SECTION 3.0 - ALTERNATIVES CONSIDERED

Of the possible alternatives to the Project, the Project was selected as the preferred option that would meet the objectives of the Company and contribute to the economic development and well-being of the people of Nunavut. Within the Project, several alternatives were evaluated and the preferred overall options were retained considering social, environmental, technical, economic, ease of reclamation and local community acceptance aspects.

The optimal Project was found to be production of 21 Mt/a of iron ore. Up to 3 Mt/a of ore will be transported by truck to Milne Port, stockpiled, and shipped from Milne Port during the open water season. When the railway becomes operational, 18Mt/a of ore will be shipped by rail to the Steensby Port and loaded onto ore carriers for year around shipment from Steensby Port.

3.1 FACTORS TO CONSIDER FOR PROJECT DEVELOPMENT

The scale of the operation required to achieve economic viability is driven by the realities of establishing an operation in a remote location of the Canadian arctic. Due to the remoteness of the site, arctic climatic conditions, and, the absence of infrastructure (ports, transportation, energy supplies, etc.), the development of a major project in the North Baffin Region is extremely costly. For any industrial operation, economies of scale are required to overcome the technical challenges associated with the adverse climatic conditions, the absence of infrastructure, and, to ensure that the Project is economically feasible.

Other relevant aspects are as follows:

- Iron ore - the iron ore commodity market is a high volume, low margin operation; therefore, the ability to produce the ore and provide a consistent and reliable ore supply is required in order to successfully compete on world markets.
- The steel industry - the steel industry is the primary customer for iron ore (approximately 98%). This industry is rapidly expanding in Asia in order to satisfy the ever increasing demand for steel that is driven by the strong growth of many Asian countries. Meanwhile, demand for steel in Europe is stabilizing and growth follows economic activity. Over the last decade, the rapid growth of the Asian economies has progressively diverted the higher grades (higher quality) iron ores from traditional steel makers in Europe. European customers are now in a position where they need to secure long term supply of high quality iron ore. Steel making is also a capital and highly energy intensive and competitive industry. Most steel makers operate on a large scale (annual production in the millions of tonnes). Production costs are largely driven by the quality of the raw material inputs (iron ore, coking coal, fluxes, etc.) and the associated energy consumption. In this competitive environment, steel makers need to secure large quantities of high quality iron ores without interruption in supply. Regular shipment and political stability ensure consistency and security of iron ore supply.

- The Mary River Iron ore deposits - the Mary River Deposit is a high grade deposit which will command a premium on world iron markets.
- The Mary River setting - within the region, there is a relatively low diversity of species. The soil profile comprises primarily sand and gravels with limited organic material. The growing season is short resulting in low biological productivity. Permafrost covers the entire region. This region receives nearly 24 hour of sunlight in the summer season and 24 hr darkness during the winter months. To date, access to the site is limited to air transport and the open water shipping season via Milne Inlet. The productive arctic marine environment supports an abundant marine mammal population, which in turn has been an important food supply for the subsistence economy of the region.
- Land Use and social considerations - the NLCA establishes the requirements and expectations for development activities occurring in Nunavut. Inuit land use for harvesting, and a strong dependence on wildlife as a healthy, affordable and culturally relevant food source is a primary consideration. The communities in the vicinity of the Mary River site have historical socio-economic and/or ecosystemic ties to the Project area. These communities have a subsistence economy and have experience dramatic population growth over the last 20 years. Over 70% of the population is under the age of 25. Underemployment and lack of opportunities is causing severe social stress. There is recognition by community elders that the communities must position themselves to enter the wage economy.
- Capital Expenditure - there is a high cost associated with the construction and operation of mining operations, ancillary facilities, and, the associated transportation infrastructure in the arctic._In some regions of the world where other iron ore projects are currently being developed (Brazil, Liberia, Guinea and Australia) climatic conditions make it possible to operate without interruption through the year, there is existing infrastructure, and a large pool of workers resident to the area.
- Logistics and technical challenges of construction in the arctic environment - the limited seasonal access to the site and absence of transportation infrastructure mean that site capture and mobilization must take place during the arctic open water season. Difficult geotechnical conditions (permafrost, ice lenses, et.) require specialize design and construction techniques to ensure stability of the works constructed. The extreme cold also requires special consideration.
- Need for All Season Shipping - the competitive nature of the steel making industry demands a steady, consistent, and secure supply of a high tonnage of iron ore. Seasonal shipping would require the establishment of massive ore stockpiles both at the shipping port and at the receiving ports. Steel mills are generally located in proximity of urban centres where land is at a premium. Furthermore, the competitive nature of the steel business forces this industry to maintain minimal stockpiles of raw material.
- Benefits for the Local Communities- the Project must provide tangible benefits to Inuit.

