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2.0 DEVELOPMENT ALTERNATIVES

2.1 Introduction

2.1.1 Context

This section of the Developer's Assessment Report (DAR) for the NICO Cobalt-Gold-Copper-Bismuth Project (NICO Project) consists of the alternatives considered for the NICO Project in support of the development as proposed in Section 3 (Project Description). In the Terms of Reference (TOR) for the NICO Project's DAR issued on 30 November 2009, the Mackenzie Valley Review Board (MVRB) identified the need to consider and present alternatives to some components of the development (MVRB 2009). This section also details how comments and concerns from Tłı̨chǫ community members and other sources (Section 4 Engagement) resulted in changes to the NICO Project design, where feasible.

This Alternatives section provides the rational for the design and proposed development schedule of the NICO Project in view of the various options and challenges that Fortune faced when completing the Project Description (Section 3) for the DAR.

2.1.2 Purpose and Scope

The purpose of the Development Alternatives Section is to meet the TOR, which identified 3 specific requests as they related to NICO Project alternatives:

- **Section 3.2.5**: Where the developer feels it would be helpful to reviewers, the Developer's Assessment Report should describe alternative development components, management systems, or alternative locations for physical works and activities considered for the NICO Project. Where applicable, the developer will provide reference to research that identifies the successful use of the specific technologies being proposed, and their relevance for this environmental setting;
- **Section 3.2.6**: All commitments and agreements made in response to issues raised by the public during these discussions, and how these commitments altered the planning of the proposed NICO Project; and
- **Appendix D, 2 (b):** a list of closure and reclamation components and activities including alternatives considered, a rationale for why Fortune chose a particular alternative and how it best meets the developer's reclamation objectives.

This section presents the options available to Fortune Minerals Limited (Fortune) in the design of some elements and components of the NICO Project and the factors that influenced the decisions made on the NICO Project. This section also details factors that influence the NICO Project development timing, with emphasis on the schedule for the construction of the Proposed Tłı̨chǫ Road Route.

2.1.3 Content

The content of this section includes the following:

- need for the NICO Project;
- cancellation of the NICO Project;
- NICO Project schedule;

- mine rock and tailings management options; and
- downstream processing options.

This section also demonstrates where comments and concerns gathered during community engagement efforts were incorporated into the NICO Project design when alternatives were being considered.

2.2 Need for the NICO Project

The NICO Project will offer many direct and indirect economic, social, and cultural benefits to the Northwest Territories (NWT). Although it is not a large development compared to the 3 existing diamond mines, the NICO Project will contribute overall to the labour, financial, physical, human, and social resources of both the NWT and the potentially-affected communities. Benefits will accrue notwithstanding various employment and contracting barriers, which include, among others, employability, availability, education and skills, advancement, retention, women, criminal records, and drug and alcohol use. Overall, the NICO Project will have few adverse effects on population (e.g., in-migration), business capacity, or public infrastructure and services. With the proposed mitigation measures as outlined throughout Section 16, most negative economic, social, and cultural effects from the NICO Project will be reduced to negligible levels.

On the economic side, the NICO Project will increase employment, personal income, business revenues, and tax revenues to all levels of government. In general, it will increase the amount of money flowing throughout the local study area through additional wages and business activities, with secondary benefits, such as improved public infrastructure and consumer spending. It will add value to the Government of the Northwest Territories through personal, corporate, and payroll taxes, and add to the territorial gross domestic product. Participation agreements to affected groups such as the Tłı̨chǫ communities will also add to the economy. Revenues will be generated through employment, and provision of goods and services will give increased benefit. Increased (induced) spending by wage earners and businesses is also expected, which will help distribute some of the economic benefits, although most of this additional spending will be concentrated in Yellowknife due to the scarcity of retail stores in the smaller communities. At the time the DAR was being completed, the Tłı̨chǫ Investment Corporation had received funding to complete a feasibility study on the Nailii Hydro Project which would include a run-of-river hydro plant constructed on the La Martre River, downstream of the community of Whatì. The largest scale plan includes a 12 megawatt hydro facility connected to Whatì to reduce their dependency on diesel generated power, and a transmission line to the existing Snare Hydro Complex to distribute power to Behchokǫ̀ and Yellowknife. Surplus power could be made available to the NICO Project. Selling hydro power to the NICO development presents an attractive long-term, environmentally sustainable business opportunity for the Tłı̨chǫ people and NWT government. Fortune will consider the purchase of power from this facility should the Tłı̨chǫ Investment Corporation decide to proceed with the development, subject to power availability and cost.

