Baffinland Iron Mines LP
Mary River Expansion Stage 3

Definitive Study Report

Section 20 – Project Risks and Opportunities

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Table of Contents

List of Tables

List of Figures

20. Risks and Opportunities

Effective risk management is integral to the capital investment cycle, from evaluation of a business development opportunity through basic and detailed engineering, project execution, operations and, ultimately, closure. A structured and thorough understanding of the key risks of the investment allows the Project team to focus their attention and allocate resources effectively.

Aligned with the Baffinland Iron Mine (BIM) risk management guidelines and the Hatch risk management framework, the concept of risk during the Stage 3 Definitive Study considered all aspects related to engineering, cost and schedule, environment, communities, health and safety, human resources, procurement, construction, project strategy and economics. The risk management process was forward-looking, structured, consistent and continuous, and allowed for a clear and unambiguous communication of Project risks to all Project stakeholders, and established the framework for managing those risks during Project execution.

The primary focus of risk management during the Stage 3 Definitive Study was to:

- Update the project risk register developed in the previous project phases to ensure that risk information was valid, accurate and complete, and all project risks which could occur, or which must be mitigated during the Stage 3 Definitive Study and project execution, were identified and evaluated;
- Develop the project quantitative capital cost risk profile and determine the cost contingency to be included in the capital cost estimate.

The risk management strategy developed for the Stage 3 Definitive Study was consistent with the project strategic goals and objectives, which includes:

- No harm to people, equipment and environment.
- Ensure project schedule is maintained to commence functional testing of ship loader with material prior to end of 2019 shipping window and ship loader production feed to ore carriers in 2020.
- Ramp up of ore shipping to ensure 12 Mtpa sustainable performance is achieved.
- Minimize and delay capital expenditure to as much as possible.
- Minimize interruptions to existing operations.
- Maximize opportunities for early revenue generation.

20.1 Scope of Risk Management

Qualitative and quantitative risk assessments were completed during the Stage 3 Definitive Study to adequately characterize project uncertainties and develop appropriate response plans to eliminate or reduce the identified risks to a level that falls within BIM's tolerable limits. These assessments are described in the following sections.

20.1.1 Qualitative Risk Assessment

Qualitative risk assessment consisted of risk register reviews and updates conducted with key project team members to ensure that the risk information was current, accurate and complete, and the risk mitigation measures developed for key project risks were effective and implemented as planned.

New project risks were identified during risk register reviews and risks that were no longer applicable due to changes in project conditions and circumstances, risks which have been "designed out" or risks which occurred were closed.

Risks were assessed in terms of likelihood and impact using a project-specific risk likelihood and impact rating scales and matrix (Appendix A20-1).

The project team has identified measures to eliminate or reduce the most significant Project risks to a level that falls within BIM's tolerable limits. The risk mitigation measures, including their status and completion date, are documented in the Project Risk Register (Appendix A20-2).

As the Project progresses into the execution phase and more detailed information becomes available, including vendor data, assumption validation, completion of testwork, the Project team will identify and implement additional cost effective and practical measures to reduce the Project risk profile to a tolerable level.

Table 20-1 summarizes the qualitative and quantitative risk assessments conducted during the Stage 3 Definitive Study.

Table 20-1: Qualitative and Quantitative Risk Assessments Completed during Stage 3 Definitive Study

Risk Assessment Date	Risk Assessment	Risk Assessment Scope
March 2017	Project risk register review	Review and update of the project risk register
April 2017	Quantitative Risk Analysis (QRA)	Development of the project capital cost risk profile and assessment of cost contingency requirements to support project financing

Following the assessments listed above, eighty-three (83) risks remain open at the end of the study, as shown in the project risk register presented in Appendix SE21_AP0B. The project team has effectively managed the most significant project risks during the study and additional measures will be taken in project execution to further reduce the project risk exposure to tolerable limits.

The major risk elements can be summarised as;

- Capital cost increase due to:
  - Schedule Delay
  - Rail Earthworks Cost (quantity and/or unit cost variations).

  The receipt of lump sum bids for major contracts with liquidated damages provisions for performance and schedule provide a substantial mitigation to this risk element. Aggressive pursuit of permits remains the mitigation to ensure permit approvals do not slip beyond provisions contained in the schedule.
- Project schedule delay possible due to:
  - Project Certificate and Associated Environmental Permit Delay's
  - Project Funding Release
  - Major Equipment Lead Times
  - Ship Loader Installation and Commissioning.

  Firm bids received for the supply of the majority of the equipment supply along with liquidated damages terms provide strong risk mitigation measures put in place during the Study.
- Operations cost/production impact due to:
  - Iron Ore Market Price
  - Product Quality
  - Unable to Achieve Design Capacity
  - Rail Tie Replacement.
- Health and Safety risk from:

- Plane Crash
- Rail Collision.

As the project advances through the next stage, increased definition will change the project risk profile and allow the project team to develop appropriate treatment plans for all key project risks to a higher level of detail. Opportunities to improve project economics and parameters even further will also be considered in the next phases.

20.2 Quantitative Risk Analysis (QRA)

A Capital Cost Quantitative Risk Analysis (QRA) was completed during the Stage 3 Definitive Study to determine the project capital cost risk profile. The results of this analysis assisted the team to determine the level of capital cost contingency and estimate accuracy and was a key input into the project financial model.

