Technical Report on the Preliminary Economic Assessment

Sydvaranger Project, Norway

Sydvaranger Drift AS

Prepared by:

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Acronyms and Abbreviations

Unit	Definition
%	percent
µ	micron
µg	microgram
a	annum
A	ampere
°C	degree Celsius
cm	centimetre
d	day
g	gram
G	giga (billion)
k	kilo (thousand)
kg	kilogram
km	kilometre
km^2	square kilometre
kW	kilowatt
kWh	kilowatt-hour
kWh/t	kilowatt-hour per tonne
L	litre
lb	pound
L/s	litres per second
L/m	litres per minute
m	metre
M	mega (million); molar
m^2	square metre
m^3	cubic metre
m^3/h	cubic metres per hour
m/s	metres per second
min	minute
µm	micrometre
mm	millimetre
Mtpa	million tonnes per annum
MVA	megavolt-amperes
MW	megawatt
MWh	megawatt-hour
s	second
t	metric tonne
tpa	metric tonne per year
tpd	metric tonne per day
tph	tonnes per hour
US$	United States dollar
V	volt
W	watt

1.0 Executive Summary

1.1 Summary

SLR Consulting Ltd (SLR) was retained by Sydvaranger Drift AS (SYD) to prepare a Preliminary Economic Assessment (PEA) on the Sydvaranger Project (the Project) which is located in Kirkenes the Finnmark county of northern Norway. This Technical Report presents the results of the preliminary economic assessment (PEA) completed to confirm the economic and technical viability of the Project. This report is presented in an NI 43-101 Technical Report format.

SYD is a subsidiary of Grangex AB (Grangex), which is listed on NASDAQ under the symbol GRANGX.

The Project has a long history: iron mineralisation was first discovered in 1866, the first mine permit was granted in 1906, and iron ore was first produced in 1910. There have been four phases of mining activity: 1910 to 1939, 1952 to 1969, 1969 to 1997, and most recently 2010 to 2015. The mine produced magnetite concentrate (67.5% Fe), super high-grade magnetite concentrate (72% Fe), and iron pellets for the European Market.

The Project is expected to produce ore at a nominal rate of 6 million tonnes per annum (Mtpa) to 7 Mtpa, which equates to approximately 3 Mtpa of DR Grade iron ore concentrate. The concentrate will be shipped from the existing port at Kirkenes.

The focus of the PEA is to update the pit shell optimisation in order to implement an appropriate design, schedule and cost estimate, and ultimately for the Project to proceed to Definitive Feasibility reporting.

As part of the PEA process, SLR developed two key options:

- **Option A**: Is the As-Is option utilizing the existing infrastructure with minor upgrades to enhance mill throughputs. Process will be upgraded to produce DR grade Pellet feed. The concept is an early ore, low capital cost; and
- **Option B**: The first 3 years will be the same as Option A, thereafter, Bjørnevatn pit ore will be accessed at earliest scheduled opportunity and the moving of the crusher to facilitate this option.

A key requirement during the PEA is the development of the Process Acceptance Criteria required for the Definitive Feasibility Study (DFS).

Table 1-1 summarizes Sydvaranger's Mineral Resource estimates for total iron content (Fe_{Total}), iron in magnetite (Fe_{Mag}), and sulphur (S) that were used for the PEA study presented in this Technical Report.

Table 1-1: Sydvaranger Mineral Resource Estimate, March 27, 2019

Class	Mass (Mt)	Grade		
		Fe_{Total} (%)	Fe_{Mag} (%)	S (%)
Measured	58.4	33.6	30.8	0.038
Indicated	413.1	33.0	28.3	0.108
Measured and Indicated	471.5	33.1	28.6	0.100
Inferred	42.8	31.7	27.7	0.105

Notes:

1. *Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (CIM (2014) definitions) were used for Mineral Resource classification.*
2. *Mineral Resources are reported within open pit (OP) shell volumes to demonstrate Reasonable Prospects for Eventual Economic Extraction (RPEEE), as required under NI 43-101; mineralization lying outside of the OP shell is not reported as a Mineral Resource; mineralization lying outside of the Extraction Rights boundary has been excluded from the reported resources. Note the OP shell volumes are used for Mineral Resource reporting purposes only and are not indicative of the proposed mining method.*
3. *Mineral Resources have been depleted using the topography and underground workings at Bjørnevatn; backfill and waste dump volumes were added to the model near Bjørnevatn and the Southern Deposits.*
4. *Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.*
5. *The densities for each deposit area are based on regressions created from the relationship between Fe_{Total} assays and bulk density measurements.*
6. *Mineral Resources are reported at a pit wall angle of 45°, Revenue Factors of 0.65 (Northern Pits) and 0.7 (Southern Pits), and an iron metal price of USD84.5/t.*
7. *The effective date of the MRE is March 27, 2019, and the MRE is based on all drilling data up to and including holes drilled in 2015.*
8. *The Inferred Mineral Resources in this estimate have a lower level of confidence than that applied to the Indicated Mineral Resources and must not be converted to Mineral Reserves. There is also no certainty that these Inferred Mineral Resources will be converted to Measured or Indicated through further drilling, or into Mineral Reserves once economic considerations are applied. It is reasonable to expect the Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.*
9. *Mineral Resources have been estimated by Howard Baker (FAusIMM(CP)), an independent Qualified Person as defined in NI 43-101.*

1.1.1 Geology and Mineral Resources

- The Mineral Resources for Sydvaranger comprise a total of four deposit areas: Bjørnevatn, Bjørnefjell, Kjellmansåsen, and the Southern Deposits (Grundtjern, Søstervann, Tverrdalen, Bjørnefjell, Fisketind, Oscarsmalmen, Blixmalmen, Jerntoppen, Hyttemalmen).
- Sydvaranger is considered a typical Algoma-type banded iron deposit consisting of thinly banded to laminated quartz-magnetite iron formations. Comparable deposits include the Lake Superior-type iron formations.
- The total combined Mineral Resources for Sydvaranger are estimated to total 58.4 Mt, at an average grade of 33.6 % Fe_{Total}, 30.8 % Fe_{Mag}, and 0.038 % S in the Measured category, 413.1 Mt, at an average grade of 33.0 % FeTotal, 28.3 % Fe_{Mag}, and 0.108 % S in the Indicated category, and 42.8 Mt, at an average grade of 31.7 % Fe_{Total}, 27.7 % Fe_{Mag}, and 0.105 % S in the Inferred category.