The NICO Project is expected to contribute social benefits with increased labour force participation, especially for those potentially-affected communities closest to the mine site. Location of the NICO Project is a substantial benefit to the Tłı̨chǫ communities and even to Yellowknife. Since the closure of the Giant and Con mines, which were close to Yellowknife, other mines in the NWT have not been located within short driving distance to nearby communities. Since flexibility with shift rotation and time for cultural traditions will be considered for reasons related to this proximity, some Aboriginal and northern residents are expected to benefit. More women will also be able to participate in the NICO Project due to its closeness to their home communities. Additional training will

be available and this will create opportunity for residents to become more employable for this and other projects through increased skills and work experience.

The NICO Project will have a positive effect on employment and business levels, as well as labour income. It will increase local and regional employment, including up to 231 annual Full Time Equivalents (FTE's) during construction, up to 233 annual FTEs during the underground and Open Pit mining phase of operations, and up to 127 annual FTEs for the rest of the operations. Many of these will be filled by already trained workers from other mines, but first preference for hiring will go to the Tłı̨chǫ communities and other Aboriginal communities.

Other economic and social benefits are expected. Improved and new road access in the area will give some residents better access to services and goods that previously were difficult to obtain, either by short-term winter road or by air. There will also be regularly scheduled road transportation. Workers with more disposable cash will have the ability to purchase more amenities such as vehicles and recreational vehicles for pursuing traditional cultural activities, such as trapping and hunting. They may make improvements to their housing or the quality of food and clothing. Additional income and time off during the 2-week rest periods will also allow some workers from the communities to engage more in traditional activities, including hunting, fishing, and trapping.

For the most part, due to its small size and scale, the NICO Project will have limited effects on social and cultural valued components. The NICO Project is not expected to either substantially increase or decrease education levels or health and wellness indicators. While not all communities have experienced the same level of educational achievement, improved health, or reduced crime rates, for example, progress has been made overall in almost all of these areas.

2.2.1 Commodities and Demand

The NICO Project is projected to generate average annual production of approximately 32 000 ounces of gold, 1550 tonnes of cobalt, 1650 tonnes of bismuth, and 350 tonnes of copper over a planned mine life of 18 years. The mine plan has 68 percent (%) of the mill feed coming from higher-grade, gold-rich underground ores during the first 2 years of production that will increase annual gold production up to 100 000 ounces in the early years. Global demand for gold is on the rise.

The 2010 global refined cobalt market was approximately 76 360 tonnes, excluding production from recycling and some intermediate products and growth is about 8% per year. NICO's forecast average annual production represents only 2% of the current market and is well below the annual increase. The average price for high grade cobalt metal in 2010 was US$20.56 per pound.

The principal uses for cobalt are rechargeable batteries, superalloys, hard materials, pigments, magnets, catalysts, and adhesives. The largest segment of the market and the greatest growth is in the manufacture of lithium ion and nickel metal hydride batteries used in portable electronic devices and plug-in electric and hybrid electric cars. The market for these products is growing as a result of increased demand for consumer goods in emerging markets and the transformation of the automobile industry towards greater production of electric and hybrid-electric cars, the batteries for which can contain 5 to 10 pounds of cobalt. Cobalt superalloys are used in the aerospace industry, principally for the manufacture of turbines, and aircraft demand is growing with the increase in air travel in Asia. Cobalt demand is also growing in catalysts used in petroleum refining, liquid natural gas, and the manufacture of automobile tires and plastics.

The global bismuth market is approximately 15 000 tonnes per year and growth has been constrained by the shortage of supply from the dominant Chinese producers. The current price for 99.99% bismuth metal is approximately US$11.50 per pound.