3.2 PROJECT FEASIBILITY

After years of exploration to define the ore reserve, in 2007, Baffinland undertook a "Definitive Feasibility Study" to establish the conditions and parameters for which the development of the Mary River Deposit No. 1 would be technically, environmentally, socially, and economically viable. The aim of the DFS was to confirm the economies of scale required to achieve long term economic viability taking into account the context and constraints identified in Section 6.1 and 6.2.

The DFS was completed in early 2008. Subsequent to the completion of the DFS, further economic scenarios and sensitivity analyses have been undertaken. The capital cost of the Project is estimated at C$4.1 billion which includes over C$1 billion for the Steensby Port, C$ 1.9 billion for the railway, C$ 100 million for the Milne Inlet Tote Road upgrade, over C$ 200 million for the workers accommodation facilities, and, C$ 150 million for the airstrips. Not included in the capital estimate are the capital cost of the Milne Port construction and the cost of the ice breaking ore carriers. The operating costs were estimated at C$ 14.62 per tonne that includes an estimated C$ 1.50/tonne for rail transportation of the ore. As a comparison, truck transportation of the ore is estimated at C$17 to C$ 22 per tonne based on current fuel prices.

3.2.1 Project Go - No Go Decision

The economic analyses enabled Baffinland to evaluate the environmental, social, and financial risks associated with the development of the "Mary River Project". On the basis of this information, Baffinland had a choice of three possible decisions regarding for the development of the Mary River Deposit No. 1:

- Proceed with mine development in the near term, as proposed herein;
- Delay the project until circumstances are more favourable; or
- Abandon the Project.

Recognizing that long term economic viability is highly sensitive to current and expected long term iron ore prices, Baffinland opted to proceed with the Project at this time (Baffinland, 2008a).

The Project production rate was set at 21 Mt/a, which would enable the Project to support the support the development cost of the infrastructure required for its operation.

To assist in the cost of the design, construction, and operation of the ice breaking ore carrier fleet, Baffinland decided to enter into a long term contractual agreement with Fednav. Fednav would build and operate a dedicated fleet of ice breaking ore carrier to transport the iron ore from Steensby Port to European markets. The cost of 10 ice breaking vessels (190,000 DWT) is estimated at C$ 175 million.

If the Project does not proceed, the mineral resource will not be developed, and the potential effects and benefits predicted in this EIS will not be realized.

3.2.2 Decreased Production Rates

The facilities are designed for an optimum production rate which requires a minimum capacity for the associated Project infrastructures (railway, port, roads). Reducing the production rate will not result in a lower fixed capital investment for these facilities. Once the Project is operational, there is the need to repay the capital borrowed to finance the construction of the Project. This approach provides more flexibility for the Company to make decision related to production volumes and potential plant shutdowns during market downturn. For this reason, as long as the iron market remains buoyant, Baffinland intends to operate its facilities at maximum capacity.