1.1.2 Mining

1.1.2.1 Geotechnical

- A geotechnical berm or ramp of ~30 m should be placed every ~140 m vertical height on the pit walls.
- Whilst not prohibited, it is not recommended to place ramps on the West wall of each pit (NE wall for Kjellmansåsen – Pit 8 - as the foliation is overturned in this pit); the dominant structures of each pit predominantly dip to the east and thus may pose localised ramp loss issues.
- As a combined result of the high pit slopes, low permeability, and high groundwater levels, the pore pressures at the base of some of the pit slopes are high and could lead to instability (both localized and overall slope).

1.1.2.2 Mining

- Total combined mining inventory totals 139.3 Mt of clean ore at an Fe(mag) grade of 28.2% and MIS factor of 0.02%. The mineral inventory includes 6.5 Mt of inferred ore material at a grade of 23.7% Fe(mag).
- The inventory excludes 10.4 Mt of high-MIS mineralised waste with an average Fe(mag) of 18.8% and a MIS of 0.66%. Any concentrate likely produced from this material will not meet product specification requirements particularly for sulfur content.
- A practical mine schedule can be produced for both the early-start and plant upgrade scenarios with potential mine life of 18 and 19 years respectively.
- If a new crusher upgrade is not sought the majority of the ore in the northern half of Bjørnevatn will be sterilised.

1.1.3 Mineral Processing

The following preliminary conclusions can be drawn from the historical operating data and the mineralogical and metallurgical test work completed on the project.

- A concentrate product with a FeMag grade of above 70% can be produced with an overall FeMag recovery of 97%.
- It is technically feasible to include fine cobbing into the flowsheet along with the installation of a new crusher.
- The concentrate purity can be upgraded by reducing the silica content while improving the Fe content. This will help increase the marketability of the concentrate product.
- According to the current mining sequence, the ball mill capacity might become a bottleneck during the 2nd year of plant operation. However, this could be effectively managed by diverting a small portion of the ball mill cyclone underflow to another mill.
- It is anticipated that the ball mill capacity can be potentially increased by removing the scats. However, additional permits might be required.

1.1.4 Infrastructure

The Sydvaranger mine site is well established supported by existing infrastructure. The plant upgrades proposed as part of the Option B are supported by a detailed 2019 feasibility study. While an up-to-date condition report is required there are no significant infrastructure upgrades required in order to proceed with the Option A.

A PEA level study into alternative tailings disposal methodologies has been carried out and detailed as part of this PEA.

1.1.5 Environmental and Social

The Mine has all required permits in place to allow for mining and processing operations to start-up again as well as planned expansion, following years of being in care and maintenance. The operation had well-developed operational management plans and a management system covering the major aspects of the health, safety, environment and community (HSEC), as would be expected for a mature operation in a well-regulated jurisdiction. Prior to starting-up operations, SYD intends to update these management plans and system to ensure it aligns with good international industry practice (GIIP). As part of this, even though it is not a required under Norwegian legislation (given the mine has all required permits), SYD will be completing the first full environmental and social impact assessment (ESIA) for the operation. It will be completed in accordance with Norwegian and EU legislation along with aligning with international best practice including IFC Performance Standards where relevant.

A number of preliminary environmental and social risks and potential impacts have been identified and summarised in the PEA. SYD will update the list of identified potential impacts as the ESIA progresses and management and monitoring will be put in place to avoid or mitigate the risks.

1.1.6 Project Execution

Construction execution is based on an EPCM for the process plant area and all other scopes managed by the Owner's team.

The PEA project schedule is based on the following:

- Option A – 1 year construction period. Steady state production of 2.2Mtpa and DR grade concentrate from Year 2 onwards.
- Option B – 4 year construction period (including Option A). Production commences during development phase with a total production of 8.4Mt of DR grade concentrate. Steady state production from Year 5 onwards (3.03Mtpa of DR grade concentrate).

1.1.7 Capital and Operating Costs

1.1.7.1 Initial Capital Cost

The initial capital cost estimate is classed as an Association for Advancement of Cost Engineering International (AACEi) Class 5 estimate with an accuracy range of -50% to +100% after inclusion of project contingency.

The estimated cost summary is as per Table 1-2 below:

Table 1-2: Estimate Summary by WBS Level 1

WBS Level 1 Area	Option A (US$ M) d	Option B (US$ M) e	Incremental 2 (US$ M) f = e-d
1000 – Mining	22.78	25.47	2.70
3000 – Ore Handling	0.88	117.12	116.24
4000 – Processing Plant	11.68	53.67	41.99
6000 – On-Site Infrastructure	10.04	10.04	-
7000 – Off-Site Infrastructure	12.54	12.54	-
8000 – Owner's Costs	16.00	19.02	3.02
9000 – Indirect Costs	6.11	43.10	36.99
P000 – Contingency	24.40	66.94	42.54
Total:	104.44	347.91	243.47

The total project contingency for Option A is 30.49% of project cost excl Contingency and Option B is 23.83% of project cost excl Contingency.

As per Grangex instruction, no schedule contingency has been included in the estimate but is recorded in the risk registry.

1.1.7.2 Sustaining Capital Cost

The PEA has not fully captured the phasing costs for the Sustaining Capital Costs. The PEA applied, 2.5% of the total initial capex, Option A US$ 61.14M and for Option B US$ 139.49M. Phasing will be defined as part of the DFS.

1.1.7.3 Closure Costs

The total closure costs are estimated at US 3.10M (NOK 34.07M).

The closure costs do not include post closure monitoring.

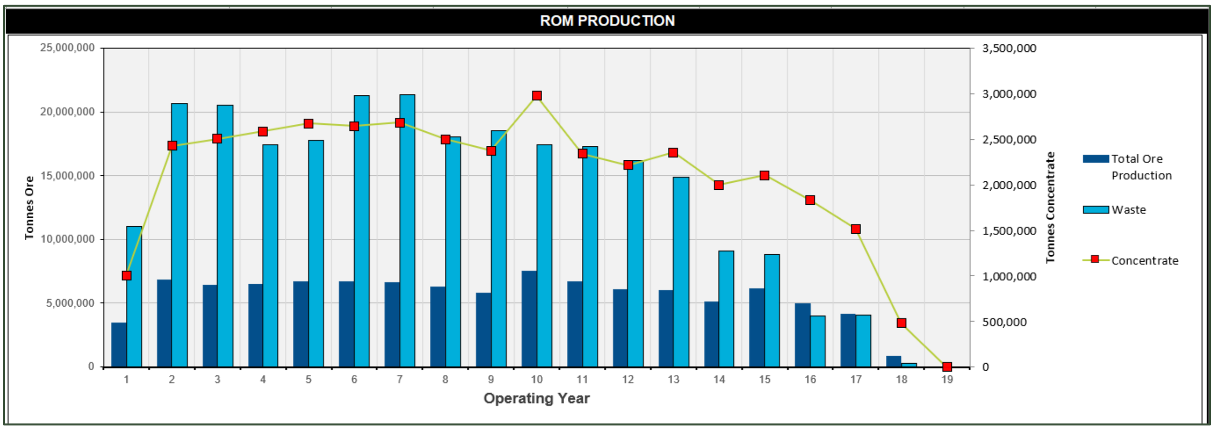
1.2 Economic Analysis

The Sydvaranger PEA project cashflow models for Option A and Option B have been developed by SLR with inputs from the Sydvaranger operations team and Zenito. The mine physical inputs, mining fleet requirements, purchase costs and sustaining costs have been determined from the mine planning by SLR. Zenito provided the cost inputs on both options for the process plant, and infrastructure capital cost estimates.

