Competent Person's Report on the Santa Rita Mine, Bahia State, Brazil

ACG Acquisition Company Limited

SLR Project No: 233.03777.R0000

Effective Date:
December 31, 2022

Signature Date:
June 12, 2023

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GeoEstima

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Geologists and Mining Engineers

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1.0 SUMMARY

1.1 Executive Summary

SLR Consulting (Canada) Ltd. (SLR) was retained by ACG Acquisition Company Limited (ACG) to prepare a Competent Person's Report (CPR) on the Santa Rita Mine (Santa Rita), located in Bahia State, Brazil. Mr. Orlando Rojas, GeoEstima SpA (GeoEstima), Mr. Anthony Maycock, MM Consultores SpA (MM Consultores); Mr. Andrew Bradfield and Mr. Greg Robinson, P&E Mining Consultants Inc. (P&E); Dr. Haiming (Peter) Yuan, WSP USA Environment & Infrastructure Inc. (WSP); and David J.F. Smith, SLR, are collectively the Competent Persons (CP) for this CPR.

The purpose of this CPR is to support a listing on the London Stock Exchange (LSE). The CPR conforms to Financial Conduct Authority (FCA) Primary Market Technical Note 619.1.

The Santa Rita nickel mine is located in the Itagibá municipality of Bahia state in northeast Brazil and is owned and operated by Atlantic Nickel Mineração Ltda. (Atlantic Nickel), a subsidiary owned by Appian Capital Advisory LLP (Appian Capital).

The operation consists of an open pit and beneficiation plant with existing permits and infrastructure, including energy, water, and paved roads to site. Santa Rita is approximately seven kilometres (km) from the city of Ipiaú and 140 km from the Port of Ilhéus. The planned mine life consists of approximately 28 years of underground mining based on the 2023 Preliminary Economic Assessment (PEA) after the remaining six year mine life of the open pit based on Mineral Reserves. The 2023 PEA mine plan is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the 2023 PEA based on these Mineral Resources will be realised.

1.1.1 Conclusions

1.1.1.1 Geology and Mineral Resources

- As of December 31, 2022, inclusive of Mineral Reserves, Measured Mineral Resources for open pit operations are estimated to total 7,914 thousand tonnes (kt) at 0.38% nickel sulphide (NiS), 0.13% copper (Cu), 0.02% cobalt (Co), 0.03 g/t palladium (Pd), 0.07 g/t platinum (Pt), and 0.04 g/t gold (Au) and Indicated Mineral Resources are estimated to total 142,202 kt at 0.48% NiS, 0.16% Cu, 0.01% Co, 0.04 g/t Pd, 0.09 g/t Pt, and 0.06 g/t Au. In addition, Inferred Mineral Resources are estimated to total 130,898 kt at 0.54% NiS, 0.17% Cu, 0.01% Co, 0.05 g/t Pd, 0.10 g/t Pt, and 0.06 g/t Au.
- The Mineral Resource estimates reported in this CPR follow Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM (2014) definitions).
- Santa Rita is a magmatic nickel-copper sulphide deposit and it is very well understood by Atlantic Nickel staff.
- The hanging wall mineralisation limits are well defined, and the limits considered for NiS (%) are reasonable for the deposit type and mineralisation style. The footwall mineralisation limits are more variable.
- The geological setting, surface samples, and geological mapping of the Santa Rita area present good exploration potential, as a number of targets have already been identified near the mining operation. Three prospects warrant drill testing, Peri-Peri, Santa Maria, and Aiquara,

and the Ibicuí prospect should be subject to an exploration review. Grassroots exploration activities should continue on the exploration permits.

- Protocols for drilling, sample preparation and analysis, verification, and security meet industry standard practices and are appropriate for the purposes of a Mineral Resource estimate.
- The quality assurance and quality control (QA/QC) program as designed and implemented by Atlantic Nickel is adequate, with no significant bias, to support the resource database. The resource database was verified by GeoEstima and is suitable for Mineral Resource estimation.
- The lithological models are reasonably constructed using available geological information and are appropriate for Mineral Resource estimation.
- The assumptions, parameters, and methodology used for the Santa Rita Mineral Resource estimate are appropriate for the style of mineralization and proposed mining methods.
- The database made available by Atlantic Nickel confirms the exploration potential identified for the Palestina target and additional drilling during 2021 and 2022 demonstrates the continuity of mineralization and shows an opportunity to convert this exploration target into Mineral Resources in the future.

1.1.1.2 Mining and Mineral Reserves

- As of December 31, 2022, the open pit Mineral Reserves were estimated as:
    - Proven Mineral Reserves: 7,980 kt at US$38.41/t net smelter return (NSR), 0.35% NiS, 0.12% Cu, 0.01% Co, 0.03 g/t Pd, 0.07 g/t Pt, and 0.05 g/t Au
    - Probable Mineral Reserves: 26,862 kt at US$31.31/t NSR, 0.30% NiS, 0.11% Cu, 0.01% Co, 0.03 g/t Pd, 0.06 g/t Pt, and 0.04 g/t Au
    - Total open pit Mineral Reserves: 34,842 kt at US$32.94/t NSR, 0.31% NiS, 0.11% Cu, 0.01% Co, 0.03 g/t Pd, 0.06 g/t Pt, and 0.04 g/t Au
- The Mineral Reserve estimation for the Project incorporates industry-accepted practices and is reported using the CIM (2014) definitions.
- No Inferred Mineral Resources were included in the Mineral Reserves.
- Mineral Reserves are based on detailed mine designs, defined within a mine plan and incorporate appropriate estimates for mining dilution and ore losses.
- The Mineral Reserve estimate is based on the 2021 optimised pit shell and mine design, depleted by the actual production to the end of December 2022.
- The open pit is a conventional open pit operation using conventional mining equipment.
- Mining is contracted to a consortium of mining contractors until Q2 2023 at which time the mine will transition to Owner operated. The transition will be completed by the end of 2024.
- Santa Rita open pit has a remaining mine life of six years, based on the estimated Mineral Reserves and the forecast ore production rate of 6.5 million tonnes per annum (Mt/a). Production is scheduled to end in 2028.
- Under the assumptions described in this CPR, the life-of-mine (LOM) plan for the open pit is achievable, and the economic analysis supports the declaration of open pit Mineral Reserves.

1.1.1.3 Mineral Processing

- The dominant sulphide minerals in the Santa Rita deposit are pentlandite, pyrrhotite, pyrite, chalcopyrite, and violarite. The major gangue materials were identified as olivine, orthopyroxene, serpentine and chrome spinel. The recoverable nickel (sulphide) was found to be predominantly in pentlandite, violarite, and pyrite. Copper is primarily associated with chalcopyrite. Iron is most abundant in pyrite (approximately 47%), less abundant in pentlandite, chalcopyrite, and chrome spinel.

- Based on the deportment of nickel and magnesia, Mirabela Mineração do Brasil Ltda (Mirabela Brazil), a previous owner, subdivided the orebody into three domains, orthopyroxenite (P domain), olivine orthopyroxenite (O domain), and harzburgite (H domain). Between 0.24% Ni and 0.30% Ni is associated with olivine, between 0.05% and 0.1% Ni with orthopyroxene, and approximately 0.09% Ni with chrome spinels. The majority of the iron occurs in olivine (11% to 12%), serpentine (5% to 9%), and orthopyroxene (8%).
- In the P and O domains, most of the nickel is hosted in sulphides and, therefore, is recoverable. In the H domain, nickel is divided more evenly between sulphides and gangue minerals. Consequently, the P and O domains have a higher proportion of recoverable nickel and the H domain has a lower proportion of recoverable nickel.
- Atlantic Nickel staff collected plant data over the period January 2021 to December 2021 and from September 2022 to December 2022 with the objective of determining a robust formula to predict NiS recovery. A strong relationship was found between the enrichment ratio (%NiS in concentrate/%NiS in feed) versus the % mass pull to the concentrate. At a fixed concentrate grade, the recovery can be calculated. The new model is suitable for calculating the LOM open pit ore recovery.
- The process plant performance data from January 2020 to December 2022 indicate NiS recovery of 79.3%; the average concentrate grade was steady at approximately 13.5% total nickel (NiT) and NiS recoveries in 2022 averaged 80.1%.
- Comminution testwork was carried out on composites of the three main open pit lithologies and on variability samples. The pyroxenite material in the north of the pit is the hardest material and harzburgite is the softest. Tests following the semi-autogenous grinding (SAG) mill comminution test (SMC) protocols and the Bond suite gave the same conclusion. JKTech used a plant survey and these results to model plant performance. The base case calculated a throughput of 855 tonnes per hour (t/h) versus the LOM production requirement of up to 842 t/h at 89.5% availability. The average throughput from December 2021 to December 2022 was 839 t/h considering 89.5% plant availability.
- Rougher-scavenger flotation testing was carried out on the three main open pit lithology composites, 51 variability samples, and a blend of the variability samples. The lithology testing confirmed that pyroxenite and orthopyroxenite perform better than harzburgite. The variability samples showed large variations in recovery and concentrate grade. Locked cycle tests (LCT) carried out on the variability sample blend gave NiS recoveries between 76% and 82% at concentrate grades between 9.9% NiS and 14.8% NiS. The CP is of the opinion that sufficient comminution and flotation variability testing has been carried out to predict plant performance in line with the parameters used in the project financial model.
- Mineralogical examinations showed that for a sample ground to 125 µm, the mean size of the particles was 48 µm for pentlandite and 30 µm for chalcopyrite. Finer grinding would lead to slime losses. The majority of losses to tailings occurs in complex particles with fine metal sulphides occluded in gangue minerals.
- The upper and lower composite underground material and the underground variability samples showed similar particle size data to the open pit ore. The pentlandite content was approximately 60% higher.
- The comminution data for the underground upper and lower composites showed that they were softer for crushing and SAG milling than the open pit ore but harder for ball milling. The

tests carried out on the LOM period composites confirmed these results. JKTech calculated a throughput of 955 t/h for the upper and lower composites. The required throughput is 797 t/h for the first five years of underground operation at 89.5% availability to attain a production level of 6.25 Mt/a. The CP considers that the plant is capable of this throughput; however, it is recommended that the JKTech report be updated with the comminution data from the variability and LOM period composites testing.

- Rougher-scavenger flotation testing on the upper and lower underground composites showed similar results to the previous Atlantic Nickel tests on open pit ore but with higher recovery and lower rougher concentrate grade. The tests on the underground variability samples also showed generally higher recoveries but at similar rougher concentrate grades.
- LCTs on the underground upper and lower composites gave similar results to the open pit blend material. However, the LCTs on the underground LOM period composites gave better results with NiS recoveries in the range 85% to 91% at concentrate grades between 13.3% and 14.9% NiS. Atlantic Nickel staff plotted the enrichment ratio (%NiS in concentrate/%NiS in feed) versus the % mass pull to the concentrate for the open pit and underground LCTs. The R^2 correlation coefficient for the resulting curve is 0.9804. The CP considers this model to be suitable for calculating the LOM underground material recovery.
- The only deleterious element in the concentrate that could lead to downstream treatment penalties is magnesium oxide (MgO); this is controlled by efficient cleaner flotation and has not been an issue to date.
- The process plant re-started in October 2019 and from January 2020 to December 2022 treated 17.06 million tonnes (Mt) of ore, producing 290,821 t of nickel concentrate containing 39.488 t of nickel. The average overall nickel recovery was 58% and the average nickel sulphide recovery was 79%. The plant is currently operating at its design capacity of 6.5 Mt/a.
- The NiS recovery has improved since January 2020, especially during 2022. The average recovery increased from 80.2% in Q1 2022 to 81.3% from June to December 2022. The improvement is due to the following:
  - Improvements in control algorithms for the SAG and ball mills
  - Adjustment in the cyclone operating pressure
  - Reducing fines generated in grinding
  - Change in the classification solids percent parameters
  - Better knowledge of the flotation kinetics per stage
  - Improvements in flotation control
  - Use of a different collector resulting in better recovery
  - Training of process, operation and maintenance teams
  - Operational stability leading to increased equipment availability

  The expected performance for 2023 takes these improvements into account

1.1.1.4 Infrastructure

- The Santa Rita Mine has all the necessary infrastructure in place to support a large open pit mining and mineral processing operation.

1.1.1.5 Environment

1.1.1.5.1 Environmental Studies

- An Environmental Impact Assessment (EIA) was completed in 2006. To support the development and approval of the 2006 EIA and State licensing permitting requirements, the EIA evaluated impacts on water quality, flora and fauna, air quality, soil, and the socio-economic impact on immediate communities. The 2006 EIA is linked to numerous mitigation measures, consisting primarily of management plans that are required based on permits and licences. Mitigation measures have been undertaken with the re-start of operations including implementation of the water management system mitigation, which has significantly reduced sulphate and other constituents in the discharge water.

1.1.1.5.2 Tailings Storage Facility

- The existing Santa Rita tailings storage facility (TSF) consists of an unlined basin with a zoned earthen and rockfill perimeter embankment enclosing three sides of the impoundment. The TSF embankment is planned to be constructed in three major stages (initial, intermediate, and final stages), with a downstream raise methodology. The existing TSF is permitted to be constructed to a dam crest elevation 198.0 metres above sea level (MASL) higher than the currently planned st final dam crest elevation 180.0 MASL that is required to contain the tailings produced from the LOM of the open pit operations.
- Under Brazilian laws and regulations, the Santa Rita TSF is classified with "high" potential damage (among three categories of "high", "medium", and "low"), and "low" risk (among three categories of "high", "medium", and "low"), and with a recommended classification category of Class "A" to guide the operation management. Class A indicates a second highest rating "score" out of five tiers (AA, A, B, C, and D), indicating generally satisfactory operations practice. The new TSF phases have been designed to also satisfy the Canadian Dam Association (CDA) Dam Safety Guidelines (2019) for an "Extreme" Consequence Classification facility.
- The TSF has been well managed by the mine using an operation, maintenance, and surveillance manual and an emergency action plan has been prepared in line with recent Brazilian regulations. The dam has been inspected and assessed semi-annually by the mine tailings management team and an engineering consulting firm each year, with the recent two inspections completed by GeoHydroTech Enginharia (2021) and WSP (2022); no significant concerns have been raised and the safety factors were found to be in compliance with design criteria for both Brazilian regulations and CDA guidelines. In addition, the dam has been inspected annually by Agência Nacional de Mineração (ANM).

1.1.1.5.3 Closure

- Atlantic Nickel developed a mine closure plan, with the last plan updated in 2022. Since the current closure plan is conceptual in nature, the reclamation cost estimate only provides a preliminary assessment of the potential cost for reclamation.
- As the conceptual closure plan is revised to a detailed closure plan, the closure cost will also be more accurately developed.

1.1.1.5.4 Permitting

- Santa Rita has the required permits for open pit mining and processing operations.

1.1.1.5.5 Social

- Atlantic Nickel completed an updated Environmental and Social Impact Assessment (ESIA) in 2020.
- Atlantic Nickel continuously registers and monitors interactions with stakeholders to enhance the quality of the engagements.
- Atlantic Nickel has several social programs focusing on education and training, environmental stewardship, social entrepreneurship, and culture.

1.1.1.6 Preliminary Economic Assessment

The Mineral Resource considered amenable to underground mining methods includes both Indicated Mineral Resources and Inferred Mineral Resources.

The Santa Rita deposit is currently being mined by conventional open pit methods, and production is scheduled from 2023 to 2028. The open pit will be mined to a maximum depth of 320 m (164 m RL). Underground development would commence before the open pit is depleted so that there would not be a significant gap in feed to the process plant.

The Santa Rita mineralization extending below the open pit comprises a large tabular-to-massive deposit, striking north-south for over 800 m, dipping 50° to 55° to the east, extending to a known depth of approximately 1,100 m, and varying in thickness from 50 m to 150 m. The mineralization shows a trend for increasing grade and thickness with depth.

The 2023 PEA contemplates, at a conceptual level, an underground mine using sub-level caving (SLC) and producing at a rate of approximately 6.2 Mt/a. An SLC mining method was selected for the underground portion of the Santa Rita deposit based on the amenable geometry of the deposit and the productivity and cost advantages of SLC enabling greater exploitation of the Mineral Resource at a greater margin than more selective methods. The relatively wide deposit determined that a transverse drill drive orientation should be used.

Based on the estimated Mineral Resources, an underground mine life of approximately 28 years following two years of pre-production development is envisaged. The mine plan is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the 2023 PEA based on these Mineral Resources will be realised. Inferred Mineral Resources comprise 55% of the mine plan. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

Initial capital costs for the 2023 PEA were estimated at US$417 million. Capital costs during the production period are considered sustaining capital costs. Total sustaining costs have been estimated at US$1,086 million before tax credits and at US$1,038 million after tax credits.

The average LOM all-in sustaining cost (AISC) for underground mining is estimated at US$31.50/t processed.

Under the 2023 PEA assumptions presented in this CPR, the portion of the Mineral Resource subset within the 2023 PEA mine plan returns positive economics. The 2023 PEA is estimated to generate US$180 million in average unlevered free cash flow annually over the LOM and has a post-tax net present value (NPV), using an 8% discount rate, of US$942 million. The post-tax internal rate of return (IRR) is estimated at 25% and payback is estimated at 3.4 years.

The current mine plan calls for raising the existing TSF to contain the 33 Mt of tailings to be produced from mining the open pit, without encroaching on the existing gas pipeline right-of-way located to the east of the TSF. A new TSF would be required to store the additional 140 Mt of tailings to be produced from the underground mine over a period of 28 years. A new conventional TSF located to the southwest of the mine site was selected as the preferred alternative. The new TSF would be outside of the existing mine property boundaries and located approximately six to nine kilometres southwest of the existing open pit and plant areas. It is assumed that Atlantic Nickel will acquire lands associated with the future TSF footprint and access roads prior to construction. The new TSF construction will begin with an initial starter dam and will be expanded every three years using a downstream raise method. The Pre-Feasibility Study (PFS) design is currently ongoing. As a backup plan, several alternative tailings management strategies and facilities have been assessed at a scoping level including options located within the mine boundary.

1.1.2 Recommendations

1.1.2.1 Geology and Mineral Resources

GeoEstima has the following recommendations for Geology and Mineral Resources:

1. Prepare a Mineral Resource estimate for the Palestina target considering all the information available and conduct an economic study for possible extraction either through open pit or underground mining.
2. Update the Mineral Resource estimate at Santa Rita with the ongoing drilling information added since 2021, as well as the updated metal prices and costs. The new drilling may better define the mineralization extents, mainly in the deeper portion of the deposit, and it will upgrade the Mineral Resource classification in some areas.
3. Review the NSR parameters to include the platinum group metals (PGM) (Pd and Pt), as well as the cut-off value for open pit and underground shapes, aiming to update the reasonable prospects for eventual economic extraction (RPEEE) criteria.
4. Integrate the post-mineralization faults into the geological model, improving the shape modelling of mineralised zones. This activity will mainly impact the modelling of the deeper zone of the deposit.
5. Carry out a comparison between the blast hole and drilling data.
6. Improve the reconciliation with analysis and comments about the blast hole model versus the long-term resource model inside the depleted volume.

1.1.2.2 Mining

A number of initiatives are recommended in support of the 2023 PEA findings.

1. A review of the proposed NSR cut-off value used in the 2023 PEA should be undertaken, to assess whether it can be lowered, and to assess the potential to optimize the cut-off over time.
2. An investigation as to optimisation of the mine layout for automated equipment should be conducted.
3. A mass mining method such as an incline cave should be evaluated to determine if operating cost savings can be achieved by reducing operating development, and production drill and blast costs.
4. These work programs are estimated at US$230,000.

1.1.2.3 Mineral Processing

JKTech carried out a comminution survey in February 2021 and made several recommendations for potential improvements based on the results of this work. The key recommendations were to:

1. Decrease the SAG mill total volumetric load to 25% and increase the ball load to decrease fines generation and decrease the load on the SAG mill.
2. Review the SAG mill grate design to increase the pebble port size to further decrease fines generation. This change could be made during a scheduled liner change with minimal additional expenditure.
3. Upgrade the cyclone feed pumping capacity to allow a target of 55% solids; then, increase water addition to achieve this density (and improve cyclone efficiency).

The CP agrees with recommendations 1 and 2 as they will avoid the SAG mill becoming a throughput restriction. The CP also agrees with recommendation 3 because higher cyclone efficiency will assist in minimising slimes production and nickel losses. The site stated that the amount of water added in the grinding circuit has been increased without the need to re-power the cyclone feed pumps and that an ongoing study has shown that good classification efficiency is being achieved.

The plant technical staff have stated that a new load and impact meter has been purchased and they are now in a position to carry out the load test in 2023 in a safe manner (avoiding breakage of mill liners).

The grate slot width has not yet been increased as the current focus is to increase the grate life. The current opening is 70 mm and the pebble port size is 90 mm (the maximum size feed for the pebble crushers). There is a concern that increasing the slot width would reduce the grate life.

The JKTech February 2021 report should be updated with the comminution results from testwork carried out in 2022 on underground variability samples and LOM period composites.

The CP recommended in 2021 that consideration be given to operating the cleaner-scavenger circuit in open circuit instead of returning the cleaner-scavenger tailings to the rougher feed. The LCTs carried out at SGS in 2021 showed that reducing the recycle prevented the build-up of gangue minerals in the concentrate. This phenomenon has not been reported in the plant; however, it may be possible to improve the concentrate grade with minimal loss of recovery. Additional cleaner-scavenger capacity may be required to maintain the recovery. This could be tested directly on the scavenger circuit feed and tailings in the on-site pilot plant. This test has not yet been performed nor has a test to increase the scavenger cleaning capacity. The plant staff report that efforts are being made first to reduce the fines generation in the grinding circuit.

1.1.2.4 Tailing Storage Facility

A new TSF to support the underground expansion project is currently being designed to the PFS level. Besides the new TSF, the design should include appurtenance facilities consisting of a tailings delivery system, decant pumping and reclaim water return system, access roads, and power supply. The required budget to complete the remaining PFS design related to the TSF appurtenances is estimated to be US$200,000.

1.1.2.5 Preliminary Economic Assessment

A two-phase work program is proposed. The first work phase includes grassroots geochemical exploration, greenfields exploration, step-out and infill drilling, metallurgical testwork on material from exploration prospects, mining initiatives on aspects of the 2023 PEA, and improvements to the process design. This work phase is estimated at about US$7.6 million. The second work phase is dependent on the results of the first work phase. Work recommended includes follow-up of any geochemical anomalies generated in Phase 1, incorporation of infill and step-out drilling results into an updated Mineral Resource estimate and revised 2023 PEA, and incorporation of the metallurgical testwork results for Palestina into a Mineral Resource estimate that can be used as the basis for a PEA on the underground potential of the Palestina area. This work phase is estimated at US$0.8 million.

1.2 Economic Analysis

1.2.1 Cautionary Language

The results of the economic analyses discussed in this section represent forward-looking information. The results depend on inputs that are subject to a number of known and unknown risks, uncertainties, and other factors that may cause actual results to differ materially from those presented here. Information that is forward-looking includes:

- Mineral Reserve estimates;
- Commodity prices and exchange rates;
- Mine production plan;
- Mining and process plant recovery rates;
- Mining dilution and mining recovery;
- Sustaining costs and operating costs;
- Closure costs and closure requirements;
- Environmental, permitting, and social risks.

Additional risks to the forward-looking information include:

- Changes to costs of production from what is assumed;
- Unrecognised environmental risks;
- Unanticipated reclamation expenses;
- Unexpected variations in quantity of mineralised material, grade, or recovery rates;
- Geotechnical or hydrogeological considerations during mining being different from what was assumed;
- Failure of mining methods to continue to operate as anticipated;
- Failure of process plant, equipment, or processes to operate as anticipated;
- Changes to assumptions as to the availability of electrical power and its rates used in the operating cost estimates and financial analysis;
- Ability to maintain the social licence to operate;
- Accidents, labour disputes, and other risks of the mining industry;
- Changes to interest rates;
- Changes to tax rates.

1.2.2 Basis of Estimate

A financial model was developed to estimate the Santa Rita Mine base case open pit LOM plan consisting of mining the Proven and Probable Mineral Reserve within the open pit. The LOM plan covers a period of six years beginning Q1 2023. The financial analysis was prepared on a real currency basis with all cash flows expressed in Q1 2023 US dollar terms.

LOM production and payable nickel equivalent (NiEq) metal are summarised in Figure 1-1. NiEq is determined by dividing the revenue from payable copper, cobalt, gold, platinum, and palladium by the price of nickel to calculate equivalent pounds of nickel, then adding the payable Ni pounds to sum to the total NiEq pounds.

Other economic factors include the following:

- Discount rate of 8%;

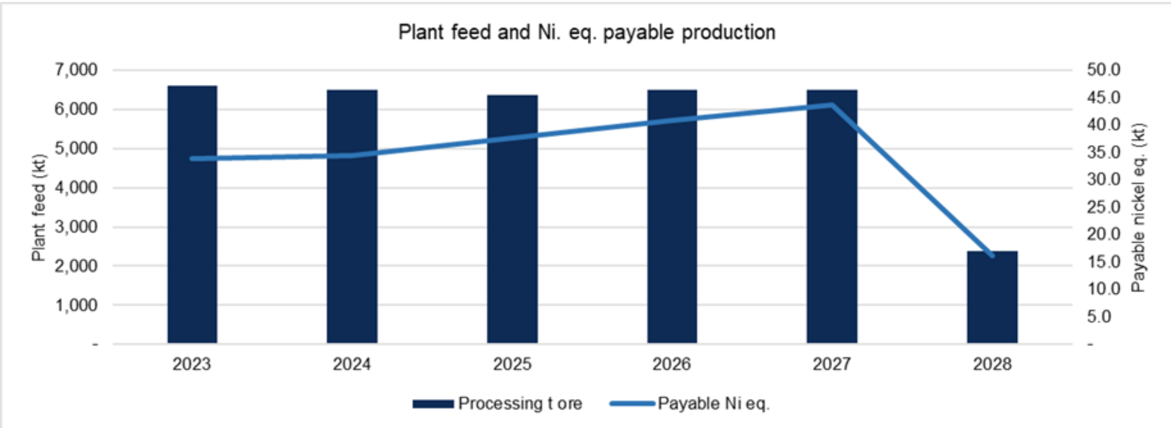
- All cash flows include 90% to 95% payments for concentrate during the period in which they are incurred, depending on the concentrate sales agreement. The remaining 5% to 10% of the metal is paid within 90 days of reaching the Brazilian port.
- All applicable Brazilian taxes are estimated in the financial model.

Net revenue is calculated based on the following:

- Revenues are calculated on the sale of nickel concentrates based on metal prices from the consensus mean of leading banks and financial institutions as of Q1 2023, and forecast Brazilian to US dollar exchange rates.
- Treatment and refining charges for concentrates are based on contracted terms with several smelters/refineries and metal offtakers.
- There are four NSR royalties payable over the LOM:
  - The CFEM (*Compensação Financeira pela Exploração de Recursos Minerais (*Compensation for the Exploitation of Mineral Resources)) royalty at 2.00% on an NSR that does not allow the deductibility of freight costs;
  - The Companhia Bahiana de Pesquisa Mineral (CBPM) royalty at 2.51% on 60% of the value of nickel contained in concentrate and a royalty rate of 2.51% on 100% of the value of copper, cobalt, palladium, platinum, and gold contained in concentrate;
  - Land owner royalties at 1.00%;
  - The Appian Natural Resources Fund II royalty at 2.75%.

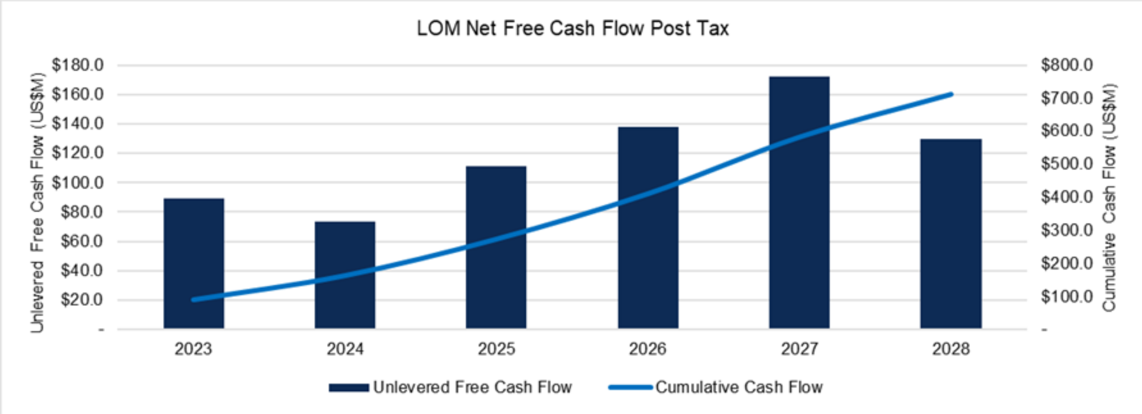
1.2.3 Economic Outcomes

The operations are estimated to generate US$122 million in average unlevered free cash flow annually over the open pit LOM at a post-tax NPV, using an 8% discount rate, of US$546 million. IRR and the number of payback years are not applicable in this case since the initial capital costs have been expended. The financial results are presented in Figure 1-2 and a summary of the financial model is provided in Table 1-1.



Source: Atlantic Nickel, 2023.

Figure 1-1: LOM Payable NiEq



Source: Atlantic Nickel, 2023.

Figure 1-2: LOM Net Unlevered Free Cash Flow Post Tax

Table 1-1: Base Case LOM Cash Flow and Parameters
ACG Acquisition Company Limited – Santa Rita Mine

Item	Unit	Value
Commodity Prices and Exchange Rate 1		
2023–2028 nickel price	US$/lb	9.87–8.46
2023–2028 copper price	US$/lb	3.55–3.59
2023–2028 cobalt price	US$/lb	25.58–23.53
2023–2028 gold price	US$/oz	1,753–1,615
2023–2028 platinum price	US$/oz	1,027–1,140
2023–2028 palladium price	US$/oz	1,977–1,363
2023–2028 BRL:USD	R$:US$	5.39–5.55
LOM Mine Plan Summary		
Mine life (including stockpile processing)	Years	6
Mineral Reserve	kt	34,842
Grade NiS	%	0.31
Grade Cu	%	0.11
Grade Co	%	0.01
Grade Pd	g/t	0.03
Grade Pt	g/t	0.06
Grade Au	g/t	0.04
Processing rate	Mt/a	6.5
LOM Concentrate Production		
Concentrate (dry)	kt	656
Ni	%	13.50
Cu	%	4.39
Co	%	0.24

Item	Unit	Value
Pd	g/t	1.67
Pt	g/t	2.26
Au	g/t	1.03
LOM Revenue		
Net smelter return revenue	US$M	1,569
LOM Operating Cost		
Mining	US$/t processed	7.55
Processing	US$/t processed	5.46
Site General and Administrative (G&A)	US$/t processed	1.94
Treatment, refining, penalties	US$/t processed	7.17
Freight	US$/t processed	2.50
By-product credits	US$/t processed	(8.94)
C1 operating cost 2	US$/lb Ni 3	3.16
AISC cost 4	US$/lb Ni	5.26
Operating costs net of adjustments	US$M	(858)
Royalties	US$M	(131)
LOM Cash Flow		
EBITDA cash	US$M	967
Cash Flow		
Taxes	US$M	(54)
Change in working capital	US$M	25
Sustaining capital	US$M	(245)
Unlevered Free Cash Flow	**US$M**	**694**
Post-Tax $NPV_{8\%}$	**US$M**	**546**

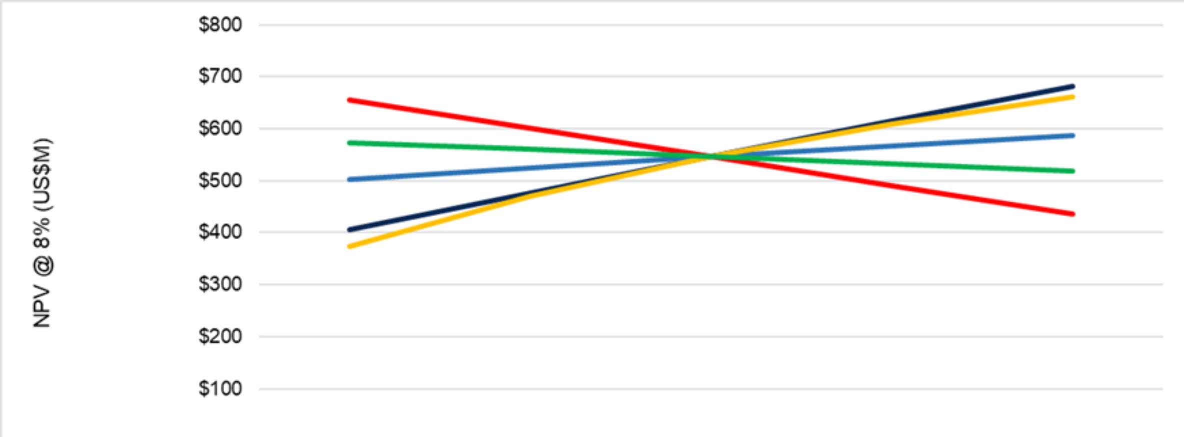
Notes: EBITDA = earnings before interest, taxes, depreciation, and amortisation.

1. Metal prices and exchange rates after 2027 are long-term forecast numbers. Refer to Table 19-1 for values used from 2023 to 2028.
2. C1 cost = cash operating costs less net by-product credits.
3. Ni cost = (mining cost + processing cost + site G&A cost + treatment/refining cost + freight cost – by-product credits for Cu, Co, Pd, Pt, Au) / payable Ni.
4. All-in sustaining cost (AISC) = C1 cost plus royalties and sustaining capital expenditures.

1.2.4 Sensitivity Analysis

Figure 1-3 presents an NPV sensitivity analysis on nickel price, by-product prices, exchange rate, operating costs, and sustaining capital costs.

The operations are most sensitive to changes in the nickel price, less sensitive to changes in foreign exchange rate fluctuations and operating costs, and least sensitive to commodity price changes for the by-product elements and variations to the sustaining capital costs.



	(20%)	(10%)	-	10%	20%
Nickel price	$407	$476	$546	$614	$682
By-products prices	$503	$525	$546	$567	$588
FX	$375	$470	$546	$608	$660
Opex	$656	$601	$546	$491	$437
Capex	$574	$560	$546	$532	$518

Source: Atlantic Nickel, 2023.

Figure 1-3: Base Case NPV Sensitivity Analysis

1.3 Technical Summary

1.3.1 Property Description and Location

The Santa Rita Mine located in the Itagibá municipality of Bahia state in northeast Brazil, seven kilometres from the city of Ipiaú, 140 km northwest of the Port of Ilhéus, and 360 km southwest of Salvador. The operations are accessed via paved roads from Ilhéus to Ipiaú, and then via unsealed road to the mine site. Access within the property is by unsealed municipal roads and farm tracks. A small airstrip is located at Ipiaú and Ilhéus is serviced by a regional airport. Ipiaú (population 47,000) is the major source of commercial and industrial support services, and skilled and unskilled labour for the Santa Rita Mine.

The climate in the Itagibá region is humid tropical. Annual rainfall varies between 800 mm and 1,800 mm and averages approximately 1,200 mm. Mining operations are conducted year-round. Exploration activities can be curtailed by rainfall events, but are generally also conducted year-round.

The topography is characteristically flat to gently undulating terrain at approximately 150 MASL and is in the drainage basin of the Contas River. The property area is characterised as being sub-tropical rainforest; however, a minimal amount of that forest remains due to deforestation for agricultural purposes.

1.3.2 Land Tenure and Ownership

The Santa Rita Mine is owned by Atlantic Nickel, a wholly-owned subsidiary of Appian Capital. Mining concessions and exploration licences covering the Santa Rita and Palestina deposits are owned by the state company Companhia Bahiana de Pesquisa Mineral (CBPM) and are leased to Atlantic Nickel under a lease contract signed in 2008 and valid for 20 years. Exploration licences outside the Santa Rita and Palestina areas are held by Atlantic Nickel.

Atlantic Nickel holds a number of mining concessions and exploration licences throughout the Santa Rita property area, collectively covering 28,997.21 ha:

- Two mining concessions for nickel in the municipality of Itagibá, Bahia state
- Three applications for mining concessions for nickel in the municipality of Itagibá, Bahia state
- 32 exploration licences for nickel in different municipalities in the Bahia state

Mining concessions and exploration licences are registered in the name of CBPM and are leased to Atlantic Nickel as per a mineral rights lease agreement with CBPM (the CBPM Lease Agreement) and an exploration agreement with CBPM (the CBPM Exploration Agreement). The CBPM Lease Agreement is valid until June 16, 2028. In the capacity of lessee, the Atlantic Nickel can mine and become the owner of the production from the mining concessions.

Applications for mining concessions and three exploration permits held by CBPM will be leased to Atlantic Nickel if and when the respective mining concessions are granted, as per the CBPM Exploration Agreement.

The remaining exploration permits and the application for exploration permit are registered with the ANM in Atlantic Nickel's name.

1.3.3 History

In 1976, mafic–ultramafic intrusive complexes were identified by CBPM using aeromagnetic survey data. From 1976 to 2003, various companies conducted geological reconnaissance, geochemical surveys, and various types of geophysical surveys. That work identified the layered nature of the Fazenda Mirabela intrusion as well as some of the mineralisation. CBPM performed a limited drill program in 1988 and 1989 that confirmed the presence of primary sulphide mineralisation.

In 2003, the Fazenda Mirabela project was acquired by Mirabela Brazil. From 2004 to 2012, a number of drill campaigns were conducted, and a feasibility study was completed in 2008. Mining operations commenced in 2009 and continued until 2016, when the mine was placed on care-and-maintenance.

In 2018, Appian Capital acquired the project, with Atlantic Nickel as the in-country operating subsidiary. Atlantic Nickel conducted extensive drilling campaigns from 2018 to 2021, with the objectives of improving confidence in the mineral resources potentially amenable to open pit mining methods, and investigating underground potential. In October 2019, Atlantic Nickel re-started the concentrate plant and the first concentrate sales were in January 2020.

1.3.4 Geology and Mineralisation

Mineralisation within the Fazenda Mirabela intrusion is considered to be an example of a magmatic nickel–copper sulphide deposit.

The Fazenda Mirabela intrusion, which hosts mineralisation at Santa Rita, is located within the Archean–Paleoproterozoic Itabuna–Salvador–Curaça orogenic (ISC) belt. It consists of a low-potassium calc-alkaline plutonic suite of rocks that includes intercalated metasedimentary rocks, gabbro, and basalt. The Fazenda Mirabela mafic–ultramafic body intruded granulite of the ISC. The lower zone of the intrusion consists of olivine-rich cumulates, primarily dunite to harzburgite, and is capped by pyroxenite; the upper zone consists primarily of gabbroic cumulates, consisting of gabbronorites to norites.

The intrusion is oval-shaped in plan view, with outcrop dimensions of approximately 4.0 km by 2.5 km and original stratigraphic thickness of at least three kilometres. In cross-section, the intrusion extends to a vertical depth of approximately 1,400 m.

Three generations of deformation phases are recognised, including thrust duplexes, quartz–feldspar pegmatite dikes intruded into basement lithologies, and folding. The major alteration type is fracture or structurally controlled serpentinisation.

A significant laterite profile, typically 25 m thick, developed over the dunite–harzburgite lithologies, but is absent or poorly developed over other lithologies.

The Santa Rita deposit is characterised by the lateral continuity of the mineralisation (approximately 2 km along strike and 1.3 km down dip). Nickel and copper sulphides form stratiform bodies that are generally parallel to the lithostratigraphic contacts. The primary lithological host rocks are orthopyroxenite, olivine orthopyroxenite, harzburgite, and dunite.

The mineralisation that supports the Mineral Resource estimate is primarily hosted in disseminated sulphides, 2% to 5% sulphide by volume. Some evidence of vein-like semi-massive sulphides is also noted, but this mineralisation type is not economic. On average, sulphide mineralisation comprises 52% pentlandite, 7% violarite ($(Ni,Fe)3S_4$), 18% chalcopyrite, 14% pyrite, and 9% pyrrhotite as granular intercumulus aggregates. Traces of PGMs also occur, however, these elements appear to be included within the structure of the principal sulphides.

The Fazenda Palestina mafic–ultramafic intrusion is located 25 km to the south-southwest of the Santa Rita Mine. The intrusion cluster measures approximately 5 km east-west by 3 km north-south and, similar to the Fazenda Mirabela intrusion, has intruded granulite facies country rocks. The two dominant lithologies within the intrusion are orthopyroxenites and, to a lesser extent, gabbronorites. The deposit is approximately 1,350 m long, 50 m wide, and extends to a depth of at least 350 m. Pentlandite and chalcopyrite are the dominant nickel and copper minerals, respectively.

1.3.5 Exploration Status

As of December 31, 2022, a total of 1,403 drill holes for 382,029.32 m have been completed at Santa Rita and surrounding targets. Drilling included core (DDH) and reverse circulation (RC) types. Atlantic Nickel has carried out exploration systematically since 2018. The 2022 exploration program including an additional 87 drill holes totalling 33,866.18 m, as of December 31, 2022, confirmed the continuity of the mineralisation at the Santa Rita open pit mine and at depth below the pit. A total of 47 drill holes for 7,862 m completed at the Palestina target in 2022 have confirmed the existing mineralisation and increased the exploration potential.

Three prospects within the Santa Rita area are considered to warrant drill testing, Peri-Peri, Santa Maria, and Aiquara.

1.3.6 Mineral Resources

The Mineral Resource estimate for the Santa Rita deposit, as of December 31, 2022, using all data available as of June 23, 2019 for the open pit model and February 25, 2021 for the underground project, was completed by Mine Technical Services Ltd. (MTS) and reviewed and adopted by GeoEstima.

The Mineral Resource estimate was completed using Leapfrog Geo/Edge software and Vulcan software. Wireframes for mineralisation were constructed in Leapfrog Geo based on geology sections, assay results, and lithological information. Assays were capped to various levels based on exploratory data analysis and then composited to 3.0 m and 6.0 m lengths. Wireframes were filled with blocks at wireframe boundaries. Block models were estimated using a combination of indicator and ordinary kriging models using 6 m length composites, and includes indicator estimates for sulphur, NiT, NiS, copper, cobalt, and MgO. Block estimates were validated using industry standard validation techniques. Classification of blocks used nominal drill spacing, visual inspection, and other criteria. The Mineral Resource estimate was reported using all the material within resource shapes generated in Whittle software and Datamine Mineable Reserves Optimizer (MRO), satisfying the minimum mining unit, continuity criteria, and using a net smelter return (NSR) cut-off value of US$8.91/t for open pit and US$30.00/t for underground resource shapes. NSR cut-off values for the Mineral

Resources are based on a NiS price of US$6.50/lb, a Cu price of US$3.00/lb and, a Co price of US$20.00/lb.

The CP reviewed the Mineral Resource assumptions, input parameters, geological interpretation, and block modelling and reporting procedures, and is of the opinion that the Mineral Resource estimate is appropriate for the style of mineralisation and that the block model is reasonable and acceptable to support the December 31, 2022 Mineral Resource estimate.