Bismuth is scientifically recognized as one of the safest metals and is used in pharmaceuticals and medicines, including Pepto-bismol®, bandage dressings, cosmetics, and medical devices. Bismuth is also one of the few elements that expands upon cooling, making it ideal for use a variety of dimensionally stable alloys and compounds such as castings. Recent growth in the market for bismuth has been driven largely because of its physical properties that allow it to be used as a non-toxic replacement for lead. It is replacing lead in solders used in plumbing and electronics, brasses, hot-dip galvanizing, paint pigments, ceramic glazes, ammunition, radiation shielding, greases, batteries, and free-cutting steel. Bismuth is also used with other metals for electro-plated anti-corrosion coatings on some automobiles and to protect car windshield seals from solar radiation and temperature changes. MCP Group, the world's largest processor and consumer of bismuth-based products, has a letter of intent with our Company to purchase our bismuth production. MCP Group was recently purchased by 5N Plus Inc., a Canadian producer of high purity metals.

2.3 Alternatives for the NICO Project

2.3.1 Cancellation of the NICO Project

If the NICO Project were not to proceed, Fortune believes there would be a loss of opportunities for the Tłı̨chǫ government and people, and other residents of the NWT. The positive impacts from the NICO Project are considered to be similar to those already experienced in conjunction with other similar projects in the north, in particular, the diamond mines. Fortune's north-first hiring and procurement policy will focus potential benefits on the local economy. The positive impacts could be substantial with respect to job creation, income increases, and associated measures (such as quality of life, purchasing power, housing improvements, business development, training opportunities, and decreased welfare dependency). These benefits lead to social improvements including increased self-esteem, health, and community capacity.

The NICO Project will also lead to infrastructure enhancements, including the Proposed Tłı̨chǫ Road Route (an all-season road connecting the Tłı̨chǫ communities), which will lower the cost of importing goods to the communities that now rely on winter roads and air transport, as well as facilitate travel. On 22 March 2011, CanNor's Strategic Investments in Northern Economic Development program announced the funding of a feasibility study by the Tłı̨chǫ Investment Corporation on the proposed La Martre Falls Hydro project. Power demands in this region of the NWT and the close proximity of the NICO Project to this proposed hydro development are such that the NICO Project would be one of the potential customers for this power. The sale of hydro power to the NICO Project would result in further income for the Tłı̨chǫ people. The La Martre Falls Hydro project would also supply power to the community of Whatì, eliminating their dependency on diesel generated electricity, and provide economic sustainability for the region. Fortune and the Tłı̨chǫ Investment Corporation have had several discussions on this subject and will continue the dialogue as the feasibility study progresses.

Rotational shift work and increased income have had positive impacts on some traditional activities. The proximity of the NICO Project to the Tłı̨chǫ communities provides an opportunity for more attractive work schedules than the more distant diamond mines.

2.3.2 NICO Project Construction Schedule

Once Fortune has obtained the necessary environmental assessment approval, permits, and licences, construction will take approximately 12 to 18 months to complete under the base case scenario. Fortune envisions that the NICO Project could progress with an alternative construction schedule. Fortune has developed an alternate scenario for construction which would take longer than the base case construction schedule presented in Section 3.3.1.1.

In the alternative case, during the first year of construction, work would focus on construction of the all-season NICO Project Access Road (NPAR) into the site. In this situation, Fortune would delay major site construction and focus its initial efforts on construction of the NPAR so that an all-season service road to the anticipated mine site is available for use upon completion of the all-season Proposed Tłı̨chǫ Road Route. Fortune would not initiate construction of the NPAR until there is a firm commitment for construction of the Proposed Tłı̨chǫ Road Route by the Tłı̨chǫ Government and/or the NWT Department of Transport. It is anticipated that the concurrent construction of the NPAR with the Proposed Tłı̨chǫ Road Route would take approximately one year.