1.2.1 Option A

The Tonnes per operating year for Option A is seen in Figure 1-1.

Figure 1-1: Option A: Production Profile

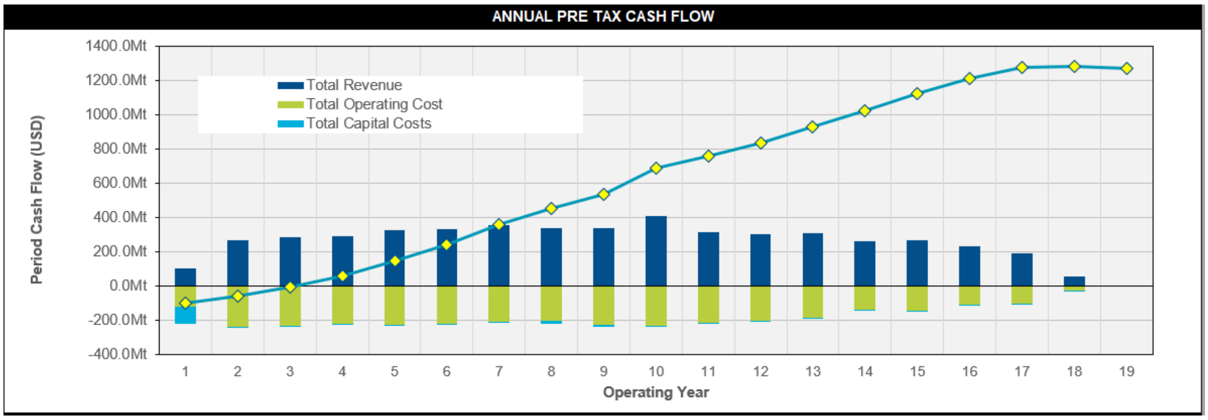


The mine is proposed to start with production of 1Mt concentrate and ramps up in Year 2 to 2.4Mt. A concentrate price FOB is variable price based on the FastMarket report supplied by SYD and ranges from of US$ 106-142 has been assumed for Option A. The strip ratio over the first 3 years is 3.12:1 and for the LOM averages at 2.51:1. Mill tonnes starts Year 1 at 2.8 Mt and ramps up Year 2 to 5.9 Mt, with an average steady state over 17 years of 5.28 Mtpa after ramping up.

Total production revenue is US$ 4,899M. This provides a Post-tax NPV[8] of US$ 572.7M IRR Post Tax 58.3%.

Pre-tax NPV[8] of US$ 734.17M and Pre-tax IRR 65.1%, Figure 1-2.

Figure 1-2: Option A: Annual After pre Cash Flow

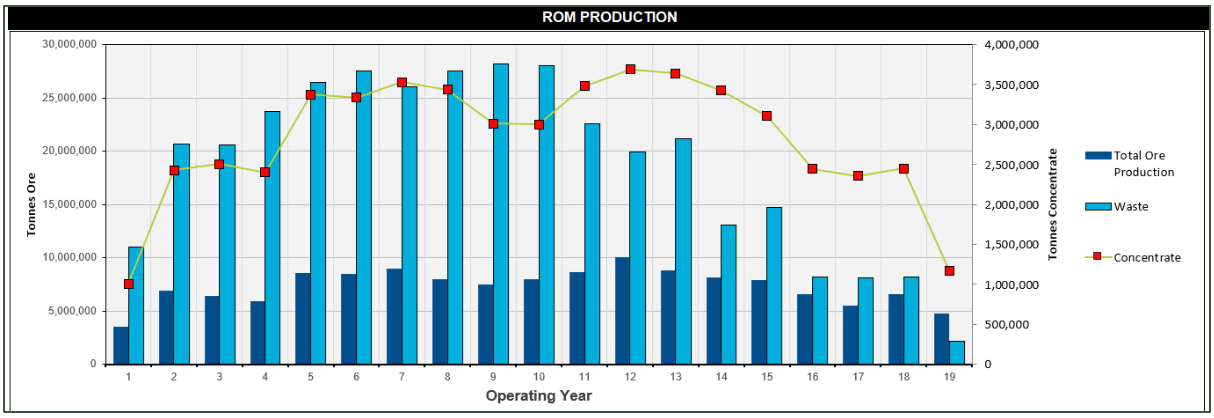


The LOM for Option A is 18 years with a payback period of 3.2 years.

1.2.2 Option B

The Tonnes per operating year for Option B is seen in Figure 1-3.

Figure 1-3: Option B: Production Profile



The mine is proposed to start identically to Option A with production of Mt concentrate and ramps up in year 2 to 2.4 Mt. A concentrate price FOB is a variable price based on the FastMarket report supplied by SYD and ranges from of US$ 106-142 has been assumed for Option B. Mill tonnes are as Option A starting Year 1 at 2.8 Mt and ramps up Year 2 to 5.9 Mt, after the mill expansion production increases in Year 5 to 6.99 Mt with an average steady state over 15 years of 6.4 Mtpa after ramping up.