The Mineral Resource estimate for the Santa Rita Mine, as of December 31, 2022, is summarised in Table 1-2. The Mineral Resource estimate is prepared in accordance with CIM (2014) definitions.

The CP is not aware of any factors that could materially impact the estimate of the Mineral Resources for Santa Rita that are not presented in this CPR.

Table 1-2: Summary of Mineral Resources – December 31, 2022
ACG Acquisition Company Limited – Santa Rita Mine

Category	Method	Tonnage (kt)	Grade								Contained Metal					
			N (%)	Cu (%)	Co (%)	Pd (g/t)	Pt (g/t)	Au (g/t)	NSR (US$/t)	NiS (kt)	Cu (kt)	Co (kt)	Pd (koz)	Pt (koz)	Au (koz)
Measured	OP	7,044	0.40	0.13	0.01	0.03	0.07	0.04	34.26	28.3	9.4	0.8	7.7	16.6	10.1
	UG	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0
	Stockpile	870	0.22	0.10	0.09	0.03	0.06	0.04	23.19	1.9	0.9	0.8	0.8	1.7	1.1
	Sub-total	7,914	0.38	0.13	0.02	0.03	0.07	0.04	33.04	30.2	10.3	1.6	8.5	18.2	11.3
Indicated	OP	36,343	0.31	0.12	0.01	0.03	0.06	0.04	26.90	112.9	41.8	3.4	36.1	73.8	49.5
	UG	105,859	0.54	0.18	0.01	0.04	0.10	0.06	45.68	568.2	187.5	13.6	135.8	331.0	216.8
	Stockpile	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-total	142,202	0.48	0.16	0.01	0.04	0.09	0.06	40.88	681.1	229.3	17.0	171.8	404.8	266.3
Measured + Indicated	**OP**	**43,388**	**0.33**	**0.12**	**0.01**	**0.03**	**0.06**	**0.04**	**28.10**	**141.2**	**51.3**	**4.2**	**43.8**	**90.4**	**59.7**
	UG	**105,859**	**0.54**	**0.18**	**0.01**	**0.04**	**0.10**	**0.06**	**45.68**	**568.2**	**187.5**	**13.6**	**135.8**	**331.0**	**216.8**
	Stockpile	**870**	**0.22**	**0.10**	**0.09**	**0.03**	**0.06**	**0.04**	**23.19**	**1.9**	**0.9**	**0.8**	**0.8**	**1.7**	**1.1**
	Sub-total	**150,117**	**0.47**	**0.16**	**0.01**	**0.04**	**0.09**	**0.06**	**40.47**	**711.3**	**239.6**	**18.6**	**180.4**	**423.0**	**277.5**
Inferred	OP	45	0.25	0.10	0.01	0.02	0.05	0.03	21.82	0.1	0.0	0.0	0.0	0.1	0.0
	UG	130,852	0.54	0.17	0.01	0.05	0.10	0.06	45.52	702.3	224.5	17.3	210.6	426.8	259.2
	Stockpile	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-total	130,898	0.54	0.17	0.01	0.05	0.10	0.06	45.51	702.5	224.5	17.3	210.7	426.8	259.2

Notes:

1. CIM (2014) definitions were followed for Mineral Resources.
2. The Competent Person for the Mineral Resources estimate is Orlando Rojas, B.Geo., AIG (N° 5543), a GeoEstima SpA employee.
3. The Mineral Resource estimates have an effective date of December 31, 2022.
4. Mineral Resources are estimated at a net smelter return (NSR) cut-off value of US$8.91/t for open pit, and US$30.00/t for underground.
5. Mineral Resources are estimated using metal prices of US$6.50/lb Ni, US$3.00/lb Cu and US$20.00/lb Co.
6. Open pit and underground Mineral Resources are reporting within a conceptual open pit and underground constraining shapes for material below the pit.
7. All blocks within underground constraining shapes have been included within the Mineral Resource estimate.
8. Minimum widths are 5 m for the open pit and 45 m for the underground.
9. The metallurgical recoveries used are 83% for NiS; 70% for Cu; 29% for Co.
10. Bulk density varies depending on mineralisation domain from 2.5 g/cm³ to 3.5 g/cm³.
11. Mineral Resources are reported inclusive of those Mineral Resources converted to Mineral Reserves.
12. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
13. Numbers may not add due to rounding.

1.3.7 Mineral Reserves

1.3.7.1 Mineral Reserve Estimation

Internal dilution was incorporated in the block model used to estimated Mineral Reserves. The block edge dilution applied represents 1.05 m transferred with the neighbouring block for each side of a 6 m x 6 m by 6 m block. The transfer was 0.25 m vertically to upper and lower blocks. This dilution methodology resulted in a reduction of 1.4% of the Measured and Indicated in-pit Mineral Resource tonnage and a 6% reduction in the nickel sulphide contained metal with no reduction in copper and cobalt contained metal.

Inferred Mineral Resources within the pit designs were set to waste material.

The Mineral Reserves were audited by the CP using two methodologies.

The first utilised a 2021 Technical Report Mineral Reserve based on starting open pit bench faces as of October 1, 2021, that was depleted by actual mining for the period October 2021 to the end of 2022. The Mineral Reserve in the 2021 study was based on an NSR cut-off value of $8.91/t with cost assumptions of US$5.17/t processing, US$1.17/t royalties, US$1.41/t site G&A, and US$0.62/t corporate general and administrative. Metal prices were US$6.50/lb nickel, US$3.00/lb copper, US$20.00/lb cobalt, US$1,000/oz palladium, US$800/oz platinum, and US$1,250/oz gold, with process recoveries of 83% nickel, 70% copper, and 29% cobalt with no credit for palladium, platinum, or gold. The resulting depleted tonnage of ore was 36.36 Mt. This compared within 0.8% of the 36.07 Mt that was indicated by querying the diluted block model using an NSR cut-off value of $8.91/t inside of the pit design with starting bench faces as of the end of 2022.

A second methodology was conducted using a revised open pit design that accounts for an underground portal location on the upper northwest benches and two wall segments that were redesigned in the central portion of the east side of the open pit. Using an NSR cut-off value of $8.91/t and starting bench faces as of January 1, 2023, the ore tonnage within the new pit design was determined to be 33.97 Mt. This tonnage was used for the Santa Rita Mine 2023 budget.

The diluted block model was updated with 2023 parameters and the resulting pit optimisation shell limits were compared to the re-designed open pit limits. Starting bench faces were as of January 1, 2023. The pit optimisation parameters included metal prices of US$8.15/lb nickel, US$3.50/lb copper, US$25.00/lb cobalt, US$1,375/oz palladium, US$1,100/oz platinum, and US$1,550/oz gold, with process recoveries of 83.2% nickel, 75% copper, and 38% cobalt with no credit for palladium, platinum, or gold. The NSR cut-off value was determined to be US$11.04/t. The pit optimisation limits closely matched the new pit design. The revenue factor used for the optimisation limits was 0.96. The Mineral Reserve tonnage of 33.97 Mt was therefore accepted as valid using 2023 parameters.

Mineralised material stockpiles exist at the mine site. Two large stockpiles in particular have been surveyed and estimated to contain approximately 5.7 Mt of material. Atlantic Nickel plans to drill and sample the material to allow a Mineral Resource estimate to be completed.

1.3.7.2 Mineral Reserve Statement

Mineral Reserves are reported using the CIM (2014) definitions, with an effective date of December 31, 2022. The CP for the estimate is Mr. Andrew Bradfield, P.Eng., of P&E. The Proven and Probable Mineral Reserve estimate for the Santa Rita Mine is summarised in Table 1-3 and includes 869,000 t of stockpiled ore. Approximately 23% of the Mineral Reserve is in the Proven classification as of December 31, 2022.

The estimate of Mineral Reserves may be materially affected by metal prices, US$/R$ exchange rate, environmental, permitting, legal, title, taxation, socio-political, marketing, infrastructure development, or other relevant issues.

Table 1-3: Santa Rita Mineral Reserve Estimate – December 31, 2022
ACG Acquisition Company Limited – Santa Rita Mine

Classification	Tonnage (kt)	NSR Value (US$/t)	Grade						Contained Metal					
			NiS (%)	Cu (%)	Co (%)	Pd (g/t)	Pt (g/t)	Au (g/t)	NiS (kt)	Cu (kt)	Co (kt)	Pd (koz)	Pt (koz)	Au (koz)
Proven	7,980	38.41	0.35	0.12	0.01	0.03	0.07	0.04	28.2	9.4	0.8	7.7	17.7	10.3
Probable	26,862	31.31	0.30	0.11	0.01	0.03	0.06	0.04	80.6	29.5	2.7	25.9	51.8	34.5
Total Proven and Probable	**34,842**	**32.94**	**0.31**	**0.11**	**0.01**	**0.03**	**0.06**	**0.04**	**108.8**	**39.0**	**3.5**	**33.6**	**69.5**	**44.8**

Notes to accompany Mineral Reserve table:

1. The Competent Person for the Mineral Reserve estimate is Andrew Bradfield, P.Eng., of P&E Mining Consultants Inc. The estimate has an effective date of December 31, 2022.
2. Mineral Reserves are defined within a mine plan and incorporate mining dilution and ore losses that result in a reduction of 1.4% of the tonnage and a 6% reduction in the nickel sulphide (NiS) contained metal with no reduction in other contained metals.
3. Mineral Reserves are based on Measured and Indicated Mineral Resource classifications only.
4. Mineral Reserves are based on metal prices of US$8.15/lb nickel, US$3.50/lb copper, US$25.00/lb cobalt, US$1,375/oz palladium, US$1,100/oz platinum, and US$1,550/oz gold and are constrained within an optimised pit shell that uses 39° to 46° overall wall slopes, and process recoveries of 83% nickel, 75% copper, and 38% cobalt with no credit for palladium, platinum, or gold.
5. An NSR cut-off value of $11.04/t is estimated to differentiate ore from waste and is based on cost assumptions of US$5.67/t processing, US$1.96/t site general and administrative, and US$3.41/t sustaining capital costs.
6. Proven Mineral Reserves include stockpiled ore of 0.87 Mt at 0.22% Ni, 0.10% Cu, 0.09% Co, 0.03 g/t Pd, 0.06 g/t Pt, and 0.04 g/t Au.
7. The estimate of Mineral Reserves may be materially affected by metal prices, US$/R$ exchange rate, environmental, permitting, legal, title, taxation, socio-political, marketing, infrastructure development, or other relevant issues.
8. Totals may not sum due to rounding.

1.3.8 Mining Method

The Santa Rita open pit mining operation mainly encompasses a single large open pit that is mined with conventional mining equipment. The open pit was planned to be completed in 10 phases, of which six phases remain as of January 1, 2023. A small satellite open pit located to the southeast of the main pit has also been mined. The primary crusher area is located to the north of the open pit and the main waste rock storage facility (WRSF) is on the east side.

The open pit design was modified in 2021 and 2022 for three reasons:

- Underground mining studies indicated that the best location for a portal location is on an upper bench in the northwest corner of the open pit, close to surface, in Phase 8 north. The revision was made in late 2021.
- Failure of a wedge-shaped segment of the open pit wall in the central portion of the east side in November 2021 resulted in a modification to Phase 10 centre in late 2021. Material between the 70 m and 130 m levels, with a width of approximately 200 m, was vertically displaced by about 1.5 m. The modified open pit design resulted in 2.6 Mt mined outside the previously defined pit limit. There were no accidents associated with the displacement and the displaced material was mined-out over a period of approximately eight months.
- Failure of a 200 kt segment of the open pit wall in the central portion of the east side in August 2022 resulted in a modification to Phase 10N centre in late 2022. The deformation was detected 30 days before significant displacement, the area was isolated, and the event occurred without injury or equipment damage.

Risks are being mitigated through 24/7 monitoring of three ground radar systems covering the open pit area, more than 40 prisms deployed in the pit monitored by high precision total robotic stations, automated piezometric monitoring, automated in-situ monitoring (inclinometers and time domain reflectometry), continuous mapping of the faults and structures, a geotechnical drilling campaign, additional slope stability studies, and updates of the geotechnical model and dewatering/depressurization program.

The production plan targets ore to the process plant at 6.5 Mt/a and a total production rate of 30 Mt/a (combined ore and waste). Mining operations use standard open pit methods with drilling and blasting, loading and hauling. Bench heights are 6 m in ore and 12 m in waste. Mining is contracted to two mining contractors until Q2 2023 at which time the mine will transition to Owner-operated. The transition will be completed by the end of 2024.

Four ore types and stockpiles of material are used. They are defined based on NSR cut-off values, lithology type (based on MgO grade) and head grade ranges (high-grade and low-grade based on NiS%). Ore types include lithologies based on MgO% (peridotite >29% MgO and pyroxenite <29% MgO). The high-grade versus low-grade boundary for NiS% is approximately 0.35% NiS. The open pit remaining mine life is approximately six years, ending in 2028.

Hydraulic excavators (70 t) are used for waste rock loading, and hydraulic excavators (50 t) are used for ore loading. Wheel loaders are used for miscellaneous clean-up jobs and as backups to the excavators. A peak fleet of 80 haul trucks with capacities of 36 t and 48 t are used to transport material to either the WRSFs or the primary crusher stockpiles. Drills are equipped with 114 mm (4.5 inch) diameter bits. The primary mining operations are supported by a fleet of equipment consisting of bulldozers, graders, water trucks, fuel trucks, maintenance vehicles, and service vehicles.

Mining operations manpower is estimated to reduce from 1,700 people with contractors to 1,465 people when Owner operated.

1.3.9 Metallurgical Testwork

1.3.9.1 Open Pit

Metallurgical testwork was conducted from 2005 to 2021. Primary laboratories involved in the testwork that supports the mine plan and original plant design include SGS Lakefield, SGS Geosol, JKTech, AMMTEC Ltd., Independent Metallurgical Laboratories Pty. Ltd., and Outokumpu Technologies.

Testwork that supported plant design included mineralogy, comminution, heap leach, flotation, and thickening tests.

Once operating, review of the plant performance indicated that there was a variation in annual total nickel recovery from 48.6% to 59.9% over the period 2012 to 2016. The NiS recovery varied from 78.2% to 84.9% over the period July 2012 to March 2016.

The plant was re-started in January 2020. The average NiS recovery over the period January 2020 to December 2022 was 79.3%; however, improvements in plant operating practices and a change in the main flotation collector have led to an increase in the NiS recovery to an average of 80.1% over the period June to December 2022. Analysis of the plant performance data has enabled a robust NiS recovery equation to be developed based on the relationship between the concentrate enrichment ratio (%NiS in concentrate/%NiS in feed) versus the % mass pull to the concentrate.

The only deleterious element in the concentrate that could lead to downstream treatment penalties is MgO; this is controlled by efficient cleaner flotation and has not been an issue to date.

Atlantic Nickel commenced new testwork in support of re-starting operations which continued up to mid-2021 on ores from the open pit. The work included mineralogy (chemical assays and quantitative evaluation of materials by scanning electron microscopy, or QEMSCAN), comminution (Bond ball mill work index, crusher work index, abrasion index, breakage parameters), flotation tests (effects of feed grind size P_{80}, desliming, pH, collector, activator, and dispersant dosages; re-cleaner, kinetic tests; LCTs), geometallurgical variability testing, tailings thickening, and rheology tests. Results for open pit ore included:

- Comminution testwork: this was carried out on composites of the three main lithologies and on variability samples. The pyroxenite material in the north of the pit is the hardest material and harzburgite is the softest. Tests following the SMC protocols and the Bond suite gave the same conclusion. JKTech used results from a plant survey to model plant performance. The base case calculated a throughput of 855 t/h versus the production requirement of 842 t/h at 89.5% availability.
- Rougher–scavenger flotation testing: this was carried out on the three main open pit lithology composites, 51 variability samples and a blend of the variability samples. The lithology testing confirmed that pyroxenite and orthopyroxenite perform better than harzburgite. The variability samples showed large variations in recovery and concentrate grade. An LCT carried out on the variability sample blend gave a result that fell on the calculated regression line determined from recent plant results.
- Mineralogical examinations: these showed that for a sample ground to 125 µm, the mean size of the pentlandite particles was 48 µm and for the chalcocite was 30 µm. Finer grinding would lead to slime losses. The majority of losses to tailings occur in complex particles with fine metal sulphides occluded in gangue minerals.

1.3.9.2 Underground

An initial testwork program was conducted on site on material from the area where potential underground operations were being evaluated. The lithologies were the same as those found in the open pit, but divided into upper and lower domains, based on depth. Flotation tests were carried out to determine the optimum flotation feed size, the optimum reagent additions and flotation kinetics. Subsequently a more comprehensive program was carried out at SGS Geosol on samples from the upper and lower domains and included assaying, mineralogical examinations, comminution testing, flotation testing (including variability testing and LCTs) and tailings testing.

Results and interpretations included:

- The upper and lower composite underground material showed similar mineral particle size data to the open pit ore. The pentlandite content was approximately 60% higher.
- The comminution data for the underground composites showed they were softer for crushing and SAG milling than the open pit ore but harder for ball milling. JKTech calculated a throughput of 955 t/h. To achieve the production forecast of 6.25 Mt/a (plan for the first 5 years after underground mining ramp-up), an hourly throughput of 797 t/h is required at a plant availability of 89.5%.
- Rougher–scavenger flotation testing conducted by SGS Geosol on the upper and lower underground composites showed similar results to the previous Atlantic Nickel tests but with higher recovery and slightly lower rougher concentrate grades.
- LCTs on the underground composites gave higher NiS recoveries at slightly higher concentrate grades than the open pit ore. The concentration ratio versus percent concentrate mass pull data were plotted for all open pit and underground LCTs. The regression equation for the resulting curve had an R^2 of 0.98, a very high correlation, thus enabling the recovery to be calculated with a high degree of confidence.
- As with the open pit, no deleterious elements are expected to affect plant performance or lead to downstream treatment penalties.

1.3.10 Recovery Methods

The plant design was based on metallurgical testwork results. The Santa Rita process plant consists of crushing, grinding, flotation, thickening, and filtration unit operations to produce a saleable nickel concentrate. Flotation tailings are pumped to a TSF.

The process plant re-started in October 2019 and from January 2020 to December 2022 treated 17.06 Mt of ore, producing 290.821 t of nickel concentrate containing 39,488 t of nickel. The average overall nickel recovery was 58.4% and the average nickel sulphide recovery was 79.3%. The NiS recovery has improved since January 2020, especially during 2022. The recovery increased from 80.2% in Q1 2022 to an average of 81.3% over the period June to December 2022.

The plant is currently operating at its design capacity of 6.5 Mt/a.

Payable metals such as platinum, palladium, and gold are also contained in the concentrate with the nickel, copper, and cobalt. The majority of revenue is generated by nickel.

The initial nameplate capacity was 4.6 Mt/a; this was expanded to 6.5 Mt/a in 2012 with the addition of a desliming circuit, pebble crushing, a second ball mill and a pressure filter. Since the re-start in 2019 the desliming circuit has not been used as it has been proved to provide no performance benefits.

The process plant requires approximately 1,600 m^3/h of water, which is derived from three sources; the Contas River, recycled water from the TSF, and tailings thickener overflow. The plant power requirement is 21.1 MW. Power is provided from the national grid. Key consumables include grinding media, slimes depressant, copper sulphate, sodium ethyl xanthate, sodium di-alkyl dithiophosphate, sodium silicate, citric acid, and flocculant.

1.3.11 Project Infrastructure

The Santa Rita Mine currently has all necessary infrastructure in place to support a large open pit mining and mineral processing operation.

Infrastructure includes a gatehouse, administration offices, kitchen/canteens, maintenance buildings, warehouse, washroom and change rooms, health and fire-fighting facilities, process plant, conveyors, and concentrator, laboratories, pipelines, and powerlines.

There is no accommodations camp on site. Personnel reside in nearby communities and commute to the site.

Electricity supply is generated by a hydroelectric power plant that is located approximately 20 km from the mine. The power plant is connected to the mine via a 230 kV transmission line that can provide up to 40 MW. The average power demand in 2022 was 25 MW:

- Mine: 1.04 MW
- Process plant: 23.22 MW
- General administration: 0.84 MW

Three emergency 500 kVA diesel generators provide backup power in the event of grid power failures.

There are two existing WRSFs, located to the east and south of the open pit. The East WRSF is the primary waste rock storage area and the South WRSF is a secondary storage area. The East and South WRSFs are estimated to have a capacity of 143 Mt to a maximum height of 150 m which is sufficient to store the LOM waste rock production.

Ore stockpiles and ore bins are mainly used for short-term operational ore control and emergency ore handling purposes and are not intended to provide longer-term storage capacity. Consequently, no oxidation or recovery issues are reported or expected. The stockpiles are located close to the crusher area.

1.3.12 Market and Contracts

There are several smelter/refinery agreements in place between Atlantic Nickel and smelters/traders for export from Brazil. Offtake contracts and terms are proprietary. The CP has reviewed the contracts and has confirmed that the terms are appropriately included in the financial model.

The commodity prices used in the financial analysis of the open pit base case are derived from the consensus median of leading banks and financial institutions as January 2023. The forecasts used vary for the period 2023–2026, reverting to long-term pricing in 2027. The long-term prices include US$8.46/b Ni, US$3.59/lb Cu, US$23.53/lb Co, US$1,615/oz Au, US$1,140/oz Pt, and US$1,363 Pd. The Brazilian reais to US$ exchange rate is forecast at 5.55.

A portion of nickel and copper production is subject to hedging agreements. A total of 6,892 t of nickel and 1,200 t of copper have been hedged up to the end of 2023. Otherwise metal prices are subject to spot market conditions. Currency exchange rates are subject to spot market conditions. There are no metal streaming agreements in place.

Atlantic Nickel has entered into agreements with various contractors for open pit mining at Santa Rita. The contracts include all open pit mining activities, such as drilling, blasting, loading, and hauling of ore and waste rock. The CP has reviewed the mining contracts and confirmed that the terms are appropriately included in the financial model. Atlantic Nickel is planning to transition from open pit contractor mining to Owner-operated mining starting in Q2 2023. Downpayments for acquisition of mining equipment will take place during three periods, Q1 2023, Q2 2024, and Q4 2025.

Atlantic Nickel has also entered into electrical power agreements as follows:

- Power Purchase Agreement, take-or-pay with Tradener Ltda for approximately 50% of the yearly required power;
- Power Purchase Agreement, take-or-pay with Focus Energia for approximately 50% of the yearly required power.

1.3.13 Environmental, Permitting and Social Considerations

1.3.13.1 Environmental

An Environmental Impact Assessment (EIA) was completed in 2006. To support the development and approval of the 2006 EIA and State licensing and permitting requirements, the EIA evaluated impacts on water quality, flora and fauna, air quality, soil, and the socio-economic impact on immediate communities. The 2006 EIA is linked to numerous mitigation measures, consisting primarily of management plans that are required based on permits and licences. The 2006 EIA was representative of conditions at the time. Mitigation measures identified in the 2006 EIA have been implemented including the water management system changes to reduce sulphate and other constituents in the mine discharge. Environmental and social conditions had changed by the time operations resumed in 2019. These changes were addressed in an Environmental and Social Impact Assessment (ESIA) in early 2020. The 2020 ESIA was the first requirement from the Environmental and Social Action Plan prepared in 2019.

1.3.13.2 Tailings Storage Facility (TSF)

The Santa Rita TSF consists of an unlined basin with a zoned earthen and rockfill perimeter embankment enclosing three sides of the impoundment. The TSF embankment is planned to be constructed in three major stages (initial, intermediate and final), using a downstream raise methodology. Construction of Phase 3 of the intermediate stage ceased in early 2016 when the mine was placed on care and maintenance. The TSF embankment is constructed of zoned, locally sourced earth materials, which form the inner inclined low-permeability core layers, filter/transition layers, and rockfill sections of run-of-mine (ROM) waste rock.

The TSF operations were resumed in October 2019. Prior to resumption of operations, a total of approximately 35.3 Mt of tailings had been stored in the existing TSF, with dam crest ranging in elevation from 154 MASL to 158 MASL. A conceptual TSF design of the final stage was completed with the final dam crest at elevation 180 MASL to achieve an additional storage capacity exceeding the planned remaining life-of-mine (LOM) tailings production from the open pit of approximately 33 Mt. The TSF final stage design will be revised and optimised as needed to accommodate mining operations. Since the resumption of TSF operations in 2019, the subsequent TSF expansion intermediate stages were renamed to Phase I, Phase II, and Phase III. Phase I has been constructed; Phase II is divided into two interim stages, II-A and II-B, with the construction of Phase II-A recently completed to the lowest dam crest elevation 162.2 MASL. Phase II-B (to crest elevation 168.0 MASL) and Phase III (to crest elevation 174.0 MASL) are currently being designed and constructed.

Under the new Brazilian laws and regulations, the Santa Rita TSF is classified with “high” potential damage (among the three potential damage classification categories of “high”, “medium”, and “low”), and “low” risk (among the three risk classification categories of “high”, “medium”, and “low”), and with a recommended classification category of Class A to guide the operations and management. Class A indicates the second highest rating “score” out of five tiers (AA, A, B, C, and D), indicating generally satisfactory operations practice. The new TSF phases have been designed to also satisfy the Canadian Dam Association (CDA) Dam Safety Guidelines (2019) for an "Extreme" Consequence Classification facility.

The TSF has been well managed by the mine using an operation, maintenance, and surveillance manual and an emergency action plan has been prepared in line with recent Brazilian regulations. The dam has been inspected and assessed semi-annually by the mine tailings management team and an engineering consulting firm each year, with the latest inspection completed by WSP, formerly Wood Environment and Infrastructure Solutions Inc (Wood E&I). No significant concerns have been raised and the safety factors were found to be in compliance with design criteria for both Brazilian regulations and CDA guidelines.

1.3.13.3 Closure and Reclamation Planning

Atlantic Nickel developed a mine closure plan with the last update in 2022. Since the current closure plan is conceptual in nature, the reclamation cost estimate only provides a preliminary assessment of the potential cost for reclamation. The 2022 closure plan estimates a closure cost of US$29.3 million. As the conceptual closure plan is revised to a detailed closure plan, the closure cost will also be more accurately developed.

1.3.13.4 Permitting Considerations

The environmental licensing process in Brazil has four stages:

- Presentation of the Project
- Issuance of the preliminary licence
- Issuance of the installation licence
- Issuance of the operating licence

With the approval of these licences, additional management plans or permits are required. Administrative penalties for irregular installations or operations can include shutdowns, and/or fines ranging from R$500 to R$10 million. In addition, non-compliance with requirements and conditions identified in environmental licences can be subject to similar penalties.

Santa Rita has the required permits for open pit mining and processing operations.

1.3.13.5 Social Considerations

Atlantic Nickel updated the 2006 EIA with Santa Rita's ESIA in 2020. The updated ESIA did not encounter any major additional impact, above and beyond what had already been identified in the initial studies developed during the previous licensing processes. The gaps have been identified, however, as compared to the International Finance Corporation (IFC) Performance Standards. The findings have been thoroughly described within the Environmental and Social Action Plan (ESAP), and recommendations were fully implemented by the end of 2021.

To understand the needs of the stakeholders including the local communities, Atlantic Nickel created a stakeholder mapping and engagement plan. A survey was conducted as part of the plan to obtain information from interested parties that frequently interact with the mine. Based on the results of the survey, an action plan was developed that establishes frequent engagement with the stakeholders to ensure a bidirectional flow of communication and transparency. Atlantic Nickel registers and monitors interactions with the stakeholders to enhance the quality of the engagements.

Atlantic Nickel has several social programs focusing on education and training, environmental stewardship, social entrepreneurship, and culture.

1.3.14 Capital and Operating Cost Estimates

1.3.14.1 Capital Cost Estimates

Initial capital costs were incurred to rehabilitate and re-open the Santa Rita Mine with a process plant throughput of 6.5 Mt/a (17,800 t/d) in 2019. Atlantic Nickel declared commercial production on January 1, 2020 and the mine has been operating continuously since then. This CPR considers a mine plan with a start date of January 1, 2023. All capital costs incurred in the LOM plan are considered sustaining capital.

The cost estimates are expressed in Q1 2023 US dollars. Unless otherwise indicated, all costs in this section of the CPR are expressed without allowance for escalation or interest rates. The currency exchange rates used in the estimate are based on forecast rates of R$5.39 per US$1.00 for 2023, and a long term rate of R$5.55 per US$1.00.

Sustaining capital costs over the open pit LOM are estimated at US$245 million (Table 1-4). The sustaining capital cost estimate covers direct and indirect costs, Owner's costs and 15% contingency on process plant, site refurbishment and open pit mining equipment. Water treatment is based on actual quotes. The contingency on the tailings dam construction varies with each phase depending on the type of work. There is no contingency on drilling programs since the costs are well established.

Table 1-4: LOM Sustaining Capital Cost Estimate
ACG Acquisition Company Limited – Santa Rita Mine

Item	Sustaining Capital (US$M)
Mining equipment	65.8
Equipment salvage value	(20.3)
Process Plant and Site Refurbishment	15.1
Water treatment pond	1.8
Tailings dam	76.7
Mineral Resource drilling	3.3
Closure cost	27.6
Capitalised deferred waste stripping	75.3
Total	**245.2**

1.3.14.2 Operating Cost Estimates

The AISC for the Santa Rita Mine is estimated to average $26.07/t processed over the open pit LOM. Table 1-5 summarizes the breakdown by activity.

Table 1-5: Base Case Operating Cost Summary
ACG Acquisition Company Limited – Santa Rita Mine

Item	Units	Unit Cost ($/t)	LOM Total ($M)
Open pit mining costs	US$/t mined	2.04	
Open Pit mining costs	US$/t processed	7.55	262.9
Processing costs	US$/t processed	5.46	190.1

Item	Units	Unit Cost ($/t)	LOM Total ($M)
Site G&A	US$/t processed	1.94	67.7
Treatment, refining, penalties	US$/t processed	7.17	249.9
Freight costs	US$/t processed	2.50	87.2
By-product credits*	US$/t processed	(8.94)	(311.6)
C1 cost 1	**US$/t processed**	**15.68**	**546.2**
Royalties	US$/t processed	3.77	131.4
Sustaining capital costs	US$/t processed	6.62	230.6
All-In Sustaining Cost 2	**US$/t processed**	**26.07**	**908.2**

Notes: *Includes revenue from Cu, Co, Pd, Pt and Au.

1. C1 cost = cash operating costs less net by-product credits.
2. All-in sustaining cost (AISC) = C1 cost plus royalties and sustaining capital expenditures.

1.3.15 Preliminary Economic Assessment - Underground

1.3.15.1 Introduction

The 2023 PEA is an alternative development option completed at the conceptual level based on Mineral Resources which assesses the potential for underground operations beneath the Santa Rita open pit. Underground development would commence before the open pit is depleted so that there would not be a significant gap in feed to the process plant.

The mine plan is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the PEA based on these Mineral Resources will be realised. Inferred Mineral Resources comprise 55% of the 2023 PEA mine plan.

Sections 1.1.1.10 and 1.3.10.2 of Section 1 also apply to the 2023 PEA. Years presented in the 2023 PEA are for illustrative purposes only.

1.3.15.2 Mine Plan

The 2023 PEA mine plan envisages SLC using a transverse drill drive orientation. Two caveability assessments were undertaken by different consultants, and each study indicated the SLC method was feasible for the deposit.

A cut-off value of $35/t for production was selected because it was shown to generate near-maximum NPVs across varying nickel prices. Dilution and recovery will be dependent on geometry, rock types, geotechnical conditions, drill and blast performance, and draw control management (which can be tonnage or grade based).

The SLC modelling resulted in an overall SLC draw factor of 75% of the blasted tonnes and 6% grade dilution. Development in mineralisation is estimated to total 18 Mt over the underground mine life.

The production rate was assumed at 6.2 Mt/a. The LOM plan covers a period of 30 years, including pre-production.

The underground mine design was based on decline access from surface with a separate conveyor decline developed in parallel to accommodate a conveyor handling system for mill feed. Truck haulage was selected for handling all waste material to simplify the materials handling infrastructure and given the relatively small waste movement required.

Table 1-6 summarizes the subset of the Mineral Resource estimate included within the 2023 PEA mine plan.

Table 1-6: Subset of Mineral Resource Estimate within the 2023 PEA Mine Plan
ACG Acquisition Company Limited – Santa Rita Mine

Classification	Tonnes (kt)	Grade						Contained Metal					
		NiS (%)	Cu (%)	Co (%)	Pd (g/t)	Pt (g/t)	Au (g/t)	Ni (kt)	Cu (kt)	Co (kt)	Pd (koz)	Pt (koz)	Au (koz)
Indicated	64,346	0.57	0.19	0.02	0.04	0.09	0.06	364	121	10	73	187	126
Inferred	77,396	0.55	0.18	0.02	0.05	0.10	0.06	428	135	12	117	249	152

Note: Numbers have been rounded and totals may be affected by small rounding errors. See footnotes in Table 1-2.

Additional design considerations included:

- Access decline for level access;
- 40 production levels, spaced at 25 m vertically;
- Footwall drives parallel to the SLC for entire strike length on each level with a nominal stand-off distance of 30 m from the SLC;
- Ore-passes consisting of an ore-pass access drive and a finger raise;
- Crushers, consisting of tip and loading levels, and transfer drives;
- Primary intake, exhaust and escape-way raises.

The ventilation system was based on a pull (or exhaust) system.

A generic pumping system comprising pump stations in stages (in series) was assumed in the absence of sufficient data for specific station design. Water surge storage stopes will be used to store excess rainfall underground in preference to pumping.

A modern diesel mining fleet was selected and sized appropriately for the mine, consisting primarily of 63 t trucks, 17 t and 21 t automated load-haul-dump (LHD) units, automated longhole drills, programmable development jumbos, ground support bolters, and shotcreting units. A high level of automation was assumed to improve productivity, reduce costs, and increase quality.

The underground mine will operate continuously seven days per week, 24 hours a day, using an 8-hour shift roster and a total of four crews.

1.3.15.3 Infrastructure

The Santa Rita Mine has all necessary infrastructure in place to support a large open pit mining and mineral processing operation. Infrastructure includes a gatehouse, administration offices, kitchen/canteens, maintenance buildings, warehouse, washroom and change rooms, health and fire-fighting facilities, process plant, conveyors, and concentrator, laboratories, pipelines, and powerlines.

There is no accommodations camp on site. Personnel reside in nearby communities and commute to the site.

Electricity supply is generated by a hydroelectric power plant that is located approximately 20 km from the operations.

Future underground mining operations will largely use the existing surface facilities. The current workshop, canteen, explosives magazine, warehousing, fuel storage and office facilities will generally be more than sufficient for supporting the underground operation. The underground is expected to function with fewer people than the open pit.

New surface infrastructure associated with the underground will include the following:

- A box cut and portal located to the west of the north end of the open pit;
- A conveyor portal connecting to the bottom of the existing crusher installation;
- A temporary construction portal in the west wall at the north end of the open pit on the 82 m RL bench;
- Multiple ventilation raise surface collars on the western side of the open pit;
- Ventilation adits on the west wall at the south end of the open pit on the 10 m RL bench;
- Dewatering pond for storing, settling, and recycling water from underground.
- Electrical reticulation to the portals, adits and services;
- Shotcrete batch plant.

1.3.15.4 Environmental, Permitting and Social Considerations

A new TSF or facilities would be required in order to store the additional 140 Mt of tailings to be produced from the underground mine over a period of 28 years.

The proposed site is outside of the existing mine property boundaries and located approximately six to nine kilometres southwest of the existing open pit and plant areas. It is assumed that Atlantic Nickel will acquire lands associated with the future TSF footprint and required infrastructure, including access roads and pipelines prior to construction of the new TSF. The new TSF construction will begin with an initial starter dam and will be expanded every three years using a downstream raise method until reaching the ultimate maximum dam height of approximately 70 m. Initial discussions have begun with landowners. Several alternative tailings management strategies and facilities are being assessed at a scoping level including options within the mining property boundaries.

Since underground operations would use existing surface infrastructure, with the exception of a new TSF, the Bahia State Environmental Agency (INEMA) defined a permitting process in a single phase, called "Alteration Licence (LA)". This process would likely include presenting compliance data from the ongoing monitoring programs for the existing operations and collecting additional baseline data for the area proposed for the new TSF. In addition to regranting of the operating licence from INEMA, other permits required for operations would need to be renewed or extended for the life of the underground operations. This would include waste management, water use (industrial and drinking water), and other current permits and plans. Compliance with existing permits, development of a TSF design to meet current and proposed new dam safety laws and regulations, and a strong public outreach program will reduce and mitigate the risks associated with development of a new TSF.

The baseline data collected in the area of the new TSF and TSF corridor would be used to develop a new or supplemental ESIA associated with the new underground operation and new TSF. The ESIA would address proposed changes to the operations, existing environmental and social conditions, expected impacts to the environment and socioeconomic conditions, and proposed mitigation measures to address the expected impacts.

With the addition of the underground operations, Atlantic Nickel would continue existing social programs and would extend these programs to areas that would be impacted by the new TSF and new TSF transportation corridor. These programs would be extended to the projected life of the mine based on the underground operations.

The reclamation and closure of the facilities associated with the underground would be the same procedure as currently planned for the open pit facilities. The new TSF would be closed in a similar fashion as the current TSF.

1.3.15.5 Markets and Contracts

The commodity prices used in the financial analysis of the underground mining case are based on the consensus median of leading banks and financial institutions as of January 2023. Long-term prices are US$8.46/lb Ni, US$3.59/lb Cu, US$23.53/lb Co, US$1,615/oz Au, US$1,140/oz Pt, and US$1,363/oz Pd. The long-term Brazilian reais to US$ exchange rate is forecast at 5.55. Both the metal prices and currency exchange rate are subject to spot market conditions. There are no metal streaming agreements in place, and current hedge contracts are scheduled to be completed in Q1 2024 so will not affect financial analysis of the underground.

There are several smelter/refining agreements in place between Atlantic Nickel and smelters/traders for export from Brazil. Offtake contracts and terms are proprietary. The CP has reviewed the contracts and has confirmed that the terms are appropriately included in the financial model.

There are no contracts in place related to underground mining.

1.3.15.6 Capital and Operating Cost Estimates

1.3.15.6.1 Capital Cost Estimates

Initial capital costs for the 2023 PEA are estimated at US$417 million. Total sustaining costs during the production period have been estimated at US$1,086 million before tax credits and at US$1,038 million after tax credits. The capital cost estimate is presented in Table 1-7.

Table 1-7: 2023 PEA Capital Cost Estimates
ACG Acquisition Company Limited – Santa Rita Mine

Item	Initial Capital (US$M)	Sustaining Capital (US$M)
Process plant and site refurbishment	7.3	42.6
Tailings dam	3.2	399.1
Drilling and technical studies	13.1	48.5
Underground development	209.3	325.0
Underground infrastructure	127.6	181.5
Underground equipment	58.6	78.4
Closure cost	0.0	11.3
Sub-total	**419.2**	**1,086.3**
Tax rebate	(2.6)	(47.9)
Total	**416.6**	**1,038.4**

1.3.15.6.2 Operating Cost Estimates

LOM operating cost estimates are presented in Table 1-8. The average LOM AISC for underground mining is estimated at US$31.50/t processed.

Table 1-8: 2023 PEA Operating Cost Summary
ACG Acquisition Company Limited – Santa Rita Mine

Item	Unit Cost (US$/t processed)	UG Total (US$M)
Mining costs	12.91	1,830.3
Processing costs	5.43	769.4
Site G&A	1.59	225.3
Treatment, refining, penalties	7.40	1,049.3
Freight costs	4.40	623.4
By-product credits *	(13.87)	(1,966.6)
C1 cost 1	**17.86**	**2,531.1**
Royalties	6.40	906.9
Sustaining capex after tax credits	7.24	1,026.9
All-In Sustaining Cost 2	**31.50**	**4,464.9**

Notes: * Includes revenue from Cu, Co, Pd, Pt and Au.

1. C1 cost is cash operating costs less net by-product credits.
2. All-in sustaining cost (AISC) is C1 cost plus royalties and sustaining capital expenditures.

1.3.15.7 Economic Analysis

1.3.15.7.1 Cautionary Language

The results of the economic analyses discussed in this section represent forward-looking information. The results depend on inputs that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here. Information that is forward-looking includes:

- Mineral Resource estimates and the subset of the Mineral Resource estimate included in the 2023 PEA mine plan;
- Assumed commodity prices and exchange rates;
- The proposed mine production plan and mining method;
- Projected mining and process recovery rates;
- Assumptions as to mining dilution and mining recovery;
- Sustaining costs and proposed operating costs;
- Assumptions as to closure costs and closure requirements;
- Assumptions as to environmental, permitting and social risks.

Additional risks to the forward-looking information include:

- Changes to costs of production from what is assumed;
- Unrecognised environmental risks;
- Unanticipated reclamation expenses;
- Unexpected variations in quantity of mineralised material, grade or recovery rates;
- Geotechnical or hydrogeological considerations during mining being different from what was assumed;

- Failure of mining methods to operate as anticipated;
- Failure of process plant, equipment or processes to operate as anticipated;
- Changes to assumptions as to the availability of electrical power, and its rates used in the operating cost estimates and financial analysis;
- Ability to maintain the social licence to operate;
- Accidents, labour disputes, and other risks of the mining industry;
- Changes to interest rates;
- Changes to tax rates.

The mine plan is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the 2023 PEA based on these Mineral Resources will be realised. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

1.3.15.7.2 Basis of Estimate

A financial model was developed to estimate the Santa Rita Mine underground mine development case LOM plan. The LOM plan including pre-production covers a period of 30 years. All costs are in Q1 2023 US dollars, and inflation has not been considered in the cash flow analysis.

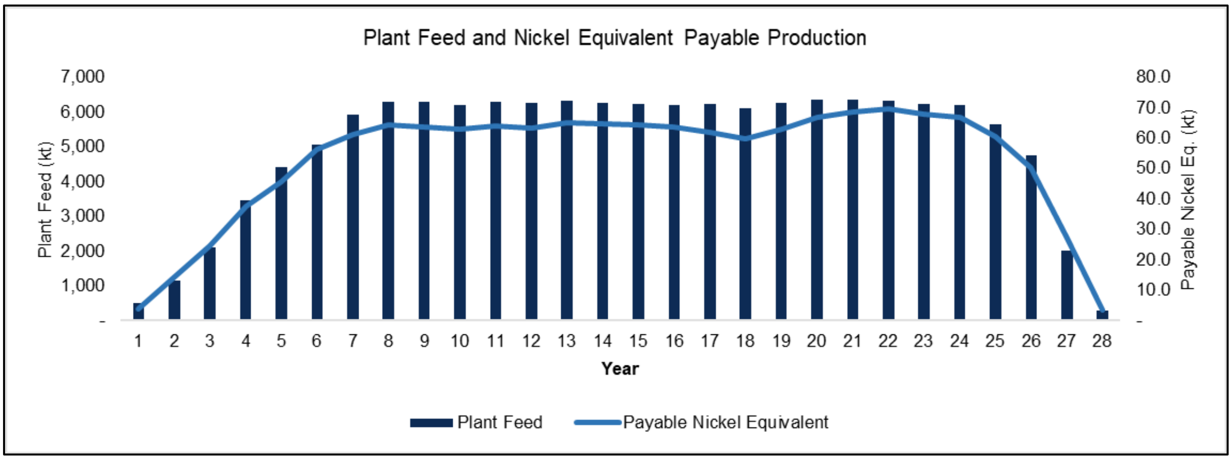
A total of 1,484 million pounds (Mlb) of NiEq are estimated to be payable over the LOM (Figure 1-4). NiEq is determined by dividing the revenue from payable Cu, Co, Au, Pt and Pd by the price of Ni to calculate equivalent pounds of nickel, then adding the payable nickel pounds to sum to the total NiEq pounds.