Following the analysis a contingency of USD $40.3 or 4.49% at the P75 level (where there is a 75% probability of cost underrun and 25% probability of cost overrun) was added to the base estimate of USD $896.5M.

Figure 20-1 shows the project capital cost risk profile resulting from the analysis.

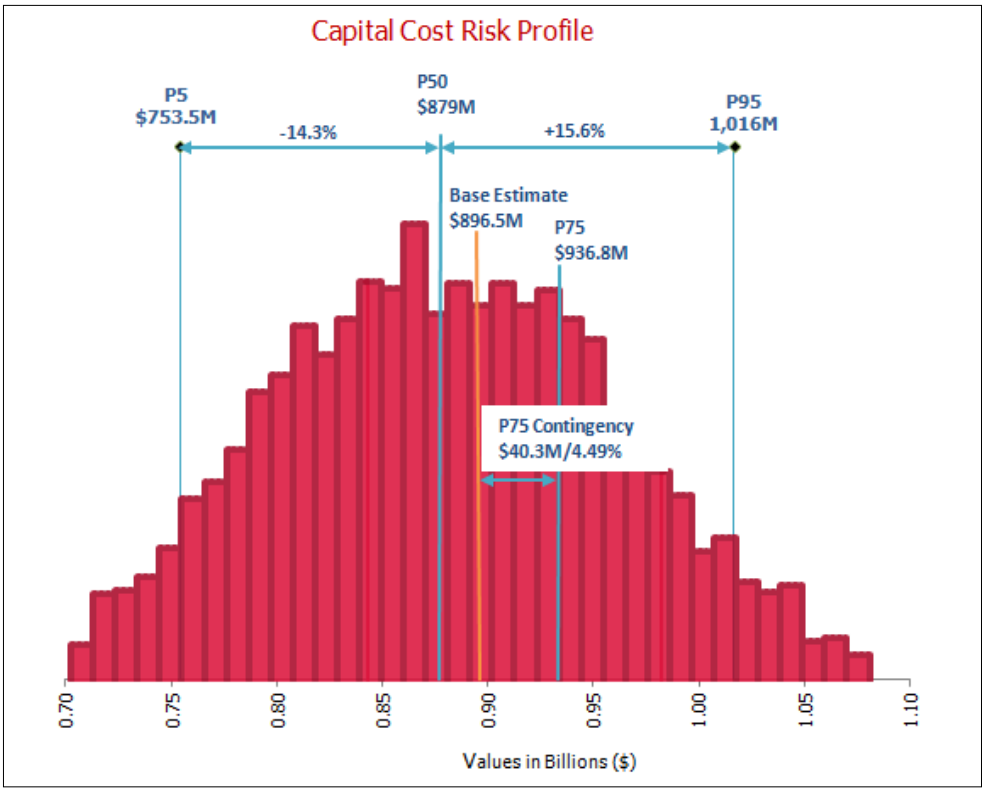

Figure 20-1: Mary River Expansion Stage 3 – Capital Cost Risk Profile

The “Tornado” graph shown in Figure 20-2 displays the cost elements that have the greatest impact on the project capital risk profile. These items represent the main uncertainty sources that the project team will focus on during project execution in order to reduce the risk profile.

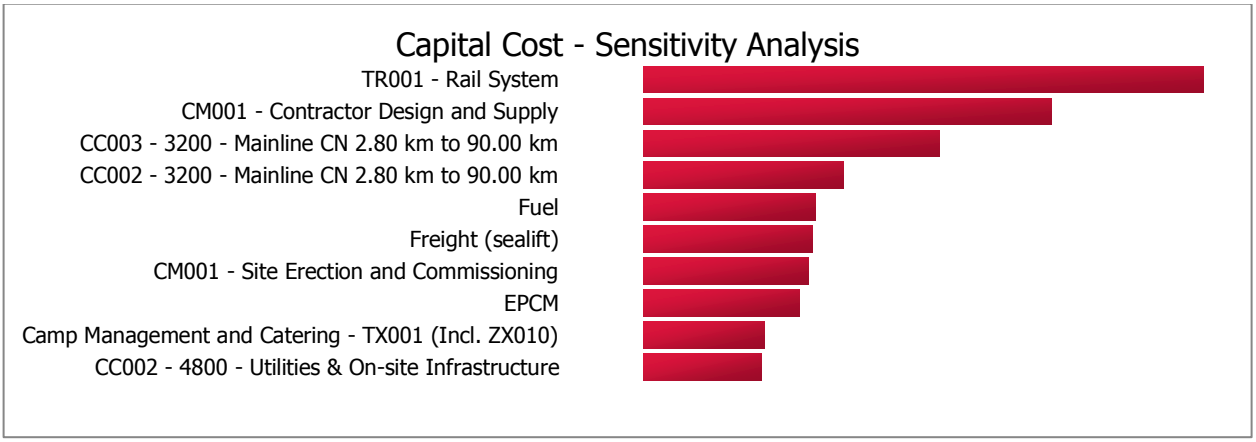

Figure 20-2: Mary River Expansion Stage 3 – Capital Cost Sensitivity Analysis

The Capital Cost Contingency Analysis results are discussed in detail in the QRA Report, refer to Appendix A20-2.

20.3 Reference Documents

Document Number	Title	Revision	Date	Appendix Number
	Risk Rating Matrix	0	04/21/2017	A20 - 1
	Project Risk Register		04/21/2017	A20 - 2
H353004-00000-140-0566-0001	QRA Report	A	04/21/2017	A20 - 3