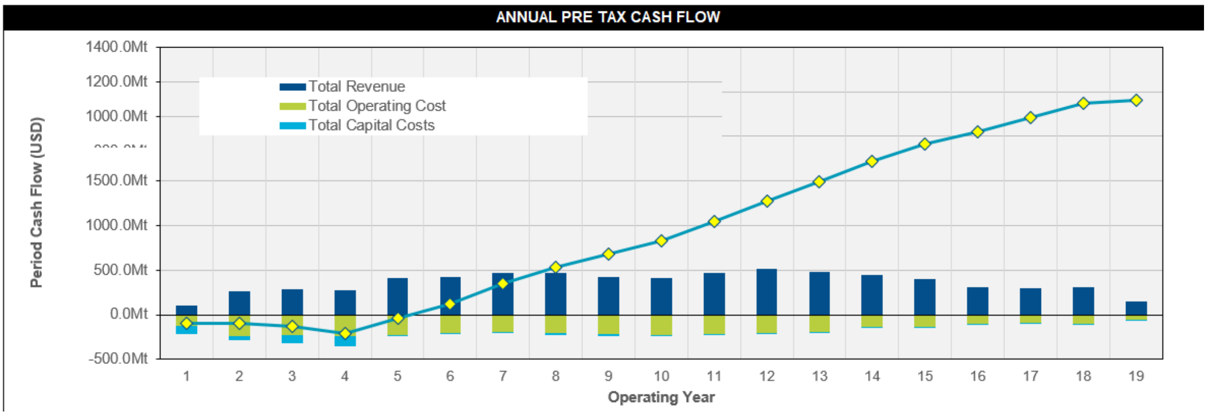
The Initial Capex totals US$ 350.89M over the first four years: Year 1 at US$ 99.14M, Year 2 at US$ 49.13 with more mining equipment being brought on. Year 3 requires US$ 82.9M for the relocation of the crusher and mill expansion, and Year 4 US$ 119.7M residual expansion project. The total capital cost over the LOM which accounts for contingencies but excludes schedule delays has been estimated for this PEA at US$ 490.5M for 19 years.

Total production revenue is US$ 6,802M. Operating Expenses US$ 3,335M for an EBITDA of 3,574M.

This provides a Post-tax NPV[8] of US$ 924.70M and Post-tax IRR 41.1%, or

Pre-tax NPV[8] of US$ 1,215.1M and Pre-tax IRR 46.9%, Figure 1-4.

Figure 1-4: Option B: Annual Pre-Tax Cashflow



The LOM for Option B is 19 years with a payback period of 5.48 years.

1.2.3 Comparison Option A and Option B

Life of mine, production physicals and economics summary, Table 1-3.

Table 1-3: Economic Comparison Table for Options A and B

Production & Assumptions	Option A	Option B
Ore Mined	102,866 kt	139,180 kt
Waste Moved	258,874 kt	357,738 kt
Strip Ratio	2.51 x	2.57 x
Ore Grade - Magnetic Fe	27.5 %	28.17 %
Material Processed	92,579 kt	116,026 kt
Concentrate Produced	39,223 kt	54,333 kt
Concentrate Grade	70%	70%
FOB Selling Price (US$/dmt con.)	106-142	106-142
Mining costs (US$/dmt con.)	43.48	42.02
Processing, Maintenance, Rail (US$/dmt con.)	36.65	17.99
G&A (US$/dmt con.)	inclds	inclds
Total average - Unit cash operating cost (US$/dmt con.)	81.87	61.99
Steady state years	17	15
Steady state cash cost (US$/dmt con.)	78.5	54.3
NPV[8] pre-tax	US$ 734.07 M	US$ 1,215.10 M
IRR	65.1%	46.9%
NPV[8] post-tax	US$ 572.72 M	US$ 924.70 M
IRR	58.3%	41.1%

1.3 Technical Summary

1.3.1 Property Description and Location

The Sydvaranger iron ore mine, established in 1906, has over 100 years of mining history, ending with the previous operator's bankruptcy in 2015. This long history of extraction has left a substantial industrial footprint, shaping the topography significantly. Reopening plans include expansion into an undeveloped greenfield area within the existing mining permit boundary (also referred to as the mine concession area).

The mine is located near Bjørnevatn village, approximately 7 km from Kirkenes, within Sør-Varanger Municipality, Finnmark County. The Project is also 2 km west of the Norway-Russia border and 30 km north of the Norway-Finland border.

The mine straddles a river catchment boundary, with the eastern section draining towards the Pasvik River and the Russian border, and the western section to the brackish fjord Langfjorden. Several lakes and streams are situated within and around the mining concession area. There are five permitted waste rock dumps within the mine concession area designed to store waste material generated by the mine operations.

The areas surrounding the mine support various land uses, including recreational activities, holiday cottages owned and used by the local population, natural resource harvesting, and reindeer husbandry managed by a Sámi organisation (indigenous peoples). A reindeer migratory route passes through the mine concession area and has been managed throughout the operational history of the mine.

Access to the mine is via E6 and 8850 roads, with an 8 km railway connecting it to the processing plant in Kirkenes. Raw water for the processing plant is sourced from the nearby Kirkenes lakes. Tailings separated at the processing plant is transported via pipeline to a subsea tailings deposit in Bøkfjorden, where tailings have been disposed of since 1972.

1.3.2 Land Tenure

The Project is situated in northern Norway in the Sør-Varanger municipality of Finnmark county, at 70°N latitude and 30°E longitude. The Project Mine site is located near Bjørnevatn, a small village with 2,574 inhabitants; the plant and ship loader facilities are located in Kirkenes, the municipality centre with 3,535 inhabitants as of 2024. Sør-Varanger is in a strategic position, close to the borders with Finland and Russia. The Russian border is at its closest less than five kilometres from the Project, whilst the Finnish border is approximately 30 km to the southwest of the Project.

Comprising 11 main deposits and several smaller mineralization occurrences, the Project Mine site covers a strike length of approximately 10 km, with the combined Project licences covering 16 km^2.

SYD holds seven exploration and 14 extraction rights, covering an area of 16 km^2 over the Project.

1.3.3 Existing Infrastructure

The municipality of Sør-Varanger has a well-developed infrastructure, transportation and digital network including roads, ports, and airports; and is able to readily supply both water and power to the mine and plant sites.

The Project workforce will be a combination of residents and fly-in fly-out and drive-in and drive-out employees.

Site infrastructure constructed and maintained by previous and current operators remains available for continued use.

1.3.4 History

Low-grade mineralization was initially discovered in the region around 1865 with more extensive exploration activities commencing in 1902. In 1906, the company Sydvaranger AS was founded which led to the first concentrate from the Bjørnevatn mine being produced in 1910.

Mining activity at Bjørnevatn has taken place over four periods, with interruptions due to the two World Wars. The four periods of previous mining activity are 1910-1939, 1952-1969, 1969-1997, and 2009-2015.

- Post World War II, the process plant was re-built, and the Mine operated under state ownership, with the Government of Norway.
- 1969, Sydvaranger AS produced a higher value iron pellet product for use in steel mills.
- 1989, produced high-grade magnetite concentrate.
- 1994, produced hard ferrite product.
- 1995, produced a pigment product.
- 1997, the mine operations were closed.
- 1999, the government sold its 63% stake in the mine to Varanger Kraft. the remaining 37% were held by the Sør-Varanger municipality. Arctic Bulk Minerals (ABM) purchased equipment and attempted to re-open the mine; however, this proved unsuccessful.
- 2006, the Tschudi Group acquired rights to the Project and formed a joint venture (Sydvaranger Gruve AS) with Northern Iron Limited (NIL).
- 2007-2008, exploration took place.
- 2009, production restarted
- 2015, due to the decline in iron ore prices, Sydvaranger Gruve AS filed for bankruptcy.
- 2016, Tschudi Group reacquired the commenced activities to re-start operations under the subsidiary Sydvaranger Drift AS (SYD). A test production campaign was initiated for 100 days, which produced 100,000 tonnes of ore.
- 2020, Tschudi Group engaged Orion Mine Finance Inc. (Orion), which invested in a feasibility study (FS) and secured Tacora Resources Inc. as the operator through an agreement with Orion Mine Finance Inc. to facilitate the restart of operations.
- 2023, Orion exercised its rights to reclaim Sydvaranger from Tacora Resources Inc. and subsequently sold it on the open market to the Swedish company Grangex AB in May 2024.