Other economic factors include the following:

- Discount rate of 8%;
- All cash flows include 90% to 95% payments for concentrate during the period in which they are incurred, depending on the concentrate sales agreement. The remaining 5% to 10% of the metal is paid within 90 days of reaching the Brazilian port.
- All applicable Brazilian taxes are estimated in the financial model.

Net revenue is calculated on the following:

- Revenues are calculated on the sale of nickel concentrates based on long term metal prices from the consensus mean of leading banks and financial institutions as of January 2023, and a long term forecast Brazilian to US dollar exchange rate.
- Treatment and refining charges for concentrates are based on contracted terms with several smelters/refineries and metal offtakers.
- There are four NSR royalties payable over the LOM:
  - The CFEM royalty at 2.00% on an NSR that does not allow the deductibility of freight costs;
  - The CBPM royalty at 2.51% on 60% of the value of nickel contained in concentrate and a royalty rate of 2.51% on 100% of the value of copper, cobalt, palladium, platinum, and gold contained in concentrate;
  - Land owner royalties at 1.00%;
  - The Appian Natural Resources Fund II royalty at 2.75%.



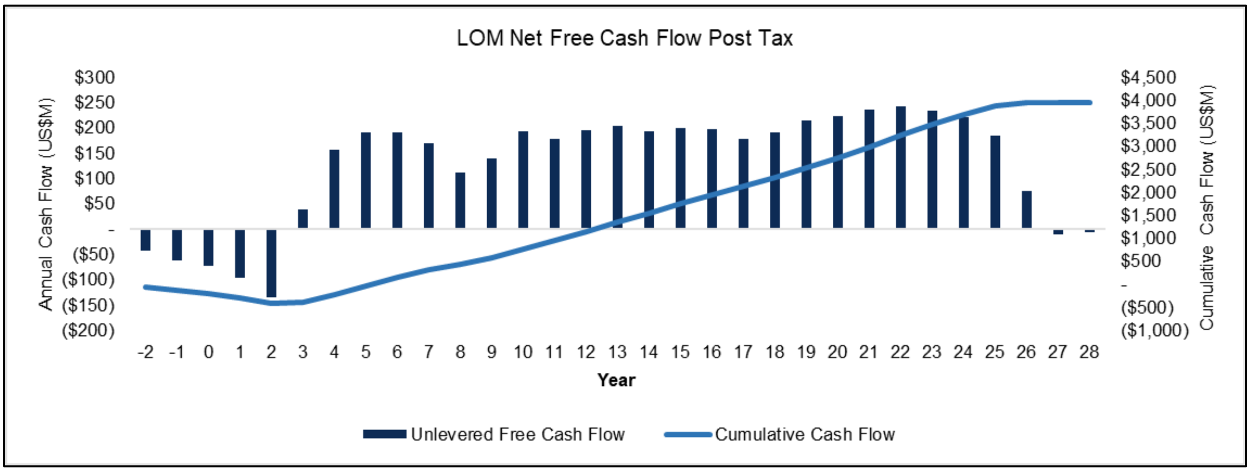
Source: Atlantic Nickel, 2023.

Figure 1-4: LOM Payable NiEq

1.3.15.8 2023 PEA Outcomes

The 2023 PEA is estimated to generate US$180 million in average unlevered free cash flow annually over the LOM and has a post-tax NPV, using an 8% discount rate, of US$942 million. The post-tax IRR is estimated at 25% and the payback is estimated at 3.4 years.

The financial results are presented in Figure 1-5 and a summary of the financial model is presented in Table 1-9.



Source: Atlantic Nickel, 2023.

Figure 1-5: LOM Net Unlevered Free Cash Flow Post Tax

Table 1-9: Underground LOM Cash Flow and Parameters
ACG Acquisition Company Limited – Santa Rita Mine

Item	Unit	Value
Commodity Prices and Exchange Rate		
Nickel price	US$/lb	8.46
Copper price	US$/lb	3.59
Cobalt price	US$/lb	23.53

Item	Unit	Value
Palladium price	US$/oz	1,363
Platinum price	US$/oz	1,140
Gold price	US$/oz	1,615
BRL:USD	R$:US$	5.55
LOM Mine Plan Summary		
Mine production life	Years	28
Measured and Indicated Mineral Resource mined	kt	64,346
Inferred Mineral Resource mined	kt	77,396
Grade NiS: MI, I	%	0.57, 0.55
Grade Cu: MI, I	%	0.19, 0.18
Grade Co: MI, I	%	0.02, 0.02
Grade Pd: MI, I	g/t	0.04, 0.05
Grade Pt: MI, I	g/t	0.09, 0.10
Grade Au: MI, I	g/t	0.06, 0.06
Processing Rate	Mt/a	6.2
LOM Concentrate Production		
Concentrate (dry)	kt	4,888
Ni	%	13.85
Cu	%	3.94
Co	%	0.25
Pd	g/t	1.67
Pt	g/t	2.26
Au	g/t	1.03
LOM Revenue		
Net Smelter Return Revenue	US$M	10,871
LOM Operating Cost		
Mining	$/t processed	12.91
Processing	$/t processed	5.43
Site G&A	$/t processed	1.59
Treatment, refining, penalties	$/t processed	7.40
Freight	$/t processed	4.40
By-product credits	$/t processed	(13.87)
C1 operating cost [1]	US$/lb Ni [2]	2.02
AISC cost [3]	US$/lb Ni	3.57
Operating costs	US$M	(4,498)
Royalties	US$M	(907)

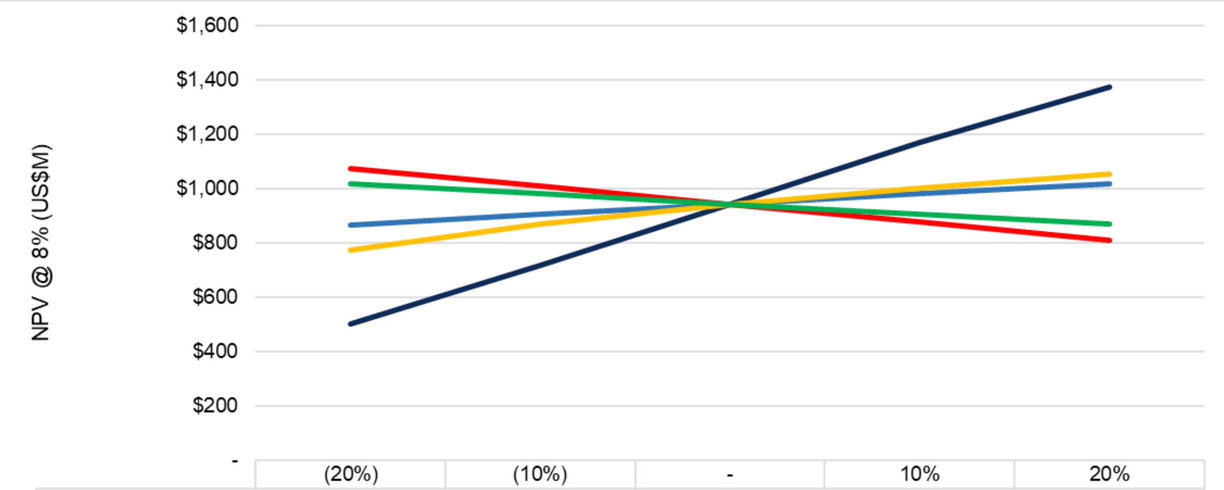
Item	Unit	Value
LOM Cash Flow		
EBITDA cash	US$M	7,139
Cash Flow		
Taxes	US$M	(1,685)
Capital expenditures	US$M	(1,505)
Unlevered Free Cash Flow	US$M	**3,938**
Post-Tax $NPV_{8\%}$	US$M	**942**
Post-Tax IRR	%	**25**
Payback period	years	**3.4**

Notes: EBITDA = earnings before interest, taxes, depreciation and amortisation. MI = Measured and Indicated, I = Inferred.

1. C1 cost = cash operating costs less net by-product credits.
2. Ni cost = (mining cost + processing cost + site G&A cost + treatment/refining cost + freight cost – by-product credits for Cu,Co,Pd,Pt,Au) / payable Ni.
3. All-in sustaining cost (AISC) = C1 cost plus royalties and sustaining capital expenditures.

1.3.15.9 2023 PEA Sensitivity Analysis

Figure 1-6 presents an NPV sensitivity analysis on nickel price, by-product prices, exchange rate, operating costs, and capital expenditures. The Project as envisaged in the 2023 PEA is most sensitive to changes in the nickel price, less sensitive to changes in operating costs and capital expenditures and foreign exchange rate fluctuations, and least sensitive to commodity price changes for the by-product elements.



	(20%)	(10%)	-	10%	20%
Nickel price	$501	$717	$942	$1,168	$1,375
By-product prices	$865	$904	$942	$980	$1,017
FX	$775	$868	$942	$1,003	$1,053
Opex	$1,074	$1,008	$942	$876	$810
Capex	$1,017	$980	$942	$905	$867

Source: Atlantic Nickel, 2023.

Figure 1-6: 2023 PEA Sensitivity Analysis

1.4 Risks and Opportunities

1.4.1 Risks

Project risks are summarised in Table 1-10.

Table 1-10: Risks
ACG Acquisition Company Limited – Santa Rita Mine

Area	Risk	Comment/Mitigation Plan
Geology and Mineral Resources	Tonnage and grade variation – new diamond drill data	Update the mineralised wireframes with the new drill hole information, to obtain a more precise tonnage and grade according to the new drill hole campaign
	Geological faults – underground	Incorporate the post-mineralised faults in the geological model, aiming to increase the confidence level of the underground Resource shapes
Mining Operations	Mine performance below expectations (grade, tonnage)	Short-term production planning at eight week intervals; production plan; consideration of alternate accesses; pumping requirements
	Poor blast performance	Detailed firing plan
	Pit slope instability due to dip of mineralization and low rock mass attributes	Maintain thorough ongoing monitoring program of geotechnical inspections; water level, vibration, and mass movement monitoring
	Meet plant throughput	Short-term production planning at eight week intervals; alternate faces available for mining operations
Mineral Processing	Inability to meet nickel recovery and concentrate grade targets	Maintain program of continuous improvements in process control and operational practices
TSF	Difficulty acquiring land for the new TSF site and right of way.	Early discussions with landowners have been initiated and will be advanced as a priority. Moreover, as backup plans, several alternative tailings management strategies and facilities have been assessed at a scoping level including options located within the mining boundary.
	Compliance with new regulations and industry standards, including Global Industry Standard on Tailings Management (GISTM)	Early planning in future designs; currently working toward compliance with GISTM.
Environmental	Not meeting water quality discharge requirements	Monitoring; ensuring that no sulphide waste is used for any construction activity; lithological characterisation studies.
Permitting	Inability to renew licences	Monitoring; ensuring compliance with licence terms.

1.4.2 Opportunities

Opportunities identified are outlined in Table 1-11.

Table 1-11: Opportunities
ACG Acquisition Company Limited – Santa Rita Mine

Area	Opportunity	Note
Geology and exploration	Potential to increase resource base	Current advanced exploration at the Palestina Project has the potential to define a resource. There is excellent potential to increase the underground resource at Santa Rita, by drill testing extensions of the mineralisation at depth.
Mining	Mineralised stockpiles (open pit)	Historical mineralised material stockpiles exist at the mine site. Two large stockpiles have been surveyed and are estimated to contain approximately 5.7 Mt of material. The stockpiles require drilling and sampling to allow a Mineral Resource Estimate to be completed.
	Cut-off grade (underground)	The 2023 PEA assumes a higher cut-off grade than the break-even grade. There is potential to both lower the cut-off to allow more material to be mined, and to optimize the cut-off over time.
	Ventilation (underground)	There may be an opportunity to reduce ventilation costs if checks with the applicable regulatory agency allow ventilation criteria to be modified from that assumed in the 2023 PEA mine plan.
	Automation (underground)	An investigation should be conducted into the feasibility of automating much of the underground equipment to provide potential capital and operation cost savings, and reduce safety risks associated with human-operated equipment.
	Mining method (underground)	A mass mining method such as an incline cave should be evaluated to determine if operating cost savings can be achieved by reducing operating development, and production drill and blast costs.
Mineral Processing	Improve nickel sulphide concentrate grade	Investigate open circuit scavenger cleaning to reduce the circulating load in flotation; this may require more cleaner scavenger flotation residence time.
	Improve SAG mill performance to increase throughput and produce less ultra fine particles	Implement JKTech recommendations once the current in-house optimisations have been completed.
	Upgrade the existing low grade stockpiles using ore sorting	Carry out ore sorting testwork on low grade material at a laboratory with the requisite experience and testing equipment.
TSF	Capacity (open pit)	The existing TSF capacity is limited to that for the open pit due to the presence of a gas pipeline located downstream of the toe. If the gas pipeline route can be moved, the facility can be expanded to hold approximately 50 Mt. Depending on the costs to move the pipeline, this could represent a significant savings in capital and

Area	Opportunity	Note
		operating costs and a delay in the shift to the new TSF required for the 2023 PEA scenario.

2.0 INTRODUCTION

SLR Consulting (Canada) Ltd. (SLR) was retained by ACG Acquisition Company Limited (ACG) to prepare a Competent Person's Report (CPR) on the Santa Rita Mine (Santa Rita), located in Bahia State, Brazil. Mr. Orlando Rojas, GeoEstima SpA (GeoEstima), Mr. Anthony Maycock, MM Consultores SpA (MM Consultores); Mr. Andrew Bradfield and Mr. Greg Robinson, P&E Mining Consultants Inc. (P&E); Dr. Haiming (Peter) Yuan, WSP USA Environment & Infrastructure Inc. (WSP), and Mr. David J.F. Smith, SLR, are collectively the Competent Persons (CP) for this CPR.

The purpose of this CPR is to support a listing on the London Stock Exchange (LSE). The CPR conforms to Financial Conduct Authority (FCA) Primary Market Technical Note 619.1.

The Santa Rita nickel mine is located in the Itagibá municipality of Bahia state in northeast Brazil and is owned and operated by Atlantic Nickel Mineração Ltda. (Atlantic Nickel), a subsidiary owned by Appian Capital Advisory LLP (Appian Capital). The operation consists of an open pit and beneficiation plant with existing permits and infrastructure, including energy, water, and paved roads to site. Santa Rita is approximately seven kilometres (km) from the city of Ipiaú and 140 km from the Port of Ilhéus. The planned mine life consists of over 28 years of underground mining after a remaining open pit life of six years.

2.1 Sources of Information

The following serve as the CPs for this CPR:

- Mr. Orlando Rojas, AIG, GeoEstima
- Mr. Andrew Bradfield, P.Eng., P&E
- Greg Robinson, P.Eng., P&E
- Mr. Anthony Maycock, P.Eng., MM Consultores
- Dr. Haiming (Peter) Yuan, P.E., WSP
- David J.F. Smith, CEng., FIMMM, SLR

Mr. Rojas visited the Santa Rita Mine and Palestina Project from November 17 to 18, 2022. During the site visit, Mr. Rojas reviewed plans and sections, visited the core shack, examined drill core and mineralised exposures at the open pit mine, reviewed core logging and quality assurance and quality control (QA/QC) procedures and database management system, and held discussions with Atlantic Nickel personnel.

Mr. Bradfield visited the Santa Rita site on February 14, 2023. The purpose of the visit was to inspect open pit mining activities, the process plant, tailings storage facility (TSF), and other site infrastructure, then hold discussions with mine management on items such as the Mineral Reserve, mine production plan, costs, and financial model inputs.

Mr. Robinson visited the Santa Rita site on January 18, 2019. The purpose was to review engineering aspects of the operations, including the open pit, process plant and surface infrastructure.

Mr. Maycock visited the Santa Rita site over the period July 22 to 24, 2019. The visit included inspection of the port facilities in Ilhéus to witness the concentrate storage shed and ship loader, a presentation of the complete project by Atlantic Nickel staff, a tour of the site, and a detailed visit to the process facilities and infrastructure. The rehabilitation and improvement works at the concentrator were witnessed and discussions were held with the plant management on plant operations and plans for future metallurgical testwork.

Dr. Yuan visited the Santa Rita site from October 25 to 28, 2021, to inspect the existing TSF and perform a site reconnaissance for candidate sites of the new TSF.

Mr. Smith has not visited the site, however, Mr. Renan Lopes, SLR Geological Consultant, visited the property between January 5 and 6, 2023. During the site visit, an introduction of the mine and TSF operation was made by the site personnel, including the general manager of the site. In addition, field inspections in the TSF and core shed were also carried out, followed by a session of questions and answers for many of the subjects involving a mine operation, such as mine scheduling and the transition from open pit to underground, legal permissions, exploration plan and current results, TSF capacity and management, and geotechnical aspects. Discussions were held with personnel from Atlantic Nickel and Appian Capital Brazil.

Table 2-1: Competent Persons and Responsibilities
ACG Acquisition Company Limited – Santa Rita Mine

CP, Designation, Title	Company	Responsible for Sections
David J.F. Smith, CEng., FIMMM, Global Technical Director – Mining and Mining Advisory Group	SLR Consulting (Canada) Ltd.	Overall responsibility, including Sections 2, 3, and 23
Orlando Rojas, AIG, Principal Consultant	GeoEstima SpA	1.1.1.1, 1.1.2.1, 1.3.1 to 1.3.6, 4.1 to 4.8, 4.12, 5 to 12, 14, 25.1, and 26.1
Andrew Bradfield, P.Eng., Chief Operating Officer	P&E Mining Consultants Inc.	1.1.1.2, 1.1.1.4, 1.1.1.6 (except TSF), 1.1.2.2, 1.1.2.5, 1.2, 1.3.7, 1.3.8, 1.3.11, 1.3.12, 1.3.14, 1.3.15 (except 13.15.4), 15, 16, 18, 19, 21, 22, 24.1.1, 24.1.2, 24.1.4, 24.1.6, 24.1.9, 25.2, 25.3, 25.5, 25.6, 25.8 to 25.10, 25.11.3, 26.2, 26.6
Greg Robinson, P.Eng., Lead Mining Engineer	P&E Mining Consultants Inc.	1.3.15.2, 24.1.3, 24.1.8 and 25.11.1
Anthony Maycock, P.Eng., Principal	MM Consultores SpA	1.1.3, 1.1.2.3, 1.3.9, 1.3.10, 13, 17, 24.1.5, 25.4, 26.3
Dr. Haiming (Peter) Yuan, P.E.	WSP USA Environment & Infrastructure Inc.	1.1.1.5, 1.1.1.6 (TSF), 1.1.2.4, 1.3.13, 1.3.15.4, 4.9, 4.10, 4.11, 20, 24.1.7, 25.7, 25.11.2, 26.4, 26.5
All		1.4, 25.12, 27

The documentation reviewed, and other sources of information, are listed at the end of this CPR in Section 27 References.

2.2 List of Abbreviations

Units of measurement used in this CPR conform to the metric system. All currency in this CPR is US dollars (US$) unless otherwise noted.

µ	micron	kt/a	kilotonnes per annum
µg	microgram	kVA	kilovolt-amperes
µm	micrometre	kW	kilowatt
a	annum	kWh	kilowatt-hour
A	ampere	L	litre
bbl	barrels	lb	pound
Btu	British thermal units	L/s	litres per second
°C	degree Celsius	m	metre
C$	Canadian dollars	M	mega (million); molar
cal	calorie	m^2	square metre
cfm	cubic feet per minute	m^3	cubic metre
cm	centimetre	MASL	metres above sea level
cm^2	square centimetre	m^3/h	cubic metres per hour
d	day	mbs	metres below surface
dia	diameter	mg/L	milligrams per litre
dmt	dry metric tonne	mi	mile
dwt	dead-weight ton	min	minute
°F	degree Fahrenheit	mm	millimetre
ft	foot	mph	miles per hour
ft^2	square foot	Mt/a	million tonnes per annum
ft^3	cubic foot	MVA	megavolt-amperes
ft/s	foot per second	MW	megawatt
g	gram	MWh	megawatt-hour
G	giga (billion)	oz	Troy ounce (31.1035g)
Gal	Imperial gallon	P_{80}	80% passing
g/L	gram per litre	ppb	part per billion
Gpm	Imperial gallons per minute	ppm	part per million
g/t	gram per tonne	psia	pound per square inch absolute
		psig	pound per square inch gauge
gr/ft^3	grain per cubic foot	R$	Brazilian Real
gr/m^3	grain per cubic metre	RL	relative elevation
ha	hectare	s	second
hp	horsepower	t	metric tonne
hr	hour	t/a	metric tonne per year
Hz	hertz	t/d	metric tonne per day
in.	inch	t/h	tonnes per hour
in^2	square inch	US$	United States dollar
J	joule	USg	United States gallon
k	kilo (thousand)	USgpm	US gallon per minute
kcal	kilocalorie	V	volt
kg	kilogram	W	watt
km	kilometre	wmt	wet metric tonne
km^2	square kilometre	wt%	weight percent
km/h	kilometre per hour	yd^3	cubic yard
kPa	kilopascal	yr	year

3.0 RELIANCE ON OTHER EXPERTS

3.1 Introduction

This CPR has been prepared by SLR for ACG. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to the CPs at the time of preparation of this CPR.
- Assumptions, conditions, and qualifications as set forth in this CPR.

3.2 Mineral Tenure, Surface Rights and Royalties

For the purpose of this CPR, the CPs have relied on ownership information provided from Atlantic Nickel by Bichara Advogados: Legal Opinion – NI 43-101 Report dated March 7, 2023 (Atlantic Nickel, 2023a) and this opinion is relied on in Section 4 and the Summary of the CPR.

The CPs have not independently reviewed property title, mineral rights, or ownership of the project area and express no opinion as to the ownership status of the property.

3.3 Permitting, Environmental and Community Impacts

The CPs have fully relied upon, and disclaim responsibility for, information supplied by experts retained by Atlantic Nickel for information related to environmental and permitting as follows:

- Arcoverde Consultoria e Projetos S/C, 2006: Environmental Impact Report, Nickel Ore Mining and Processing, CRA PROCESS No. 2006-000986/TEC/LL-0013, and DNPM PROCESS No. 871.369/1989: report prepared for Companhia Baiana de Pesquisa Mineral and Mineração Mirabela do Brasil Ltda., August, 2006, 243 p., in English.
- Ramboll, 2020: Environmental and Social Impact Assessment, Atlantic Nickel Mineração Ltda - Santa Rita Farm, Itagibá, Bahia, Brazil: report prepared for Atlantic Nickel Mineração Ltda, April 2020, 266 p., draft, in English.

This information is used in Section 20 and Section 24.1.7 of the CPR. It is also used in support of the Mineral Resource estimate in Section 14, the Mineral Reserve estimate in Section 15, the financial analysis in Section 22, and the 2023 PEA financial analysis in Section 24.1.9 and the Summary of the CPR.

3.4 Taxation

The CPs have relied on ACG for guidance on applicable taxes, royalties, and other government levies or interests, applicable to revenue or income from the Santa Rita Mine.

The CPs have fully relied upon, and disclaim responsibility for, information supplied by experts retained by Atlantic Nickel for information related to taxation as applied to the financial models as follows:

- KPMG Assessores Ltda., 2020. Santa Rita Financial Model Tax Review. 20 May 2020.

This information is relied on in the financial analyses in Section 22 and Section 24.1.9 and the Summary of the CPR.

Except for the purposes legislated under securities laws, any use of this CPR by any third party is at that party's sole risk.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The Santa Rita Mine is located in the Itagibá municipality of Bahia state in northeast Brazil, seven kilometres south-southeast of the city of Ipiaú, 140 km northwest of the Port of Ilhéus, and 360 km southwest of Salvador (Figure 4-1).

The open pit mine is centred at latitude 14°11’38.68” S and longitude 39°43’23.61” W within Zone 24S of UTM coordinate system (Córrego Alegre Datum).

Source: Atlantic Nickel, 2020.

Figure 4-1: Location Map

4.2 Land Tenure

4.2.1 Introduction

Mining activities in Brazil are governed by the Brazilian Federal Constitution of 1988 (the Brazilian Federal Constitution), the Brazilian Mining Code (Federal Decree-Law 227/1967), and various other decrees, laws, ordinances, and regulations such as the Decree number 9.406/2018 which renews the regulation of the Mining Code. Brazil also has legislation and legal guarantees related to the exploitation and use of water rights.

Under the Brazilian Federal Constitution, all mineral deposits belong to the Federal Government, whether or not the mineral deposits are in active production. Mineral rights are distinct from surface rights.

The Ministry of Mines and Energy (MME) and the Agência Nacional de Mineração (ANM) regulate mining activities in Brazil. The ANM is responsible for monitoring, analysing, and promoting the performance of the Brazilian mineral industry by administering and granting rights related to the exploration and exploitation of mineral resources and other related activities in Brazil.

4.2.2 Mineral Title

In Brazil, there are four main levels of mineral tenure: exploration licences (Autorizações de Pesquisa), mining concessions (Concessões de Lavra), mining concession applications (Requerimento de Lavra), and exploration licence applications (Requerimentos de Pesquisa), which are together broadly referred to as mineral rights.

Exploration licences can be granted for a period of one to three years, and can be extended by request of the holder. Exploration licences provide the licence holders with the right to access the licence and undertake exploration activities. Such licences are typically issued with specific commodities to be explored for listed in the licence. The licence holder must have an agreement in place with any surface owners before exploration work commences. The exploration licence is a preliminary stage granted to discover a mineral deposit that can support mineral reserves, and the grant of a mining concession by the ANM.

The following obligations must be complied with:

- Start exploration within 60 days, counted from the date of publication of the licence or from the date access to the relevant properties is obtained;
- Inform and notify the ANM of any discoveries of mineralisation that was not included in the titleholder's list of authorised commodities;
- Not interrupt the exploration activities without reason for more than three consecutive months or for more than 120 non-consecutive days during the licence term;
- Pay all relevant fees;
- Request approval from the ANM (i.e., an extraction permit) before removing any substances from the licence area for analysis or testwork;
- Pay any required compensation to the surface owner or possessor;
- Prepare and present a final exploration report to the ANM, within the time frame determined by the ANM.

Once a positive exploration report is approved by the ANM, the licence holder has a year to apply for a mining concession.

Applications for mining concessions require documentary support, including the commodities that are to be explored for, a description and location of the area applied for, a map showing the area, any easements, an “Economic Development Plan”, and evidence of sufficient funds to complete the mine plan. Mining concessions are considered granted when an ordinance is published in the Official Gazette.

Within 90 days of the publication of the ordinance, the holder must apply for possession (imissão de posse) of the surface area that is required to enact the Economic Development Plan. The ANM will then draft an “Access Term” that must be signed by all stakeholders. The owner of the surface area is entitled to royalties that are equivalent to 50% of the amount paid as the Compensation for the Exploitation of Mineral Resources (Compensação Financeira pela Exploração de Recursos Minerais, or CFEM).

Work must commence within six months of the mining concession grant. Annual production reports must be filed. Assuming all other conditions are met, mining concessions remain valid until the deposit is depleted.

The holder can conduct mining activities only in the area covered under the lease agreement after the agreement has been registered with the ANM, and the appropriate operation licence (Licença de Operação - LO) is issued. If additional minerals are discovered, the mining concession must be amended to include the new list of minerals.

4.2.3 Surface Rights

Surface rights in Brazil are separate from mineral rights. Under the mining law, mining rights holders have the right to use and access areas that are planned for exploration or exploitation. Rights of way and easements can be granted to mining rights holders over public and private lands.

Typically, the mining rights holder enters into an agreement with the affected surface rights holder in return for a compensation fee for the land use. Where disputes arise, a mining rights holder may apply for a local court order to allow a judge to establish the appropriate compensation fee to be paid to the surface rights holder.

4.2.4 Water Rights

All waters are considered to be in the public domain, and are separated into:

- Federal waters: lakes, rivers, and any water courses on lands under Federal authority; those that flow through more than one State; those that serve as a frontier with another country, or flow into or originate in another country; as well as marginal lands and riparian beaches;
- State waters: Groundwater and rivers located entirely within the territory of a single State, unless otherwise classified as a Federal water.

Law 9,433/1997 established the National Water Resources Policy (NWRP), created the National Water Resources Management System (NWRMS), and defined a catchment (river) basin as the unit for water resource planning. The law includes the principle of multiple water uses, thereby putting all user categories on an equal footing for access to water resources.

The organisational framework administering water includes the National Water Resources Council (NWRC), State Water Resources Councils (SWRCs), River Basin Committees (RBCs), State Water Resources Management Institutions (SWRIs) and Water Agencies (WAs).

In 2003, to facilitate the management of Brazilian water resources, the country was divided into 12 hydrographic regions, which do not coincide with the 27 state political divisions. The NWRC is responsible for resolving disputes over use of water for basins at the Federal level, and for establishing guidelines necessary to implement the institutional framework and instruments contained in the NWRP. The SWRCs are responsible for basins at the State level. The SWRIs are responsible for implementing the guidelines set by the SWRCs. The RBCs and WAs cover the actual water regions, which may be part of more than one State.

4.2.5 Royalties and other Encumbrances

Revenues from mining activities at Santa Rita are subject to the CFEM royalty that is paid to the ANM and varies depending on the mineral product:

- 1% for rocks, sand, gravel, clay, and other mining substances for immediate use in civil works, as well as for mineral and thermal water
- 1.5% for gold
- 2% for diamond and other unspecified mining substances (includes nickel, copper, and cobalt)
- 3% for bauxite, manganese, niobium, and rock salt
- 3.5% for iron ore

4.3 Project Ownership

The Santa Rita Mine is owned by Atlantic Nickel Mineração Ltda (Atlantic Nickel), a wholly-owned subsidiary of Appian Capital. Mining concessions and exploration licences covering the Santa Rita and Palestina deposits are owned by the state company Companhia Bahiana de Pesquisa Mineral (CBPM) and are under a lease contract signed in 2008 and valid for 20 years. Exploration licences outside the Santa Rita and Palestina areas are held by Atlantic Nickel.

4.3.1 Ownership History

CBPM assumed ownership of what is now the Santa Rita property in 1989 (see Section 6.1). In 2003, CBPM offered private enterprise the opportunity to develop the nickel-bearing sulphide and laterite prospects that had been identified within the Fazenda Mirabela via public tender. Mirabela Mineração do Brasil Ltda (Mirabela Brazil) won the tender.

On October 17, 2003, Mirabela Brazil entered into an Exploration and Mining Lease Agreement, as amended on June 29, 2004, October 17, 2005, November 24, 2005, April 12, 2007, and February 27, 2008 for the Mirabela Project in Brazil with CBPM.

Mirabela Brazil completed an approved exploration program for exploration licence 871.369/1989 in 2006. The Brazilian National Department of Mineral Production (DNPM) approved the final report on December 5, 2006. Subsequently, DNPM gazetted Mining Licence 871.369/1989 in CPBM's name on January 2, 2008. Mirabela Brazil and CBPM signed a Mining Lease agreement on March 3, 2008, which was gazetted on June 9, 2008.

Mirabela Brazil commenced mining operations in 2009. However, due to a combination of low nickel prices in 2014–2015, and a loan restructure, Mirabela Nickel Ltd. (Mirabela), the parent company of Mirabela Brazil, was placed into bankruptcy proceedings in 2015 and the operations were placed on care and maintenance. The bond-holders for Mirabela acted as receivers and managers for the operation until 2018, and focused on keeping the mine and infrastructure in a ready for start-up mode. In 2017, the bond-holders determined that a sale of the operations was the best method available to creditors to recover value.

In 2018, Appian Capital acquired the Project via the Mirabela bankruptcy proceedings.

4.4 Property Agreements

4.4.1 CBPM Agreements

4.4.1.1 Agreement for Supplementary Exploration and Promise to Lease Mineral Rights

Atlantic Nickel entered into the Agreement for Supplementary Exploration and Promise to Lease Mineral Rights with CBPM on October 17, 2003 (the CBPM Exploration Agreement). The agreement has subsequently been amended dated June 29, 2004, October 17, 2005, November 24, 2005, April 17, 2007, February 27, 2008, February 27, 2010, August 27, 2010, August 27, 2012, February 27, 2013, November 4, 2013, February 23, 2015, January 25, 2017, January 18, 2019, January 17, 2021, March 3, 2021, and August 30, 2022.

4.4.1.2 Mineral Rights Lease Agreement

Atlantic Nickel concluded a mineral rights lease agreement with CBPM on March 3, 2008 (CBPM Lease Agreement). The CBPM Lease Agreement was amended on August 7, 2010, November 30, 2010, and May 12, 2014, and is valid until June 16, 2028.

Pursuant to the CBPM Lease Agreement, the lease of the mining concessions can be renewed at Atlantic Nickel's request in case the Mineral Reserve is not fully mined out. Conditions for renewal will be set if and when Atlantic Nickel formalizes the renewal request, and will include considerations of the mine's technical and economical performance and market conditions for concentrate sales.

4.4.1.3 Exploration Agreement

As per the CBPM Exploration Agreement, the Atlantic Nickel performs exploration on behalf of CBPM in the areas covered by mineral rights held by CBPM. In case the titles develop into mining concessions, then such titles become part of the existing CBPM Lease Agreement.

4.5 Mineral Tenure

The Atlantic Nickel holds a number of mining concessions throughout the Santa Rita property area, collectively covering 28,997.21 ha:

- Two mining concessions for nickel in the municipality of Itagibá, Bahia state
- Three applications for mining concessions for nickel in the municipality of Itagibá, Bahia state
- 32 exploration licences for nickel in different municipalities in the State of Bahia

Mining concessions and exploration licences granted in ANM Processes Nos. 871.486/2017, 870.736/2021, 870.737/2021, 870.738/2021, 870.739/2021, 870.740/2021, and 870.741/2021 are registered with the ANM in the name of CBPM. Mining concessions are leased to Atlantic Nickel as per the CBPM Lease Agreement. The CBPM Lease Agreement is valid until June 16, 2028. In the capacity of lessee, Atlantic Nickel can mine and become the owner of the production from the mining concessions.

Applications for mining concessions and three exploration permits held by CBPM will be leased to Atlantic Nickel if and when the respective mining concessions are granted, as per the CBPM Exploration Agreement.

The remaining exploration permits and the application for exploration permit are registered with the ANM in Atlantic Nickel's name.

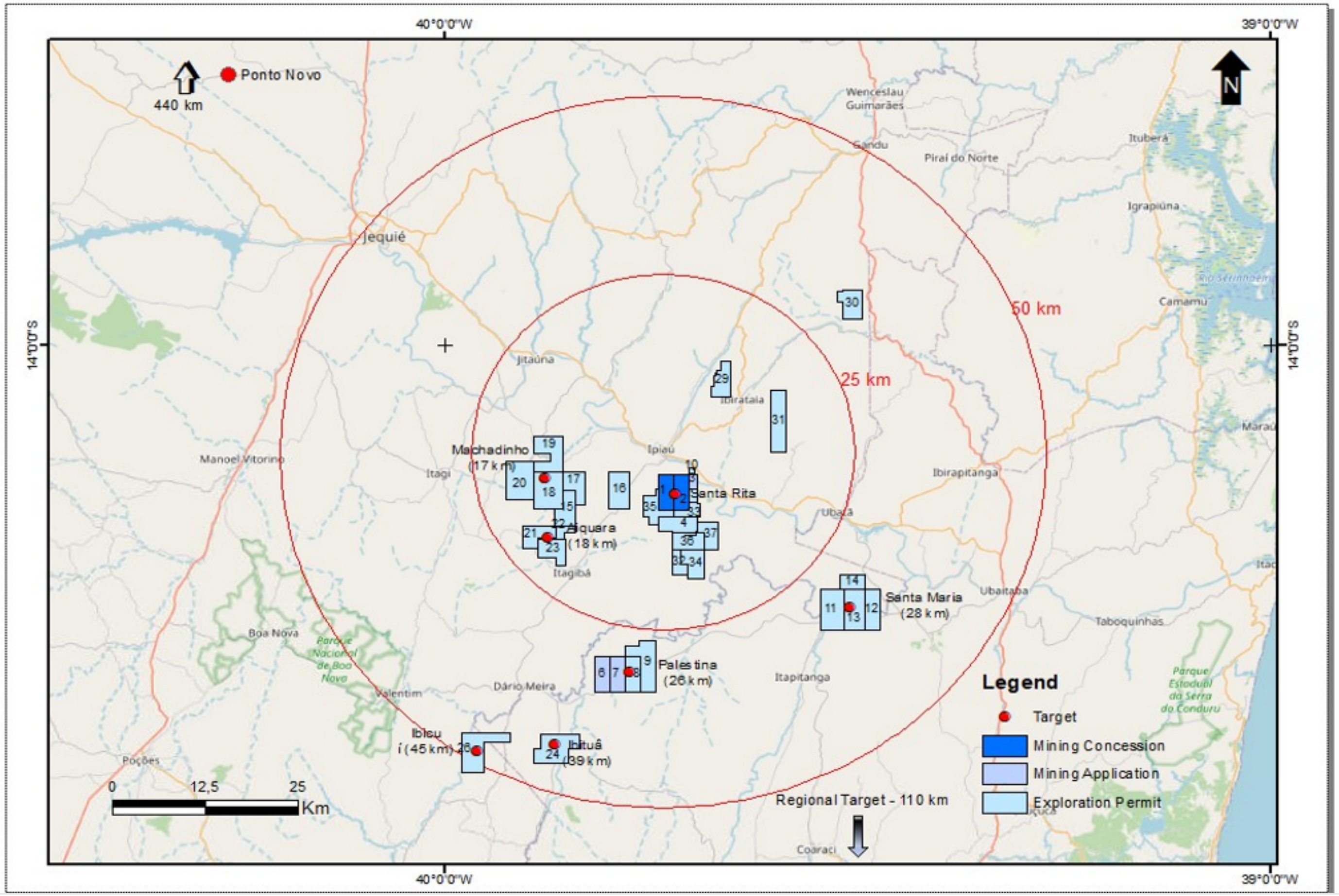
The mineral rights are summarised in Table 4-1. The mining concession map is shown in Figure 4-2.

As at the effective date of this CPR, all required payments and reporting had been completed to have the mineral tenures in good standing.

Table 4-1: Mineral Rights Summary
ACG Acquisition Company Limited – Santa Rita Mine

Name	ANM No.	Registered Holder	Stage	Area (ha)	Commodity
Santa Rita	871.368/1989	CBPM	Mining Concession	1,000.00	Nickel
	871.369/1989	CBPM	Mining Concession	1,000.00	Nickel
	871.291/2003	CBPM	Application for Mining Concession	208.27	Nickel
	872.741/2016	CBPM	Exploration Permit	1,050.87	Nickel
	871.486/2017	CBPM	Exploration Permit	207.65	Nickel
Palestina	871.843/2003	CBPM	Application for Mining Concession	1,000.00	Nickel
	870.255/2007	CBPM	Application for Mining Concession	1,000.00	Nickel
	871.572/2016	CBPM	Exploration Permit	999.73	Nickel
	870.736/2021	CBPM	Exploration Permit	499.97	Nickel
	870.737/2021	CBPM	Exploration Permit	478.93	Nickel
	870.738/2021	CBPM	Exploration Permit	999.44	Nickel
	870.739/2021	CBPM	Exploration Permit	999.84	Nickel
	870.740/2021	CBPM	Exploration Permit	984.61	Nickel
	870.741/2021	CBPM	Exploration Permit	859.28	Nickel
	871.195/2017	Atlantic Nickel	Exploration Permit	1,789.00	Nickel
Formiga	870.251/2018	Atlantic Nickel	Exploration Permit	57.18	Nickel
Santa Maria	870.009/2018	Atlantic Nickel	Exploration Permit	1,677.86	Nickel
	870.010/2018	Atlantic Nickel	Exploration Permit	1,089.50	Nickel
	870.011/2018	Atlantic Nickel	Exploration Permit	1,549.63	Nickel
	870.012/2018	Atlantic Nickel	Exploration Permit	692.01	Nickel
Machadinho	871.187/2017	Atlantic Nickel	Exploration Permit	1,125.85	Nickel
	871.188/2017	Atlantic Nickel	Exploration Permit	1,373.45	Nickel
	871.190/2017	Atlantic Nickel	Exploration Permit	1,011.29	Nickel

Name	ANM No.	Registered Holder	Stage	Area (ha)	Commodity
	871.203/2017	Atlantic Nickel	Exploration Permit	1,993.00	Nickel
	870.249/2018	Atlantic Nickel	Exploration Permit	1,702.86	Nickel
	870.250/2018	Atlantic Nickel	Exploration Permit	1,957.78	Nickel
Aiquara	872.368/2016	Atlantic Nickel	Exploration Permit	971.28	Nickel
	871.220/2017	Atlantic Nickel	Exploration Permit	335.82	Nickel
	872.158/2017	Atlantic Nickel	Exploration Permit	1,113.47	Nickel
Ibitupã	870.318/2018	Atlantic Nickel	Exploration Permit	1,903.47	Nickel
Ponto Novo	872.157/2017	Atlantic Nickel	Exploration Permit	1,999.98	Nickel
Ibicuí	870.319/2018	Atlantic Nickel	Exploration Permit	1,966.73	Nickel
Regional	873.416/2011	Atlantic Nickel	Exploration Permit	86.86	Nickel
	873.431/2011	Atlantic Nickel	Exploration Permit	684.35	Nickel
	870.248/2018	Atlantic Nickel	Exploration Permit	968.1	Nickel
	870.252/2018	Atlantic Nickel	Exploration Permit	1,178.28	Nickel
	870.253/2018	Atlantic Nickel	Exploration Permit	1,769.46	Nickel
Total				**40,285.80**	



Code	ANM Process
1	870319/2018
2	870318/2018
3	870253/2018
4	870252/2018
5	870251/2018
6	870250/2018
7	870249/2018
8	870248/2018
9	870012/2018
10	870011/2018
11	870010/2018
12	870009/2018
13	872158/2017
14	872157/2017
15	871220/2017
16	871203/2017
17	871195/2017
18	871190/2017
19	871188/2017
20	871187/2017
21	872368/2016
22	873431/2011
23	873416/2011
24	870255/2007
25	870736/2021
26	870737/2021
27	870738/2021
28	870739/2021
29	870740/2021
30	870741/2021
31	871291/2003
32	871368/1989
33	871369/1989
34	871486/2017
35	871572/2016
36	871843/2003
37	872741/2016

Source: Atlantic Nickel, 2023

Figure 4-2: Mineral Tenure Location Plan

4.6 Surface Rights

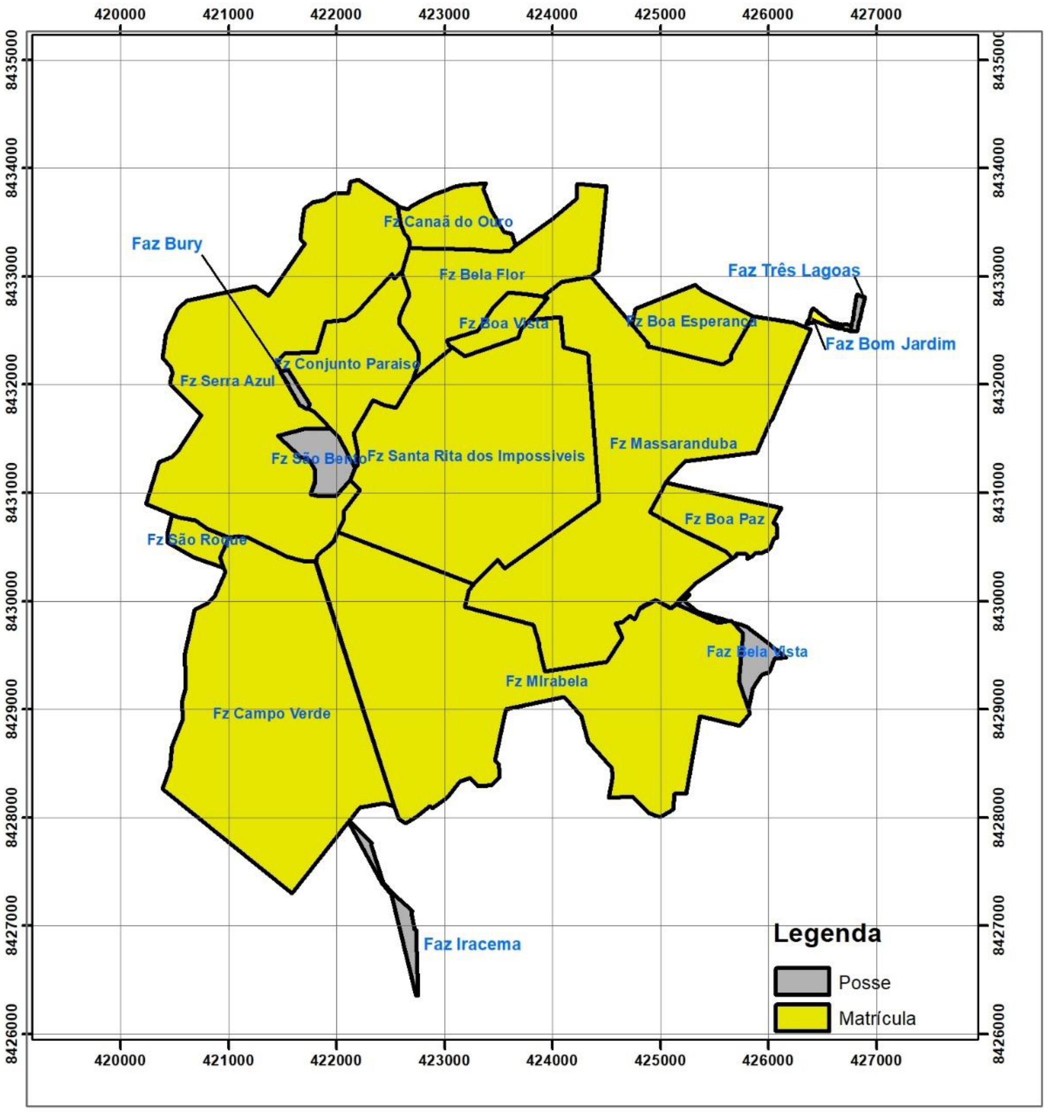
Atlantic Nickel owns the surface rights over the area of the operations, totalling 5,238.31 ha, being that 2,731.70 ha surface rights cover the areas of the mining operations, waste rock storage facilities (WRSFs), and the tailings storage facilities (TSF). The surface rights parcel boundaries are fixed by a combination of surveyed points, and the locations of cultural features.