Following completion of the NPAR, the infrastructure would facilitate a shorter construction period for the Mineral Process Plant (Plant), mine, and related facilities over 10 to 12 months. Total time for construction would be in the order of 24 months but this would depend heavily on the timing for construction of the Tłı̨chǫ. The permanent camp, building materials, mobile and fixed plant equipment, and construction contractors would be delivered to site on an as-needed basis over the NPAR. One summer construction season would be required to complete the initial dyke infrastructure of the combined tailings and mine rock Co-Disposal Facility (CDF). This option mitigates site effects by limiting the requirement for diesel fuel storage and the amount of disturbance of the NICO Project footprint dedicated to lay-down. In addition, a NICO Project Airstrip would not be required during the 1-year construction period as construction personnel would be mobilized overland using the NPAR and the Proposed Tłı̨chǫ Road Route. Consideration of this sequential rather than concurrent construction schedule will be tied to the construction schedule of the Proposed Tłı̨chǫ Road Route.

2.3.3 Management of Mine Rock and Tailings

Fortune has considered several options for the long-term management of mine rock and tailings produced at the NICO Project. A number of detailed technical studies have been completed to aid in the selection of the most appropriate means for disposal and storage of mine rock and tailings to limit potential effects to the environment in the short-term and long-term (i.e., post-closure). Fortune commissioned a site selection study for conventional slurry tailings and mine rock disposal in 2004 (Golder 2004). Eleven candidate sites were selected for review within a 5 kilometre (km) radius of the ore body. Of these, 3 sites were selected for further evaluation, which was then reduced to 2 sites based primarily on environmental considerations. The 2 sites were immediately north and south of the Open Pit location described in the 2008 water license application (Fortune 2008). Various scenarios were examined for tailings and mine rock storage using these 2 basins.

During the course of the DAR scoping sessions, community meetings, and NICO site visits with elders and other Tłı̨chǫ citizens, a number of concerns were raised concerning the storage of tailings and mine rock:

- water usage rates;
- water quality with emphasis on water quality post-closure;
- aesthetics as they relate to Hislop Lake and the Marian River;

- wildlife habitat loss, especially in relation to potential loss of habitat for caribou;
- proposed closure techniques and long-term stability; and
- air quality during operations and closure in relation to dust generation.

Subsequent to the submission of its water license application in 2008, Fortune decided that the Mine Rock Management area proposed for the basin south of the Open Pit was no longer feasible based on the results of geochemical studies. Fortune commissioned its design team to re-examine options for the permanent disposal of tailings and mine rock generated by the NICO Project. A series of design criteria were compiled that incorporated engineering and environmental requirements and community concerns.

2.3.3.1 Design Drivers

A number of key design drivers for the management of tailings and mine rock were assessed.

- **Footprint:** Limit the footprint of the mine rock and tailings management facilities and keep them as close as possible to the Open Pit and Plant site. This would limit haul distance, and help reduce potential environmental effects from dust generation.
- **Consolidation of Effluent Discharge:** The previous design would have discharged water into 2 sub-basins within the Burke Lake watershed. The preferred design option was to have the containment of tailings and mine rock, the Open Pit, and the Plant all within a single watershed to increase efficiency in water management and treatment.
- **Aesthetics:** Based directly on Tłı̨chǫ input, the new facility had to have a low profile that was not visible from Hislop Lake and the Marian River.
- **Geochemistry (water quality):** Both the tailings and mine rock are susceptible to metal leaching and a small portion of the mine rock has acid generation potential. The facility had to limit the risk of operational and post-closure mass release and mass loadings from the containment facilities into downstream receiving water bodies. Oxidation can be limited by reducing the ingress of oxygen. Loadings from metal leaching can be reduced by limiting seepage through the material.
- **Water Conservation:** Water will freeze quickly in a tailings management facility during the winter months. To prevent permanent freezing and reduce freshet water return volume, and to lower the demand for reclaim water in the Plant, the amount of water sent out of the Plant with the tailings had be limited. Conservation of the water in the Plant was desired as a management strategy to reduce raw water requirements.
- **Water Treatment Requirements:** Effluent from the site will require treatment throughout the operating period and possibly at closure. The cost of operating the Effluent Treatment Facility (ETF) is substantial, and a function of water volumes and solute concentrations. Water treatment requirements during operations and post-closure were considered. Water conservation, the consolidation of water requiring treatment into a single basin, water quality generated by the facility, and water treatment technologies most suited to the chemistry and volumes of water generated by the new facility were all important considerations in determining the best option for the NICO Project.