3.2.3 Increased Production Rates

Mineral resources for Baffinland's mining leases are not completely delineated. Exploration activity during 2010 confirmed the presence of additional deposits (refer to Volume 3, Section 1.5). The locations of all currently identified deposits known are shown on Figure 3-1.2. Should there be a need to increase production, Baffinland would accelerate the development of another deposit.

Although the Project has been designed for a nominal capacity of 21 Mt/a of iron ore, due to the flexible nature of the mining equipment and transportation facilities that will be constructed, no additional infrastructure would be required to increase production up to 30 Mt/a.

3.3 EVALUATION OF PROJECT ALTERNATIVES

Within the context described above, numerous alternatives were evaluated for the various components of the Project. In the assessment of the economic viability for each alternative option, technical feasibility was paramount. Due consideration was given to the vulnerability of the arctic ecosystem, as well as the potential for extension of the mine life and/or increased iron ore production rates. The public opinions and preferences were also taken into consideration as a criterion in the assessment of the alternative options (refer to Volume 2.0, Section 2.0). Finally, relative investment costs and closure considerations were also important factors in decision making process. The methodology and comparative ranking of Project alternatives is presented in Volume 3.0, Section 6.0.

Some of the major alternatives that have major social, environmental, and/or cost implications on the Project are discussed in the sections that follow.

3.3.1 Port Location

The key technical determinants for the selection of the port site are:

- Winter ice conditions and accessibility of the port site during all seasons;
- Winter navigation by large ore carriers (190,000 DWT) and manoeuvrability at the port site;
- Distance from the Mine Site to the port site; and

- Accessibility of the port site from the Mine Site, which in turn, establishes the alignment and cost of the Mine Site - Port Site.

Environmental consideration such as the avoidance of sensitive marine or land based habitats have also been considered. Feedback from public consultation confirmed the validity of the decision made for the port site location. Several potential port sites (13) were considered for the Project (Figure 3-6.1). They include:

- West Coast Port Sites (two alternatives);
- East Coast Port Sites (seven alternatives);
- Iqaluit Port;
- South Port;
- Milne Port; and
- Steensby Port.

The advantages and disadvantages of each location are discussed in Volume 3, Section 6.0.

Selection of the Steensby Port Site on Steensby Inlet was primarily based on ship and rail access. The preferred ore dock location is off of the island at the preferred Port Site. This island allows access to deep water, and provides a natural protected port site. Steensby Port is one of the closest points to access by rail from Mary River. Finally, with the exception of the South Port alternative, Steensby Port is the only port location that can support year-round shipping due to preferred ice conditions in winter months.

Shipping from Milne Inlet is feasible during the open water season. Milne Inlet is a relatively narrow fjord. Year-round shipping may be problematic with the use of large ore carriers during the winter period. Inuit concerns related to the close proximity of the shipping route to Pond Inlet and winter shipping activity could interrupt important flow edge activities; therefore, the current project proposal considers open water shipping to Milne Inlet. As the Project evolves additional information will be assembled and continued consultation will be undertaken to address Inuit concerns.

The shipping route from Steensby Port is preferred based on a number of land transportation factors and marine shipping considerations such as the difficulty of ice navigation. Milne Inlet is relatively narrow and represents operational uncertainty with respect to winter navigation of large ore carriers. There are also environmental sensitivities such as the potential for interactions with Inuit use of the landfast ice in the area and proximity to the community of Pond Inlet during winter months.

3.3.2 Shipping Route through Foxe Basin

Two shipping corridors were assessed through northern Foxe Basin into Steensby Inlet (Figure 3-6.1). The ships will pass through southern Foxe Basin following established shipping lanes accessing Hall Beach and

Igloolik. In northern Foxe Basin, the ships will pass either to the east or the west of the Spicer Islands, Rowley Island and Koch Island.