1.3.5 Geology and Mineralization

The bedrock geology of eastern Finnmark and the western Kola Peninsula is composed of Archaean to Early Proterozoic gneisses and volcano-sedimentary supracrustal rocks overlain by Late Proterozoic to Palaeozoic sedimentary rocks.

The Kola and Karelian cratons display a long evolutionary history from 2.8Ga (Pre-Samides) to 1.8Ga (Carelides). It starts with rocks formed in an intracratonic rift environment at 2.5-2.4Ga, including the iron ore formations at Sydvaranger, and culminates in the collision of the Kola craton with the Karelian craton around 1.9Ga, followed by orogenic collapse and crustal thinning (Lehtinen et al., 2005).

All of the iron deposits that comprise the Sydvaranger Iron Project are situated in the metamorphosed sedimentary iron formations of the Fisketind Formation. The iron formations are structurally deformed and moderately to strongly metamorphosed and have been defined over a 12 km strike length from Bjørnevatn in the north to Kjellmansåsen in the south. More than 23 separate iron deposits have been identified in the region to date.

The stratigraphic rock units relevant to the iron ore deposits are the Fisketind and Bjørnefjellet Formations of the Bjørnevatn Group. The Fisketind Formation contains all the economically important iron formations, whereas most of the waste that has to be mined comprises the Bjørnefjellet Formation. The principal and best-known parts of the Fisketind iron formations are the Bjørnevatn West and East deposits located in the northern portion of the syncline within the central part of the Sydvaranger mining area.

Throughout the Sydvaranger deposit, the magnetite occurs in thin bands up to several mm in thickness laminated together with quartz and amphiboles. The amount of magnetite and gangue minerals is variable in different layers of the deposit. The amount of sulphides present in the mineralisation is generally very low with only occasional thin veins and disseminations of pyrite and pyrrhotite. Sulphides generally occur in shear zones, mylonites, and brecciation structures.

1.3.6 Exploration

Banded iron ore formations (BIFs) were first discovered in the Bjørnevatn area by the Commissioner of Mines, Tellef Dahll in 1865. The first significant period of exploration of the iron ore potential of the area commenced in 1906 and subsequently led to the establishment of Sydvaranger AS and production of the first concentrate in 1910.

Drilling has been the predominant exploration method, with drilling undertaken from surface, and to a lesser extent from underground at Bjørnevatn. The current database provides details for 882 drill holes, totalling 142,280 m, drilled between 1906 and 1985, and drilling between 2007-2012, totalling 24,747 m from 127 drill holes. The total metres drilled from 1906 to 2015, including reverse circulation (RC) drilling, is 184,617 m.

Golder Associates (UK) Ltd (Golder) was commissioned by Sydvaranger Drift AS (Sydvaranger) to undertake a hydrogeological and geotechnical study to Feasibility Study (FS) standards. A total of 33 boreholes (19 geotechnical and 14 hydrogeological) were drilled in 2018 totalling 6,880 m.

A drill program was started in November 2024 in Kjellmansåsen, Søstervann, Grundtjern and Bjørnefjell. The aim of this drilling program is confirmatory drilling for sulphur/MIS zones, collecting geometallurgical data, and historical data validation. The 2024 drilling campaign is projected to end in January 2025.

In 2008, Geotech Airborne Limited conducted an Electromagnetic (VTEM) survey over the licence area. Three additional magnetic anomalies, referred to as Boris-Gelb, Bjørnefjell South and an unnamed anomaly to the southeast of Bjørnevatn, were identified. The Boris-Gelb and the Bjørnefjell South anomalies have been drilled (10 drillholes for Boris-Gelb and 1 drillhole for Bjørnefjell South), however no drilling was conducted at the Bjørnevatn southeast anomaly.

1.3.7 Mineral Resources

The previous Mineral Resource estimate for Sydvaranger is supported by a comprehensive set of data inputs, including drilling data, assay results, bulk density measurements, geological modelling, and estimation parameters.

The Mineral Resource estimate for Sydvaranger was completed in 2019 by Howard Baker, Baker Geological Services (BGS), and was independently validated by SLR.

Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (CIM (2014) definitions) were used for Mineral Resource classification.

The total combined Mineral Resources for Sydvaranger are estimated to be 58.4 Mt, at an average grade of 33.6% Fe_{Total}, 30.8% Fe_{Mag}, and 0.038% S for the Measured Resource category, 413.1 Mt, at an average grade of 33.0% Fe_{Total}, 28.3% Fe_{Mag}, and 0.108% S for the Indicated Resource category, and 42.8 Mt, at an average grade of 31.7% Fe_{Total}, 27.7% Fe_{Mag}, and 0.105% S for the Inferred Resource category. Mineral resources are constrained using an optimized open pit shell generated using an iron metal price of USD84.5/t, pit slope angles of 45°, and revenue factors of 0.65 and 0.7 for the Northern Pits and Southern Pits, respectively. Mineral Resources for Sydvaranger have an effective date of March 27, 2019.

1.3.8 Mining

The Sydvaranger Iron Ore Mine will be a conventional open-pit operation. Ore will be mined from 11 individual pits across the deposit with ore fed to a single centralised crusher location. Ore is crushed on-site and transported by rail to the Kirkenes processing plant. Waste along with reject from the cobbing plant is to be dumped at one of five waste dumps.

Mining will be carried out by a fleet of hydraulic shovels, wheel loaders, rigid dump trucks and production drill rigs. An ancillary fleet of smaller excavators, haul trucks, dozers, motor graders and water bowsers will maintain pit conditions and support general operations. Mining will be carried out in 10m benches.

The total Mining Inventory includes 139.3 Mt of Ore at a grade of 28.2 % Fe(mag) and 357.7 Mt of waste providing a strip ratio of 2.57. This waste value includes 10.4 Mt high-MIS material (Above 0.2% MIS Factor) which has been excluded from the mining schedules.