- **Design for Closure:** Progressive closure (i.e., closure activities carried out during the period of operations) will reduce the area of tailings and mine rock that will be exposed to the environment. Tailings solids are erodible and contain metals. Covers over tailings had to be designed to prevent erosion and potential off-site transport of tailings solids. The design had to reduce infiltration and to prevent contact between tailings and surface runoff. Vegetation growing on the covers could potentially be consumed by local wildlife, so the tailings cover system had to contain a capillary break to reduce potential metal uptake by vegetation.
- **Cost:** The design had to aim at reducing mine life cycle cost, including capital, operational, and closure costs.

2.3.4 Tailings and Mine Rock Disposal Options

In 2010, Fortune re-considered its options for a thickened tailings and/or a mine rock and tailings CDF (Golder 2010). Only 6 of the 11 sites identified during the 2004 site selection were re-evaluated during the 2010 site selection. A detailed trade-off study was carried out that compared 3 alternatives of tailings and mine rock disposal using environmental, engineering, and economic criteria (Golder 2010).

- **Alternative 1:** Conventional tailings disposal in Site 1 and mine rock disposal in Site 2 (south of Open Pit where the former mine rock management areas was to be located; Fortune 2008).
- **Alternative 2:** Adjacent disposal of thickened tailings and mine rock in Site 1 (Grid Pond Basin); and
- **Alternative 3:** A CDF of thickened tailings and mine rock in Site 1.

The following summarizes the results of the comparisons.

- Alternative 1 would utilize well established techniques for the placement of tailings and mine rock, would be easy to implement, and would involve relatively low operational costs. This alternative would require very high capital investment for dam construction and high closure costs because of the requirement for long-term (possibly perpetual) active treatment of site effluent. Alternative 1 would also involve a relatively large footprint area and would have high water consumption rates compared to the other options under consideration.
- Alternative 2 would require an intermediate level of capital, operational, and closure costs. This alternative would use only one site (Site 1). This option would potentially require long-term perpetual treatment of site effluent.
- Alternative 3 would involve the smallest footprint area and the lowest closure cost of the 3 alternatives. It would require a smaller water treatment plant due to reduced water usage rates. The deposition plan is flexible enough to allow changes if operational challenges arise. The co-disposal technique will reduce infiltration and seepage, improve geochemistry, and reduce dust generation. This alternative would require relatively low capital costs but high operational costs, and operation would require substantial controls and a well trained workforce.

Alternative 3, co-disposal of mine rock and tailings, was selected as the preferred tailings and mine rock disposal option once all factors were taken into consideration.

The preferred site for the CDF is Site 1. The site is located northeast of the Open Pit within a 1 km radius from the Plant. It contains the Grid and Little Grid ponds, both of which have elevated background concentrations of

arsenic. The site has good natural topographic containment, particularly on the north side where it adjoins a prominent ridge. The site has sufficient capacity to store both the tailings and the mine rock for the life of mine. The site is located in the upper reaches of the Burke Lake sub-watershed; consequently, relatively little upstream runoff will need to be managed and diverted. The natural drainage from the site flows eastwards to Nico Lake through the narrow valley that will facilitate water management.

Site 2 was also considered for the location of the CDF. The site is located in the valley immediately south of the Open Pit within a 2 km radius from the Plant. The site has a relatively small watershed area, but drainage from the site would have to be collected and directed away from the ponds immediately downstream of the facility, which are fish bearing. Although this site provides good natural topographic relief and could be used for the storage of either tailings or mine rock, it does not have the capacity to store both. The site would need to be used in conjunction with another site for containment of all the tailings and mine rock. Site 2 would also have been visible from Hislop Lake and the Marian River. Given the water quality, aesthetics, and area of disturbance issues, this site was discounted for the placement of the CDF.

2.3.4.1 Benefits of Co-Disposal

There are number of benefits associated with the co-disposal of tailings and mine rock.