The more westerly route departs from the existing shipping lanes near to Igloolik and Hall Beach and runs west of Rowley and Koch Islands. The easterly route departs from the existing shipping lanes south of the Spicer Islands, and runs along the east side of Rowley and Koch Islands. Based on the results of bathymetric surveys carried out for the Project, both routes are viable for the Project, but the eastern route is operationally preferable. The communities of Igloolik and Hall Beach have indicated preference for the more easterly route during public meetings held by Baffinland in September 2007, on the basis that this route was more removed from primary land use areas by the communities.

The eastern route is the preferred alternative, as it is considered less intrusive to inhabitants. The communities of Igloolik and Hall Beach have indicated a clear preference for the eastern route. The Nunavut Wildlife Harvest Study shows harvest locations concentrated near the communities of Igloolik and Hall Beach with virtually no harvests reported along eastern route. Marine Mammal workshops and individual interviews from Inuit knowledge study show that the western route has a higher use level than the eastern route. The use is limited to Steensby Inlet which is fairly removed from the community.

The shipping route to Milne Inlet is well established in open water; extending from Baffin Bay and passing through Pond Inlet, Eclipse Sound and to the head of Milne Inlet.

3.3.3 Length of Shipping Season

Shipping season length was considered, examining the case for open water shipping only (four months), ice breaking of early season ice only (eight months), or ice breaking all winter (12 months). The viability of the Project depends on the ability to provide smelters with ore 12 months a year. Shipping 12 months of the year is the only commercially viable alternative. As a result, the Steensby Port option is the only economically viable alternative for a production rate of 18 to 21 Mt/a. The Milne Port option offers only a three to four month shipping season without ice breaking increasing the ocean freight cost significantly for 18 to 21 Mt/a of ore production. The Project would not be commercially competitive with iron ore suppliers in Brazil with only an open water shipping season.

Shipping from Milne Inlet is potentially feasible for a smaller quantity of ore that could reach markets sooner after the start of construction than year-round shipping from Steensby Port. The feasibility of shipping about 3 Mt/a from Milne Inlet is currently under study. It could potentially supplement year-round shipping and would offer an opportunity to produce revenues about two years sooner than shipping from Steensby Inlet.

3.3.4 Ore Transportation Methods

The economic viability of rail transportation is driven by volume or tonnage of ore to be transported. The construction cost of a railway range from C$ 10 million per km to C$ 13 million per km depending of the terrain (geology, grade, mountains, marshes etc.). The railway option is feasible for Steensby Port because of the port's capability of year-round shipping. Over 18 Mt/a can be transported effectively and efficiently from the Mine Site to Steensby Port throughout the year.

A railway option to Milne Port carries to much uncertainty at this time. It is anticipated that ore shipping from Milne Port will only take place during the open water season. The cost of building a railway to Milne Port would range from C$ 1 billion to C$ 1.3 billion. Such an investment is not economically viable for a four month shipping season. The only other feasible alternative to railway transportation is trucking. Baffinland estimates that the optimum tonnage for a trucking and shipping option via Milne Port is approximately 3 Mt/a.

3.3.5 Railway Alignment Between Mine and Steensby Port

The various alignment options for the Mine Site - Steensby Port railway are discussed in Volume 3, Section 6.0 and presented on Figure 3-6.5 (Appendix 1A). The retained railway alignment offers the optimum combination for environmental trade-off and construction cost considerations.

3.3.6 Dock Location at Steensby Port

Various locations were evaluated for the positioning of the ore and freight docks at Steensby Port. The potential locations are presented on Figure 3-6.1 (refer to Volume 3.0, Section 6.0). Figure 3-2.9 presents the configuration that was retained for Steensby Port.

3.3.7 Work Scheduling During Operation

The preferred worker rotation during operation is two weeks of site work followed by two weeks in their resident communities. While this is not the most cost-effective schedule, it has been found by decades of experience at remote mines to be the preferred work schedule in terms of worker safety, separation from family members, having a consistent workforce that shares the same rotation, and ultimately for the retention of the mine's workforce.