This study provides an update to the 2019 Feasibility Study by incorporating updates to geotechnical assumptions, pit optimisation inputs, operational costs, mining strategy and product assumptions.

SLR conducted an Options Study in 2024 which investigated various operating scenarios to support the earliest possible start of operations and provide an economic project. The results of the options study were used to define the scenarios investigated as part of this PEA.

There are two key scenarios investigated as part of the PEA. These are Option A, an early-start operation where the existing crusher is utilised throughout the life of the mine; and, Option B, where a plant upgrade option, whereby the crushing and plant upgrades proposed during the 2019 feasibility study are implemented in year 3.

Updated pit optimisation analysis has been carried out and pit designs updated in line with updated pit shell selection and project economics. Practical schedules were subsequently produced for both the Option A and Option B with mine life of 18 and 19 years respectively.

Schedules were used to derive equipment requirement and support the economic analysis presented in Section 23.0.

1.3.9 Mineral Processing and Metallurgical Testing

The process plant will consist of the existing equipment, as per the historical flowsheet with the following modifications.

- New crusher station

The current crusher system located at the plant is unable to provide feed to the primary ball mill at the design specifications. The main reason is that the tertiary crushers are required to have the currently missing choke feeding system to enable the designed function.

This challenge will be initially resolved by installing a feeding system required for tertiary crushers, which will improve the crushing circuit efficiency. This will then follow with the installation of a new crusher system at the mine site. A new crusher station will incorporate the required choke feeding system that the tertiary crushers must have for achieving the design performance of P80 12.5 mm product.

- Secondary ball mill

An additional ball mill with a capacity of up to 100 tph (on a dry basis) in the flowsheet. It is anticipated that the additional mill would have sufficient capacity to grind the material (with high BWi) to nearly the same P80 as targeted by the primary milling (more than 80% < 250 microns).

1.3.10 Health, Safety, Environmental and Communities

The Mine and associated infrastructure has all required permits and approvals in place to commence operations. For the current mine plan, two additional water permits will possibly be required to mine in pits 7.2 and 8. The time required to acquire these permits will be one to two years. This time has been built into the Project development timeline.

SYD has an environment, health and safety (EHS) management system in place with policies, procedures and management plans based on the former operation. The system will be updated and further developed before operation is commenced to incorporate planned operational changes.

Key environmental and social areas for further assessment include alternative tailings disposal methods, area of influence from current tailing disposal method, surface and groundwater impact from Mine including proper waste characterisation of waste rock, biodiversity and natural value impacts, water supply risk for processing, air quality, vibrations and noise impacts for local communities, and community health and safety concerns.

The mine re-opening will affect, directly, the interests and concerns of many stakeholders at a local/regional and, indirectly, some stakeholders at a national level. The acceptance for the mine is very high among local communities, and both more formal and informal stakeholder engagement is an ongoing process, with a grievance mechanism and internal whistleblowing systems in place to monitor grievances. An updated stakeholder engagement plan will be developed to further address and understand possible concerns.

Indigenous peoples – Sámi - are present in the local area and are entitled to special protections and rights under Norwegian law (signatory to key international treaties on indigenous peoples). Dialogue between the mine and the Sámi has been regular throughout the operational history and regular meetings and communication will continue onwards. As part of the engagement, a formal agreement was signed in 2018 between the previous operator and the local reindeer husbandry association. This requires the Mine to keep access open to the main migration route through the Mine and outlines compensation and mechanisms for any future grazing land, access losses and restrictions.

A mine closure and rehabilitation plan has been generated for the site and includes mine closure costs set by the Directorate of mining in Norway. This includes a total of NOK 29,373,610, of those NOK 6,424,833 have already been put in escrow. NOK 8,360,000 shall be put up at mine start and then 1 NOK per tonne of ore should be put in escrow until full sum.

1.4 Recommendations

1.4.1 Geology and Mineral Resources

- Consider conducting additional drilling in planned mining areas to gain a better understanding of the sulphur distribution across the Sydvaranger mine. This includes confirming existing sulphur domains. This additional data will also help in the construction of refined sulphide domains that can be used to better constrain the sulphur for the mining schedule.
- Consider additional drilling or re-sampling of existing drill core to continue to validate historical assays to ensure a robust drill hole database exists. Any remaining historical pups from Room 400 should also be a consideration for this.
- Consider a re-assaying campaign aimed at validating previous QAQC using third-party labs. Existing pulps or historical pulps from Room 400 can also be a consideration for this.
- Consider conducting a grade control drilling campaign from within the open pits to target lower benches before mining progresses. This drilling should also be used to collect additional Geometallurgical data and to upgrade existing Indicated resources.
- Future exploration drilling program to target areas at depth to convert Inferred classification to Indicated classification. This should be completed prior to future mining studies.
- Future exploration or grade control drilling plans should consider implementing a more robust QAQC program that only uses third party labs.
- Consider sterilization drilling in areas to be used for future waste dumping locations.
- Consider further mineralogical studies or mineral phase mapping to better define the sulphide distribution (i.e. pyrrhotite).
- Consider including additional structural data to the mineralization model to show more of the folded complexities of the Sydvaranger deposit. This is especially key for areas such as Kjellmansåsen.
- Consider refining the host rock model by including any structures that may control the sulphide distribution or structures that may affect the overall mineralisation.
- Consider taking new density measurements from historical drill core from various areas of the mine to confirm that recorded historical density values can be relied upon.
- Continuously review open pit slope angles as new data is collected to ensure that parameters reflect any changes in geological and geotechnical conditions.
- Consider using smaller sample intervals to avoid any bias with future sulphur grade estimation.
- Consider extending the Extraction Rights boundary to account for the additional 1.6 Mt of material that falls outside of this boundary.
- Consider employing a field geologist with structural and hydrothermal alteration expertise to map out shear zones and mylonitic structures across Sydvaranger Mine. Mapping of quartz veins and quartz-rich pegmatites should also be carried out.

1.4.2 Mining

It is noted that the Geotechnical information available is sufficient to allow for geotechnical analysis to feed into the Mine Design for the Feasibility Study. However, the following Geotechnical recommendations are made in alignment with industry best practices as the drilling campaigns progress and should be incorporated before execution:

- Geotechnical logging and testing of planned Resource holes to supplement geotechnical data coverage in starter pits and update geotechnical data and domains.
- Geotechnical recommendations for the Feasibility Study are:
- Re-analyse kinematics for 20 m bench heights.
- Re-run West Wall Failure buttress analyses (based on work done by SRK in 2014).
- Update large scale kinematics (all pits) using updated mine design.
- Verification of 26 m (or smaller) geotechnical berms.
- Run verification analyses on select pit domains / sections.
- Develop mine plans including short-term monthly and quarterly mine plans for the first 3 years of operations.
- Complete infill drilling program and proposed test work for ore classification and characterisation. Upgrade drilling of early-stage pits should be a prioritised to improve the confidence in the mining schedule and economic results.
- Develop a plan to manage permitting across the site and in particular interactions with existing lakes to minimise environmental disturbance.