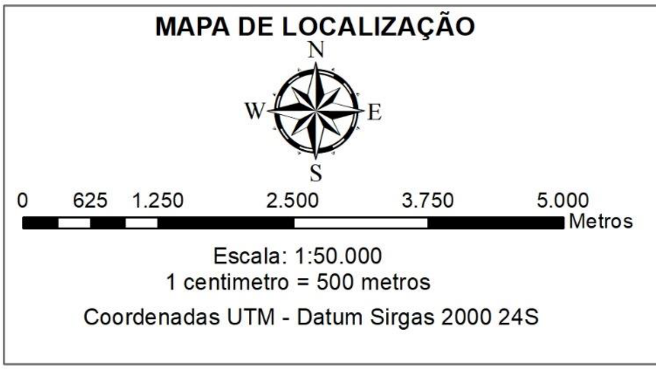
The surface rights acquisition process has included agreements to pay royalties to certain of the surface rights holders.

The various surface rights agreements are shown in Figure 14-3 and summarised in Table 4-2.

Table 4-2: Surface Rights Summary
ACG Acquisition Company Limited – Santa Rita Mine

Surface Right	Registry Number	Area (ha)	Landowner Royalty
Bela Flor	2,872/2,803/2,827/ 2,828/2,873/2,831/2,091	135.54	
Boa Esperança	380	51.65	
Boa Paz	2,018	49.14	
Boa Vista	750	23.03	
Fazenda Bom Jardim	8,573	2,580.00	
Campo Verde	2,468	427.05	1% of the concentrate net sales revenue
Canaã do Ouro	1,551	46.61	
Conjunto Paraiso	1,039	106.03	
Massaranduba	2,535	452.33	
Mirabela	2,834	529.23	1% of the concentrate net sales revenue
Santa Rita Dos Impossíveis	1,564	399.33	
Serra Azul	584	398.39	1% of the concentrate net sales revenue
São Bento	7,595	24.35	
São Roque	2,154	15.63	
	Total	**5,238.31**	





Identificação	FAZENDAS	MATRÍCULA	ÁREA (HA)
1	Serra Azul	584	398,39
2	Bela Flor	2872/2803/2827/ 2828/2873/2831/2091	135,54
3	Boa Esperança	380	51,65
4	Boa Paz	2018	49,14
5	Boa Vista	750	23,03
6	Campo verde	2468	427,05
7	Canaã do Ouro	1551	46,61
8	Conjunto Paraiso	1039	106,03
9	Massaranduba	2535	452,33
10	Mirabela	2834	529,23
11	Santa Rita dos Impossíveis	1564	399,33
12	São Bento	7595	24,35
13	São Roque	2154	15,63
14	Três Lagoas	-	2,22
15	Bela Vista	209	25,17
16	Fazenda Iracema	-	12,22
17	Fazenda Bury	-	3,16
18	Fazenda Bom Jardim	8573	2,580
-	-	TOTAL	2700,49

Source: Atlantic Nickel, 2022.

Note. Yellow outline shows the locations of the surface rights held by Atlantic Nickel in the immediate vicinity of Santa Rita.

Figure 4-3: Surface Rights

4.7 Water Rights

Atlantic Nickel holds permits from the Bahia State Environmental Agency (INEMA) to extract ground water for use in the processing plant and for human consumption. The rights are sufficient for the life-of-mine (LOM) processing plant and ancillary needs.

The extraction allowances are summarised in Table 4-3.

Table 4-3: Water Extraction Permits
ACG Acquisition Company Limited – Santa Rita Mine

Permit No.	Object	Key Conditions	Issuance Date	Expiry Date
24,957/2022	Authorizes water impound from Contas River for industrial purposes – 16,800 m³/day	Regularly monitor water quality	06-Jan-22	06-Jan-26
20,312/2020	Authorizes water impound from Contas River for human consumption purposes – 720 m³/day	Regularly monitor water quality	28-Mar-20	28-Mar-24
20,313/2020	Authorizes collection of underground water for industrial purposes – 1,540 m³/day	Regularly monitor water quality	28-Mar-20	28-Mar-24
26,534/2022	Authorizes effluent discharge at Contas River – 48 m³/day	Regularly monitor water quality	22-Jul-22	22-Jul-24
24,352/2021	Authorizes collection of underground water for mining purposes – 4,665 m³/day	Regularly monitor water quality	15-Oct-21	15-Oct-25

4.8 Royalties and Encumbrances

4.8.1 CFEM

All of the concessions are subject to the CFEM (see Section 4.2.5).

4.8.2 CBPM

Atlantic Nickel is required to pay a royalty to CBPM as provided for in the CBPM Lease Agreement. The royalty is calculated as follows:

- For sulphide nickel: 2.51% levy on:
  - 60% of the value attributed to contained nickel in the concentrate, based on the London Metals Exchange (LME) average monthly sales price for nickel;
  - 100% of the value attributed to the contained copper in the concentrate, based on the LME average monthly sales price for copper;
  - 100% of the value attributed to the contained cobalt, gold, platinum, and palladium in the concentrate, based on the Metal Bulletin average monthly price for such minerals.
- For lateritic nickel (secondary ore): progressive values set per tonne of extracted, transferred, or sold ore, being:
  - US$2.01/t when the nickel value at the LME is higher than US$9,000.00/t;
  - US$1.51/t when the nickel value at the LME is within the range of US$8,000.00/t to US$9,000.00/t;
  - US$1.01/t when the nickel value at the LME is lower than US$8,000.00/t.

For other economic recoverable substances contained in the lateritic ore, including cobalt, gold, and platinum group metals (PGM), US$0.31/t of extracted, transferred, or sold ore.

4.8.3 Surface Rights Holders

Some surface rights holders are owed royalties (refer to Table 4-2). Atlantic Nickel has to pay a royalty to the former owners of Fazenda Mirabela (record No. 2,834), Fazenda Santa Rita dos Impossiveis (record No. 1,564), Fazenda Serra Azul (record No. 584), and Fazenda Campo Verde (record No. 2468). The royalty is levied at a rate of 1% on the proceeds from the sales of any ores exploited within the geographical limits of the respective properties. The following deductions are permitted:

- Tax on distribution of goods and services (ICMS);
- Contribution for the Social Integration Program (PIS), Social Contribution on Revenues (COFINS);
- External transportation costs indicated in the bill of sale;
- Insurance costs indicated in the bill of sale.

Contractual royalties are currently being paid only to the former owners of Fazenda Mirabela and Fazenda Santa Rita dos Impossiveis, as there is no exploitation activities taking place in the lands encompassed by Fazenda Serra Azul and Fazenda Campo Verde.

4.8.4 Appian Natural Resources Fund II

A 2.75% net smelter return (NSR) royalty on quarterly nickel production is payable to Appian Natural Resources Fund II. The NSR royalty covers all payable metals produced from the mining licences and exploration licences held by Atlantic Nickel, including those leased from CBPM, as of July 2020, and is calculated based on the net revenue received after deductions for downstream smelting, refining, treatment, and transportation charges.

4.9 Permitting Considerations

Permitting considerations for operations are discussed in Section 20.

4.10 Environmental Considerations

Environmental and closure considerations for operations are discussed in Section 20.

There are no environmental liabilities associated with the exploration licences other than those associated with exploration drilling activities. Permits for clearing of vegetation are required where gridlines are opened in forested areas. Drilling operations require appropriate approvals for clearing of vegetation, and licences for pumping and utilisation of surface water. Atlantic Nickel retained the services of environmental consulting group Projetos de Geologia e Topografia (PROGET) for concession/permit environmental management.

4.11 Social Licence Considerations

Social licence considerations for operations are discussed in Section 20.

4.12 CP Comments on "Item 4: Property Description and Location"

The CP notes the following:

- Information provided by Atlantic Nickel and experts retained by Atlantic Nickel supports the interpretation that the mining concessions and exploration permits are valid. More detail is provided in "Legal Opinion - NI 43-101 Report, Belo Horizonte, March 7, 2023. Bichara Advogados".
- Atlantic Nickel holds sufficient surface and water rights to support the LOM plan.
- Royalties are payable to the Brazilian state, to CBPM, to former surface rights holders, and to the Appian Natural Resources Fund II.

The CP is not aware of any environmental or social liabilities on the property. To the extent known to the CP, there are no other significant factors and risks that may affect access, title, or the right or ability to perform work on the property that have not been discussed in this CPR.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

5.1 Accessibility

Santa Rita is located approximately seven kilometres south-southeast of Ipiaú, Brazil, which is approximately two kilometres from Brazilian highway BR330. A small airstrip is located at Ipiaú.

Ilhéus, a regional centre, is approximately 140 km southeast of Santa Rita. A regional airport with scheduled commercial service and a port are located at Ilhéus.

The Palestina deposit lies approximately 25 km to the south of Santa Rita, close to highway BR-030.

Access within the Santa Rita property area is by unsealed municipal roads and farm tracks.

5.2 Climate

The climate in the Itagibá region is humid tropical.

Annual rainfall varies between 800 mm and 1,800 mm and averages approximately 1,200 mm. There is no well-defined dry season; however, it is generally drier in May–September and wetter in October–April. The average monthly temperatures typically exceed 22°C.

Mining operations are conducted year-round. Exploration activities can be curtailed by rainfall events, but are generally also conducted year-round.

5.3 Local Resources and Infrastructure

The city of Ipiaú, which has a population of about 47,000, is the major source of commercial and industrial support services, and skilled and unskilled labour for Santa Rita.

Infrastructure that has been constructed to support mining activities is discussed in Section 18.

5.4 Physiography

The topography is characteristically flat to gently undulating terrain at approximately 150 MASL and is in the drainage basin of the Contas River. There are gently rounded hills that may reach 350 MASL to 400 MASL.

The Santa Rita area is characterised as being sub-tropical rainforest; however, a minimal amount of that forest remains due to deforestation for agricultural purposes.

6.0 HISTORY

6.1 Exploration and Development History

A summary of the exploration and development history is provided in Table 6-1.

In 1976, mafic–ultramafic intrusive complexes were identified by CBPM using aeromagnetic survey data. From 1976 to 2003, various companies conducted geological reconnaissance, geochemical surveys, and various types of geophysical surveys. That work identified the layered nature of the Fazenda Mirabela intrusion as well as some of the mineralisation. CBPM performed a limited drill program in 1988 and 1989 that confirmed the presence of primary sulphide mineralisation.

In 2003, the Fazenda Mirabela project was put up for sale by public tender (No. 005/2003), and Mirabela Brazil provided the winning bid. From 2004 to 2012, a number of drill campaigns were conducted, and a feasibility study was completed in 2008. Mining operations commenced in 2009 and continued until 2016, when the mine was placed on care-and-maintenance.

In 2018, Appian Capital acquired the project, with Atlantic Nickel as the in-country operating subsidiary. Atlantic Nickel conducted extensive drilling campaigns from 2018 to 2021, with the objectives of improving confidence in the mineral resource potentially amenable to open pit mining methods, and investigating underground potential. In October 2019, Atlantic Nickel re-started the concentrate plant and the first concentrate sales were in January 2020.

In 2021 and 2022, Atlantic North completed exploration drill holes both in areas within the Santa Rita area to convert to Mineral Resources and in nearby targets such as Palestina.

Table 6-1: Exploration and Development History
ACG Acquisition Company Limited – Santa Rita Mine

Year	Operator	Comment
1976	CBPM	Identified mafic–ultramafic intrusive complexes in the Itaberaba–Belmonte area using regional aeromagnetic surveys.
1979–1981	Mineração Nhambú Limitada (MBL)	Joint venture between BP Minerals and RTZ. Stream sediment sampling, soil sampling and regional geological mapping; program details unknown. Identified a nickel-copper-cobalt anomaly at Fazenda Mirabela. Concluded the anomaly was not related to significant primary mineralisation and relinquished mineral tenure in 1981.
1985–1989	Caraíba Metais SA (Caraíba Metais)	Acquired tenements in the Fazenda Mirabela area. Completed geological reconnaissance, geochemical surveys, geophysical surveys and drilling. Focused on ultramafic components of intrusive complexes, identified a 40 m thick layer of disseminated sulphides hosted by the ultramafic zone. Also identified a 30 m to 40 m laterite zone overlying the primary sulphide mineralisation. Relinquished mineral tenure in 1989.

Year	Operator	Comment
1989–2003	CBPM	Conducted geological mapping, geochemical analysis and petrographic investigations, geophysical ground surveys including magnetics, induced polarisation (IP), and very low frequency electromagnetic(VLF-EM) surveys, magnetic susceptibility measurements, airborne magnetic and time-domain electromagnetic surveys. Identified the Fazenda Mirabela intrusion as a differentiated mafic–ultramafic body comprising a western ultramafic sequence that was succeeded by an eastern mafic sequence. The eastern mafic sequence included a nickel sulphide zone. Completed a drill program, which confirmed the presence of primary sulphide mineralisation as well as secondary lateritic mineralisation. CBPM offered the area to private enterprise via public tender.
2006	INCO	As part of an exploration agreement between INCO and MNL, INCO assessed the area for massive nickel sulphides during 2006. The samples were nominally collected on a 200 m x 25 m east–west grid. The dataset contains a total of 1,329 samples assayed by ALS Chemex in Vancouver, Canada, for Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, K, La, Mg, Mn, Mo, Na, Ni, P, Pb, S, Sb, Sc, Sr, Th, Ti, Tl, U, V, W, and Zn by inductively coupled plasma atomic emission spectroscopy (ICP-AES) following a four-acid digest.
2004–2008	Mirabela Brazil	Won tender. Drilled 650 core holes (178,681 m) at Santa Rita.
2009		Beneficiation plant commences operations.
2011–2012		Drilled 15 core holes (10,145 m) to intersect mineralisation at depth that could represent an underground mining option.
2016		Mining operations placed on care and maintenance due to market conditions.
2018–2021	Atlantic Nickel	Completed 469 core and reverse circulation (RC) drill holes (125,913 m) testing both the open pit and underground targets. Completed a feasibility study into operations re-start.
2019–2020		Restarted the concentrate plant in October 2019, and reached steady state operation in January 2020.

6.2 Past Production

There is no known commercial production from the Santa Rita area prior to 2009.

The first phase of open pit mining was from 2009 to 2016, with actual mill production from 2012 to 2016. Production during that period is discussed in Section 13.3 in relation to plant performance.

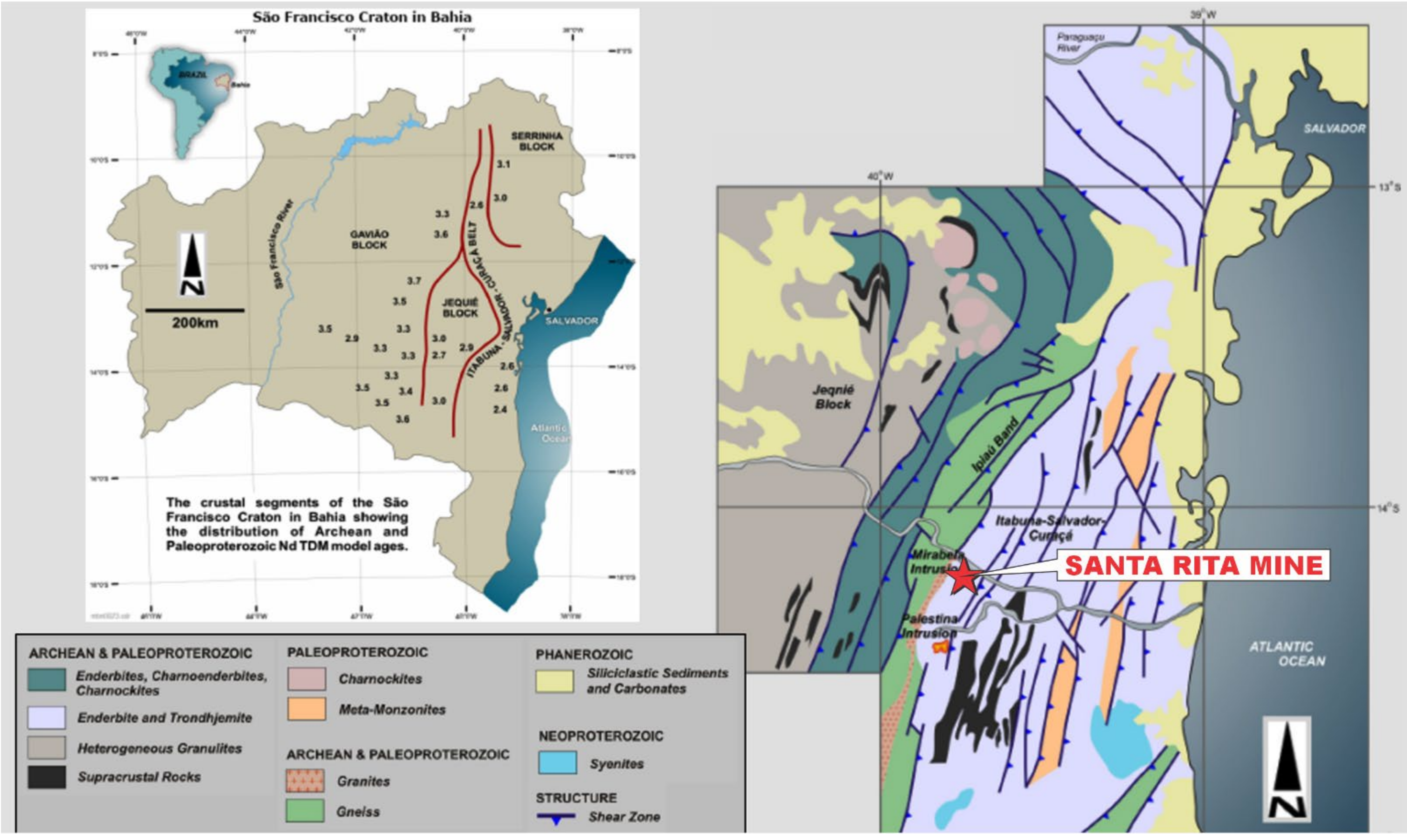
Processing plant production history is provided in Section 13.3, accompanying a review of the plant performance since the plant was re-started.

7.0 GEOLOGICAL SETTING AND MINERALISATION

7.1 Regional Geology

The Fazenda Mirabela intrusion, which hosts the mineralisation at Santa Rita, is located within the Archean-Paleoproterozoic Itabuna–Salvador–Curaça orogenic (ISC) belt that extends from southeast Bahia state to Salvador, and north into northeast Bahia. The ISC belt separates the Archean Gavião and Jequié cratonic blocks from the Serrinha block, all of which are part of the São Francisco Craton (SFC) (Barbosa and Sabaté, 2004; Figure 7-1).

The ISC belt is the youngest segment exposed in this part of the SFC and was formed during Transamazonian orogeny (2.15 to 2.05 Ga). It consists of a low-potassium calc-alkaline plutonic suite of rocks that includes intercalated metasedimentary rocks, gabbro, and basalt. Regional metamorphism was the result of collisional tectonics and crustal thickening during the Transamazonian orogeny. Metamorphism reaches granulite facies in the southern part of the belt (Barbosa and Sabaté, 2004).



Source: RPA, 2015.

Figure 7-1: Regional Geology

7.2 Property Geology

The Fazenda Mirabela layered mafic–ultramafic intrusion intruded granulite of the ISC. The lower zone of the intrusion consists of olivine-rich cumulates, primarily dunite to harzburgite, and is capped by pyroxenite (Figure 7-2). The upper intrusive lithologies are primarily gabbroic cumulates, consisting of gabbronorites to norites. Nickel sulphide mineralisation is associated with the upper ultramafic rocks (dominantly harzburgite and orthopyroxenite). More rarely, dunite can host mineralisation.

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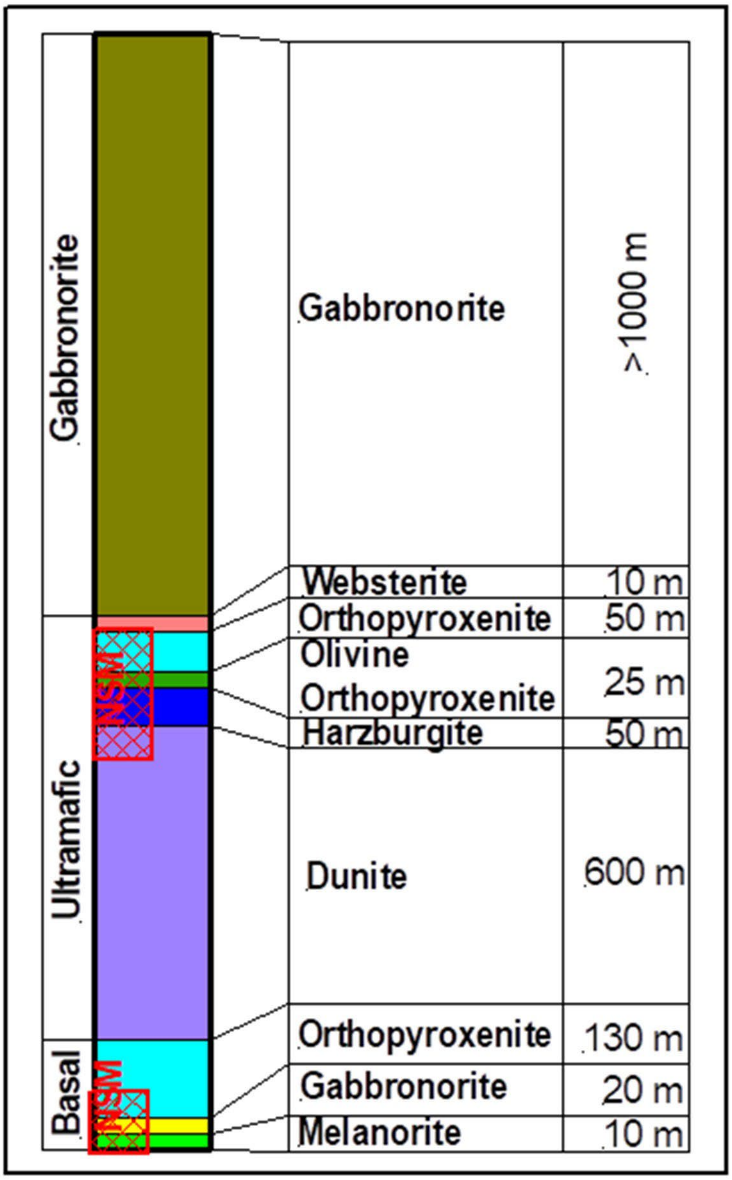
The intrusion is oval-shaped in plan view, with outcrop dimensions of approximately 4.0 km x 2.5 km and original stratigraphic thickness of least three kilometres. In cross section, the intrusion extends to a vertical depth of at least 1,400 m. A geology plan and geological cross-section are shown in Figure 7-3. The Fazenda Mirabela intrusion appears to have differentiated into a lower ultramafic zone and an upper mafic zone, with distinct internal stratigraphy in each zone.

The stratigraphy is described from the uppermost unit to the lowermost in Table 7-1, and shown in Figure 7-2. Two types of dikes intrude these units.

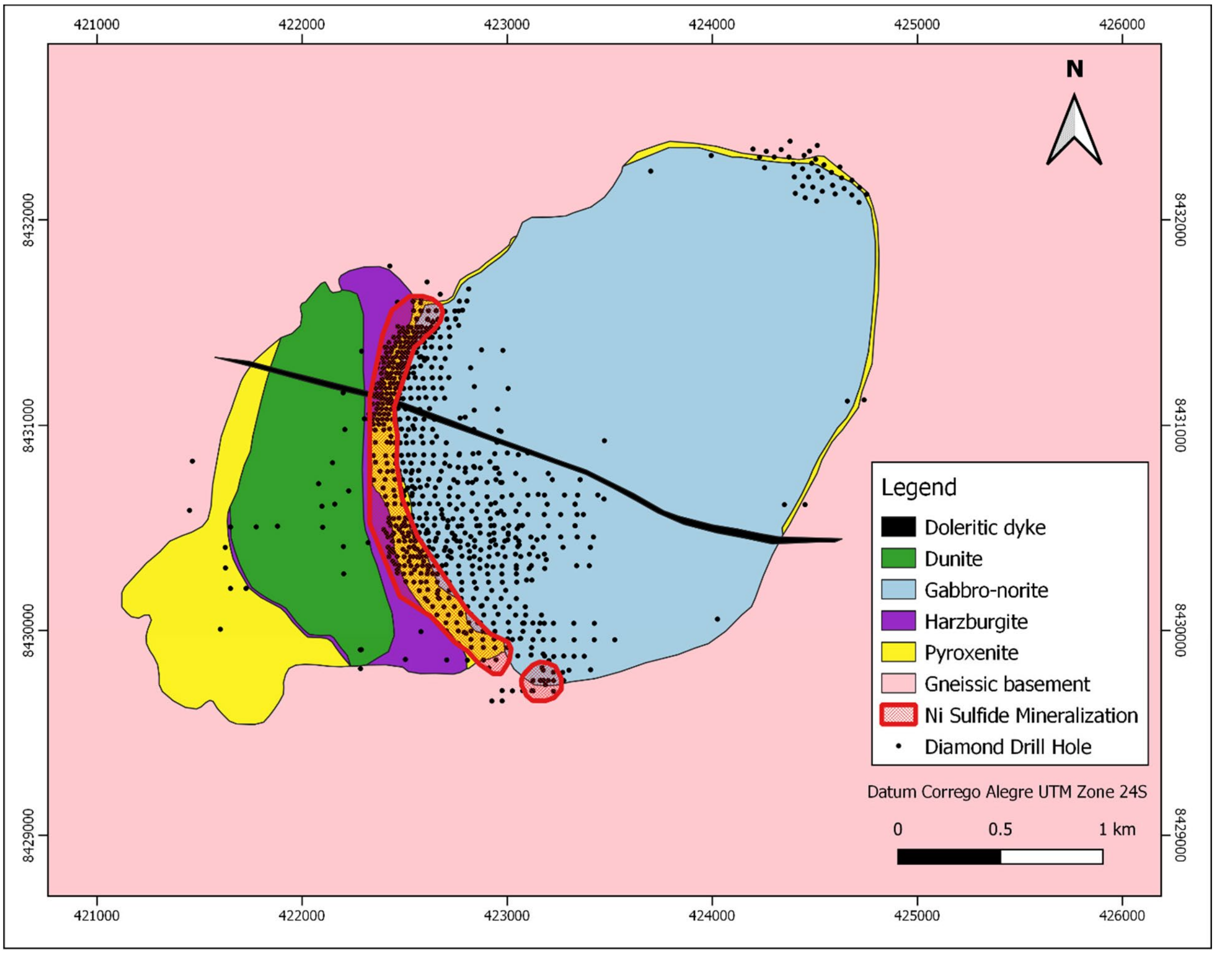
A significant laterite profile developed over the dunite–harzburgite core of the ultramafic unit but is absent or poorly developed over other lithologies. The laterite profile is typically 25 m thick but reaches 60 m in places and comprises saprolite at the base of oxidation to limonite near the surface.



Source: modified by MTS from Barnes et al., 2011.

Note. NSM = nickel sulphide mineralisation. Top NSM occurrence is the Santa Rita deposit, lower NSM is the location of the Peri-Peri prospect within the Fazenda Mirabela intrusion.

Figure 7-2: Stratigraphic Column, Fazenda Mirabela Layered Intrusion



Source: Atlantic Nickel, 2021

Figure 7-3: Project Geology Plan

Table 7-1: Mafic/Ultramafic Units
ACG Acquisition Company Limited – Santa Rita Mine

Lithology	Description
Dolerite dikes	At least two sets of dolerite dikes cross-cut the Fazenda Mirabela intrusion in an east–west orientation. A series of undeformed and un-metamorphosed dolerite dikes occur at approximately 8,431,100 mN, where they separate the nickel mineralisation into the northern and central sectors. They are approximately 10 m to 15 m thick, and dip steeply to the south. Nickel mineralisation generally shows an increase in grade adjacent to these dikes. Farther south, at approximately 8,430,300 mN, a second series of suspected dolerite dikes occur. These dikes are strongly metamorphosed.
Pegmatite dikes	Common, especially within the peridotite unit of the ultramafic zone, where they appear to have intruded sub-parallel to the unit itself. These are sometimes composed of large euhedral crystals of plagioclase up to 3 cm long in a matrix of fine-grained polygonal plagioclase (oligoclase, total for both types is 66%), oriented phlogopite (30%) and chlorite (Fróes, 1993). Relatively large crystals (up to 0.5 mm) of euhedral zircon (1%) and apatite (trace) and masses of monazite (0.5%) also occur in the mica matrix. Veinlets and impregnations of chalcopyrite and pyrite are dispersed throughout the mica.

Lithology	Description
Gabbronorite	Consists of mixed orthopyroxene, clinopyroxene, and plagioclase cumulate. Mineralogically, they vary between augite norite, hypersthene gabbro and their leucocratic variants (Purvis 2006d). They possess a coarse, locally pegmatitic, intergranular gabbroic or mosaic texture, sometimes modified by brittle fracturing, and are composed of 40% to 73% plagioclase with a grain size of 1.5 mm to 4.0 mm, 19% to 23% orthopyroxene (bronzite to hypersthene, grain size 2.0 mm to 3.0 mm), and 3% to 24% clinopyroxene (diopside/augite, average grainsize of 0.5 mm). Accessory minerals include hornblende (0% to 10%), traces of biotite and titanomagnetite, rare pyrite, and apatite. Local concentrations of plagioclase (as much as 90%) and minor quartz confer an anorthositic composition to the rock, but these concentrations have no defined stratigraphic horizon.
Websterite	Mixed orthopyroxene and clinopyroxene cumulate with variable concentrations of intercumulate plagioclase. This may not comprise a continuous mappable unit.
Orthopyroxenite	Nearly pure orthopyroxenite cumulate with minor chromite and some clinopyroxene. The composition of the orthopyroxenite is 88% orthopyroxene (bronzite), 2% to 13% clinopyroxene, 0.5% to 2% plagioclase, 2% sulphide, 1% olivine, and 1% hornblende. Orthopyroxene may vary between enstatite, bronzite and hypersthene, displaying both granular and tabular forms ranging from 1.5 mm to 3.0 mm, and up to 10 mm in heterogeneous rocks. Clinopyroxene (diopside/augite) is the principal post-cumulate mineral, with a grain size varying from 2.0 mm to 3.0 mm. It occurs in the interstices and also as large optically continuous oikocrysts enclosing orthopyroxene. Plagioclase is also a post-cumulus phase, occurring in larger concentrations in plagioclase-bearing pyroxenites.
Olivine orthopyroxenite	Olivine with minor chromite cumulate with intercumulate orthopyroxene. Olivine orthopyroxenite is 66% orthopyroxene (bronzite/enstatite), 24% olivine/serpentine, 3% clinopyroxene (diopside/augite), 2% hornblende, 2% sulphide, and 1% chrome spinel. Orthopyroxene is euhedral, commonly showing exsolution lamellae of clinopyroxene, and varies from 0.4 mm to 4.5 mm in grain size. Olivine occurs as subhedral crystals measuring 0.3 mm to 0.6 mm long, and cumulate crystals of olivine are often found within large plates of post- cumulus clinopyroxene. Clinopyroxene is a post-cumulus phase with grainsize varying from 2.0 mm to 3.0 mm. It occupies grain interstices and also occurs as large plates poikilitically enclosing olivine, orthopyroxene, and chrome spinel.
Harzburgite	Dominantly cumulate olivine and chromite with intercumulate orthopyroxene. Massive and granular, with olivine (68%) and orthopyroxene (23%) crystals mostly <5.0 mm in size, and olivine to orthopyroxene ratios of about 2. Two types of harzburgite are present; olivine mesocumulates with orthopyroxene entirely, or largely, as oikocrysts, and partly layered harzburgites with bands and lamellae rich in olivine, and alternate bands rich in granular or prismatic cumulus orthopyroxene. Some olivine bands have orthopyroxene as oikocrysts, but clinopyroxene (3%), hornblende (1%) and plagioclase (trace) occur as oikocrysts in other layers, with olivine or orthopyroxene as cumulus grains. Harzburgite includes minor, mostly granular chromite (1%), and accessory disseminated fine granular sulphide (1.5%).
Dunite	Dunite is cumulate material with >90% olivine and minor chromite and orthopyroxene. Massive/granular olivine with inequigranular olivine varying from 0.8 mm to 7.0 mm in crystal size, averaging 3.0 mm, as the principal cumulus mineral (94%). Localised areas of finer recrystallised olivine (<0.4 mm in grain size) also occur. Minor orthopyroxene (bronzite; 3%) is mostly interstitial as large optically continuous oikocrysts, some of which are >10 mm in diameter. Trace hornblende or biotite is fine grained and granular, and may be metamorphic. Granular chromite (1%) occurs as

Lithology	Description
	rounded grains up to 2.0 mm in diameter, generally rimming the olivine, but lacks Fe^{3+}-rich chromite or chrome-magnetite rims.
Basal units	These are melanorite at the base, gabbronorite in the middle, and orthopyroxenite at the top, immediately beneath the thick dunite unit. Total thickness of the basal unit is 150 m to 160 m. These rocks are not well known because they appear to be barren of nickel or copper sulphide minerals and were rarely drilled.

7.3 Deposit Descriptions

7.3.1 Santa Rita

7.3.1.1 Lithologies

The Santa Rita deposit is characterised by the lateral continuity of the mineralisation (approximately 2.0 km along strike and 1.3 km down dip), the significant thickness of up to 200 m of 2–5 vol% disseminated sulphides, the high nickel tenor in the bulk sulphide (16–18 wt%), and variable Ni/Cu ratios (average 3–4).

The lithological descriptions of the host intrusion are summarised in Table 7-1.

7.3.1.2 Structures

Three deformation phases are currently recognised in the Santa Rita open pit area:

- The oldest phase forms thrust duplexes on the scale of tens to hundreds of metres in the open pit. The deformation strain is oriented northeast–southwest and forms west–northwest to east–southeast trending structures that converge to the southwest.
- The second deformation comprises a suite of quartz–feldspar pegmatite dikes developed in basement lithologies.
- Folds with a north–south axis form the third phase of deformation.

A dolerite (diabase) dike was observed in the Santa Rita open pit cross-cutting the Santa Rita intrusion at a 120° azimuth. The dike is approximately 20 m thick and follows previously existing fracture planes that were reactivated during dike intrusion.

Detailed geological mapping of the available faces and individual blast hole cuttings was performed since the beginning of mining activities. This mapping revealed the presence of a number of post-mineralisation faults with offsets ranging from metre-scale to over 100 m. Fault offsets are consistent with down-to-the-east displacement. Many of these post-mineralisation faults strike north to northeast and dip steeply west at 45° to 60°, and locally can be steeper. Other fault orientations are recognised but those are less frequent. These faults strike northeasterly with shallow westerly dips and westerly with sub-vertical dips. All faults observed to date appear to pre-date the dolerite (diabase) dikes.

7.3.1.3 Alteration

Serpentinisation is pervasive but generally weak to approximately 400 m below surface and all olivine-bearing rocks are affected. There are local areas where serpentinisation is intense, and those areas are flagged during exploration and mining so that they can receive special handling during mining and processing. Below 400 m, olivine is mostly fresh.

Geological mapping in the open pit revealed the presence of a number of larger areas of intense serpentinisation. This alteration appears to be fracture or structurally controlled as the individual zones are observed to cross-cut the general stratigraphic sequence. Alteration zones comprise a central core of either quartz veining/silicification or narrow pegmatite dikes that can be as much as 10 m wide. Wall rocks to these zones are intensely serpentinised host rocks, which results in a pronounced reduction in the alteration mineral grain size. These serpentinised zones are restricted mostly to the dunite or harzburgite layers and do not appear to occur as frequently in the olivine pyroxenite or pyroxenite units.

Serpentinised zones are commonly devoid of sulphide minerals.

7.3.1.4 Mineralisation

Nickel and copper sulphides form stratiform bodies that are generally parallel to the lithostratigraphic contacts. The mineralised layers gently transgress upwards in places from the harzburgite unit through the olivine orthopyroxenite unit and into the websterite unit. Sulphide mineralisation was identified in dunite horizons during the 2018–2019 drill programs.

There are two styles of sulphide mineralisation:

- Disseminated sulphides, 2% to 5% sulphide by volume, hosting the mineralisation that supports the Mineral Resource estimate;
- Vein-like semi-massive sulphides that have no economic interest.

On average, sulphide mineralisation comprises 52% pentlandite, 7% violarite ($(Ni,Fe)_3S_4$), 18% chalcopyrite, 14% pyrite, and 9% pyrrhotite as granular intercumulus aggregates. Minor sulphide phases identified in thin sections include mackinawite ((Fe,Ni)9S8), millerite (NiS), poorly defined low-temperature iron sulphides, cubanite, bornite and chalcocite, along with traces of native copper. Individual sulphide aggregates are commonly not more than 0.5 mm to 1.0 mm in size; however, larger cumulates up to 30 mm are observed locally. Finer and more widely disseminated sulphide grains include abundant chalcopyrite.

Four lithologies host mineralisation (Table 7-2). The sulphide composition is much the same for each lithology, but the lithologies have very different recovery and metallurgical characteristics. Traces of PGMs also occur, but these elements appear to be included within the structure of the principal sulphides.

