCIPAL INVESTIGATOR:	INSTITUTION / DEPARTMENT:	UBC BREB NUMBER:
Michael Hitch	UBC/Applied Science/Mining and Mineral Engineering	H08-01274

INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT:

Institution	Site
N/A	N/A

Other locations where the research will be conducted:
The project will be conducted at the subjects' offices.

CO-INVESTIGATOR(S):
Pooya Mohseni

SPONSORING AGENCIES:
Mathematics of Information Technology and Complex Systems (MITACS) - Networks of Centres of Excellence (NCE)

PROJECT TITLE:
"Development of recommendations for improvement of National Instrument 43 101 with respect to Industrial Minerals"

6. **CERTIFICATE EXPIRY DATE: July 22, 2009**

DOCUMENTS INCLUDED IN THIS APPROVAL:		DATE APPROVED: July 22, 2008
Document Name	**Version**	**Date**
Protocol:		
Hitch-Mohseni MITACS proposal	N/A	January 16, 2008
Consent Forms:		
Consent Form	Version 2	July 7, 2008
Questionnaire, Questionnaire Cover Letter, Tests:		
Interview Questions	Version 1	July 7, 2008
Letter of Initial Contact:		
Initial Recruitment Letter	Version 1	July 7, 2008

The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

Approval is issued on behalf of the Behavioural Research Ethics Board and signed electronically by one of the following:

Dr. M. Judith Lynam, Chair
Dr. Ken Craig, Chair
Dr. Jim Rupert, Associate Chair
Dr. Laurie Ford, Associate Chair
Dr. Daniel Salhani, Associate Chair
Dr. Anita Ho, Associate Chair

Appendix E. Interview Summary Points

Qualified Persons - Consultants	Ore Reserve Committees	Professional Advisors for Financial Institutions and Investors	Senior-level Mangers of Industrial Mineral (IM) Companies	Leading Experts in Geology and Mining of IM from Academia	Regulators and Authorities
Does the definition of industrial minerals properly address IMs?					
It is not possible to define industrial minerals	The definition was appropriate	The definition is not clear	Were not agreed with the CIM definition	the definition is exclusionary rather than inclusionary	The definition was appropriate
They are very diverse in terms of physical and chemical specifications	It is broad enough to cover industrial minerals	No suggestion	provide a list of minerals that are considered industrial minerals	Poor way to define a term	It is broad enough to cover industrial minerals
IM are sold based on their marketability regardless of their geological occurrence			IM are sold based on their marketability		
How do we define QP in industrial minerals sector? Is it different from the general definition?					
QP for industrial minerals requires not only an understanding of geology, mining techniques	The definition is a generic definition	The definition is adequate	QP should have qualifications from business point of view	The definition is adequate	QPs definition is a generic definition
, and process technology, but also of markets that the material is used in, costs	It is up the person to acknowledge that if they have required skills or knowledge	Add a paragraph in the standards that some marketing experience is required	QP must rely on technical experts, engineers, and geologists	Five years of experience is not enough	Add a paragraph in the standards that some marketing experience is required
the particular process that is required to meet the market requirements, and logistic	Preparation of a technical report is a team effort		Five years of experience is not adequate		

Qualified Persons - Consultants	Ore Reserve Committees	Professional Advisors for Financial Institutions and Investors	Senior-level Mangers of Industrial Mineral (IM) Companies	Leading Experts in Geology and Mining of IM from Academia	Regulators and Authorities
How are MRMR estimations of IMs are different from those of metals? What are the modifying factors for MRMR estimations?					
They are significantly different from those of metals	Principles of MRMR estimations for industrial minerals are absolutely identical	Principles of MRMR estimations for industrial minerals are absolutely identical to any other deposit	They are different	They are different	Principles of MRMR estimations for IMs are the same
Possibility of having more than one reserve estimate	modifying factors, as listed in reporting standards, are applicable to industrial minerals.	QPs should move away from the single deterministic estimate	Marketing studies are the most challenging part	Geology and exploration are the least important factors in MRMR estimations	QPs' judgements and opinions must be relative important components of the conversion
Must evaluate a deposit from a producer's point of view	marketing is important, but should not rank on the top of the list of modifying factors	Ranges of probabilities would be better in dealing effectively with uncertainties	Customers; physical and chemical specification requirements are the key	Modifying factors are the ability to meet the specific technical requirements of customers	
Geology and exploration are the least important factors in MRMR estimations	QPs' judgements and opinions must be relative important components of the conversion	emphasis should be on addressing the uncertainties in the modifying factors and taking a risk based approach			
How do we balance Materiality and Transparency of a technical report with confidentiality of (sale) contracts?					
Extremely difficult	Must disclose information to the public	Depends on the size of companies	Quite challenging	It is Challenging	Have the option of consulting with regulators
Takes a lot of time and considerations	Have the option of consulting with regulators	Sometimes there is no way to get around it	Could not balance Materiality and Transparency with confidentiality	No way to get around it	Companies can file a confidential material change report
They have to disclose sensitive information	It is a case by case process and there is no general rule applies to it		Prefer to not disclose this type of information		It is a case by case process and there is no general rule applies to it

Qualified Persons - Consultants	Ore Reserve Committees	Professional Advisors for Financial Institutions and Investors	Senior-level Mangers of Industrial Mineral (IM) Companies	Leading Experts in Geology and Mining of IM from Academia	Regulators and Authorities
Does the Industrial Minerals Sector Require a Separate National Instrument?					
Yes they do	No it does not	Maybe not	The sector requires a separate set of standards	Maybe not	No it does not
The current reporting standards are too focused on metal sector	Current standards are applicable to IMs	IMs are different, but it is beneficial to the sector to have a separate reporting standards	Face serious challenges complying with current reporting standards	Diversity of Ims reminds us to keep the standards on relatively high level	Current standards are applicable to IMs
The do not properly address Ims	An improved reporting standard can be applied to any type of mineral	New reporting standards create inconsistency in public reporting			