- **Reduced footprint:** About 35.5% of the thickened tailings is anticipated to fill the void space of the mine rock, hence reducing the total volume of the facility and the area of disturbance. Selection of the CDF and elimination of the Mine Rock Management Area reduces the footprint of the NICO Project by over 200 hectares.
- **Consolidated water management:** Use of the CDF allows for water management related to the mine to be concentrated into a single watershed.
- **More efficient water collection (maximizing the rate of consolidation of the tailings):** The coarse mine rock will act as a drainage path for tailings consolidation water.
- **Aesthetics:** The CDF was specifically designed to be lower than the surrounding hills making it invisible from Hislop Lake and the Marian River.
- **Improved stability:** The presence of mine rock will increase the overall stability of the facility, reducing operational and post-closure risk of the facility.
- **Improved water quality:** The CDF reduces metal leaching and acid mine drainage potential. Filling of the mine rock void space with thickened tailings will reduce infiltration, maintain saturation, and reduce the rate of oxygen ingress into the co-disposed mass, thus reducing the rates of infiltration, mass transfer of solutes, sulphide oxidation, and acid generation.
- **Dust control:** The co-disposal will reduce wind and water erosion. The surface area of tailings exposed to wind and rainfall will be reduced by placing tailings in cells. The tailings disposal cells will also be covered with mine rock shortly after they are filled.
- **Progressive closure:** Closure activities can be carried out during operations. Fortune will be able to demonstrate if its closure techniques are successful during late operations, which will allow for adjustments

to be made if needed. Progressive reclamation will also reduce the area of tailings and mine rock that is exposed to the environment.

2.3.5 Relocation of Downstream Processing

Subsequent to its 2008 water license application, Fortune completed a study assessing the merits of conducting the downstream processing of metal concentrates produced at the NICO Project in southern Canada. A number of factors were evaluated during the course of the study that examined the merits of moving the downstream processing to another location versus processing at the NICO Project site. The primary factors considered were:

- power availability and cost;
- Tłı̨chǫ concerns over the use of process chemicals at the NICO Project site. During the course of the DAR scoping sessions, community meetings and NICO site visits with elders and other Tłı̨chǫ citizens, a number of concerns were raised with respect to water quality and the use of chemicals at the NICO Project site for processing. Concerns over cyanide use in particular were voiced on several occasions;
- cost and potential risk of transporting large quantities of process chemicals to the NICO Project site;
- increased construction costs and availability of materials;
- NICO Project schedule; and
- staffing.

On 17 June 2009, Fortune advised the Mackenzie Valley Environmental Impact Review Board that the hydrometallurgical facility (hereafter referred to as the Saskatchewan Metals Processing Plant) for the NICO Project would be located in southern Canada. The site selection study concluded that a site near Saskatoon, Saskatchewan had all of the required features for the plant.

In the Mine Industry Questionnaire (Section 4) submitted as part of the Type A Water License application, Fortune outlined the steps required to process ore mined at the NICO Project site to a final product. With the relocation of the hydrometallurgical facility, most of the process steps outlined in the Mine Industry Questionnaire will no longer occur at the NICO Project site, although the process that would be used in the primary and secondary crushing and grinding circuits will remain unchanged. The economic, social and environmental benefits of relocating the downstream processing to Saskatchewan include the following.

- **Power cost**: Electricity rates in the NWT are projected to be more than 20 cents per Kilowatt (kW) as compared to the rate in Saskatchewan of 5.7 cents per kW. Reduced hydro rates represent a substantial cost saving for the overall NICO Project.
- **Power availability**: Reducing the power requirements for the NICO Project is in line with existing and planned hydro-electric generation in the Tłı̨chǫ region of the NWT. Existing and planned hydro power in the NWT cannot satisfy the increased power loads at NICO but could supply the 8-10 MW of electrical demand for the mine and concentrator. As detailed previously, the Tłı̨chǫ Investment Corporation has received funding to complete a feasibility study on the Nailii Hydro Project which would include a run-of-river hydro plant constructed on the La Martre River, downstream of the community of Whatì. Selling hydro power to the NICO development presents an attractive long-term, environmentally sustainable business opportunity for the Tłı̨chǫ people and NWT government. Fortune will consider the purchase of power from this facility

should the Tłı̨chǫ Investment Corporation decide to proceed with the development, subject to power availability and cost.