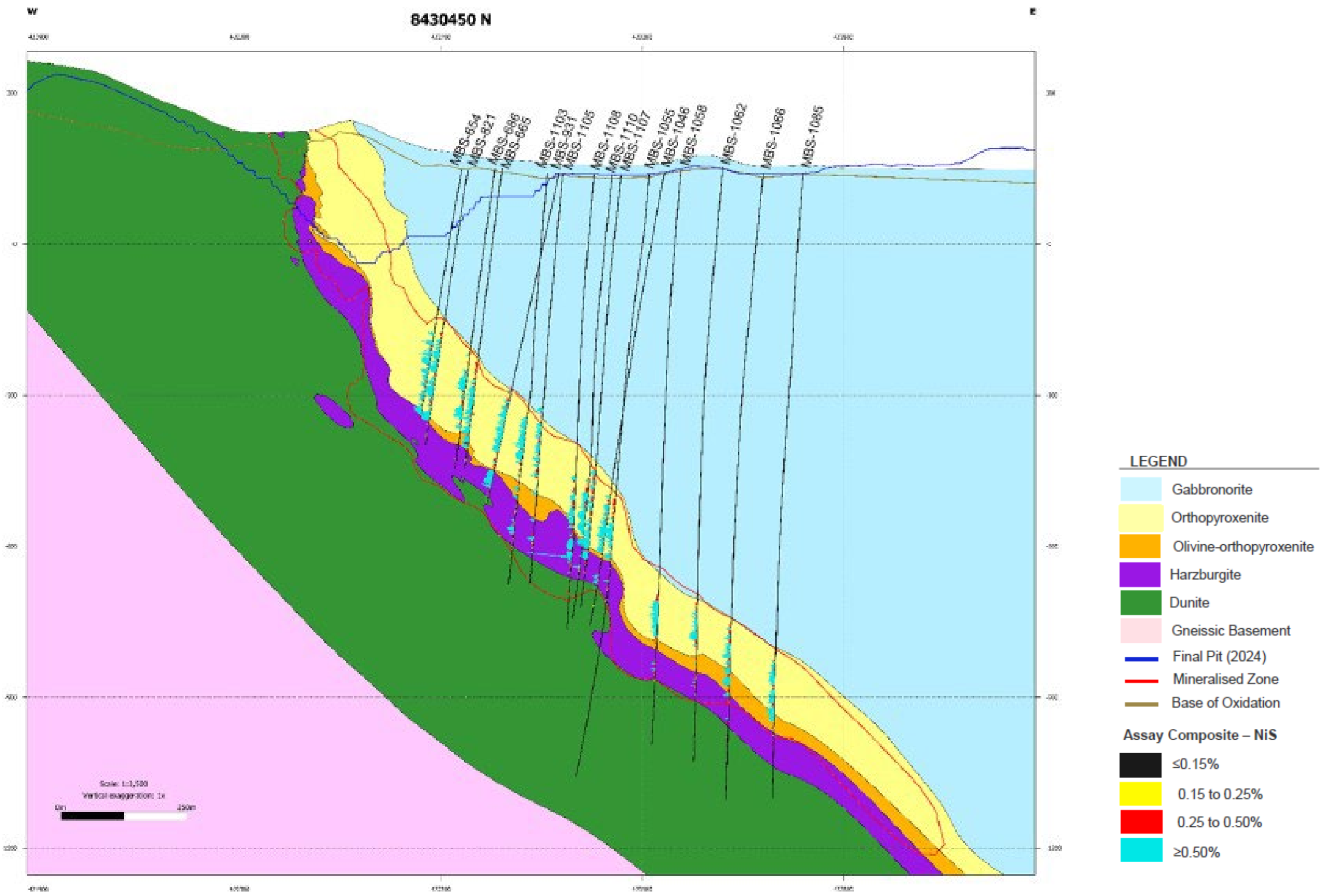
Figure 7-4 is an example cross-section through the Santa Rita deposit showing the mineralisation; Figure 7-5 is an inset showing the drilling in Figure 7-4 in more detail.

Table 7-2: Summary of Lithological Characteristics of Mineralisation
ACG Acquisition Company Limited – Santa Rita Mine

Lithology	Olivine Content (%; Fo_{85})	Ni in Silicate (approximate %)	Anticipated Maximum Nickel Recovery (%)	Comments and Characteristics
Orthopyroxenite	<10	0.08	75-80	• Majority of Mineral Resource • Very hard. Forms sharp rocks • Little effect from serpentinisation • Least susceptible to weathering • Low MgO

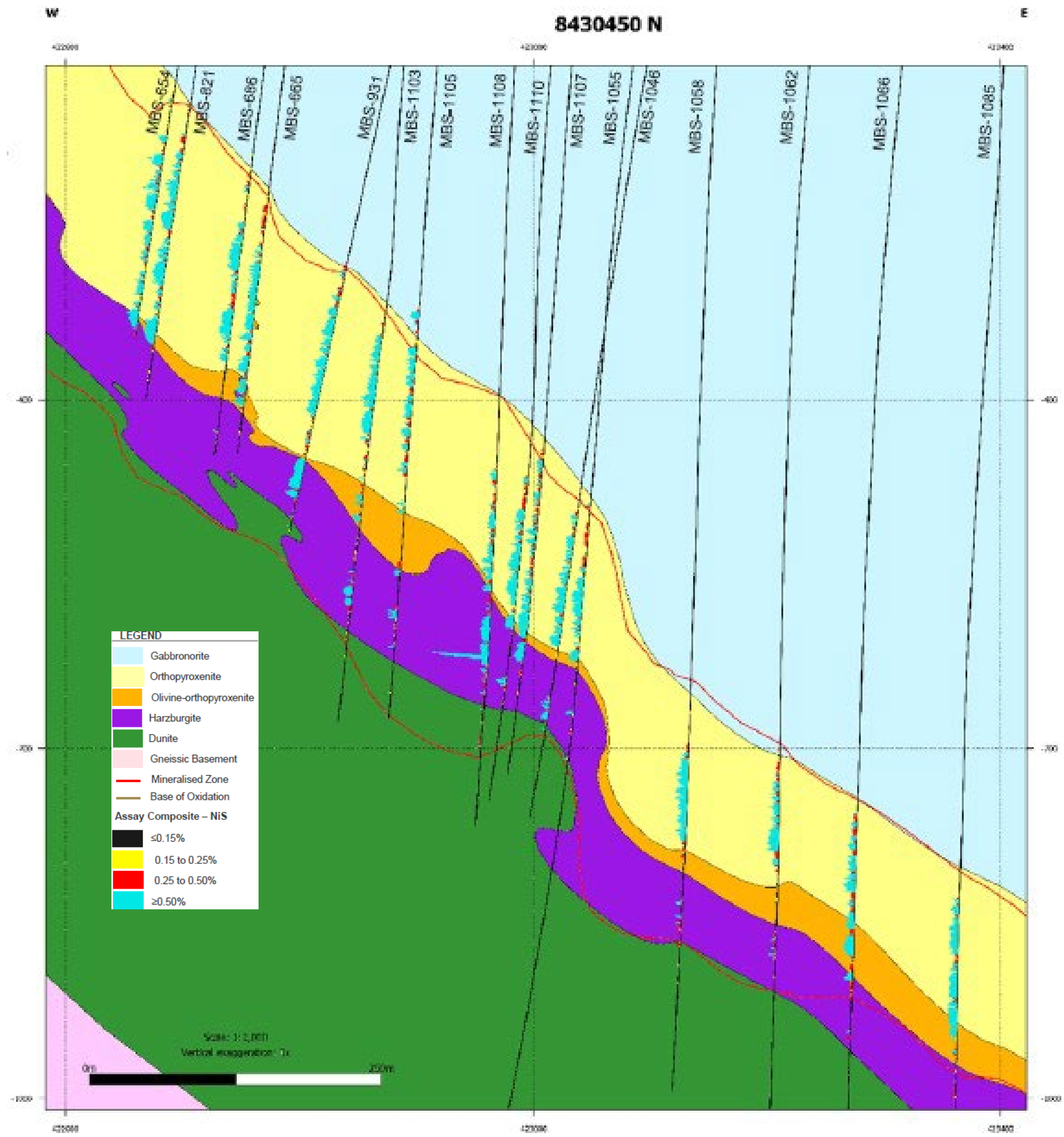
Lithology	Olivine Content (%; Fo_{85})	Ni in Silicate (approximate %)	Anticipated Maximum Nickel Recovery (%)	Comments and Characteristics
Olivine orthopyroxenite	10-40	0.13	70-75	• High specific gravity • Excellent recovery • As much as 40% olivine so serpentine may be significant • Hard and difficult to fracture • Generally has good recovery
Harzburgite	40-90	0.18	50-60	• Generally strongly serpentinised in upper 400 m • More deeply weathered and softer than orthopyroxenite • Moderate recovery • Very susceptible to chlorite alteration
Dunite	>90	0.25	40-50	• Small portion of overall Mineral Resources • Almost entirely olivine/serpentine • Very susceptible to weathering • Very susceptible to chlorite alteration • Potentially talc-bearing • Very high MgO • Poor recovery

Note: Fo_{85} is the olivine composition, i.e., 85% forsterite and 15% fayalite



Source: Atlantic Nickel, 2021.

Figure 7-4: Santa Rita Section 8430450N (Looking North)



Source: Atlantic Nickel, 2021.

Figure 7-5: Inset of Santa Rita Section 8430450N (Looking North)

7.3.2 Palestina

The Fazenda Palestina mafic–ultramafic intrusion is located 25 km to the south-southwest of Santa Rita and 12 km east of the town of Dário Meira, adjacent to highway BR-030 (Figure 7-6).

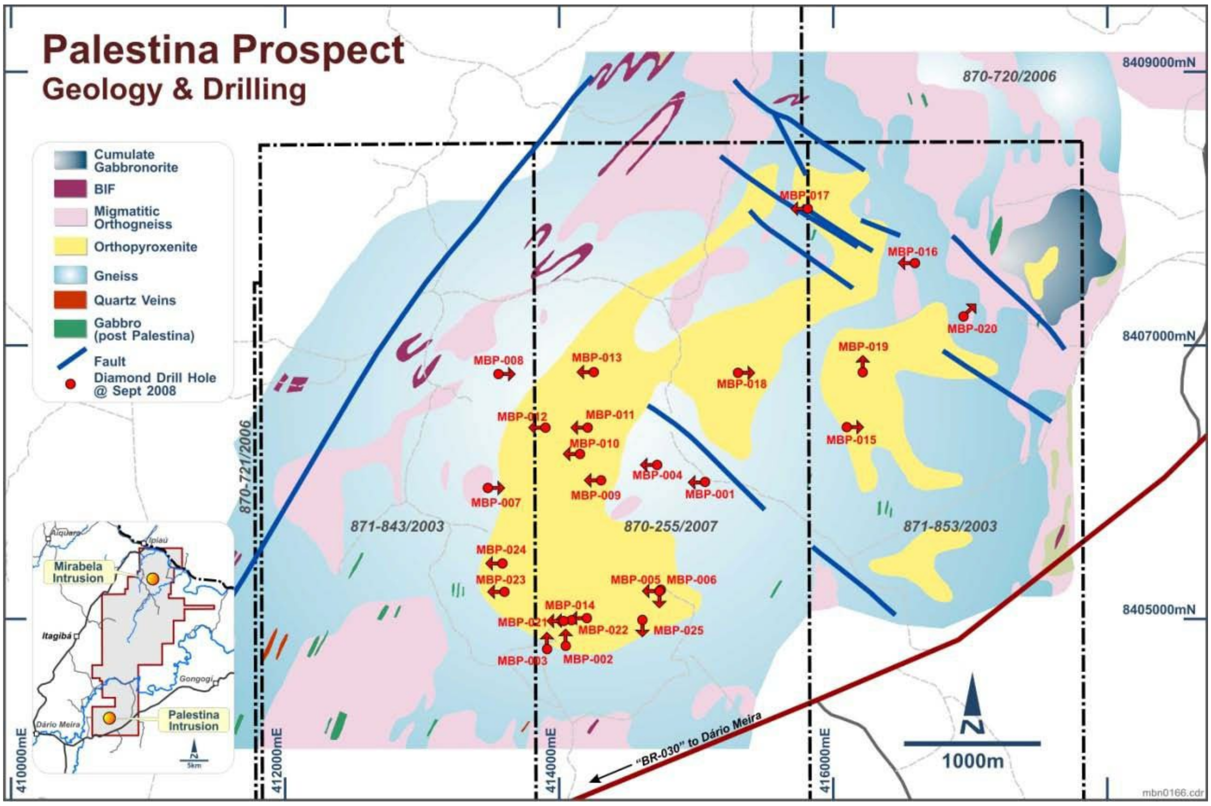
The intrusion cluster measures approximately 5 km east-west by 3 km north-south and, similar to the Fazenda Mirabela intrusion, has intruded granulite facies country rocks comprising migmatitic enderbitic gneisses, metanorites, metamorphosed oxide-silicate facies banded iron formation, marbles, and calc-silicates.

The two dominant lithologies within the intrusion are orthopyroxenites with lesser gabbronorites, the latter forming a border zone around the former in the east. The gabbronorites are composed of cumulate plagioclase, augite and bronzite, and are locally leucocratic, while the pyroxenites include adcumulate bronzitite, plagioclase bronzitite, and lesser websterite.

The orthopyroxenites show medium to fine grained, rhythmic banding, but may also be pegmatitic, with bronzite crystals noted up to 10 cm long (Soares, 2000). The pyroxenites occupy 92% of area of the intrusion, while the gabbronorites occupy the remaining 8%. Olivine-bearing lithologies have been identified only locally in drilling.

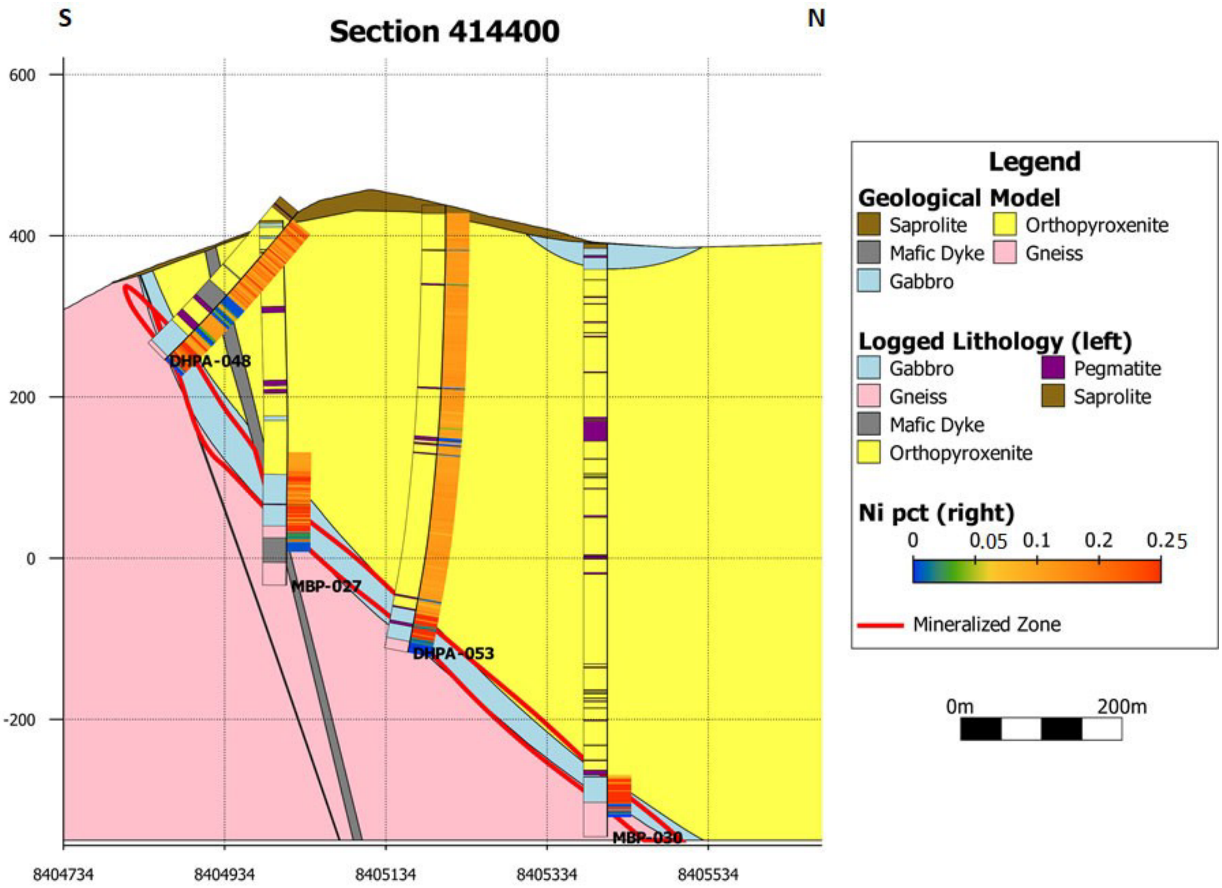
The deposit itself is approximately 1,350 m long, 50 m wide, and extends to a depth of at least 350 m. Intervals containing up to 5% sulphide occur at Palestina. Pyrrhotite, pyrite, pentlandite, chalcopyrite, and arsenopyrite are the dominant sulphide minerals. PGM tenors are elevated relative to Santa Rita, but the mineralogy of the PGMs is not currently known.

A section through the deposit is included as Figure 7-7.



Source: Gossage et al. (2009).

Figure 7-6: Palestina Geology Map



Source: Atlantic Nickel, 2021.

Figure 7-7: Palestina Section 414400E

8.0 DEPOSIT TYPES

Mineralisation within the Fazenda Mirabela is interpreted as magmatic, stratiform, structurally modified mineralisation that contains a series of disseminated to net-textured accumulations of sulphide minerals.

The magmatic model described below is summarised from Eckstrand and Hulbert (2007).

Nickel-copper sulphide deposits, where nickel is the main economic contributor, are associated with concentrations of sulphide minerals. Host bodies are classified based on the nature of the confining magmatic environment:

- Meteorite-impact
- Rift and continental flood basalts
- Komatiites
- Other related mafic/ultramafic bodies

PGM deposits are also confined to mafic-ultramafic bodies but are associated with low quantities of sulphide minerals. Reef-type or stratiform PGM deposits form in large, well-layered mafic/ultramafic intrusions, whereas magmatic breccia-type deposits occur in stock-like or layered bodies.

Magmatic nickel-copper sulphide mineralisation forms in magmas originating in the upper mantle. As the magmas rise through the crust and begin to cool, immiscible sulphide droplets form. The sulphur originates from the magma itself and/or from the wall rocks. The sulphide droplets attract metals such as nickel, copper, iron, and PGMs. These metal-rich sulphur droplets have a high density and, therefore, settle by means of gravity towards the bottom of the magma chamber. As the melt cools, the sulphide liquid crystallizes to form a concentration of pyrrhotite, pentlandite, and chalcopyrite near the bottom of the chamber.

Mineralisation is commonly concentrated in structurally low areas at the base of the intrusion or in other zones where xenoliths interrupt the settling process. The mineralisation is commonly layered in cumulate sequences ranging from massive mineralisation at the bottom to net-textured, to disseminated, and to unmineralised mafic or ultramafic rocks in the upper layer.

The ages of these deposits are commonly Archean and lower Proterozoic. Nickel and copper are the main economic commodities and generally grade between 0.7% Ni and 3.0% Ni and 0.2% Cu and 2.0% Cu. Tonnages range from hundreds of thousands to tens of millions of tonnes.

9.0 EXPLORATION

9.1 Grids and Surveys

All surveying at Santa Rita is in UTM 24S, Córrego Alegre Datum coordinates. The surface topography of the immediate region of the Santa Rita deposit was surveyed in two stages. In August 2004, an area containing the Santa Rita ridge and the adjacent Mirabela hill (i.e., from 8,429,950 mN to 8,431,900 mN and 421,500 mE to 422,900 mN; UTM 24S, Córrego Alegre Datum) was surveyed by Topografia e Mineração Ltda. (TopMin) on a 100 m (north–south) by 50 m (east–west) grid. In June 2005, TopMin increased the grid spacing to 20 m (north–south) by 10 m (east–west) in the northern part of the Santa Rita ridge (i.e., from 8,430,600 mN to 8,431,700 mN and 422,200 mE to 422,500 mN; UTM 24S, Córrego Alegre Datum).

In December 2007 and January 2008, Construtora Barbosa Mello (CBM) completed a detailed survey over the entire Santa Rita area, and produced topographic contours at one metre intervals. The survey was completed using a planar grid coordinate system and was intended specifically for the Santa Rita design and construction phases. Mirabela Brazil converted these data into UTM 24S, Córrego Alegre Datum (Gossage et al., 2009).

The Mineral Resource estimate amenable to open pit mining used the December 2022 month-end topographic surface to deplete the block model.

For the Palestina target, all topographic and serial imagery was obtained in April 2020 by GlobalGeo Geotecnologias. The topographic map was surveyed with a total area of 100 km² and 2.0 m accuracy by Advanced Elevation Series and processed to the Digital Terrain Model (DTM). All the database files and data are in South America Datum 1969 (SAD-1969).

9.2 Geological Mapping

Between 1979 and 1981, MNL reportedly produced a regional geological map (1:100,000 scale) with follow-up detailed mapping (Gossage et al., 2007). The mapping scale was not included in the Gossage et al. (2007) text.

Caraíba Metais acquired tenements in the Fazenda Mirabela region to explore for copper, nickel, and PGMs in 1985. Caraíba Metais produced a geological map (1:5,000 scale) covering the ultramafic portion of Fazenda Mirabela intrusion because landowners denied permission to work on the entire intrusion. This work identified the mafic and ultramafic rocks that comprise the intrusion.

CBPM pegged the Mirabela and Palestina tenements in July 1989 to follow up on the Caraíba Metais work. CBPM continued 1:5,000 scale geological mapping and defined the Fazenda Mirabela intrusion as a differentiated (layered) mafic-ultramafic intrusion.

9.3 Geochemical Sampling

9.3.1 Stream Sediment Sampling

A stream sediment sampling campaign was completed by MNL between 1979 and 1981 at a sample density of one sample per 4 km^2. The survey covered all of Mirabela Brazil's tenements extending from the Fazenda Mirabela intrusion in the north to the Fazenda Palestina intrusion in the south.

Samples were tested using ethylenediaminetetraacetic acid (EDTA; a selective leach method). The results showed that the only coherent nickel-copper-gold anomaly was over the Santa Rita mineralisation within the Fazenda Mirabela intrusion. The stream sediment sampling results over the

Fazenda Palestina intrusion yielded an erratic, incoherent nickel-cobalt-gold-magnesium-arsenic anomaly covering a large area, but without accompanying elevated copper values.

Later in 2011, a total of 135 stream sediment samples were collected in the Palestina target by Cesar and Mirabela Brazil geology team. The data covers a total area of 24 km² in the eastern region of the Fazenda Palestina intrusion. Sampling was carried out by Mirabela Brazil and CBPM and covered all the Palestina areas.

9.3.2 Soil Sampling

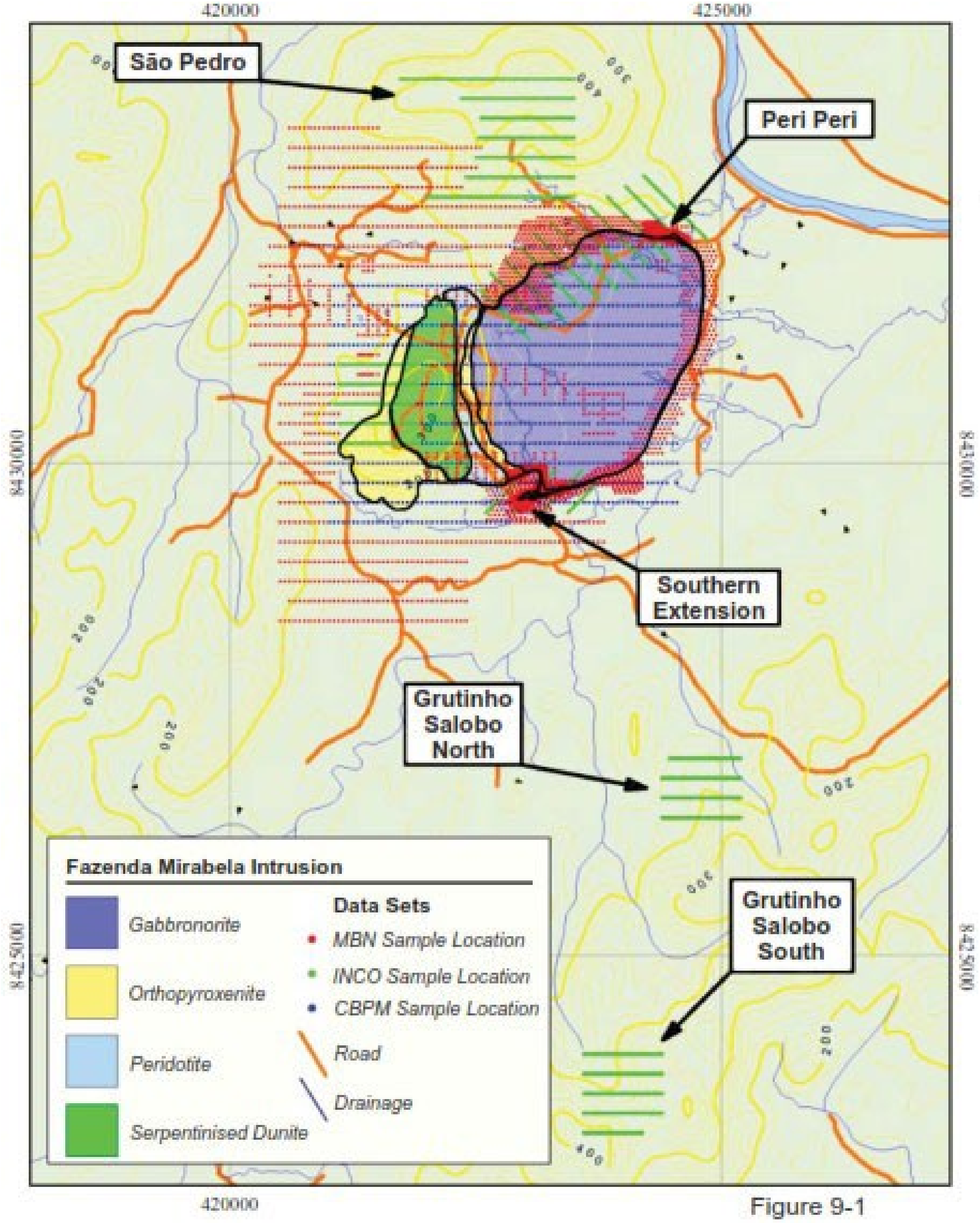
Multiple phases of surface geochemistry were completed by various operators (Table 9-1). Figure 9-1 shows the locations of soil sampling programs since 1989 (Inwood et al., 2011).

Soil sampling in the Peri-Peri area detected an anomalous nickel-copper-chromium-iron soil geochemical response that was subsequently drill tested.

A regional-scale soil survey that covered the Palestina deposit indicated that the pyroxenite units are anomalous in nickel, copper, and PGMs. A detailed geochemical soil sampling program was completed in the vicinity of the sulphide mineralisation in an attempt to delineate its surface expression and later extended to cover virtually the entire intrusion. More than 1,500 samples were collected over an area of approximately 6.4 km². The program clearly defined the extents of the Fazenda Palestina intrusion and refined the dimensions and location of anomalous areas previously delineated by CBPM's survey.

Table 9-1: Soil Sample Campaigns
ACG Acquisition Company Limited – Santa Rita Mine

Operator	Years	Description
Caraíba Metais	1985–1989	480 shallow soil samples from the B horizon on a 100 m x 40 m grid
CBPM	1989–2003	1,087 soil samples from the B and C horizons on a 200 m x 50 m grid
Mirabela Brazil	2004	2,512 samples as an extension to the CBPM program on a 40 m x 40 m grid and on a 20 m x 20 m grid at Peri-Peri and the Southern Extension
INCO	2006	1,329 soil samples on a 200 m by 25 m grid



Source: Inwood et al. (2011).

Figure 9-1: Soil Sample Location Map, Santa Rita

9.4 Geophysics

Caraíba Metais completed gravity, ground magnetic, and IP (dipole-dipole array with 40 m dipole separation), over the ultramafic rocks in the central part of the prospective area during 1985 to 1989.

The magnetic survey delineated the contact between the ultramafic and mafic succession. The gravity survey did not define any significant anomalies and the IP survey, although hindered by the laterite cap, identified a trend of anomalies in the vicinity of the ultramafic-mafic succession contact.

CBPM (1989–2002) conducted ground geophysics (magnetics and VFL-EM) along five lines, and density and magnetic susceptibility measurements were compiled for the five diamond drill holes completed by Caraíba Metais. These data permitted CBPM to subdivide the area into five magnetic domains. The electromagnetic (EM) data did not reveal any significant conductors on the three surveyed lines.

Mirabela Brazil conducted a number of surveys from 2004 to 2011 (Table 9-2), and concluded that:

- The logged density (SG) and magnetic susceptibility values account for most of the respective potential field anomalies with only very small data misfits.
- The extremely magnetic nature of the country rock hinders the use of magnetics to delineate further mineralisation or structures within the intrusion. Inversion of the magnetic susceptibility data was considered to be useful for mapping the depth of the serpentinisation of the dunite.

Constrained gravity inversions clearly indicated that the previous unconstrained model suggesting the Peri-Peri and the Santa Rita deposits were joined at depth is highly unlikely. The gravity inversions did not exclude the possibility of extending the lithological model either down dip to at least 2 km depth, or flattening under the current maximum drilled depth. The data suggested that the intrusion may thicken at depth.

Table 9-2: Geophysical Surveys, Mirabela Brazil
ACG Acquisition Company Limited – Santa Rita Mine

Contractor	Survey Type	Survey Date	Equipment Description	Survey Parameters	Survey Coverage
Fugro S.A.	Fixed loop EM IP Borehole EM	2004	Protem receiver and TEM37 transmitter operating at a base frequency of 20 Hz	100 m dipole-dipole IP and resistivity data. 10 lines collected at 200 m spacing	18.5 km
Geotech Ltd	Helicopter-borne EM and magnetic survey	2006	Eurocopter AS350 B2 Écureuil equipped with G823A magnetic sensor, readings taken at 0.1 sec	Line spacing of 250 m, flight altitude 95 m	-
CBPM	IP	2006	-	50 m dipole-dipole IP and resistivity. 17 lines collected at a spacing of 200 m	73.5 km
DS3-Desenvolvimento Sustetável Ltda.	Electrical resistivity survey	2006	Scintrex, 1500 W	40 m dipole-dipole on 8 E–W sections	24.2 km
Geodatos do Brasil	Ground magnetics	2008	GSM model GMS-19 magnetometer (2)	10 m stations	53.35 km

Contractor	Survey Type	Survey Date	Equipment Description	Survey Parameters	Survey Coverage
Laboratorio de Pesquisas em Geofisica Aplicada	Gravity survey	2008	Scintrex automated digital gravity meter (CG-3)	602 stations on a 100 m x 100 m grid	-
Laboratorio de Pesquisas em Geofisica Aplicada	Gravity survey	2008	Scintrex automated digital gravity meter (CG-3)	591 stations on a 100 x 100 m grid	-
CPRM (Brazilian government survey)	Aerial gamma spectrometry	2011	-	East-west flight line spacing of 500 m at nominal altitude of 100 m	86,629 km

9.5 Petrology, Mineralogy, and Research Studies

The various specialist studies completed at Santa Rita are summarised in Abram (1994), Barnes et al. (2011), Fróes (1993), Fróes and Soares (1998), and Silva et al. (1996).

Mirabela Brazil collected samples in zones of anomalous nickel mineralisation during 2006 and 2007 for petrological studies using thin sections. These samples were collected at approximately 10 m downhole intervals for all drill holes up to and including MBS-107. The samples, generally representing 5 cm to 10 cm quarter core billets, were then put in a protective bag and sent to Amdel Laboratories Ltd. in Adelaide, South Australia. Pontifex & Associates Pty Ltd. completed polished thin-section petrographic descriptions (Purvis, 2006a, 2006b, 2006c, 2007a, 2007b).

9.6 Exploration Potential

Mirabela Brazil and Atlantic Nickel identified several prospects during its regional exploration programs as well as the Palestina project, as described earlier in this section. The CP reviewed the exploration results and is of the opinion that the following prospects require drill testing.

1. The Peri-Peri prospect is located on the northeastern rim of the Fazenda Mirabela intrusion, about five kilometres from Santa Rita. The bounding lithology of the Fazenda Mirabela intrusion changes from the usual metres-thick zone of melanogabbronorite at Santa Rita, to a thick ultramafic sequence in the Peri-Peri area. Drilling to date has identified disseminated nickel-copper sulphide mineralisation (pentlandite-chalcopyrite associated primarily with pyrrhotite) hosted within a steeply dipping shoot that is primarily hosted by the ultramafic units, but locally transgresses the intrusive contact into a basement mafic granulite. The prospect area is underneath the current TSF. Additional drilling and deposit modelling for underground potential is recommended.
2. The Santa Maria prospect is within the 870.012/2018, 087.009/2015, 870.011/2018, and 870.010/2018 concessions, about 30 km southeast of Santa Rita. A combination of stream sediment, rock chip, and soil sampling returned anomalous nickel geochemical results. Some rock chip samples contained visible sulphide minerals, indicated by petrographic examination to be pyrrhotite, pyrite, pentlandite, and chalcopyrite. Geological mapping identified outcrops of pyroxenite within basement rocks comprising felsic and mafic granulites and amphibolites. Ground IP/resistivity geophysical surveys identified four areas of anomalous geophysical responses. The combination of nickel-bearing sulphides at surface, associated with mafic-ultramafic intrusive bodies, is considered by Atlantic Nickel to be a priority target for drill testing.

3. The Aiquara prospect, within the 872.368/2016, 871.220/2017, and 872.158/2017 concessions, is located near the city of Itagibá, approximately 17 km from Santa Rita. A combination of stream sediment, rock chip, and soil sampling returned anomalous nickel geochemical results. Ground IP/resistivity geophysical surveys identified 32 anomalous geophysical responses, of which seven were considered a high priority for follow-up and six were medium priority. Geological mapping showed an ultramafic intrusion 2,000 m long (northwest–southeast) and up to 1,500 m wide. The combination of the size of the intrusive body, and the geophysical and geochemical responses led to the prospect being considered by Atlantic Nickel to be a priority target for drill testing.
4. The Ibicuí prospect, within the 870.319/2018 concession, is approximately 45 km from Santa Rita. Limited geochemical testwork, comprising stream sediment and soil sampling, contained anomalous nickel grades. Anomalies identified from ground IP and resistivity geophysical surveys did not correlate with the geochemical data. Geological mapping identified a small intrusive ultramafic body. The Mirabela Brazil results warrant additional exploration review, but the prospect is not considered to be drill-ready.

Atlantic Nickel plans to investigate the potential for extensions to the mineralisation currently exploited within the open pit, as part of normal operational drill programs during the LOM. The CP concurs with this approach.

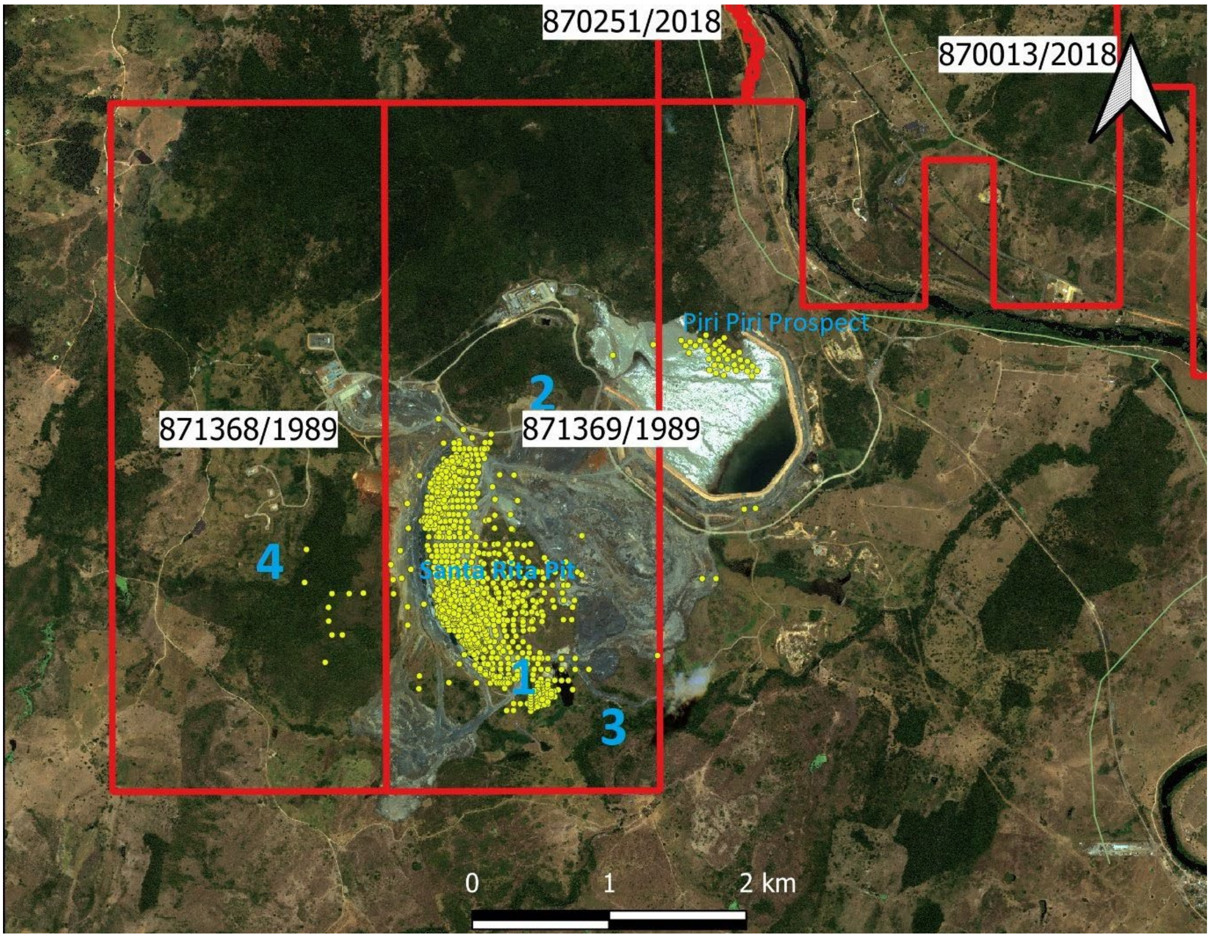
The four areas are shown in Figure 9-2, and consist of:

- Area 1: a zone that is currently under-drilled in the open pit. Drill testing may result in additional mineralisation that could be included in the mine plan.
- Area 2: although condemnation drilling did not encounter anomalous values, there is potential for mineralisation to continue from the open pit underneath the hill that separates the plant site and access road. Any such mineralisation identified during drilling could allow the pit to be expanded to the north.
- Area 3: drill testing immediately to the south of the open pit will look for any extensions to the mineralisation to the south of the open pit that could allow the pit to be expanded in this direction.
- Area 4: a zone of elevated nickel-in-soil anomalies, associated with anomalous nickel in laterite that could, if drill testing is positive, provide additional mill feed from a satellite pit.

Mineralisation potentially amenable to underground mining operations has been identified under the open pit, which was subject of the 2021 PEA. Mineral Resource estimation at Santa Rita was supported by the database ended June 2019 for open pit and February 2021 for underground. From these dates until December 2022, approximately 73 exploration drill holes for a total of 39,536 m of diamond drilling were completed. This mineralisation remains open at depth (Figure 9-3); however, given the depth to the mineralisation, this mineralisation would only be drilled when underground access is available as drilling from surface would likely be cost-prohibitive. The CP concurs with this approach.

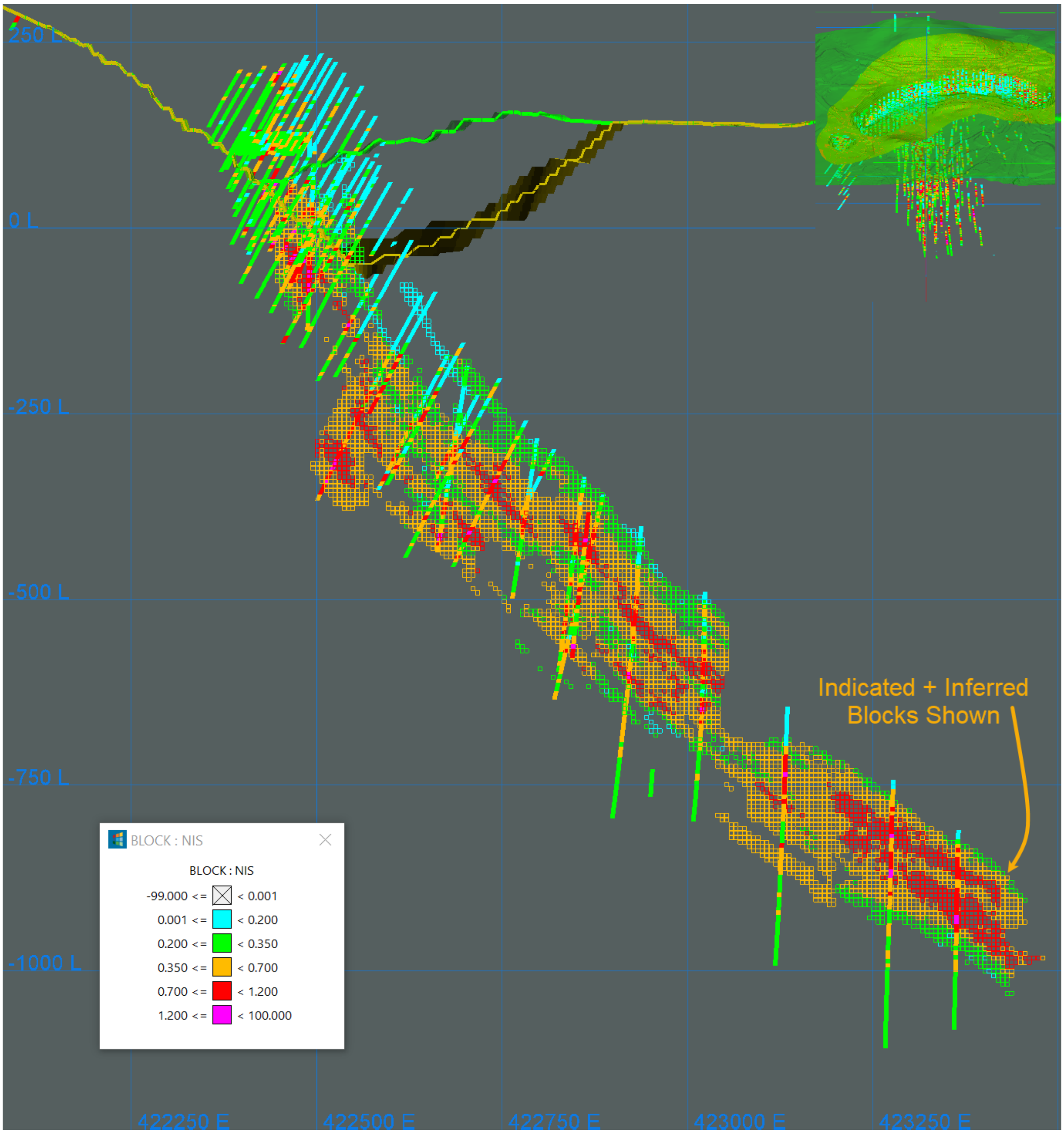
Two areas are recommended for surface drill testing in support of underground design considerations, as mineralisation discovered in these locations would be likely to change mine planning/infrastructure assumptions such as decline access locations and may allow expansion of the underground design. The areas are shown in Figure 9-4, and consist of:

- Area A: there is potential to define additional mineralisation to the north of the 2021 PEA mine design. Drilling in this vicinity currently includes some of the better mineralisation widths and grades, and step-out holes are recommended.
- Area B: this is an area that is currently under-drilled, and infill drill holes are recommended.



Source: Atlantic Nickel, 2021.