1.4.3 Mineral Processing

- The process design criteria for the suggested flowsheet modifications and an updated flowsheet that incorporates all the suggested flowsheet modifications.

1.4.4 Infrastructure

- Undertake market study.
  - It is recommended to further develop the market on SYD silica concentrate to understand potential clients, costing structures and volumes.
- Understand product classification alterations.
  - Define process in cooperation with the Norwegian Environmental Directorate on how to alter product classification when only withdrawing a fraction on existing tailings stream.
- Undertake Particle Size Distribution (PSD) underflow study.
  - Understand if PSD is homogeneous when splitting stream in underflow thickener Y-pipe.
  - SLR recommends that detailed studies into the exact requirements of each of the go-forward scenarios are included in the forward work plan.
- Identify possible additional pit depletions.
  - With existing volumetric calculations of pit 7.1 only 3.55 years of tailings production capacity are available. Extending footprint to neighbouring pits such as pit 7.2 or entire pit 7 the volumetric potential as a minimum would double.

- Identify depletion grade for pit 7.1.
  - To validate the depletion of the pit and to achieve a permit from the Norwegian Mining Directorate depletion calculation is critical. Therefore, it is recommended to recalculate both pit shell and volumetric capacities to prove depletion.
- Understand potential permit restrictions and impacts.
  - Both environmental permit and mining concession would be altered by this tailings option. It is recommended as early as possible to organize meetings with both parties to discuss the following subjects.
  - Criteria for classifying pit 7.1 as depleted.
  - Understand possibility of filling depleted pit with tailings instead of waste rock.
  - Risks of losing existing tailings permit when altering criteria for tailings disposal in pit.
  - Moving flocculant binded tailings outside existing permit battery limits. Understand possible implications on existing permit alterations or potential new applications for readjusted permit.
- Undertake social impact assessment for engineered solutions.
- Incorporate equipment surveillance designs and maintainability restrictions.
- In-depth drilling is required for sterilization drilling to confirm that the pit is fully depleted.
- Design Evaluation for CapEx Reduction.
- Further investigation is recommended to explore opportunities for reducing capital expenditure (CapEx) through design optimizations.

1.4.5 Environmental and Social

- A full ESIA completed to Norwegian/European standards, and international standards (including debt finance institutions such as IFC) where relevant, will commence in Q1-Q2 2025 and aims to be complete in Q4 2025.
- Other key studies that are planned as part of the Feasibility Study including tailings siting assessment (investigating possibility of terrestrial-based tailings facility), tailings reduction assessment (utilising tailings for construction), decarbonisation planning and scats removal.
- Water permits required for mining new areas must be applied for way in advance of planned mining in these areas to ensure there are no scheduling delays and operations are not impacted.
- A detailed pit watering plan should be developed to ensure early-start timelines can be achieved.
- Undertake a detailed mining cost evaluation at the next study level as the project is highly sensitive to mining cost.
- Continuous and transparent stakeholder engagement is required throughout the life of the Mine, ensuring concerned stakeholders are appraised of the current design planning and operational changes from the previous operation. Concerns raised by stakeholders must continue to be acknowledged and addressed.
- Complete self-assessment for Towards Sustainable Mining (TSM) responsible mining standard, as required by the Norwegian Mining Association (Norsk Bergindustri).

1.4.6 Project Execution

Assess a different execution model to divide responsibility between the Owner and EPCM to optimise project management costs and derisk the project schedule.

1.5 Risks and Opportunities

A risk review workshop was conducted and a risk registry has been created for the project to carry through to project execution, (Appendix 1-A)

1.5.1 Geology and Mineral Resources

Only 11% of the total Mineral Resources are classified as Measured. The remainder of the Mineral Resources are classified as Indicated and Inferred, demonstrating uncertainty for future mining plans.

- There is a significant amount of historical data being used in the current Mineral Resource estimate. A lot of this data has been validated by re-sampling programs (i.e. Room 400 Project), however there are still areas containing unvalidated historical data. This results in a high classification of Indicated resources.
- QAQC analyses performed by the Sydvaranger in-house lab contain erroneous results and strong biases using external CRMs (GIOP-31 and GIOP-93). This leads to doubt around the accuracy of the current assay database. The external CRM material used may not be appropriate for the Sydvaranger ore. This results in a high classification of Indicated resources.
- The current sulphur/MIS domains appear to lack supporting geological inputs that could help define the sulphur distribution in areas containing higher sulphur values. This additional detail may be required to help inform the mining schedule. There is an impact on the mine plan, schedule and processing capacity.

1.5.2 Mining

1.5.2.1 Large Scale Structures / Rock Fall

- The rock mass at Sydvaranger is very competent, as such the primary geotechnical risk will be from the presence of structures. Large scale structures in combination with the pit design can form potential failure blocks (see Bjørnevatn West Wall below). Small scale (bench/inter ramp scale) structures do form failure blocks which can produce a rock fall risk, impacting operators and equipment (either H&S and/or lost production time). Minimising exposure by maintaining the pit bench/berm designs and geotechnical benches, as well as regular clean-up of said berms/benches is required.

1.5.2.2 Bjørnevatn West Wall

- Whilst not explicitly analysed in this study, the West Wall Failure (which occurred in Bjørnevatn in 2012) and the associated Storslaeppa Fault will continue to impact the pit design. A buttress to hold the failure was left by the previous operator and it must either be mined out (adding waste) or remain in place (sterilizing ore). For this study, the buttress is assumed to be left in place. The forward work plan will include a further detailed trade off study into the previously proposed west-wall mining.

1.5.2.3 Geotechnical Risks Associated with Groundwater

- Concerns have been raised during previous studies regarding the low permeability and high groundwater levels impacting the stability of pit walls. In order to mitigate these risks lateral drain holes have been recommended to depressurise the pit walls as mining advances.

1.5.2.4 Minimum Mining Width

- The majority of the designed pits surround existing excavations. Where possible SLR have designed within minimum mining width constraints, in smaller pits and isolated areas mining may be required on small benches. To mitigate the risk to the mining schedule an 80 m advance rate has been included.
- However, mining in areas with difficult access and small bench widths will require expertise and experienced personnel should be sought for the management of the mining operation.

1.5.2.5 Pit Designs Affecting Lakes

- The Kjellmansåsen pit intersects the lakes to the south-east. Planning for permitting requirements and designs for water retaining structures will require development. This will form part of the forward work plan.