- **Process chemical use**: Relocation of the downstream processing to Saskatchewan reduces the quantity and number of process chemicals required at the NICO Project site.
- **Process chemical transportation**: The reduction in the process chemicals needed for the NICO Project will considerably reduce truck traffic on the Proposed Tłı̨chǫ Road Route and NPAR. In addition, cost savings in reagent transportation to the NWT will offset approximately half the costs of transporting metal concentrates to the Saskatchewan Metals Processing Plant.
- **Cyanide Use**: On 16 March 2011, Fortune issued a press release (Fortune 2011, internet site) to announce successful results for mini-pilot plant, gravity, and variability tests conducted at SGS Lakefield Research Limited on samples of ores from the NICO Project. The addition of gravity, regrind, and secondary flotation facilities at the Company's proposed NICO Project concentrator increases metal recovery during flotation and eliminates the need to construct cyanide leaching and smelting facilities at the NICO Project site. This mitigates the duplication of similar unit operations that are planned to be constructed at the Company's proposed Saskatchewan Metals Processing Plant site where bulk concentrates from the mine will be processed. This change specifically addresses the concerns of the Tłı̨chǫ people regarding cyanide use at the NICO Project.
- **Reduced capital costs for the development**: There will be a substantial reduction in the amount of construction materials to be transported to the NWT during construction, which will reduce costs for the NICO Project and again reduce truck traffic on the Proposed Tłı̨chǫ Road Route and NPAR. The camp facilities required to accommodate workers at the NICO Project site will be smaller, which reduces water use and the amount of sewage generated at the site. Labour and travel expenses during construction will be lower.
- **Reduction in construction period**: Construction of the NICO site and Saskatchewan Metals Processing Plant will be carried out concurrently and the most technically advanced part of the process plant will be less constrained by weather and access issues in Saskatchewan.
- **Staffing**: The labour requirements for the mine and concentrator, as well as additional personnel required to transport concentrates south can be easily sourced from the existing labour pool in the NWT. Conversely, metallurgists, engineers, and chemical plant operators are more likely to be sourced from southern Canada.

Fortune believes the moving of the downstream processing to the location chosen in Saskatchewan is the most efficient means of addressing construction and operations cost issues and the concerns of Tłı̨chǫ citizens.

2.3.6 Water Treatment

Fortune completed a water treatment options evaluation (Golder 2011) to determine the most efficient means of meeting its Site-Specific Water Quality Objectives (SSWQO) for the water treated in the ETF. For the NICO Project ETF, the initial levels of metals are relatively low; therefore, achieving high removal efficiency, particularly in a single stage process, is less likely to occur. Treatability testing will ultimately be required to confirm the final effluent quality is achievable with a process or series of processes. The treatment efficiency of the various

processes considered for the NICO Project ETF is based on literature reported values and the consultant's experience in the treatment of similar water qualities in many mining and other industrial applications.

Influent chemistry and volume and the ability to meet the SSWQO's during the entire operating period was a prime design driver for the ETF. Another key factor in considering technologies and developing treatment trains is the very cold water temperatures for most of the operating period. The cold water temperatures will be mitigated by the use of waste heat (Section 3.10). Calculations indicate that the available waste heat can increase the incoming water temperature from 1 degree Celsius to an average of 15 degrees Celsius. The heat will then be recovered prior to discharge to Peanut Lake to minimize supplemental heating requirements and to prevent temperature increase in the discharge to Peanut Lake. The selection of technologies and development of process options includes 2 primary treatment objectives: treatment of the chemicals of potential concern using best available technologies economically achievable and producing an effluent in compliance with the SSWQO's. Strong consideration was also given to processes that minimized the chemicals used, the power required, the volume of secondary waste streams generated, and the economics of the annual operating costs.

The following proven water treatment processes were evaluated for the NICO Project:

- chemical precipitation;
- chemical precipitation and polishing;
- ion exchange and media processes; and
- reverse osmosis.

As detailed in the Project Description (Section 3.9), Fortune has selected ion exchange as the technology to be used in the ETF. Fortune is initiating studies to evaluate the feasibility of implementing a reverse osmosis system and will reveal the results of this evaluation once completed.

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