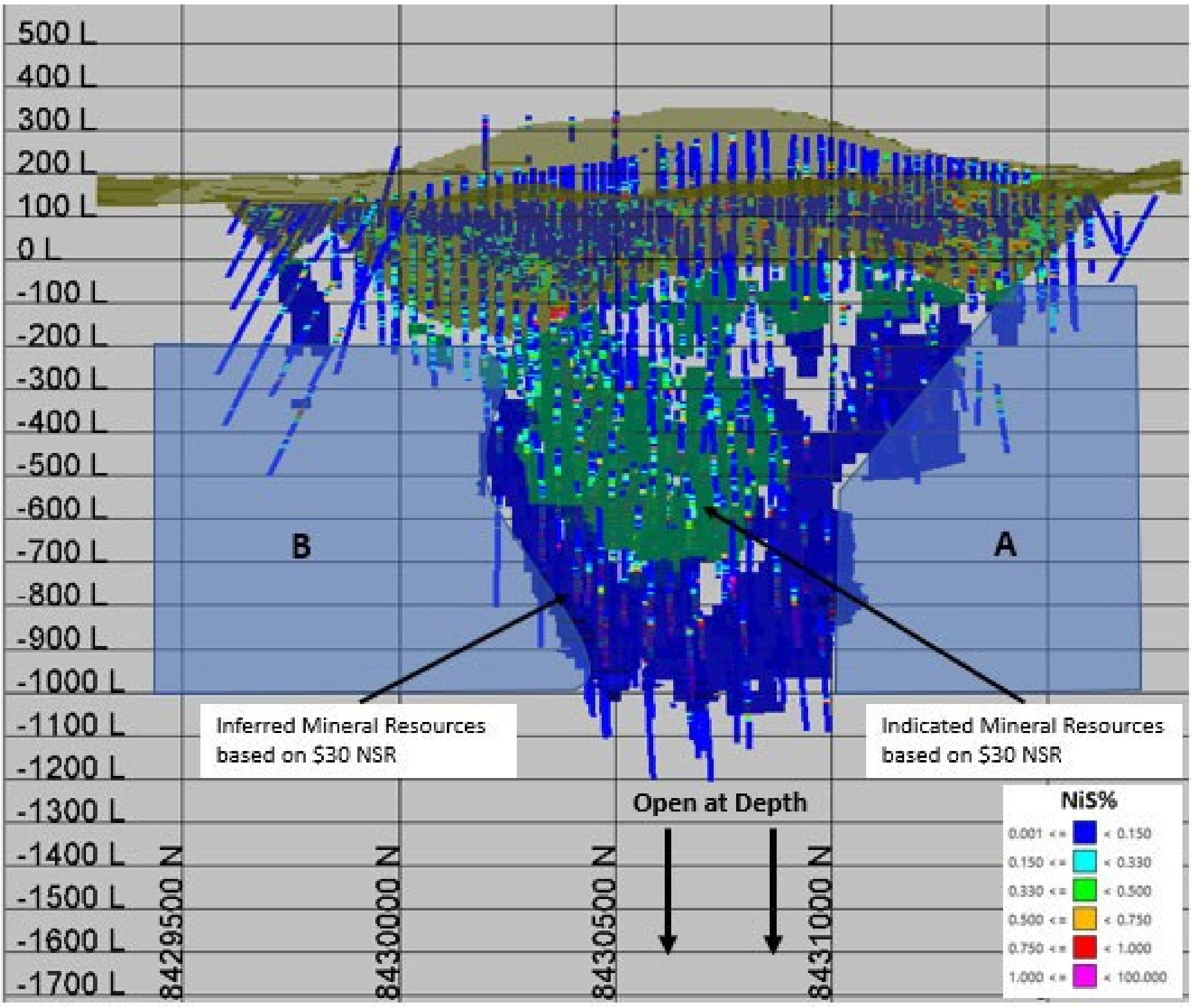
Figure 9-2: Near-Mine Prospects



Source: Atlantic Nickel, 2021.

Note. Figure shows that mineralisation is constrained by the base of the current block model limits.

Figure 9-3: Mineralisation Beneath Open Pit



Source: MTS, 2021.

Note. Longitudinal view, looking west.

Figure 9-4: Underground Upside Potential

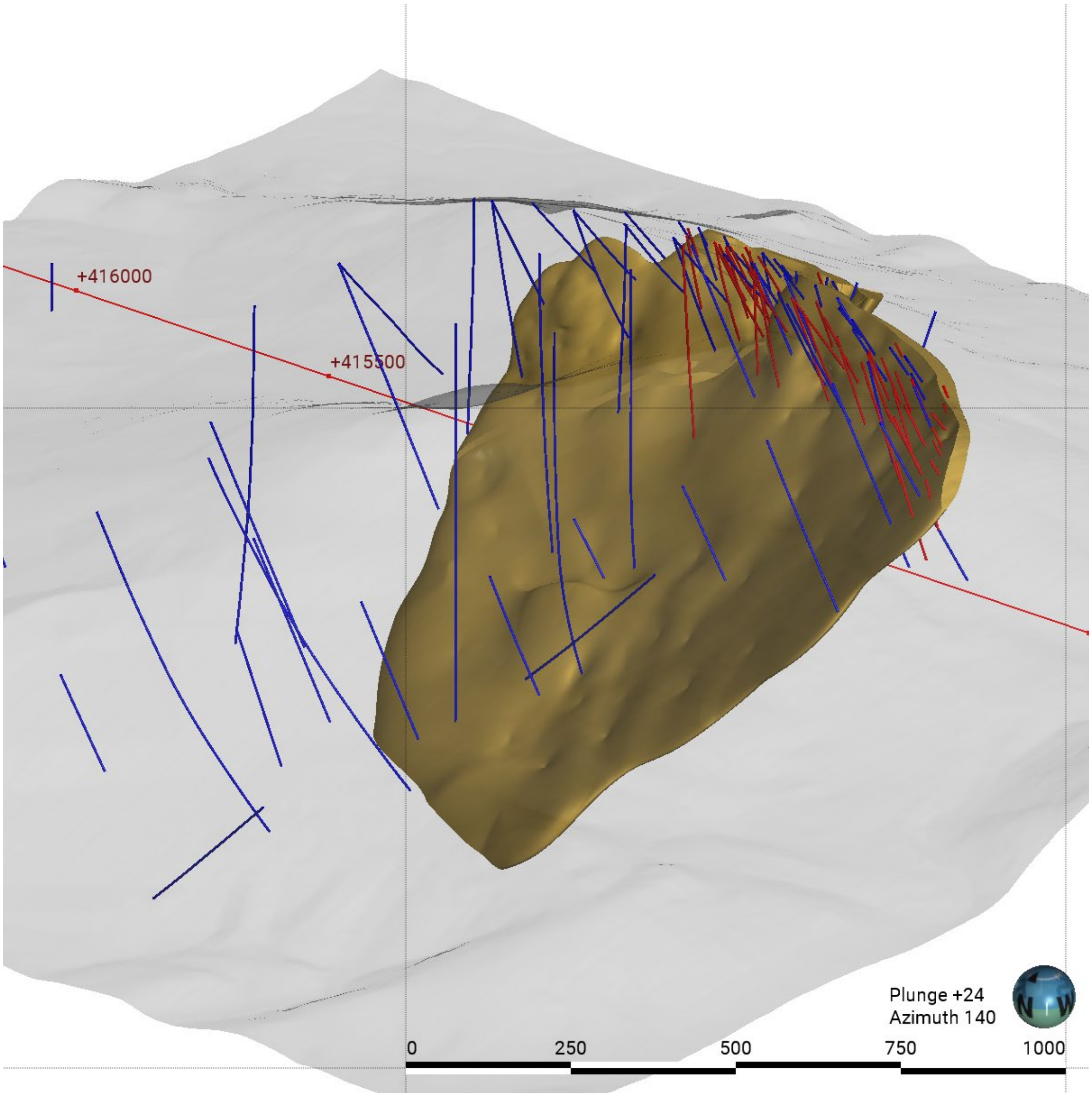
9.8 Target for Further Exploration - Palestina

The CP cautions that the quantity and grade estimated for the target for further exploration is conceptual in nature and there has been insufficient exploration to define a Mineral Resource, as well as it is uncertain if further exploration will result in the target for further exploration being delineated as a Mineral Resource. However, a conceptual range of tonnage and grade has been estimated, and is found below.

A target for further exploration was interpreted for Palestina, using the following criteria:

- Mineralisation is associated with a gabbronorite (Figure 9-5). This zone extends down dip to the extent of the current drilling.
- Review likelihood of geological and grade continuity. Completed on plan and section.
- Review available drill hole results (see discussion in Section 10). There are more than 50 drill holes that have intercepted the mineralised zone, with a nominal drill spacing of 50 m to 450 m.
- The target for further exploration is confined within a 0.15% NiS grade shell.
- Select target volume in terms of area and thickness (x, y, z dimensions). The area of the target for further exploration dips northerly at approximately 50°, has a strike length of 800 m, a vertical extent of 600 m, and a thickness of approximately 15 m. The mineralisation remains open down dip and along strike outside this volume (Figure 9-5).
- Recoverability assumptions are based on Santa Rita as an analogue. Very preliminary testwork on coarse reject material from Palestina conducted by the Santa Rita mine laboratory supports that this assumption is reasonable.
- Assign a reasonable average specific gravity value to that target volume based on lithology domains. The Palestina drill hole database includes 600 specific gravity (SG) determinations and has an average SG of 3.10.
- Based on a grade shell interpretation for this area, a tonnage variation over the ±50% range, and a grade variation over the ±30% range were assumed to define the potential target.

In 2021 and 2022, Atlantic Nickel drilled more than 64 drill holes in an ongoing program to confirm the continuity of mineralisation. Based on this new database and on the assumptions described above, the Palestina potential is estimated to be a tonnage range of 5 Mt to 20 Mt, and a NiS grade of 0.1% to 0.3%, Cu grade of 0.05% to 0.07%, and a Co grade of 65 ppm to 125 ppm. GeoEstima also notes that higher PGM grades have been reported at Palestina compared to Santa Rita.



Source: GeoEstima, 2023.

Figure 9-5: Palestina Target for Further Exploration

9.9 CP Comments on "Item 9 Exploration"

Exploration completed to date is appropriate to the deposit style and identified the Santa Rita deposit and the Palestina target for further exploration. Three prospects warrant drill testing, Peri-Peri, Santa Maria, and Aiquara, and the Ibicuí prospect should be subject to an exploration review. Grassroots exploration activities should continue on the exploration permits.

10.0 DRILLING

10.1 Introduction

As of December 31, 2022, the Santa Rita drill hole database consists of 1,240 drill holes totalling 350,106.62 m (Table 10-1). Drilling included core (DDH) and reverse circulation (RC) types. Drill hole locations are shown in Figure 10-1 (Santa Rita and Peri-Peri). Drill data collected prior to Mirabela Brazil's ownership is referred to as legacy data.

A total of 108,460 and 71,536 sample analyses were performed during legacy and the Atlantic Nickel 2018 drilling campaigns, respectively.

Both open hole percussion drilling (blast holes) and RC drilling were used for grade control in 2014–2018 and 2019–2021.

Mineral Resource estimation at Santa Rita was supported by the database with a cut-off date of February 25, 2021. Between February 25, 2021 and December 31, 2022, an additional 61 exploration drill holes for a total of 39,713.66 m of diamond drilling were completed but are not included in the current Mineral Resource estimate. Geostima has reviewed the location of the more recent drilling and is of the opinion that they would not have a material impact on the current open pit and underground resource estimate.

For Palestina, a total of 124 drill holes (26,377 m) have been drilled to December 31, 2022. The legacy information consists of 31 drill holes (8,590 m) completed in 2007, 2008, and 2012 by Mirabela Brazil, as indicated in Table 10-3 and Figure 10-2.

Table 10-1: Santa Rita Drill Hole Summary as of December 31, 2022
ACG Acquisition Company Limited – Santa Rita Mine

Year	Company	Drill Hole Type	Number of Holes	Metreage (m)
1980	Mineração Nhambú Limitada	DDH	2	388.90
1988	Caraíba Metais	DDH	5	579.70
1989	CBPM	DDH	5	1,340.31
2004	Mirabela Brazil	DDH	16	3,262.60
2005	Mirabela Brazil	DDH	85	18,287.52
2006	Mirabela Brazil	DDH	180	44,734.05
2007	Mirabela Brazil	DDH	248	54,447.40
2008	Mirabela Brazil	DDH	121	52,317.55
2011	Mirabela Brazil	DDH	5	3,598.04
2012	Mirabela Brazil	DDH	10	6,547.73
2018	Atlantic Nickel	DDH	31	14,278.14
		RC	267	22,141.00
2019	Atlantic Nickel	DDH	81	61,134.30
		RC	68	8,611.00
2020	Atlantic Nickel	DDH	19	17,643.65
2021	Atlantic Nickel	DDH	10	6,928.55

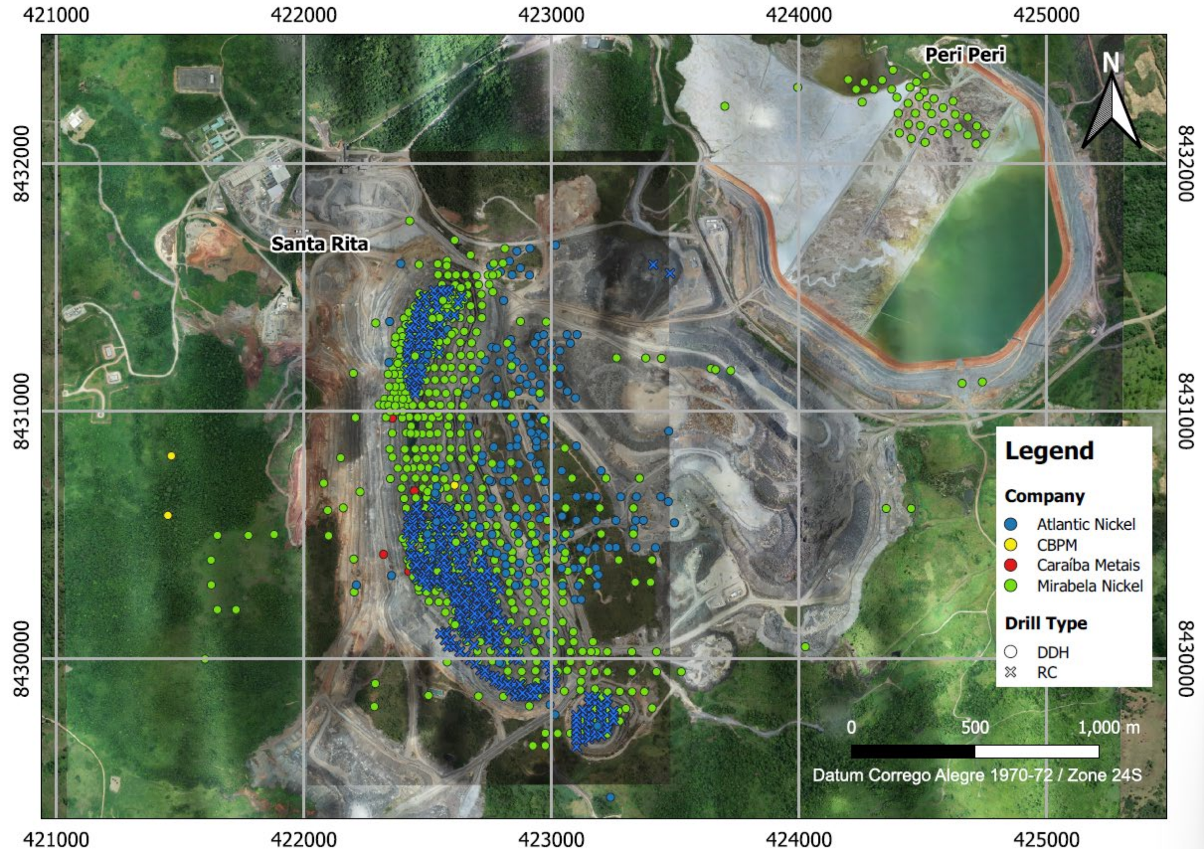
Year	Company	Drill Hole Type	Number of Holes	Metreage (m)
2022	Atlantic Nickel	DDH	63	32,608.18
		RC	24	1,258.00
	Total Santa Rita		**1,240**	**350,106.62**

Table 10-2: Peri-Peri Drill Hole Summary as of December 31, 2022
ACG Acquisition Company Limited – Santa Rita Mine

Year	Company	Drill Hole Type	Number of Holes	Metreage (m)
2007	Mirabela Brazil	DDH	39	5,545.40
	Total Peri-Peri		39	5,545.40

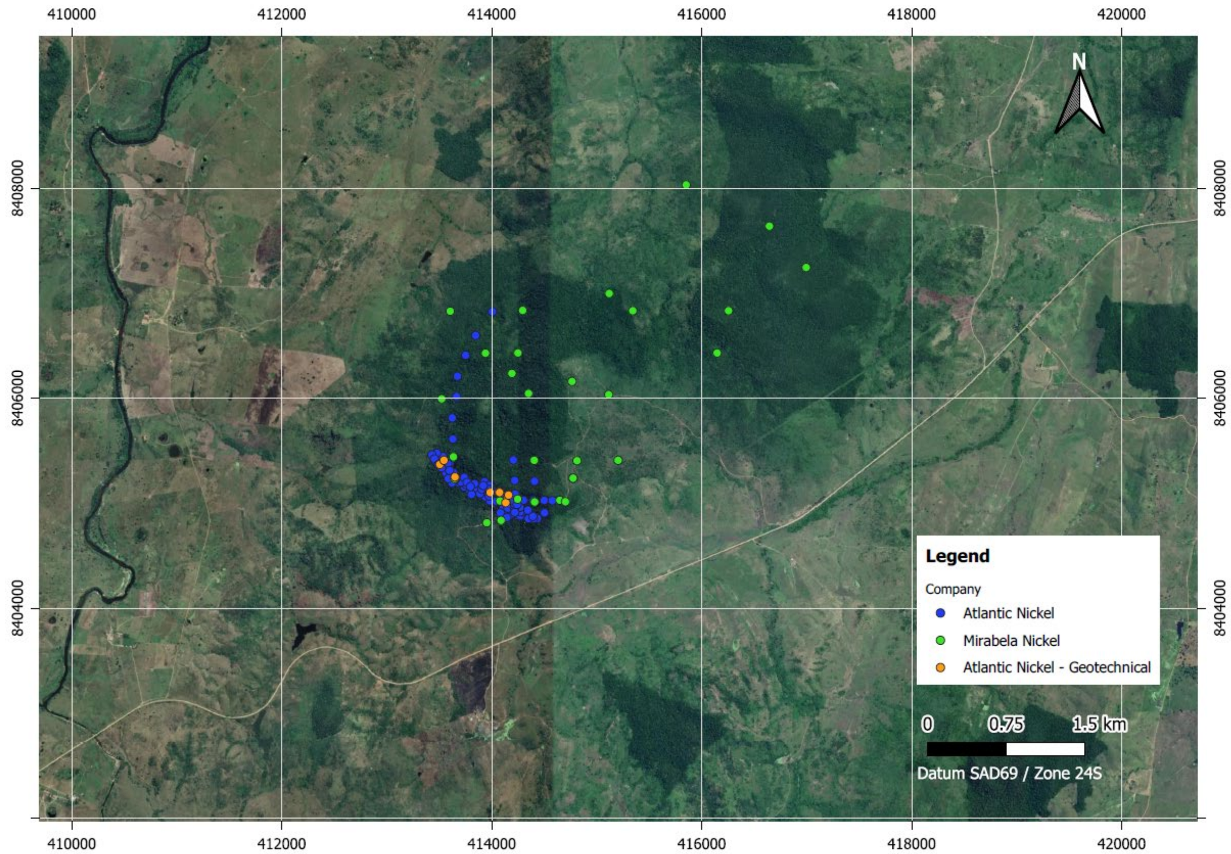
Table 10-3: Palestina Drill Hole Summary as of December 31, 2022
ACG Acquisition Company Limited – Santa Rita Mine

Year	Company	Drill Hole Type	Number of Holes	Metreage (m)
2007	Mirabela Brazil	DDH	8	2,174.00
2008	Mirabela Brazil	DDH	17	4,745.00
2012	Mirabela Brazil	DDH	6	2,340.00
2020	Atlantic Nickel	DDH	29	7,140.00
2021	Atlantic Nickel	DDH	17	2,116.00
2022	Atlantic Nickel	DDH	47	7,862.00
	Total Palestina		**124**	**26,377.00**



Source: Atlantic Nickel, 2022.

Figure 10-1: Santa Rita Area and Peri-Peri Drill Hole Location Map



Source: Atlantic Nickel, 2022.

Figure 10-2: Palestina Drill Hole Location Map

10.2 Drill Methods

The drill contractors and drill rig types used for exploration are summarised in Table 10-4.

Table 10-4: Drill Contractor Summary Table
ACG Acquisition Company Limited – Santa Rita Mine

Operator	Year	Contractor	Rig Type	Purpose
MNL	1979–1981	Unknown	Unknown	
Caraíba Metais	1985–1989	Unknown	Unknown	
CBPM	2002	Unknown	Unknown	Auger
Mirabela Brazil	2004–2008	Boart Longyear Geoserv.	Skid-mounted LM-38 and LM-44	Core
	2004–2008	Geosedna Perfurações Especiais S.A	W750 truck mounted rig	RC
	2006	Geologia e Sondagens Ltda.	Skid-mounted core drill-rig	Core
	2008	Kluane Sondagem e Perfuração de Solo do Brasil Ltda	Unknown	Core

Operator	Year	Contractor	Rig Type	Purpose
Atlantic Nickel	2018–2019	Geosedna Perfurações Especiais S.A.	Atlas Copco Explorac R50 drills	RC
	2020-2022	Geosol - Geologia e Sondagens Ltda.	Boart Longyear LF-230 (truck mounted), Atlas Copco CS-14 and CT-20, GEOSOL SHPP 1500 (Smart rig)	Core
	2018-2019	Servitec - Foraco	Maquesonda Mach 1200 (mechanical rig), Atlas Copco CS-14 and CS-3001	Core
	2022	Servitec - Foraco	Boart Longyear LF-230, Atlas Copco CS-14	Core
	2021	JC SIGMA	ENERGOL EGD SII Turbo (Manportable)	Core
	2022	Energold	ENERGOL EGD SII Turbo (Manportable)	Core

10.3 Logging Procedures

10.3.1 Legacy Data

MNL appears to have logged lithology, mineralisation, and structures. No information as to logging procedures is available.

Caraíba Metais appears to have logged lithologies, however, no description of the logging procedures or any other information collected during logging is available.

Data for the CBPM drill programs only consists of lithological descriptions for five core holes. No description of the logging procedures or any other information collected during logging is available.

Mirabela Brazil routinely recorded core structural orientations. The core was transferred from the core barrel and pieced together on a V-rail (angle iron) rack and the orientation line, determined from the spear orientation mark recorded during drilling, was drawn along the entire length of the assembled core. After the structural measurements were completed, the record indicates that lithology, colour, texture, mineralogy, alteration, estimated magnetite content, sulphide mineralogy and estimated percentages, and mineralisation were logged for all holes.

Magnetism, magnetic susceptibility, core recovery, rock quality designation (RQD), and fracture spacing are recorded in the database, but not for each sample interval. A staff geologist completed the geology log of the drill core. Geology logs were recorded both on paper and digitally.

10.3.2 Atlantic Nickel

Geological logging of RC chips and core was completed by Atlantic Nickel geology staff. RC logs captured information on lithology, alteration, mineralisation type, mineralisation abundance, and structure data. A portion of the drill cutting for each one metre interval was collected in a chip tray, and the chip trays are archived at the core facility.

Core was logged for geological information including lithology, alteration, mineralisation type, mineralisation abundance, and structure. Geology data were captured on paper logging forms and entered into the drill hole database. A core library at the core shed is used for reference which aids consistency of logging. Magnetic susceptibility was logged for some holes.

Recovery, discontinuity type, fracture shape, infill, and width, structure orientation, fracture density, RQD, weathering, rock strength, and rock type were recorded in the geotechnical logs.

Digital images of wet core were captured and are stored with the project database.

10.4 Recovery

10.4.1 Legacy

RSG Global (Gossage et al., 2007) reviewed core recovery for the project in 2006 and commented that excellent recovery was noted. Broken core was generally restricted to areas of interpreted faulting/shear structures. No obvious relationship existed between recovery and grade. The CP has not seen those data.

10.4.2 Atlantic Nickel

The 2021 database contains recovery data for the period of 2018–2020 and includes approximately 29,000 samples. Average recovery is 98.9%. The overburden and saprolite data are not used for Mineral Resource estimation. For the additional drill holes executed in 2022, the average recovery is 99.4%, which is excellent. This average includes some data from overburden and saprolite which had average recoveries lower then fresh rocks (75% to 92%).

10.5 Collar Surveys

10.5.1 Legacy

There is no record of how pre-2004 collar surveys were performed.

Early in the 2004–2009 period, drill rigs were aligned to a cord strung between three pickets put in place on the drill pads using a compass and global positioning system (GPS) instrument. Once the rig was ready to drill, alignment of the rig (i.e., the azimuth and dip) was re-confirmed using a compass. After the beginning of 2008, the drill-rigs were aligned by a surveyor using a total station instrument.

Prior to 2009, core holes were cased with polyvinyl chloride (PVC) tubing that was cemented in the drill hole collar and marked with a cement block and aluminium plaque with the drill hole identification. Collar coordinates were initially obtained using a GPS instrument. Later surveys used a differential GPS (DGPS) instrument. Surveying was completed by a contractor (TopMin) and/or Mirabela Brazil surveyors.

10.5.2 Atlantic Nickel

Atlantic Nickel used DGPS to survey collars in UTM coordinates. The horizontal datum is the SAD-69 (South American Datum, 1969) and the Marégrafo de IMBITUBA-SC vertical datum for Palestina and Corrego Alégre zone 24S for Santa Rita.

10.6 Downhole Surveys

10.6.1 Legacy

There is no record of downhole surveys for holes drilled in 1988–1989.

From 2004 to 2008, azimuth and dip changes were monitored by either single-shot surveys or by post-drilling north-seeking gyroscope surveys, or, in some instances, by both of these methods.

Single-shot surveys were completed by Boart Longyear Geoserv using a Reflex EZ-Shot tool. The surveys were initially taken at a depth of 10 m (downhole), again at 50 m deep, and then every 50 m down the hole until the end. There is no record of the declination used. The declination is approximately 23° W so the correction is significant. This was later modified to one survey at 10 m, and then a survey every 30 m down the hole to the end of the drill hole. In November 2005, drilling contract terms changed so that if a drill hole deviated by >4° in dip and/or 4° in azimuth from the initial survey, Mirabela Brazil reserved the right to request that the hole be re-drilled, at no extra cost.

From October to December 2005, Downhole Surveys DHS Pty Ltd. used a north-seeking gyroscope for downhole surveys of all drill-holes to date (i.e., MBS-001 to MBS-101). The drill holes were generally surveyed inside the PVC casing after they had been drilled, although some of the later drill holes were surveyed inside the drill rods immediately after completion of the hole. Survey points were every three metres (downhole) from the collar to just above the end of the hole (or in cases where the PVC casing did not reach the end of the hole, until the end of the PVC casing). Downhole surveys were processed by a technician from Downhole Surveys, and passed on to Mirabela Brazil in digital format.

In 2011 and 2012, single-shot and Maxibor tools were used extensively. A PeeWee magnetic multishot instrument was also used. There is no indication that data from the magnetometer-based instruments (EZ-Shot single-shot and PeeWee multishot instruments) were corrected for declination.

10.6.2 Atlantic Nickel

For the 2018-2019 campaign, the downhole survey was carried out by the company Servitec Foraco S.A. using the REFLEX GYRO SPRINT-IQ ™ equipment and carried out at the ending of the holes. Readings were collected every three metres and the final data acquired in digital format and imported into the database.

In the 2020-2021 campaign, the downhole surveying data were collected by Geosol S.A. (Geosol) using the REFLEX GYRO SPRINT-IQ™ equipment. As a way of controlling deviations, constant monitoring was carried out through partial downhole survey carried out according to the purpose of each hole. For boreholes with an exploratory purpose, the downhole survey was performed every 100 m advanced and data collected every 15 m.

For boreholes for the purpose of resource conversion, partial downhole survey was carried out every 40 m advanced with readings every 15 m in the waste zone and three metres in the mineralised zone. Drilling with the DEVICO DEVIDRILL™ tool was also used in these holes with the intent of correcting the trajectory developed during drilling.

In the 2022 campaign, downhole survey data were collected using the DEVICO DEVIGYRO™ by the drilling companies (Geosol and Servitec Foraco S.A.) and the same methodology as in the 2020/2021 campaign was used.

10.7 Grade Control

Production (grade control) drilling is not included in Table 10-1. During the initial stages of operation, detailed geological and grade control information was collected from blast holes that were completed on a nominal pattern of 5 m x 5 m. Vertical blast holes were drilled by Atlantic Nickel personnel using either an 8.5 in. diameter bit or a 6.75 in. diameter bit. Hole lengths vary from 7.5 m to 15 m in length. Information collected from these blast holes is stored in a dedicated digital database for use in short-range production planning and grade control purposes.

Mirabela Brazil evaluated the effectiveness of using RC drill holes for grade control purposes only in 2013 and 2014. During the period, no blast hole samples were collected. For this program, the drill holes were completed by Geosol using standard RC drilling equipment that produced a 5.5 in. (140 mm) diameter hole. Information collected from these RC holes is stored in a separate, dedicated digital database for use in short-range production planning and for grade control purposes. All RC holes were oriented at -60° dip to azimuth 270°, approximately perpendicular to the stratigraphy and were completed on a nominal pattern of 10 m x 20 m. The holes varied in length to as deep as 40 m with an average hole length of 30 m. The location of the RC hole collars is determined by surveys completed by Mirabela Brazil staff. RC grade control drilling was discontinued in 2015.

Atlantic Nickel uses blast holes for grade control. Drilling is performed by contractors. Since the beginning of activities in 2019, more than 65,800 holes have been sampled. Hole diameters and patterns are different for mineralisation and waste (Table 10-5).

Table 10-5: Current Blast Hole Parameters
ACG Acquisition Company Limited – Santa Rita Mine

	Depth (m)	Spacing (m)	Drill Hole Diameter (in.)
Mineralisation	6	2.80 to 3.20	4.5
Mesh for Sampling	6	5.6 to 6.4	4.5
Waste	6	3.09 x 3.56	4.5

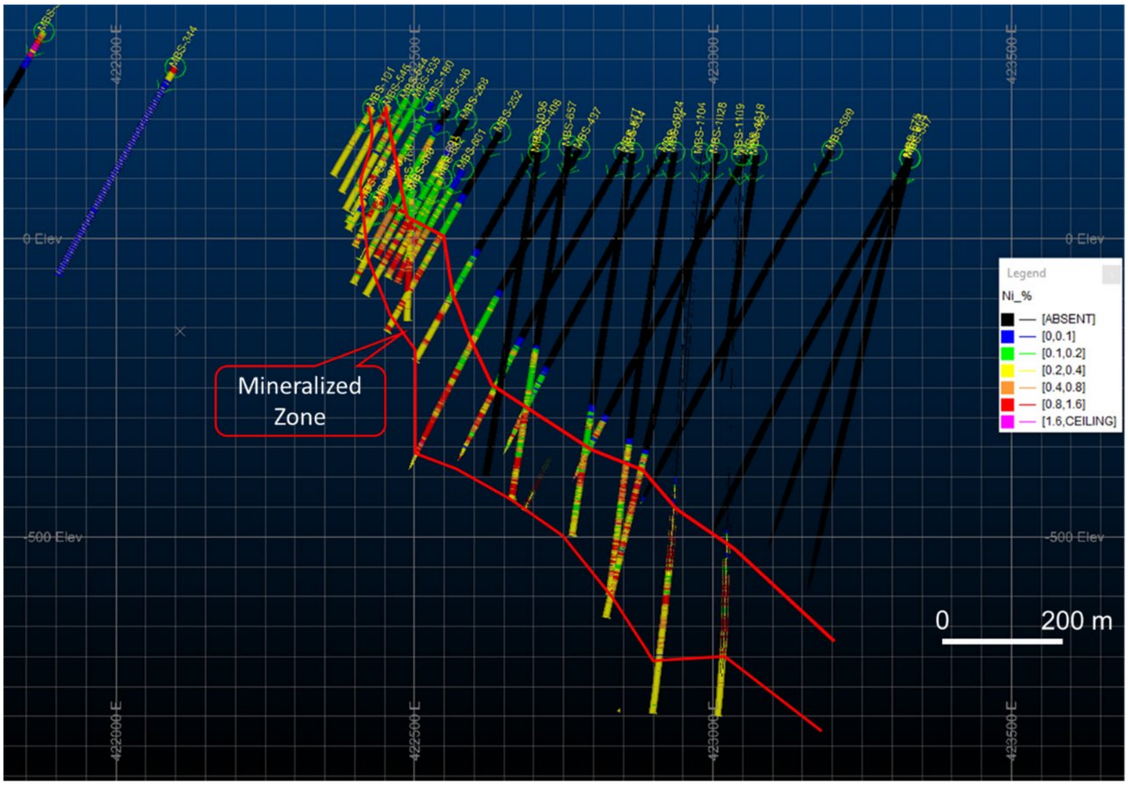
Chemical assays are performed at the Atlantic Nickel laboratory.

10.8 Sample Length/True Thickness

Drilling was generally performed normal to the plane of the principal mineralised orientation, however, some geotechnical holes have been drilled down dip targeting specific structures critical for geotechnical analysis and understanding. The dominant drill direction at Santa Rita is -60° dip at 270° azimuth (UTM Grid Zone 24 south, using Córrego Alegre Datum). In the southeast extension zone, the drill direction was changed to -60° dip at 180° azimuth to account for strike change of the mineralised zone from north–south to east–west. Most of the core holes are oriented to intersect the mineralised zones at a high angle, however, a small number of drill holes were completed which were oriented at low angles to the stratigraphy to collect geotechnical information.

Figure 10-3 illustrates a typical cross section at Santa Rita showing the relationship of the drill holes to the mineralisation. The drill holes intersect the mineralisation at 65° to 90°. At an angle of 65°, the true depth is 90% of the drilled depth.

Drill holes at Peri-Peri intersect the mineralisation at approximately 45°. True thickness will be approximately 71% of the drilled length. Figure 7-6 shows the relationship of drilling to mineralisation at Palestina. The angle of drilling mineralisation ranges from 90° to 50° so true thickness is 100% to 77% of the drill intercept depending on hole angle.



Source: MTS, 2021

Figure 10-3: Drill Section, Santa Rita

10.9 Drilling Since Database Closeout Dates

Since the last Mineral Resources update from February 25, 2021, a total of 85 drill holes have been completed at Santa Rita, including 61 diamond drill holes and 24 RC drill holes. The additional drill data received since the close of database show reasonable results and could support a future Mineral Resource update.

10.10 CP Comments on “Item 10: Drilling”

In the opinion of the CP, the quantity and quality of the logged geological data, collar, and downhole survey data collected in the exploration and infill drill programs are sufficient to support Mineral Resource and Mineral Reserve estimation and mine planning activities at the Santa Rita deposit

11.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

11.1 Sampling Methods

11.1.1 Legacy

11.1.1.1 Geochemical Sampling

There is no record of how stream sediment samples were collected. The Caraíba Metais soil samples were collected from the B horizon.

CBPM collected 977 samples from the B horizon at a depth of approximately 50 cm, and 110 samples originated from the deeper C horizon. The C horizon samples were collected by hand auger.

The Mirabela Brazil soil samples were generally collected using augers from an average depth of 2.15 m (maximum depth of 14 m).

11.1.1.2 Reverse Circulation Drilling

RC drill chips were collected at one metre intervals downhole using a cyclone into PVC bags. The collected samples were riffle split using multiple passes through a single stage riffle splitter. A final sample of approximately 2 kg was collected for submission to the laboratory for analysis. RC chips were systematically logged by collecting the sieved chips and storing them in a tray, with each labelled compartment of the tray containing the chips from a one metre interval.

11.1.1.3 Diamond Drilling

During the Mirabela Brazil 2004–2008 drilling campaigns, the logging geologist identified the intervals to be sampled. The sampling typically started from the lower contact of the gabbro unit and continued to the end of each drill hole. Sampling was commonly at one metre intervals, as marked on the core and entered into a sampling form.

The core was cut into halves using a diamond saw and the core halves were placed back in the core tray in their original position. The sampling process included taking the left half of the core and placing into a sample bag. The right half remained in the core tray. A ticket with a sample number was placed into the sample bag. A sample technician identified the hole number and sample interval on a duplicate sample ticket. For QA/QC purposes, a second technician compared the drill hole number and sample interval on the sample ticket with the intervals entered on the sample form.

Sampling procedures during the Mirabela Brazil 2011–2012 drill campaign were the same as for the 2004–2008 drill campaign described above. The zones of each hole sampled were selected at the discretion of the geologist completing the geological logging. Sampling commonly started in gabbro just above the pyroxenite contact and continued to the end of the hole (commonly into the dunite).

11.1.1.4 Production Sampling

11.1.1.4.1 Mirabela Brazil Blast Holes

Samples generated from blast holes were collected by trained Mirabela Brazil staff by cutting a complete section through the cuttings pile using a track shovel after the hole was complete and the drill had moved to another location. The major lithology of the sample was logged, and the sample was then placed into a plastic bag and taken to the on-site laboratory for analysis. Analyses were performed on a routine basis for total nickel, copper, cobalt, sulphur, magnesium, iron, aluminium, and chromium.

Samples from the blast holes were delivered to the laboratory by Mirabela Brazil staff. The samples were then passed through a jaw crusher to ensure that a particle size of <3 mm was achieved. A sub-sample of approximately 950 g was then taken from each sample by means of cone-and-quartering of the original sample. This 950 g sub-sample was pulverised in a ring-and-puck pulverizer to a nominal particle size of 85% passing 200 mesh (approximately -75 µm).

11.1.1.4.2 Mirabela Brazil RC Holes

Sample collection from the RC program was supervised by the junior geologist in the field. Recovery was very good, with greater than 25 kg per metre often recovered. Samples were logged on a metre-by-metre basis by the geologist at the drill, with the first metre discarded to avoid possible bench contamination. Cuttings over a three metre interval were composited into one, 9 kg sample by taking a 1/8th cut of the main sample stream using a riffle splitter. The samples were suitably numbered and then transported to Mirabela Brazil's on-site laboratory for analysis.

11.1.2 Atlantic Nickel

11.1.2.1 Reverse Circulation Drilling

Atlantic Nickel began sampling RC cuttings at the lower contact of the gabbro and continued on one metre intervals to the end of each drill hole. The one metre interval was collected in a bin from the cyclone and split using a three-tiered riffle splitter. The final sample shipped to the laboratory was approximately 5 kg. A number of RC drill holes reportedly encountered significant water during the drilling process which can adversely affect sample quality. These drill holes are not identified in the database.

11.1.2.2 Diamond Drilling

Sample intervals were typically one metre, as marked by the logging geologist and noted on a sample form. The sampling commonly started from the lower contact of the gabbro unit and continued to the end of each drill hole. Trained technicians, supervised by Atlantic Nickel geology staff, used a core saw to cut the drill core into halves. The sawn core was returned to the core tray. Samplers collected one-half of the core into sample bags according to the sample form. The remaining half remained in the core box and was archived at the core storage facility.

11.1.2.3 Production Sampling

One in four blast holes were sampled. Samples were collected on a tarpaulin below the cyclone used to minimize dust escape from the blast hole drills. The pile was homogenised by rolling the sample in the tarpaulin. A 5 kg sample was then obtained by splitting with a riffle splitter. The final split was bagged and sent to the mine site laboratory.

11.2 Density Determinations

11.2.1 Legacy

Gossage et al. (2009) reported that a total of 10,329 density determinations were obtained during the 2004–2008 drill campaigns. Density determinations were completed using 10 cm samples selected from available core. The methodology included sun drying, weighing the core in air, and weighing while suspended in water. The density was then determined as a ratio of weight in air divided by weight in water. Weights were obtained using a high-quality electronic scale that was checked and calibrated regularly using a standard 500 g mass.

The density was determined with the formula:

Density = weight in air/(weight in air – weight in water)

11.2.2 Atlantic Nickel

As of December 31, 2022, Atlantic Nickel completed approximately 4,185 density determinations since 2018 drilling campaigns. Density data were determined using 10 cm core samples collected at 20 m intervals from 98 core holes. Not all holes were sampled. Density was determined by:

- Weighing the sample as received;
- Drying the sample;
- Weighing the sample after drying;
- Coating the sample with paraffin;
- Weighing the sample;
- Weighing the sample suspended in water. Density is calculated using the formula (ASTM, 2015):

$$DD = \frac{M_{Drock}}{(M_{Wrock} - M_{Srock}) - (\frac{M_{Wrock} - M_{Drock})}{D_{Wax}}}$$

Where:

- DD = dry density
- Dwax = Density of wax
- MArock = Mass of sample as-received
- MDrock = Mass of dried sample
- MWrock = Mass of waxed sample
- MSrock = Submerged (buoyant) mass of waxed sample.

Atlantic Nickel also determined the moisture content of some of the samples using the as-received mass and the dry mass. Some samples were duplicated as a QC measure. These duplicates were as close to immediately adjacent to the original sample as possible. Review of those data indicate that precision (about ±1%) is adequate for these samples.

For Palestina, the density determinations were completed using 10 cm to 30 cm samples from available core. The methodology included sun drying, weighing the core in air, and weighing while suspended in water. The density was then determined as a ratio of weight in air divided by weight in water considering the formula:

Density = weight in air/(weight in air – weight in water)

11.3 Analytical and Test Laboratories

There is no information regarding the laboratory used by Caraíba Metais, as well as any possible accreditations held and independence status.

CBPM used Lakefield Geosol Limitada (Geosol) in Belo Horizonte, Brazil, for sample preparation and analysis. Geosol was independent of CBPM. Geosol is now ISO 9001, 14001, and 17025 accredited, but the CP is not aware of any accreditations at the time the analyses were performed.

Mirabela Brazil used ALS Chemex (now ALS Brazil) for analyses. Sample preparation was completed in Brazil. The ALS-operated analytical laboratories in Perth, Australia (ALS Perth), and Vancouver, Canada (ALS Vancouver), assayed the pulps. ALS Chemex was independent of Mirabela Brazil. ALS Brazil is currently 9001 accredited, but the CP is not aware of any accreditations at the time of the analyses. The ALS Perth and ALS Vancouver laboratories were ISO 9001:2000 accredited. ALS Vancouver is accredited to ISO 17025 by Standards Council of Canada for a number of specific test procedures including fire assay gold by atomic absorption (AA), inductively coupled plasma (ICP) and gravimetric finish, and multi-element ICP and AA assays for silver, copper, lead, and zinc.

Umpire assay checks were completed by ACME Analytical Laboratory Ltd (ISO 9001:2000 accredited) in Vancouver, Canada (ACME), and Ultra Trace Analytical Laboratories (ISO 17025 accredited), in Perth, Australia (Ultra Trace, now Bureau Veritas). Both laboratories were independent of Mirabela Brazil.

Analysis for non-sulphide nickel was conducted in May 2005 to determine the sulphide nickel portion of the total nickel assay result. Pulps were submitted to ALS Chemex and Genalysis Laboratory Services Pty Ltd. (Genalysis, now Intertek), in Perth. Genalysis was ISO/IEC 17025 accredited, which includes the management requirements of ISO 9001:2000. Genalysis was independent of Mirabela Brazil.