1.5.2.6 Mining Equipment Delivery Schedule

- Delivery times of equipment will need further investigation to ensure no delay to the proposed project dates.

1.5.2.7 Used Equipment in the Plan and Cashflow Model

- The existing equipment on-site has been planned to support the RoM rehandle. While this presents a potential saving in capital cost there is a small risk that the expected performance is not achieved. Condition surveys will be required and will form part of the forward work plan.

1.5.2.8 Pit Dewatering

- Before operations begin, the initial mining pits need to be dewatered. This process will involve developing a detailed dewatering plan, creating appropriate designs, refurbishing the existing on-site pumps, and either installing or replacing current pipelines.

1.5.2.9 Brownfield

- The early-start project is heavily reliant on the use of the existing equipment which while under care and maintenance has not operated for several years. Condition surveys will be required to better understand the likely performance levels.
- The upgrades proposed as part of the 2019 feasibility study were largely prepared using data from the brownfield site. This could include outdated mechanical and electrical drawings, lists and condition reports. Variance from the designs produced could impact decisions regarding basis of design or impact the future operations.

1.5.2.10 Plant Upgrades Tie-in

- To minimise disruption to the operation a carefully sequenced implementation plan will be required. SLR have considered a three month production stoppage for modelling purposes however further assessment will be required to ensure further delay is not realised.

1.5.3 Mineral Processing

1.5.3.1 Deleterious Elements

- The current project strategy includes the introduction of Silica reduction technology to upgrade the final product into a concentrate saleable as direct reduction iron ore feed. Certain deleterious elements may impact the marketability of the product and further work will be required to understand the grade-control, sampling and test work requirements going forward.

1.5.3.2 Mill Capacity

- The ball mill scat removal might require permits, if not obtained in time this could potentially lead to bottlenecks in producing the design throughput.

1.5.4 Infrastructure

- In Option A and the first 3 years of Option B the existing infrastructure for the plant will be used. The existing plant on-site has not been operating since 2015. While a care and maintenance program is in place, equipment may require additional rehabilitation which could impact project timelines and cost estimates. To mitigate this risk an asset assessment has taken place and an asset integrity assessment will be finalised as part of the Feasibility Study. Additionally, provisions have been made in the Capex estimate.
- Power supply is sufficient for the project as the total consumption for both scenarios are 21MW for entire SYD(Average demand: A=20,65, B=20,79). Top loads averages out on average demand. SYD have a connection agreement with the local grid owner for the entire 21MW which is sufficient for both options. However, if the Tailings option succeeds the available grip capacity would need to be further developed.
- Tailings alternative for in-pit disposal has not been fully developed in the PEA, there is a potential to sterilise future ore reserves and therefore deeper in pit drilling will be required.
- The market study for the tailings is required to fully assess the risk for:
    - Market capacity and volume.
    - Cement/Clinker market fluctuations could potentially increase or decrease demand from Sydvaranger Silica Sands (3S) filter plant, increasing or decreasing flow to existing fjord disposal.
    - There are no live quotes from market for SYD silica concentrate and the assumptions is for existing PSD, if needed alteration, processing plant will change.
- Limited tailing studies have been conducted for the tailings alternatives. Capital costs may be higher than anticipated. Investigative drilling will impact the Mine Planning and development schedule in the Feasibility Study therefore could impact on the FS deliverable.
- Limited study works have been carried out into the economic and permitting feasibility of the tailings disposal scenario. This might impact the project through project setbacks or failure to meet strategic objectives due to delay to tailings deposition reduction. Costs may be higher than anticipated.

1.5.5 Environmental and Social

- No ESIA has been completed on the Project to date. Although this is in-line with regulatory requirements, work is underway to develop a full ESIA in 2025.
- Although the mine is fully permitted in line with currently planned activities, changes to the operation may require additional permits that have significant lead times. There is an identified need to obtain permits for two planned interventions: the complete draining and elimination of the lake “Ørnungen” to enable the development of Pit 7.2, and the lowering of the lake “Langvatnet” to facilitate the development of Pit 8. These permits may require 1 to 2 years to complete the approval process.
- Current operational model includes diesel-based mining equipment. In order to consider climate-change mitigation, Sydvaranger is investigation various decarbonisation strategies including converting vehicle fleet to biodiesel, electric and hydrogen.
- Water supply is currently permitted and not considered a material issue; however, should climate change impact water availability, long-term supply of water remains a risk.
- Reindeer husbandry and holiday cabins exist close to the existing operation, and, although there is continuous engagement, dialogue needs to be maintained to ensure social licence to operate continues.

1.5.6 Project Execution

- The Project Execution Plan has not been fully developed and will be developed as part of the feasibility study, with due consideration the following risks:
  - Monitoring and controlling of the project study timelines.
  - Delays in the project schedule to production and the associated CAPEX may not be defined sufficiently.
  - Permitting timeframes have not been incorporated into a project schedule.
  - Detailed scheduling of the upgrades has not been sufficiently detailed.
- The planned Owner’s team may not be sufficient to manage all the project scopes and additional positions are required.

1.5.7 Capital and Operating Costs

1.5.7.1 Initial Capital Cost

Project indirect and Owner’s cost may increase due to increased staffing requirements once the execution strategy has been further developed.

Initial Capital cost does not include a contingency allowance for potential schedule delays.

1.5.7.2 Sustaining Capital Costs

The PEA has not captured the phasing costs for the sustaining Capital costs, this may be a risk and an opportunity for the project and will be fully investigated during the Feasibility study.

1.5.7.3 Closure Costs

Costs for monitoring requirements past closure has not been included in the closure costs. Should it later become a requirement to include post closure monitoring, it will increase the project closure costs.

1.6 Conclusion

Option B perceived advantages are summarised below and shown in Table 1-4:

- Optimised mineral resource management
- Lower operating costs
- Lower tonnes of tailing per tonne of concentrate
- Lower water usage per tonne of concentrate produced
- Lower energy usage per tonne of concentrate produced
- Increase DR grade concentrate produced

Table 1-4: Summary of key comparisons for Option A and Option B

Production & Assumptions	Option A	Option B
Ore Mined	102,866 kt	139,180 kt
Material Processed	92,579 kt	116,026 kt
Concentrate Produced	39,223 kt	54,333 kt
Processing, Maintenance, Rail (US$/dmt con.)	36.65	17.99
Steady state cash cost (US$/dmt con.)	78.5	54.3
NPV[8] pre-tax	US$ 734.07 M	US$1,215.10 M

Based on the analysis in the PEA and the Risk Review Workshop, the key areas to progress the Sydvaranger Project is a Definitive Feasibility Study of Option B including performing all the associated test work and detailed studies such as the Tailings and Market Studies.