From 2018 to 2021, Atlantic Nickel used ALS Global for sample preparation and analysis. ALS Global is independent of Atlantic Nickel. Sample preparation was completed in Brazil. Sample pulps were submitted to the ALS laboratory in Lima, Peru (ALS Lima) or ALS Vancouver for analysis. The ALS laboratories are ISO 9001:2015 and ISO/IEC 17025:2017 accredited for specific test procedures including fire assay gold by AA, ICP and gravimetric finish, and multi-element ICP and AA assays.

For 2022 drilling campaign, Atlantic Nickel used SGS Geosol Laboratórios Ltda. (SGS Geosol). The SGS Geosol is an independent laboratory that is ISO 9001:2015, ISO 14001:2015, and ISO/IEC 17025:2017 accredited.

The mine laboratory is used by Atlantic Nickel to prepare and analyse production samples.

11.4 Sample Preparation and Analysis

11.4.1 Legacy

11.4.1.1 Geochemical Analysis

The sample preparation procedures used by Caraíba Metais for soil and stream sediment analysis are not recorded. Samples were analysed for nickel, chromium, cobalt, copper, lead and zinc, with selected samples also analysed for silver, platinum and palladium.

The sample preparation procedures used by CBPM are not recorded. The samples were analysed for the following sample suites:

- Au (detection limit = 1 ppb) by atomic absorption, and Pt (detection limit = 10 ppb) and Pd (detection limit = 1 ppb) by optical emission spectrometry following an aqua regia digest;
- Ag, Al, As, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, La, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Sr, Ti, V, Sn, W, Y, Zn, and Zr by ICP-AES following an aqua regia digest.

All Mirabela Brazil samples were analysed by ALS Chemex using the ICP41, PGM-ICP23, and OG62 analytical techniques. Sample preparation (PREP-41) included the weighing and drying of samples prior to dry-sieving the sample to -180 µm (80 mesh). Analytical methods included:

- Al, As, B, Ba, Be, Bi, Ca%, Cd, Co, Cr, Cu, Fe%, Ga, Hg, K%, La, Li, Mg%, Mn, Mo, Na%, Ni, Ni%, P, Pb, S%, Sb, Sc, Sr, Ti%, Tl, U, V, W and Zn were analysed by ICP-AES following aqua regia digestion;
- Au (detection limit = 5 ppb), Pt (detection limit = 1 ppb), Pd (detection limit = 1 ppb), Ag (detection limit = 0.2 ppm) were assayed by fire assay using a lead collector and ICP-AES finish.

11.4.1.2 RC and Core Sample Analysis

Routine sample preparation and analysis for the Mirabela Brazil programs was completed by ALS Chemex. Sample preparation was completed at the ALS sample preparation facility in Luziânia, Brazil until February 2006 and in Belo Horizonte, Brazil after 2006.

Samples were received at the laboratory, logged into the system, weighed, and dried. Drying time and temperatures are not known. Sample preparation included crushing the half core with a jaw crusher (70% passing 2 mm). A riffle splitter was used to obtain a representative sub-sample. This crushed sub-sample was ground to a pulp with 85% passing 75 µm. A 200 g portion of this was sub-sampled and packaged into a sealed bag and shipped to ALS Perth or ALS Vancouver.

Most of the assaying was completed using ICP-AES. PGMs were assayed by 30 g lead-collector fire assay and either ICP-AES or ICP-mass spectroscopy (MS). Some samples were fire assayed using nickel sulphide collection for PGMs and an induced neutron activation analysis (INAA) finish.

The analytical methods used by ALS during this drilling phase include:

- PGM-MS23: Pt, Pd, Au package using 30 g lead collector fire assay with ICP-MS finish;
- ME-ICP41: 34 elements by aqua-regia acid digestion and ICP-AES;
- ME-ICP61: 27 elements by four-acid digestion and ICP-AES;
- ME-OG62: anomalous grade elements, four-acid digestion with ICP-AES for use as over-limit method, though atomic absorption spectroscopy (AAS) can be substituted;
- Cu-OG62: anomalous grade Cu, four-acid digestion with ICP-AES for use as over-limit method, though AAS can be substituted;
- Ni-OG62: anomalous grade Ni, four-acid digestion with ICP-AES for use as over-limit method, though AAS can be substituted;
- PGM-ICP27: anomalous grade Pt, Pd and Au, lead-collector fire assay and ICP-AES, 30 g nominal sample weight, duplicate analysis;
- PGM-MS27: anomalous grade Pt, Pd and Au, lead-collector fire assay and ICP-MS, 30 g nominal sample weight.

The pulp samples submitted in 2005 to determine the sulphide nickel portion of the total nickel assay result were analysed by the following techniques:

- ALS Chemex: total Ni–OG62-L; ascorbic acid method; ascorbic acid digestion with AAS finish;
- Genalysis: PA2/OES hydrogen peroxide, ascorbic acid digestion with ICP-optical emission spectroscopy (OES) finish specific for sulphide Ni.

11.4.1.3 Production Samples

Samples from the blast holes were delivered to the laboratory by Mirabela Brazil staff. Samples were then passed through a jaw crusher to ensure that a minimum particle size of 3 mm was achieved. A sub-sample of approximately 950 g was then taken from each sample by means of cone-and-quartering of the original sample. This 950 g sub-sample was then pulverised in a ring-and-puck pulverizer to a nominal particle size of 85% passing 200 mesh (approximately -75 µm).

For both blast hole samples and RC samples, a 15 g aliquot of the pulverised sample was collected and pressed into a pressed pellet disc for analysis. The analysis of the nickel, copper, cobalt, iron, sulphur, magnesium, and silicon quantities is carried out using an X-ray fluorescence (XRF) unit. The analytical results were then forwarded to the geology department by e-mail.

11.4.2 Atlantic Nickel

11.4.2.1 RC and Core Sample Analysis

ALS Global was the primary laboratory for analyses of drill samples for the 2018–2021 drill campaign. Sample preparation was accomplished at the ALS facility in Belo Horizonte, Brazil. The procedure consists of crushing to >70% of the sample passing 2 mm and pulverising to >85% of the sample passing 75 µm. Assays were completed at ALS Lima and ALS Vancouver.

The majority of the assaying was completed using ICP-AES. PGMs were assayed by 30 g lead-collector fire assay and either ICP-AES or ICP-MS. Some samples were fire assayed using nickel sulphide collection for PGMs and an INAA finish.

The analytical procedures used by ALS Global included:

- ME-ICP61: 33 elements by four acid digestion and ICP-AES finish;
- ME-ICP62: 15 elements by four acid digestion and ICP-AES finish;
- Ni-ICP05: NiS analysis using ammonium citrate/hydrogen peroxide digestion and ICP-AES;
- PGM-MS23: Pt, Pd, Au package using 30 g lead-collector fire assay with ICP-MS finish;
- C-IR08: For S; LECO furnace and infrared spectroscopy.

The 2022 drill samples were prepared at SGS. Sample preparation was accomplished by SGS in Minas Gerais, Brazil. The procedure consists of crushing to >70% of the sample passing 2 mm and pulverising to >85% of the sample passing 75 µm. Assays were completed at SGS Geosol in Minas Gerais, Brazil.

The majority of the assaying was completed using ICP-OES. PGMs were assayed by 30 g lead- collector fire assay and either ICP-OES or ICP-MS. Some samples were fire assayed using nickel sulphide collection for PGMs and an AAS finish.

The analytical procedures used by SGS Geosol are summarised in Table 11-1.

Table 11-1: Analytical Procedures, SGS – Atlantic Nickel
ACG Acquisition Company Limited – Santa Rita Mine

Laboratory Code	Description	Elements	Lower Detection Limit
GE_ICP40Q	Determination of 33 elements by four-acid digestion, Finish by ICP-OES and ICP-MS	Ag, Be, Cd, La, Sc, Sr, Zr, Y	0.5 ppm
		Ba, Co, Cr, Cu, Mo, Ni, V, Zn	1 ppm
		Bi, W	5 ppm
		Li, Mn, Pb	2 ppm
		As	3 ppm
		Sb, Sn	10 ppm
		Ca	0.005%
		Al, Fe, K, Mg, Na, P, S, Ti	0.01%

Laboratory Code	Description	Elements	Lower Detection Limit
ICP40B_S	Determination of 9 elements by four-acid digestion, Finish by ICP-OES and ICP-MS	Ag	100 ppm
		Co, Cu, Ni, Pb	1%
		Fe, Mg	15%
		S	10%
		Te	500 ppm
FAA323	Determination of Au, Pt and Pd by FAA (30 g charge)	Au	0.02 ppm
FAI313	Determination of Au, Pt and Pd by FAI ICP (30 g charge)	Au, Pt, Pd	0.01 ppm
AAS04B	Determination of Ni, Co and Cu by two-acid digestion AAS finish	Cu, Co, Ni	0.01%
XRF72_NL	Determination of NiO by XRF (lithium tetraborate fusion)	Al_2O_3	0.10%
		CaO, Cr_2O_3, Fe_2O_3, K_2O, MnO, NiO, P_2O_5, TiO_2	0.01%
		Co	0.005%
		MgO, Na_2O, SiO_2	0.10%

11.4.2.2 Grade Control Samples

Grade control samples were collected from under the cyclone on blast hole drills. The cones were shoveled and quartered manually. The quarter was rolled to homogenize and then split in a riffle splitter. Samples were sent to the Atlantic Nickel laboratory on site. Samples were then sent to the laboratory where they were dried and crushed to nominal 2 mm, homogenised, and split in a riffle splitter. Samples were pulverised to 95% passing 270 mesh. Samples were analysed by XRF using samples fused with lithium borate flux. Sulphur was analysed by LECO. Sulphide nickel was determined using ammonium citrate/hydrogen peroxide decomposition and an ICP-AES finish.

11.5 Quality Assurance and Quality Control

11.5.1 Legacy

Quality control measures for the Caraíba Metais (1985–1989) and CBPM (1989–2002) analytical programs are not documented. The legacy drill data are limited and have largely been verified by later drilling.

11.5.1.1 2004–2008

The QA/QC procedures for the 2004–2008 programs completed by Mirabela Brazil included five certified reference material (CRM, or standards), coarse reject duplicates, and umpire laboratory checks for pulps. The insertion rate was approximately 2% for blanks and standards. The insertion rate for sample duplicates was 5%.

Submission blanks of either flux or pure quartz were inserted at the beginning of each drill hole and for every sample number ending in 50 or 00 (every 50 samples, or 2%). Gossage et al. (2009) reported that blank material submitted returned satisfactory results. A limited number of nickel and copper blanks returned elevated grades suggesting low level contamination (generally <0.01% Ni, <0.006% Cu, and <5 ppm Co) at the sample preparation process. These were not considered material.

Standards were purchased from Geostats Pty Ltd (Geostats). A standard was inserted at sample numbers ending with 20 and 70 (every 50 samples, or 2%). Standards covered the entire nickel grade range and were rotated into the sample sequence. Standards were certified for nickel, copper, and cobalt. There was no standard for platinum, palladium, or gold. Gossage et al. (2009) concluded that the standard assaying generally fell within acceptable ranges. The majority of standard results were within the tolerance limits. A small number of standard results were outside the accepted standard range. The batches including failed standard results were flagged and investigated by Mirabela Brazil personnel. The standards indicate the assaying is accurate for nickel and cobalt, and is suitable for the purposes of grade estimation and mine planning studies. The standard assaying for other elements is occasionally problematic, but the umpire assaying supports the overall accuracy of the assaying by the various ALS laboratories.

Sample duplicates from coarse rejects were prepared by the preparation laboratory after the primary crushing phase of sample preparation. The crushed sample was split using a riffle or rotary splitter and a second sample or coarse reject duplicate was collected. The sample and duplicate sample was pulverised and inserted into the sample batch. The duplicated insertion rate was every 20 samples (5%). Gossage et al. (2009) concluded the duplicate results indicated that the sample preparation was adequate and was not impacting the precision of the majority of assaying. It was noted that gold duplicate assaying was more problematic, and pulverisation was potentially insufficient to ensure precise assaying for gold.

Routine particle size fraction analysis was completed by the laboratory to check particle size distribution and homogeneity of the sample at different stages during the sample preparation process. These analyses were completed at a rate of one per batch.

Independent umpire assaying of pulps was performed at the discretion of the geologist. Gossage et al. (2009) reported that 348 umpire samples were investigated at ACME and Ultra Trace.

ACME versus ALS:

- Ni data were not significantly biased.
- Co data showed a significant bias.
- Pd and Pd were not significantly biased.
- Au results exhibited a possibly significant bias.

Ultra Trace versus ALS:

- Excellent correlation noted for Ni. Slight positive bias in favour of ALS is noted for assays >0.8% Ni.
- Excellent relative accuracy is noted for the Cu.
- Excellent relative accuracy is noted for Co.
- Pt and Pd umpire assays showed no significant bias.
- Au umpire assays exhibited significant bias and data scatter.

11.5.1.2 2011–2012

Barnes and Corley (2012) reported that blank sample submissions from the Mirabela Brazil program at ALS returned satisfactory results. Some nickel and copper blanks returned elevated values (generally <0.02% Ni, <0.006% Cu, and <5 ppm Co), however, this was not considered to be a material issue.

Barnes and Corley (2012) reported that the standards were generally within acceptable ranges, with the majority of samples falling within the tolerance limits. Barnes and Corley (2012) concluded that the assaying completed for the 2011–2012 drill campaigns was acceptably accurate for nickel, copper and cobalt, and suitable to be used in grade estimation and mine planning studies.

Crushed sample duplicates were inserted at the sample preparation laboratory for every 20 samples for an insertion rate of 5%. Good correlation was observed for nickel, copper, and cobalt. The duplicates were not analysed for platinum, palladium, and gold.

No umpire assaying of pulps was completed.

Barnes and Corley (2012) concluded that the sampling methods, chain of custody procedures, sample preparation procedures, and analytical procedures were appropriate and compatible with accepted industry standards.

11.5.2 Atlantic Nickel

11.5.2.1 RC and Drill Core QC

The QA/QC protocol for the Atlantic Nickel drill campaign included blanks, coarse duplicates, pulp duplicates, and CRMs. A total of nine QA/QC samples were inserted into each batch of 200 samples for an insertion rate of 4.5% (Table 11-2).

During the 2021-2022 drilling campaign, Atlantic Nickel continued to follow a reasonable standard of data control and the QA/QC data is suitable to support Mineral Resource estimation. Further details for the Santa Rita and Palestina QA/QC procedures are presented below.

The discussion below is based on data used for Mineral Resources estimation (2020-2021). The 2022 drilling campaign is still ongoing and was partially reviewed for the control protocols. The Palestina database was not considered in this analysis, however, all samples from this target were submitted for QA/QC analysis.

Table 11-2: QA/QC Insertion Rate
ACG Acquisition Company Limited – Santa Rita Mine

Type	Santa Rita	Palestina
	Insertion Rate (%)	
Standard	2.0	1
Blank	0.5	7
Coarse duplicate	1.0	2.3
Pulp duplicate	1.0	2.4
Total	**4.5**	**8**

11.5.2.1.1 Standards

The CRMs used by Atlantic Nickel were produced by African Minerals Standards (AMIS). GeoEstima's review for this CPR is based on the Mineral Resource database (with a cut-off date of February 25, 2021), while additional QA/QC results from 2022 drill holes were reviewed only partially and are not included in the evaluation of Mineral Resources.

Control charts for each standard and analyte were prepared (Table 11-3, Figure 11-1 through Figure 11-11). In each control chart, outliers were identified and removed prior to assessing the laboratory bias. Most of the identified biases were within acceptable limits (-7% to +7%), with the exception of the AMIS0520 for Ni(%) which presents a very low reference value and high bias (approximately 80%). Most of the coefficients of variation (CV) for nickel, copper, and cobalt are within the ±10% limit generally accepted in the industry and CVs for palladium and platinum are acceptable. For gold, CVs are in the order of ±15% which is considered to be acceptable given the grade of the standards.

Table 11-3: Santa Rita Certified Reference Material Results - ALS Laboratory, 2021
ACG Acquisition Company Limited – Santa Rita Mine

Standard	Element	Unit	Mean	Best Value	Samples	Outliers	Outliers (%)	Bias (%)	CV
AMIS0319	Au_ppm	ppm	0.035	0.038	436	6	1.38	-7.74	15.25
AMIS0319	Co_ppm	ppm	121.6	115	459	6	1.31	5.74	4.74
AMIS0319	Cu_pct	pct	0.124	0.1223	459	6	1.31	1.79	11.49
AMIS0319	Ni_pct	pct	0.155	0.1675	474	8	1.69	-7.25	10.24
AMIS0319	Pd_ppm	ppm	0.356	0.353	436	6	1.38	0.98	12.22
AMIS0319	Pt_ppm	ppm	0.189	0.185	436	6	1.38	2.16	11.33
AMIS0319	S_pct	pct	1.309	1.29	459	6	1.31	1.45	11.59
AMIS0320	Au_ppm	ppm	0.037	0.039	428	8	1.87	-5.39	14.99
AMIS0320	Co_ppm	ppm	227.461	219	454	5	1.10	3.86	8.37
AMIS0320	Cu_pct	pct	0.163	0.1624	454	3	0.66	0.12	8.27
AMIS0320	Ni_pct	pct	0.458	0.4731	468	4	0.86	-3.27	8.79
AMIS0320	Pd_ppm	ppm	0.748	0.746	428	6	1.40	0.30	10.25
AMIS0320	Pt_ppm	ppm	0.325	0.316	428	6	1.40	3.00	9.97
AMIS0320	S_pct	pct	2.844	2.81	454	4	0.88	1.21	9.13
AMIS0385	Au_ppm	ppm	0.03	0.031	422	7	1.66	-1.96	11.69
AMIS0385	Co_ppm	ppm	915.691	934	442	2	0.45	-1.96	6.97
AMIS0385	Cu_pct	pct	0.943	0.9629	442	2	0.45	-2.02	7.30
AMIS0385	Ni_pct	pct	1.658	1.73	469	22	4.69	-4.15	11.22
AMIS0385	Pd_ppm	ppm	0.123	0.12	422	4	0.95	2.86	8.12
AMIS0385	Pt_ppm	ppm	0.032	0.029	422	8	1.90	9.99	15.94
AMIS0385	S_pct	pct	10.279	13.05	452	4	0.89	-21.23	8.33
AMIS0520	Co_ppm	ppm	82.626	82	425	5	1.18	0.76	8.40
AMIS0520	Ni_pct	pct	0.04	0.1945	440	19	4.32	-79.42	70.39

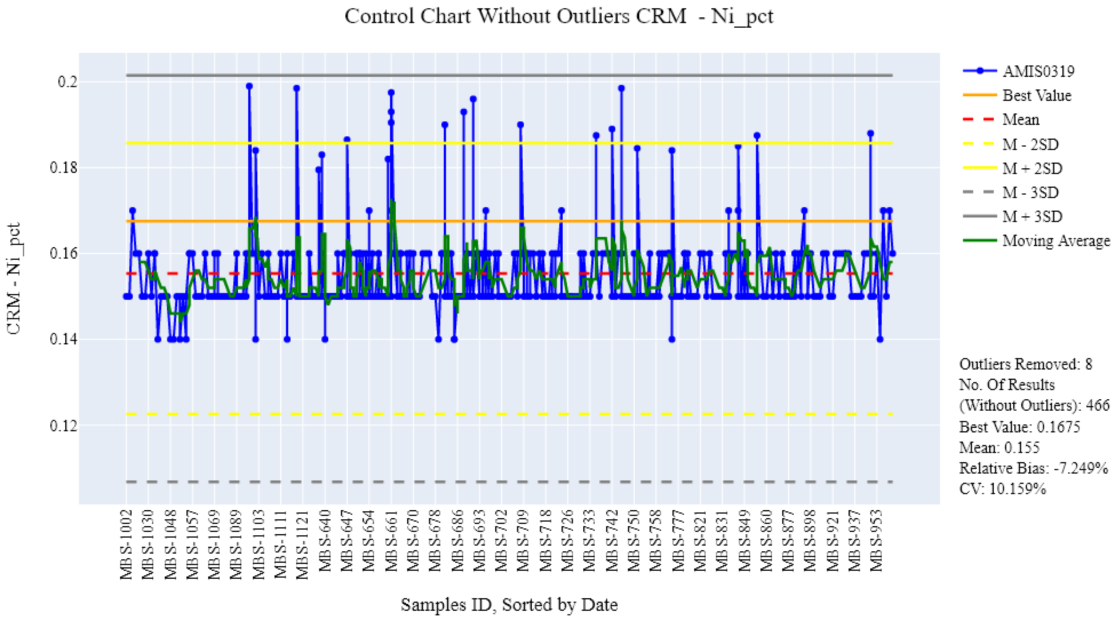


Figure 11-1: Santa Rita Control Chart – Ni (%) - STD-AMIS0319

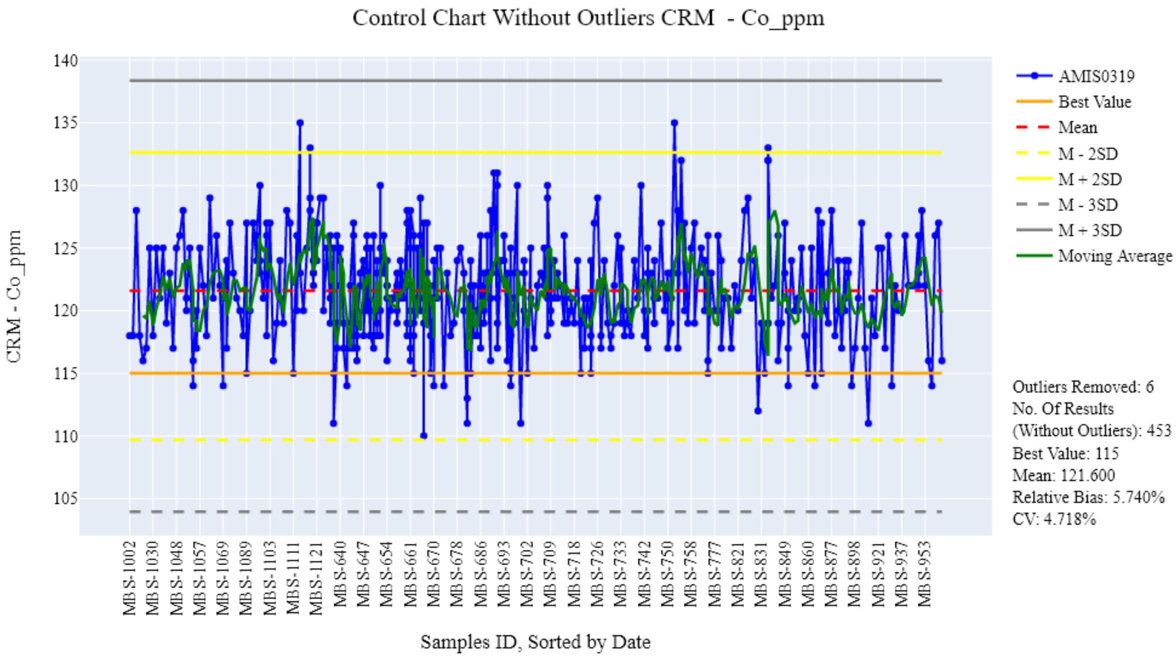


Figure 11-2: Santa Rita Control Chart –Co (%) - STD-AMIS0319

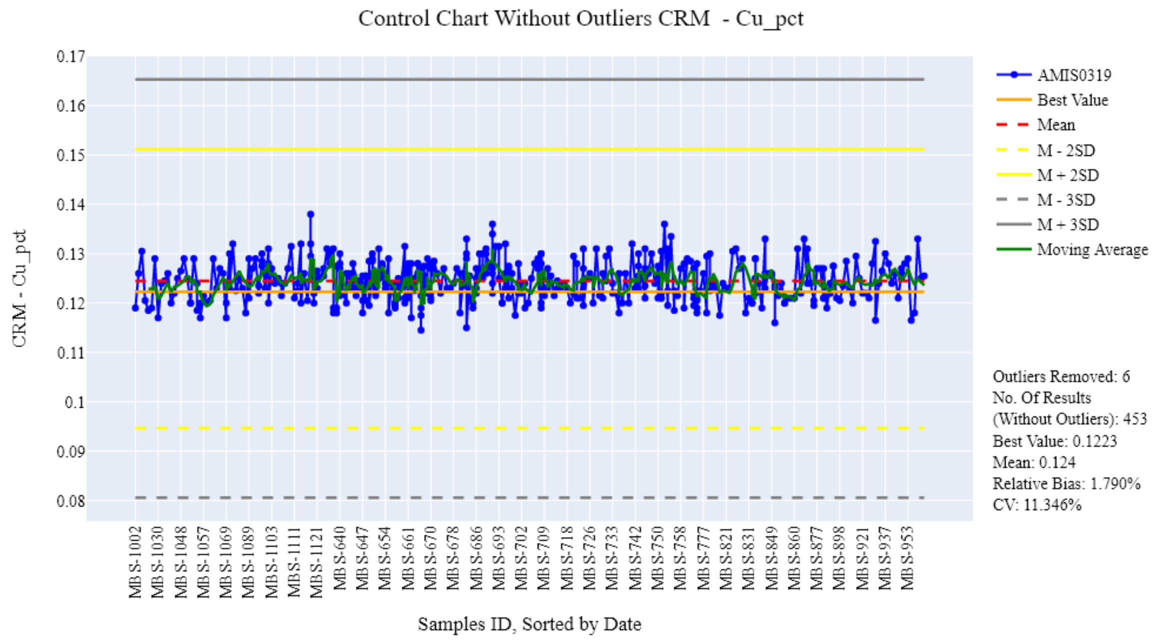


Figure 11-3: Santa Rita Control Chart – Cu (%) - STD-AMIS0319

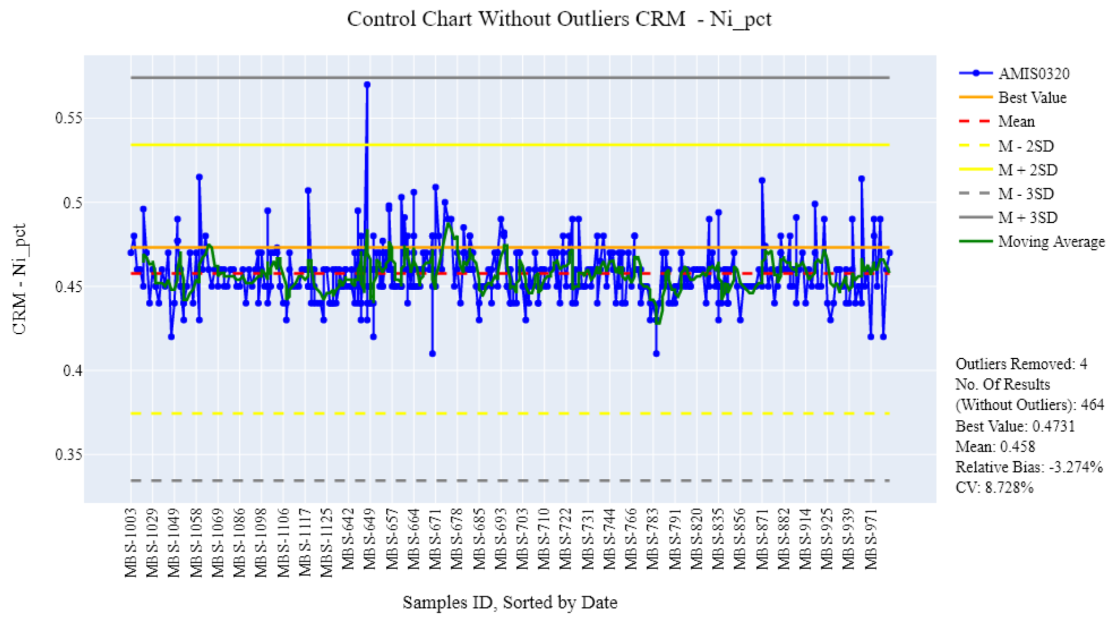


Figure 11-4: Santa Rita Control Chart – Ni (%) - STD-AMIS0320

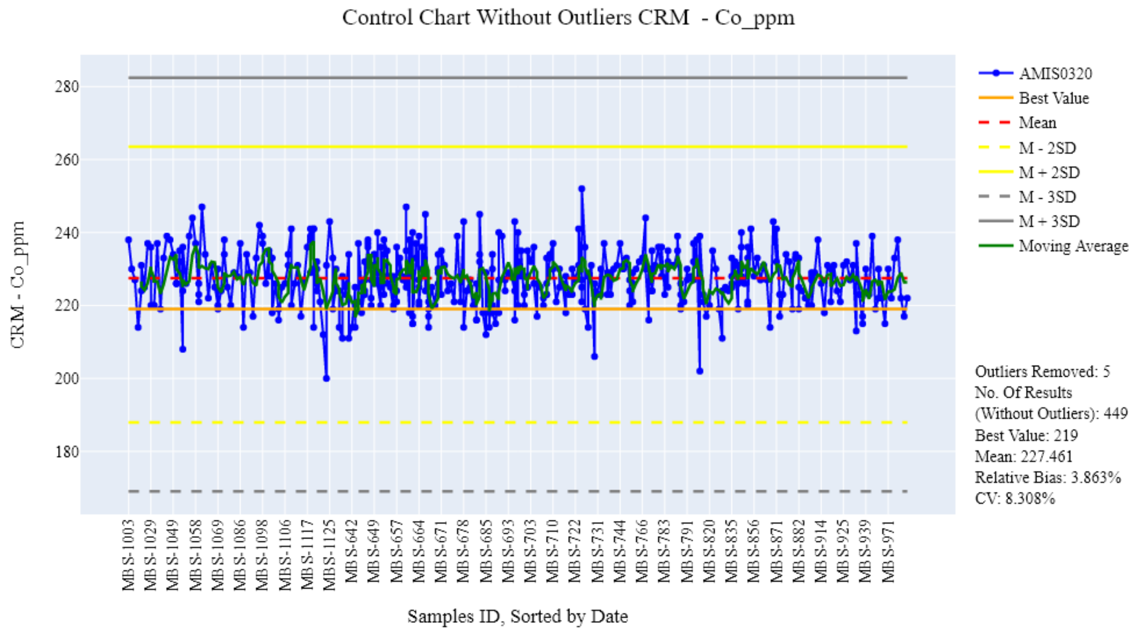


Figure 11-5: Santa Rita Control Chart –Co (%) - STD-AMIS0320

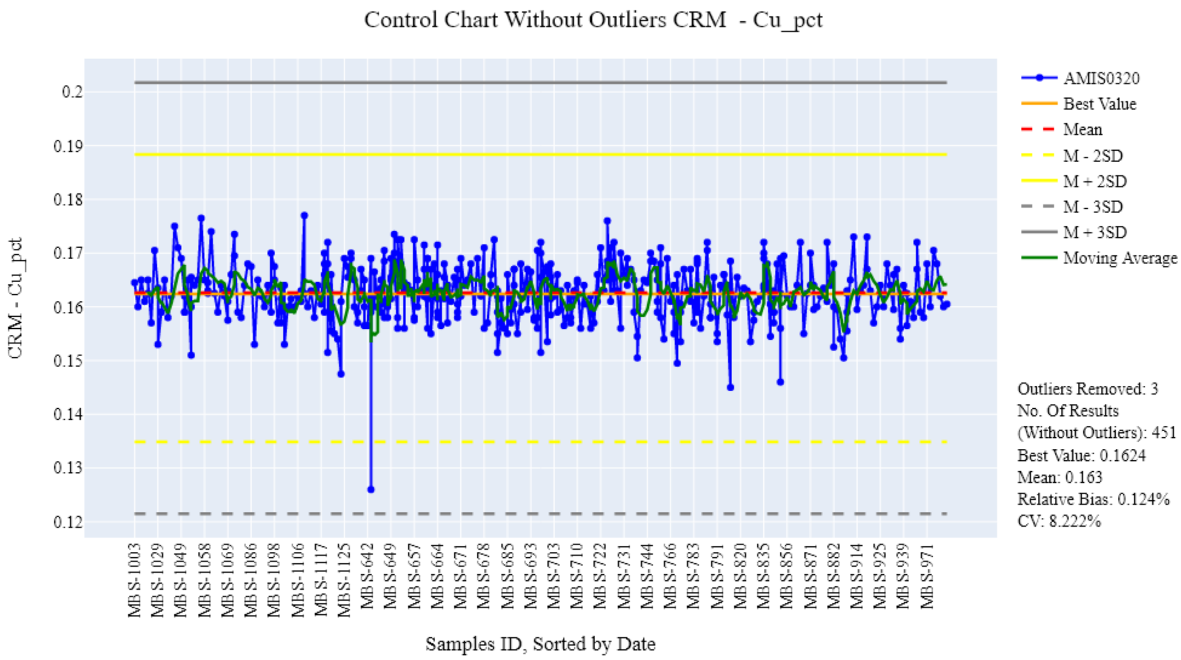


Figure 11-6: Santa Rita Control Chart – Cu (%) - STD-AMIS0320

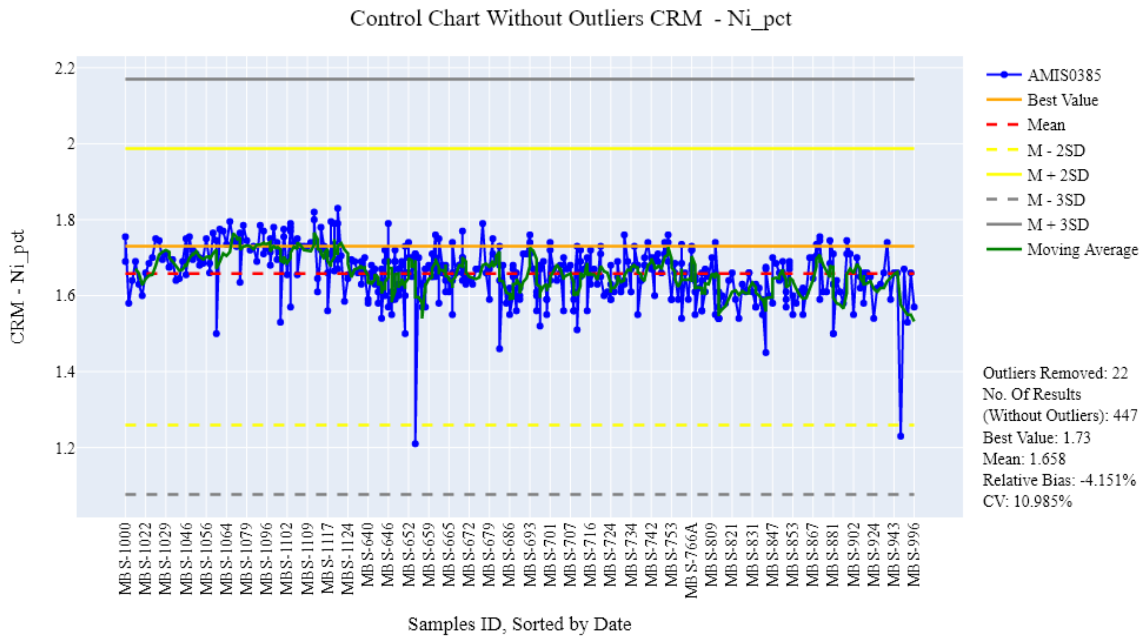


Figure 11-7: Santa Rita Control Chart – Ni (%) - STD-AMIS0385

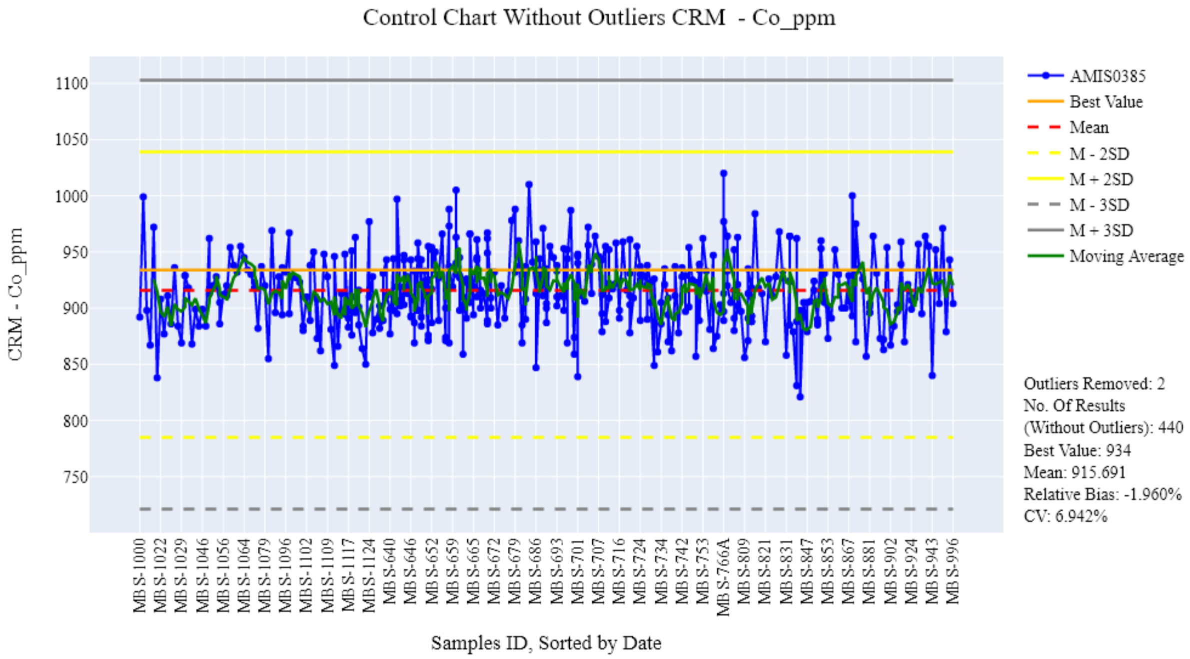


Figure 11-8: Santa Rita Control Chart –Co (%) - STD-AMIS0385

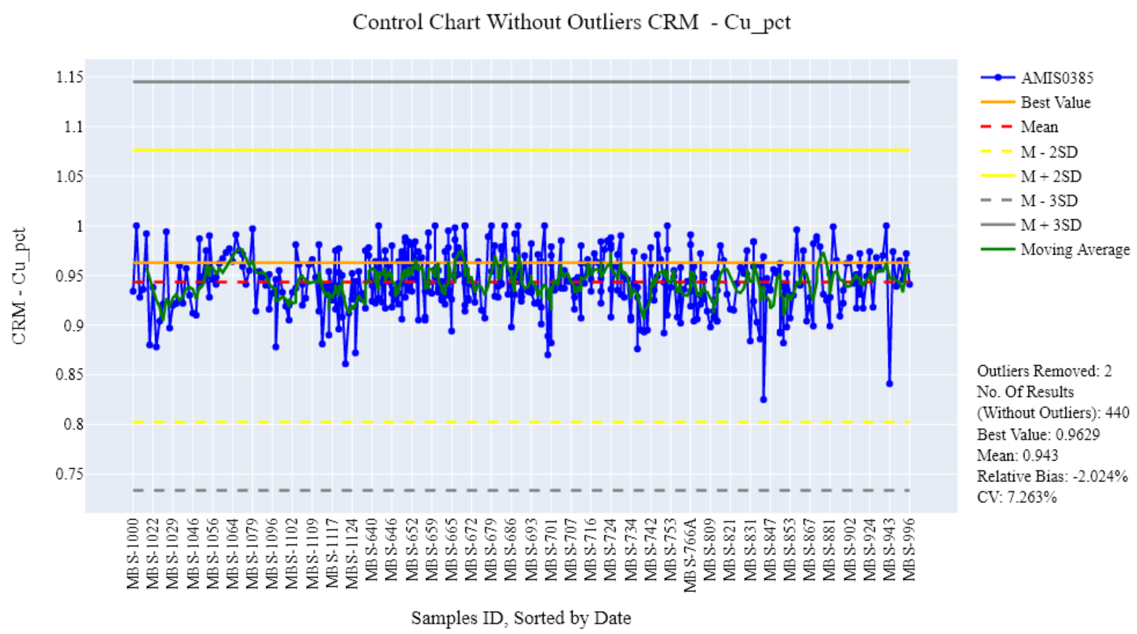


Figure 11-9: Santa Rita Control Chart – Cu (%) - STD-AMIS0385

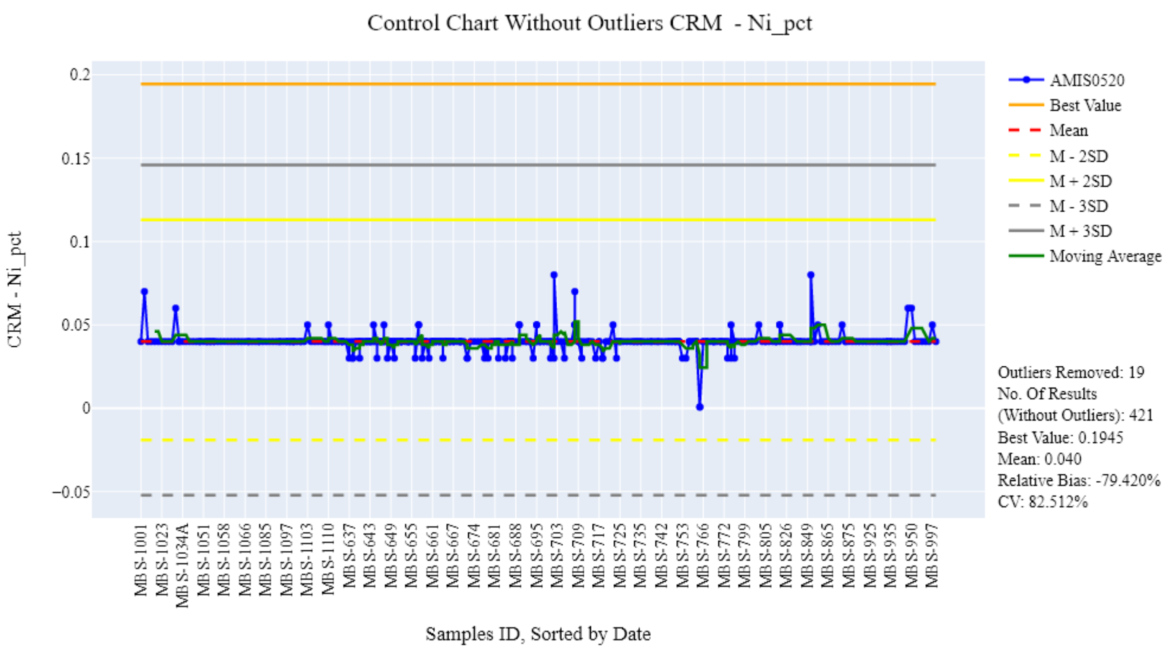


Figure 11-10: Santa Rita Control Chart – Ni (%) - STD-AMIS0520

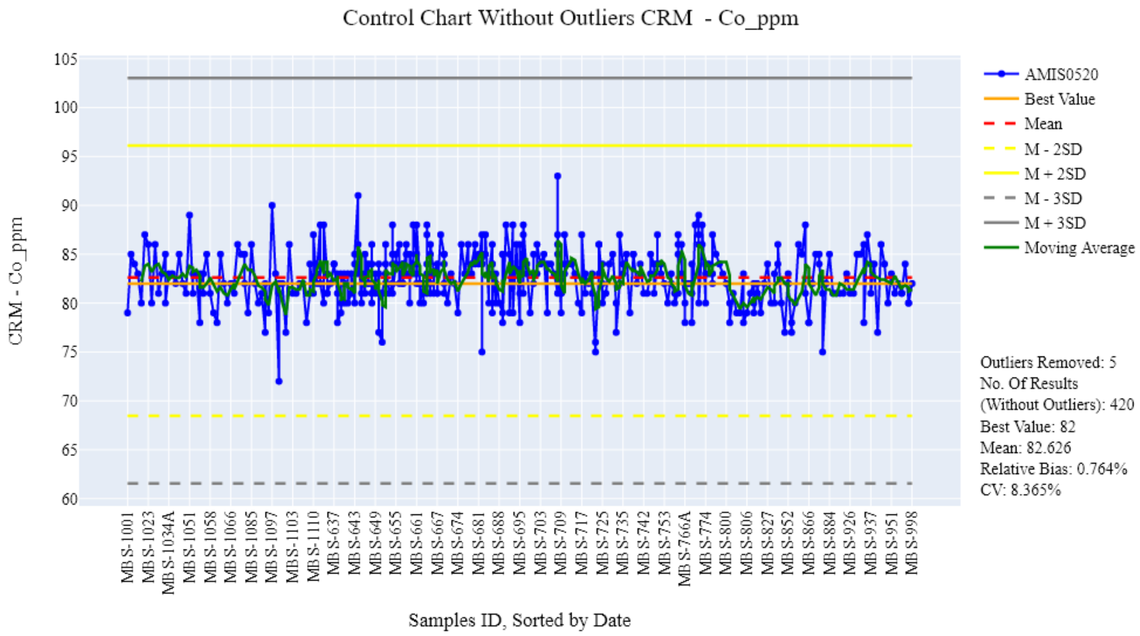


Figure 11-11: Santa Rita Control Chart –Co (%) - STD-AMIS0520

11.5.2.1.2 Blanks

Contamination was assessed using blank charts (Figure 11-12 through Figure 11-14), where the blank values were plotted against the sample values. No significant cross-contamination during preparation and assaying for gold, copper, nickel, platinum, and palladium was identified. GeoEstima identified a few blank samples with cobalt values greater than 50 ppm, which suggests that the blank material may contain anomalous cobalt or these may be sample swaps. The other elements show results that are outside the limits, however, no evidence of systematic contamination was noted.

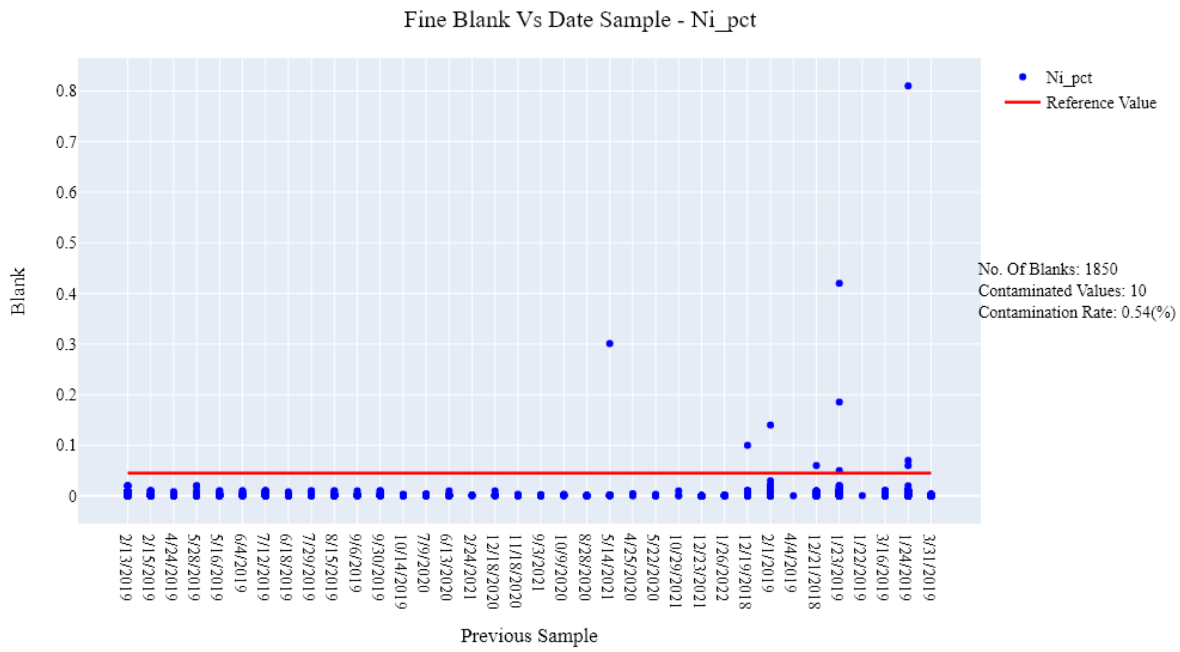


Figure 11-12: Fine-Blank Charts – Ni (%) – Santa Rita – ALS Laboratory

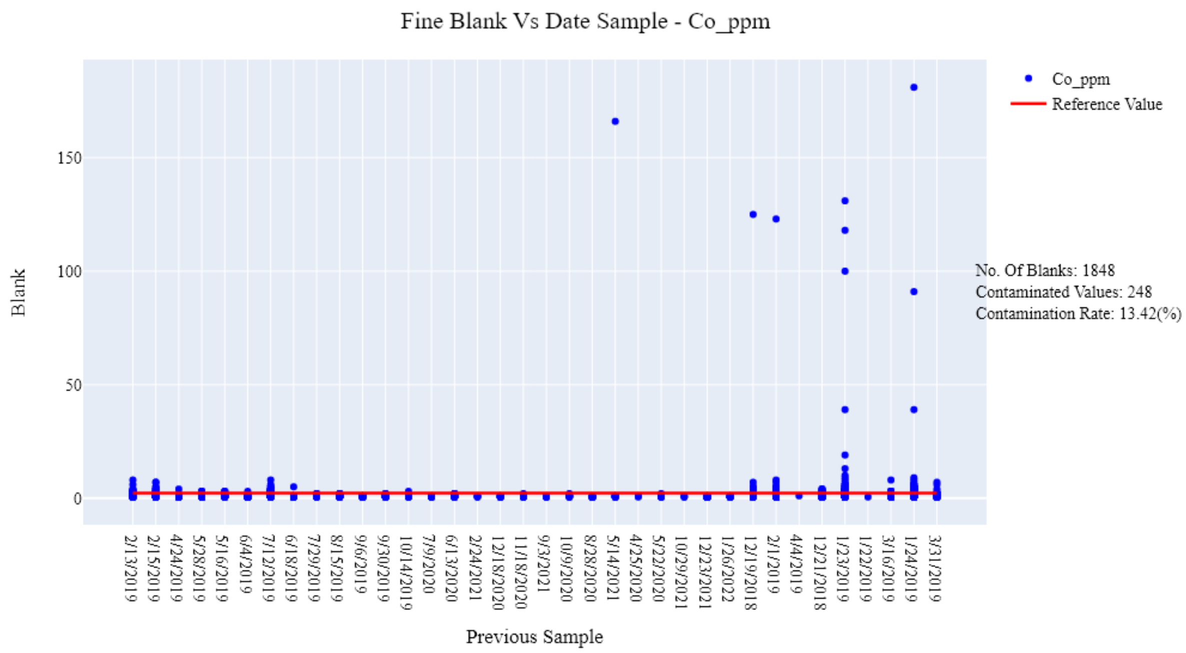


Figure 11-13: Fine-Blank Charts – Co (%) – Santa Rita – ALS Laboratory

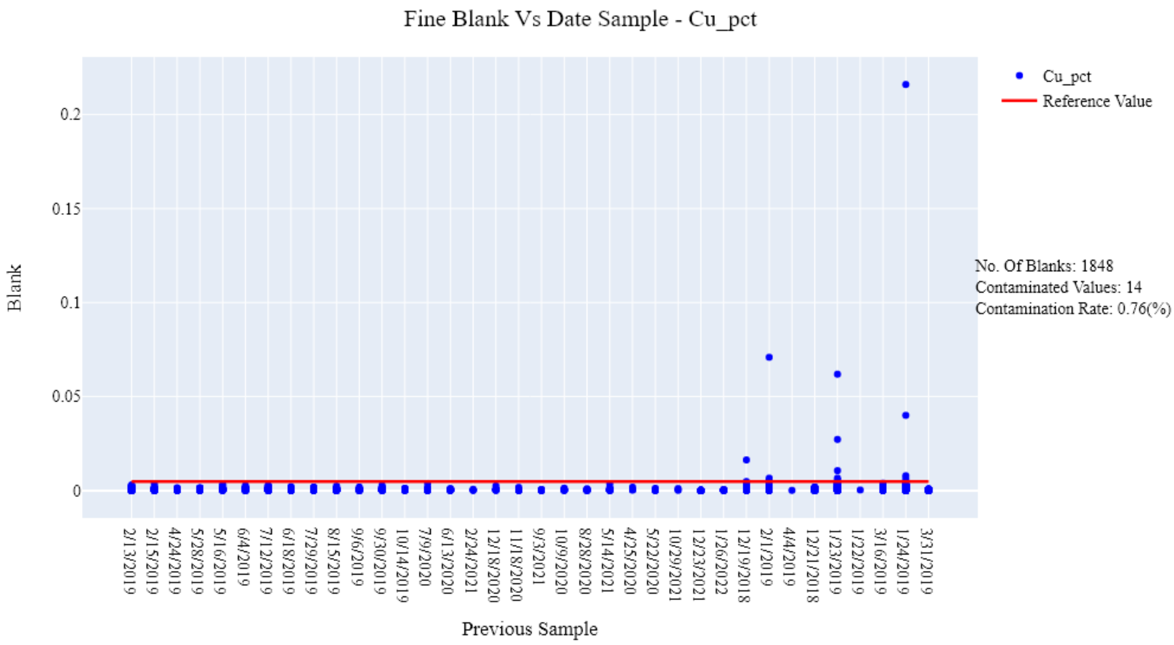


Figure 11-14: Fine-Blank Charts – Cu (%) – Santa Rita – ALS Laboratory

11.5.2.1.3 Duplicates

The precision was assessed using Max-Min plots and the hyperbolic method (Simon, 2004) for pulp and field duplicates (Figure 11-15 through Figure 11-17).

Table 11-4 shows the results for the Mineral Resource database and Table 11-5, the preliminary results for the 2022 drilling campaign.

Most of the resulting failure rates were within the conventionally acceptable range for all laboratories (less than 10%). The highest failure rate was observed in Ni (13.54%) but appears to have been due to possible sample mix-ups.

Table 11-4: Santa Rita Field-Duplicate Results – ALS Laboratory (2021)
ACG Acquisition Company Limited – Santa Rita Mine

Element	No. of Results	No. of Errors	Error Rate
Cu pct	182	1	0.55%
Ni pct	229	31	13.54%
Au ppm	114	2	1.75%
Pd ppm	114	2	1.75%
Pt ppm	114	4	3.51%
Co ppm	182	9	4.95%
S pct	185	0	0.00%

Table 11-5: Santa Rita Field-Duplicate Results – SGS Geosol (2022)
ACG Acquisition Company Limited – Santa Rita Mine

Element	No. Of Results	No. Of errors	Error Rate
Cu pct	84	0	0.00%
Ni pct	84	5	5.95%
Au ppm	84	5	5.95%
Pd ppm	84	0	0.00%
Pt ppm	84	5	5.95%
Co ppm	84	1	1.19%
S pct	84	1	1.19%

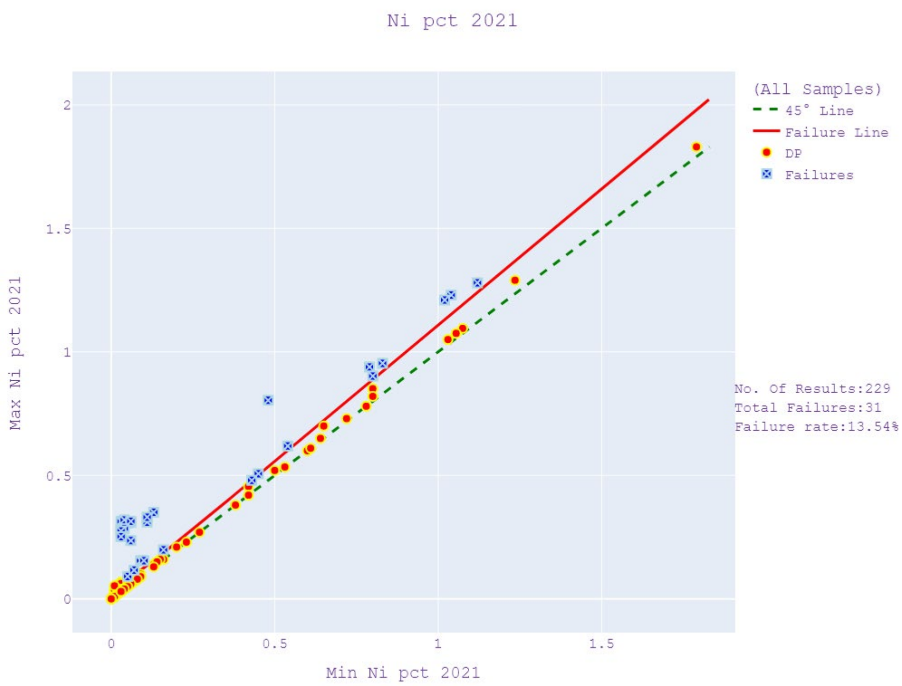


Figure 11-15: Field-Duplicate Analysis for Ni (%) – ALS Laboratory

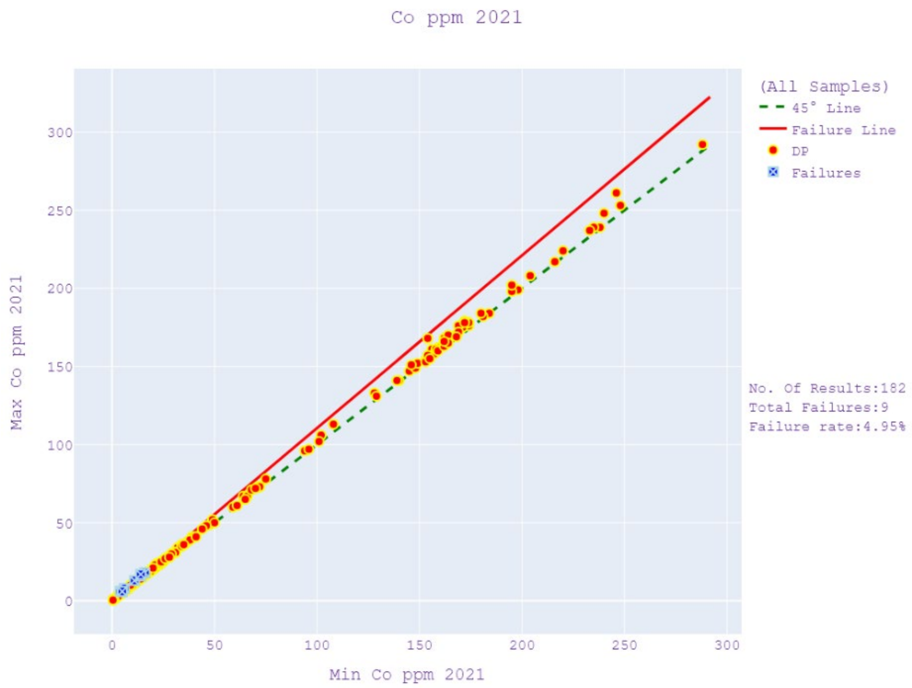


Figure 11-16: Field-Duplicate Analysis for Co (%) – ALS Laboratory

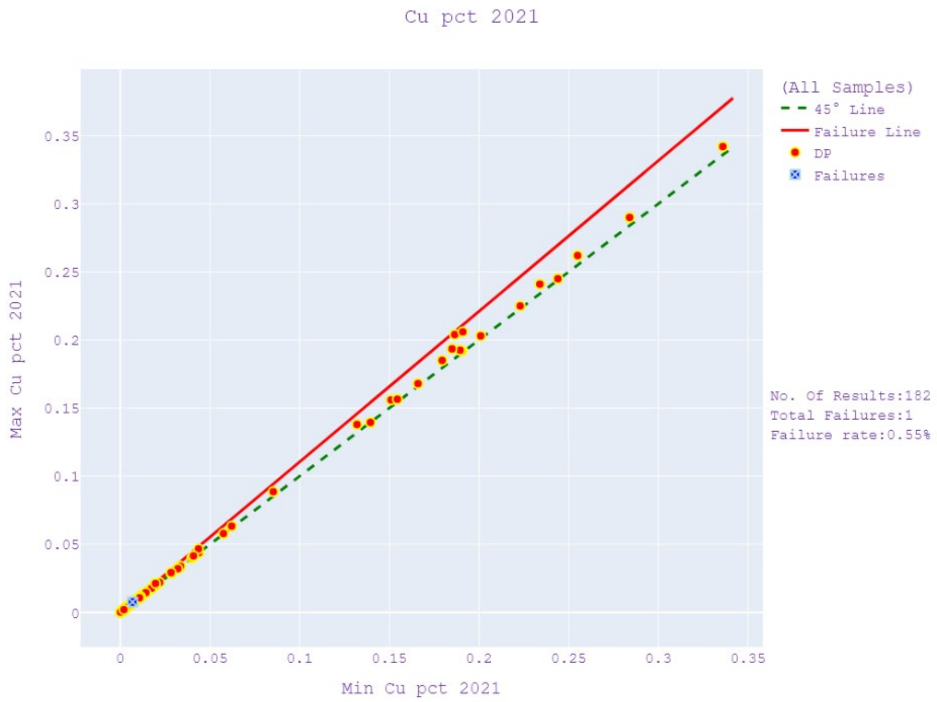


Figure 11-17: Field-Duplicate Analysis for Cu (%) – ALS Laboratory

11.5.2.2 Grade Control QC

Currently, the Santa Rita mine laboratory uses three types of QA/QC samples:

- Camp (field) duplicates are inserted randomly according to the instructions of the technician or supervisor; this sample is duplicated in the field, without the knowledge of the laboratory, each sample receives an identification generated at the time of registering with acQuire.
- Laboratory duplicates are inserted systematically; a duplicate sample is included every 20 samples, with numbers ending in “5”. For example: 5, 25, 45.
- Standards are systematically inserted by the laboratory; a standard is inserted every 20 samples, with numbers ending in “0”. For example: 0, 20, 40, 60.
- In the future, an additional blank (Gabbro NAG) will be included to monitor low-grade sulphur.

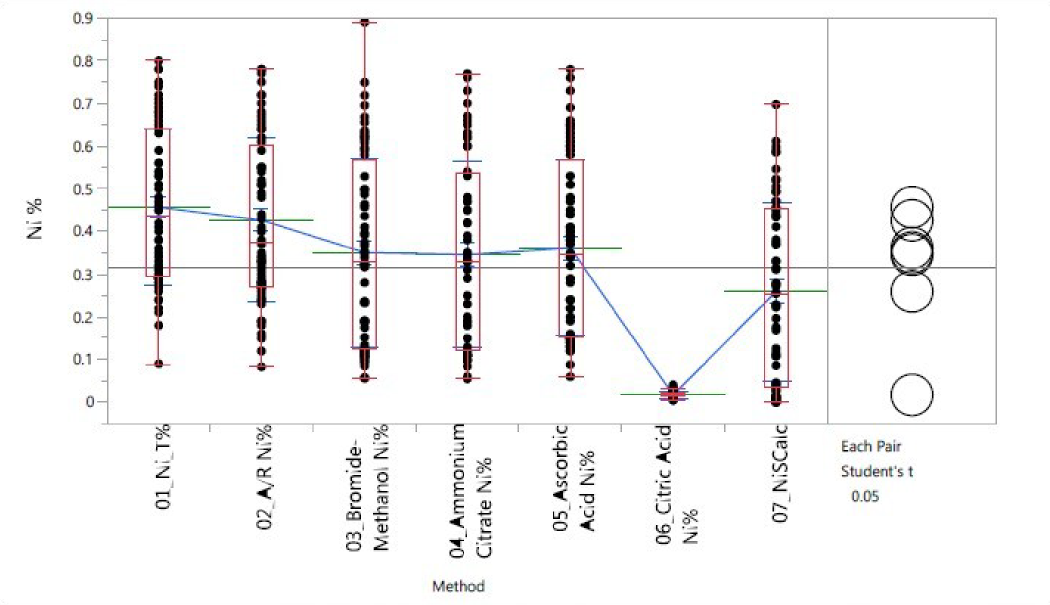
11.5.2.3 NiS Analysis

Prior to selecting the most appropriate method of NiS analysis for the 2018 Atlantic Nickel drill program, 30 harzburgite and 30 pyroxenite samples were submitted to the SGS laboratory in Lakefield, Ontario (SGS Lakefield) to compare the five NiS analytical procedures:

- Bromide-methanol digestion and AAS finish;
- Ammonium hydrogen peroxide digestion and ICP finish;
- Ascorbic acid digestion methods and ICP finish;
- Aqua regia digestion with ICP finish;
- Citric acid digestion and ICP finish.

The CP (Eggleston, 2019) reviewed the assay results for the five methods (Figure 11-18). The CP concluded that there was no quantifiable difference between the bromide-methanol, ammonium citrate, or ascorbic acid digestion methods. Any of these three methods should produce reliable NiS results. The CP concluded that aqua regia produced slightly higher NiS grades suggesting some Ni silicate was digested. The CP observed that the citric acid digestion was not useful, because nickel did not go into solution adequately.

The ammonium citrate–hydrogen peroxide digestion was selected for NiS analysis for the 2018– 2021 analytical programs.



Level	01_Ni_T%	02_A/R Ni%	03_Bromide-Methanol Ni%	04_Ammonium Citrate Ni%	05_Ascorbic Acid Ni%	06_Citric Acid Ni%	07_NiS Calc
Number	60	60	60	60	60	60	60
Mean	0.457	0.426	0.351	0.346	0.361	0.017	0.259
Std Dev	0.1838	0.1930	0.2219	0.2180	0.2068	0.0075	0.2088
Std Err Mean	0.0237	0.0249	0.0287	0.0281	0.0267	0.0010	0.0270
Lower 95%	0.4092	0.3764	0.2935	0.2893	0.3079	0.0152	0.2053
Upper 95%	0.5041	0.4761	0.4081	0.4019	0.4147	0.0191	0.3132
Minimum	0.09	0.08	0.06	0.06	0.06	0.00	0.00
10%	0.24	0.19	0.10	0.10	0.13	0.01	0.01
25%	0.29	0.27	0.12	0.12	0.15	0.01	0.04
Median	0.44	0.38	0.33	0.33	0.35	0.02	0.26
75%	0.64	0.61	0.57	0.54	0.57	0.02	0.45
90%	0.72	0.72	0.65	0.66	0.65	0.03	0.54
Maximum	0.80	0.78	0.89	0.77	0.78	0.04	0.70

Figure 11-18: Nickel Analysis Results by Method

11.6 Databases

Until 2018, the drill hole database was maintained in Microsoft (MS) Access. Prior to that time, there is no record of the database management practices or software. The drill hole data were migrated to an acQuire database in January 2019, and the entire database used in this Mineral Resource estimation was exported from that database. Since 2022, Atlantic Nickel has used Datamine's Fusion software for database management.

The database manager validated the drill hole data as it was received and imported it into the database. Verification was performed when data was imported to the main database. Validation included checks on surveys, collar coordinates, lithology data, and assay data. The checks were appropriate and consistent with generally accepted industry practices. QA/QC data were monitored as assay data were received.

From 2004 onward, assay data were received as digital files and imported directly into MS Access or later, acQuire with automated validation checks. Density data were input in MS Excel and directly imported. Geological logging data were recorded on paper and manually entered into the database with data entry masks that prevented entry of extraneous or obviously incorrect data.

The database manager validated the drill hole data as it was received and imported into the database. Verification was performed when data was imported to the main database. Validation included checks on surveys, collar coordinates, lithology data, and assay data. The checks were appropriate, and consistent with industry standards. QA/QC data were monitored as assay data were received.

11.7 Sample Security

11.7.1 Legacy

There is no record of sample handling or security measures used for drilling programs prior to 2004.

Sample security for the Mirabela Brazil drill campaigns is summarised, as follows, from Gossage et al. (2009).

Samples for each RC drill hole were placed into large plastic bags, with approximately 12 samples per bag. The bags were numbered and labelled with the enclosed sample numbers and then taped closed. In batches of approximately 1,000 samples, the large plastic bags of samples were loaded onto a truck and sent to the laboratory for preparation and subsequent analyses, together with a dispatch sheet.

Samples were inventoried and placed into shipping bags or crates and sealed. The shipping bags were numbered and labelled with the enclosed sample numbers and secured with tape. The shipping bags or crates were stored in a locked and secure facility until transported to the assay laboratory by a transport company. Samples were shipped to the laboratory for sample preparation in lots of approximately 1,000 samples. At each change of possession, a responsible person checked and verified the sample numbers and noted the condition of the samples, creating an auditable chain of custody paper trail.

11.7.2 Atlantic Nickel

Core was moved from the drill to the core shed by the drilling contractor. Core is stored in a locked logging facility when not attended. Split core (samples) are stored in a locked room until they are sent to the laboratory by truck. Samples are sealed with tamper evident seals and all shipments are accompanied by detailed sample submittal forms.

For transport to the analytical laboratory, each sample was noted on a shipping form, placed into a shipping bag and sealed. Shipping bags were inventoried and stored in a locked and secure facility until transported to the preparation laboratory in Belo Horizonte. Samples were checked and verified at each change of possession.

During 2018-2021, drill samples were submitted to ALS Brazil for sample preparation. Samples were logged into the laboratory system and weighed. Sample pulps were then shipped to ALS Lima or ALS Vancouver for analysis.

More recently, samples have been submitted for sample preparation to SGS in Belo Horizonte. Strict chain-of-custody procedures and signoffs were observed during any sample transfer.

11.8 CP Comments on “Item 11: Sample Preparation, Analyses, and Security”

In the opinion of the CP:

- Sample collection, preparation, analysis, and security for RC and core drill programs are in line with industry standard methods for nickel-copper deposits.
- Drill programs included insertion of blank, duplicate, and standard reference material samples.
- QA/QC program results do not indicate any issues with the analytical programs.
- Database construction and management and security are adequate.

- Data are subject to validation, and numerous checks that are appropriate and consistent with industry standards.
- Quality control could be improved at Palestina by including duplicate samples and applying same insertion rate applied in Santa Rita operations.

The CP is of the opinion that the quality of the nickel and copper analytical data is sufficiently reliable to support Mineral Resource estimation.

12.0 DATA VERIFICATION

12.1 External Data Verification

12.1.1 Coffey Mining

Gossage et al. (2009) completed an audit of the 2004 to 2008 drill hole database. The drill data was reviewed for 35 drill holes and 4,317 assay intervals. No material errors were identified.

12.1.2 Roscoe Postle Associates Inc.

RPA (2015) completed inspections of the field operating procedures in the open pit and an inspection of the on-site assay laboratory. Detailed discussions were conducted with relevant mine personnel. RPA (2015) completed data checks for 34 (5%) of the 676 drill holes contained in the exploration drill hole database at that time. This included an examination of collar locations against the original location data collected by the surveyor. No material discrepancies were noted. However, the elevations for four exploration drill hole collars (MBS-625, MBS-627, MBS-628, and MBS-630) were observed to be located above the digital topographic surface that was supplied by Mirabela Brazil. Collar elevations of these four holes were manually edited to conform to the digital topographic surface. RPA (2015) compared downhole deviation data contained in the drill hole database against the information in the digital drill logs. No material discrepancies were noted with the exception of MBS-078 where the digital drill hole database contained fewer downhole deviation readings than were contained in the digital drill log. It was concluded the impact of the discrepancy was minimal because the drill hole did not intersect the mineralised wireframe domains.

RPA (2015) compared the lithologic codes contained in the exploration drill hole database against information contained in the digital drill logs. A small number of differences were noted which were considered not material. Assay values for nickel contained in the database for the selected drill holes were compared against the original laboratory certificates directly on the ALS website and no discrepancies were observed.

RPA (2015) also performed data integrity checks on the drill hole database including:

- Intervals exceeding the total hole length;
- Negative length intervals;
- Inconsistent downhole survey records;
- Out-of-sequence and overlapping intervals;
- No interval defined within analysed sequences (not sampled or missing samples or results);
- Inconsistent drill hole labelling between tables; and
- Invalid data formats and out-of-range values.

RPA (2015) concluded that the 2004–2014 drill hole database was adequate for the purposes of Mineral Resource estimation.

12.1.3 Wood Canada Ltd.

Dr. Ted Eggleston, RM SME and Mr. Douglas Reid, P.Eng., a Wood Canada Ltd. (Wood) employee, completed a review of drill core, field checks of collar locations, and database checks in 2019.

12.1.3.1 Database Migration Review

Wood did not audit the pre-2018 drill data; however, Wood carried out a number of checks to confirm that data migration from MS Access to acQuire was accomplished successfully.

The Santa Rita drill hole data were migrated from MS Access to acQuire in January 2019. Wood compared drill collars, surveys, and assay data to confirm the database migration was successful. Wood compared collar and survey data between the MS Access and acQuire databases. In June 2019, Wood completed a comparison for pre-2018 drill holes (MBS-001 to MBS-635) in the acQuire assay table against assay certificates obtained from ALS Brazil. Approximately 95% of the pre-2018 data were reviewed. Minor differences were observed that were determined to be the results of re-assays.

Wood concluded that the database was successfully migrated to acQuire.

12.1.3.2 2018–2019 Review

Wood reviewed information from the 2018–2019 campaign. Drilling was in progress at the time of the database cut-off date of June 12, 2019. Wood was provided with a database export in .csv format for data tables corresponding to collar, survey, assay, geology, and density.

Supporting documents for collar surveys were reviewed for 94 core and 320 RC drill holes. Wood compared the coordinate data of 414 drill holes recorded in the database against the data recorded in their corresponding supporting document. A total of 31 drill holes were not consistent with survey certificates. Errors were commonly <1 m and are considered to be data entry errors.

Wood compared the downhole survey records from the database against the corresponding supporting survey documents for 16 core drill holes. Two drill holes were not consistent with certificates. Wood checked the downhole survey records for anomalous changes in dip and azimuth (deviations of three degrees or more in 10 m of depth) and possible transcription errors. Two anomalous records were detected and removed from the survey data. The database included data for IN surveys, OUT surveys, and an average of the IN/OUT surveys. Wood recommended that the average of the two surveys be used as the final survey.

Wood compared database entries to all assay certificates and no significant discrepancies were identified.

The review of geology database of 147 drill holes equivalent to 4,683 intervals produced 187 (3.9%) inconsistent intervals when compared to geology logging. These inconsistencies were attributed to manual data entry errors and corrected in the database.

Wood compared available density certificates with the database for 2,232 density determinations (92% of the database). Wood observed that 67 samples (3%) were not consistent with certificates, 79 samples (3.5%) were not stored in the database, and 46 samples (2%) were not found in certificates. Wood checked calculations for apparent density and moisture and no errors were found.

Wood reviewed QA/QC data for the period January to July 2019, representing the 2018-2019 drill campaigns. Atlantic Nickel data tables indicate the use of only one blank material, and no certificate was available for this blank. Wood reviewed the coarse blank results for copper, nickel, platinum, and palladium and concluded that there was no evidence of material contamination. The current blank may not be truly blank for copper. Wood recommended that two types of blank samples be used, and that those samples be truly blank for the elements of interest. Coarse blanks are intended to detect contamination at the crusher or pulverizer. Pulp blanks are used to detect contamination in the analytical instruments.

The error rate for gold pulp duplicates was considered to be outside the 10% limit (12.8). These results should be monitored by Atlantic Nickel. Some of these errors may be due to sample swaps and should be investigated. Variability in low grade samples could be due to deposit type and may be due to proximity to the detection limit.

The results of the four standards used by Atlantic Nickel from January to July 2019 showed that the coefficients of variation for all standards were above the 5% limit considered to be the upper limit of acceptability. The results showed significant problems with precision. Wood recommended that these standards be monitored closely, and if possible, standards with lower coefficients of variation should be researched and used in future programs. Wood noted that some outliers were identified, and these outliers should be verified in real time and, if required, sample batches be submitted for re-assay.

12.1.3.3 Principal Component Analysis

Wood performed a principal component analysis in 2019 to investigate the geochemical profiles of sample results from the 2018–2019 drill campaign and related NiS. Figure 12-1 summarizes the principal component analysis (PCA). The following conclusions were made from the PCA analysis:

- It is not prudent to use the logged lithology to separate the data into lithological units when MgO data are available. The logged lithology does not correlate well with MgO, which is a critical element in the rocks at Santa Rita; however, logged lithology may be used in the absence of MgO data.
- MgO is a much better discriminator than logged lithology and should be used as follows:
    - 0–15% MgO: mixed lithologies, but primarily gabbronorite and contains little available Ni;
    - 15–33% MgO: pyroxenite (including websterite) with variable Ni content;
    - >33% MgO: peridotite with variable Ni content.
- The limits above will not mix low and high MgO lithologies and will produce a cleaner estimate.
- There is little correlation of total nickel (NiT) or NiS with MgO.
- There is significant correlation of NiS with NiT that can be used to estimate NiS values for drill intervals without NiS analyses.

The CP from Wood derived a series of NiS equations to estimate the NiS values in sample intervals without NiS analyses and recommended the following equations to estimate NiS for sample intervals not analysed for NiS:

- For peridotite: $NiSperidotite = 1.04581 * NiT - 0.20922$. Based on the 2018–2019 and 2014 data, the NiS distribution in peridotites was biased low in previous Mineral Resource estimates. This estimator eliminates the underestimate and is consistent with both of the available data sets. This estimator is recommended for proper geostatistical evaluation and Mineral Resource estimation.
- For pyroxenite: $NiSpyroxenite = 1.00775 * NiT - 0.08368$. It is noted that this equation is essentially identical to the Santa Rita legacy equation.
- For mixed lithologies: no reliable estimation methodology. All overburden and saprolite samples should be considered to have no NiS as all of the Ni in those materials is oxidised and occurs as nickeliferous limonite [(Fe,Ni)O(OH)] and garnierite (a hydrous nickel silicate). NiS in gabbronorite should be considered to be 100% of the NiT. It is very unlikely that any significant Ni is found in the lattice of any of the minerals in these rocks.
- For those samples that do not have analysed MgO, the CP recommended that the logged lithology be used to place the samples into peridotite, pyroxenite, or mixed units and that the NiS be estimated as indicated above. It is likely to result in about 5% to 10% misclassifications of lithology, which is considered acceptable.

The Wood CP concluded the 2019 NiS formulae are based on a much larger (65%) NiS dataset and increases the statistical significance of the derivations. In addition, the additional data are located in the first four years of the open pit mine plan for Santa Rita.

This work was periodically updated to verify that the equations do not change with additional drilling. The latest update was in 2021, in which the earlier equations were verified. Updated equations were generated but those were insignificantly different than earlier equations and the CP recommended no change in the equations.

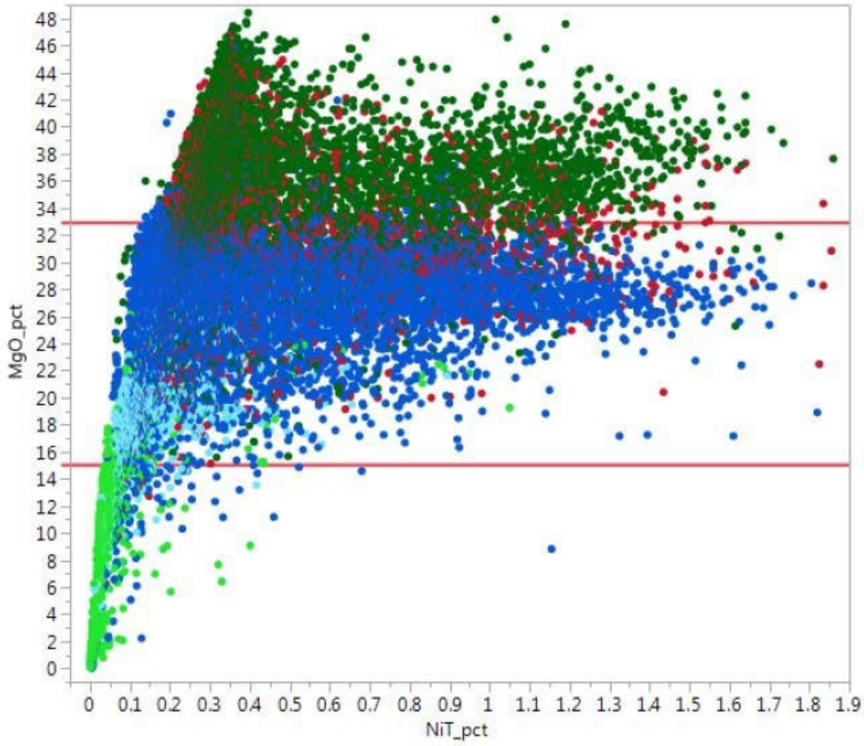


Figure 12-1: Proposed MgO Boundaries (15% and 33% MgO)

12.1.4 GeoEstima Review

12.1.4.1 Database Checks

Mr. Rojas completed the following checks on the entire database with more emphasis on the more recent drilling from 2018 to 2022:

- Collars for obvious location errors;
- Downhole surveys for excess deviations;
- Assays for out-of-range values, duplicate sample numbers, etc.;
- Lithology tables for missing data, lithologies with <10 occurrences in the database (lithology that required combination with other codes to be modelled);
- Recalculated density values from raw data and checked for out-of-range data.

Mr. Rojas validated the Santa Rita database used for Mineral Resource estimation prior to January 2021. He also checked the data for the additional drill holes that were drilled after the cut-off date for Mineral Resources evaluation. No issues were encountered that precluded the use of the drill data in future Mineral Resource update.

Mr. Rojas checked the data used in support of evaluation of the Palestina exploration potential, and identified no issues, however, the drill holes carried out after January 2021 should be used for new grade modelling and the preparation of an initial resource estimate.

12.2 CP Opinion on "Item 12 Data Verification"

- Checks performed by Atlantic Nickel staff, including QA/QC checks on the assay data and geological data are in line with industry standards for data verification. These checks have identified no material issues with the data or the Project database.
- The CP personally verified data supporting the estimates. As a result of the data verification, the CP concludes that the data and database are acceptable for use in Mineral Resource and Mineral Reserve estimation.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Introduction

Commissioning of the process plant was completed in October 2009, production of nickel concentrate commenced in November 2009, and commercial production was declared in January 2010.

In 2020, two new testwork programs were initiated. One was designed to generate information to produce a geometallurgical model for the open pit ore. This comprised comminution and flotation work. The second program was to test the underground material and also comprised comminution and flotation testing. Part of this testwork on underground material was reported in the internal 2021 NI 43-101 Technical Report (MTS et al., 2021) but the report on variability testing was only issued in November 2021. These later results are now summarised in this report.

The Santa Rita process plant consists of crushing, grinding, flotation, thickening, and filtration unit operations to produce a saleable nickel concentrate. Additional metals such as copper, cobalt, platinum, palladium, and gold are also contained in the concentrate at payable levels.

Information in Sections 13.2.1, 13.2.2, and 13.2.3 is reproduced from RPA (2015).

13.2 Metallurgical Testwork

13.2.1 Historical Testwork

A comprehensive testwork program was undertaken prior to the start of production on the nickel sulphides to determine the mineralogical, comminution, and metallurgical properties of the various mineralised zones within the deposit.

Preliminary metallurgical testwork began in July 2005 with a number of samples submitted to SGS Lakefield for flotation testwork. Subsequent testwork was completed at a number of testing facilities across Australia. These facilities included:

- Pontifex and Associates, Australia (Pontifex): ore dressing and mineralogy testwork and analysis;
- JKTech, University of Queensland, Australia (JKTech): mineralogical testwork and analysis;
- AMMTEC Ltd, Australia (AMMTEC): flotation and comminution testwork;
- Independent Metallurgical Laboratories Pty. Ltd., Australia (IMM): flotation testwork;
- SGS Lakefield, Canada (SGS Lakefield) and SGS Lakefield Oretest, Australia (SGS Lakefield Oretest): flotation and heap leach testwork and analysis;
- TUNRA, Australia (TUNRA): bulk solids characterisation.

A summary of the results of the metallurgical testwork is provided in Table 13-1. The key design criteria for the Santa Rita process are presented in Table 13-2.

Table 13-1: Summary of Metallurgical Testing
ACG Acquisition Company Limited – Santa Rita Mine

Test	Laboratory	Result
Comminution	Orway Mineral Consultants (Phases 1 & 2) GRD Minproc (Phase 3)	Samples were of medium competency in terms of crushing and were in the medium to high range in terms of milling. Samples displayed amenability to SAG milling. Abrasive properties and wear rates were between 0.346 and 0.40.
Batch flotation testing (five phases)	IMM and AMMTEC	Phases 1-3 focused on optimising concentrate grade and recovery for the different ore domains. Phase 4 utilised composite samples. Phase 5 focused on optimisation of grind size to produce the highest concentrate grade, recovery and Fe/Mg ratio. Optimum flotation feed grind size was approximately 125 µm.
Locked cycle testing	AMMTEC	6-cycle locked cycle flotation tests completed on composite samples. Concentrate grades varied from 12.2%–15.2% Ni, recoveries ranged from 67.1%–73.8% and the mass pulls were from 2.84%–3.44%.
Bulk flotation testing	AMMTEC	Conducted to produce product for marketing purposes. A total of 4.6 kg of concentrate assaying 13.9% Ni, 4.5% Cu, 10.1% MgO and 25.4% Fe was produced.
Flash flotation	AMMTEC	To evaluate the benefit of inclusion of a flash flotation unit. Negative results.
Bulk solids	TUNRA	Bulk solids results indicated an easy handling material with angle of repose of 43° at the worst case moisture content.
Tailings and concentrate thickener design	Outokumpu Technologies	Tailings sample produced from bulk flotation test. Concentrate sample sourced from a 500 kg locked cycle test. Four flocculants were tested, Magnafloc 342 was found to be most suitable for tailings and concentrate at a dosage of 10 g/t. Dynamic thickening tests attained a solids loading of 0.97 t/m2h at an underflow density of 67.0% w/w solids for the tailings and a solids loading of 0.25t/m2h at an underflow density of 75.5% w/w for the concentrate.
Tailings storage design	Golder Associates	The testwork described the tailings material as a sandy silt and silty sand with 100% passing 300 µm and a P_{80} of approximately 110 µm. The calculated tailings solid density was 3.20 g/cm3. Permeability testwork showed approximate permeability rates of 6.5 x 10-7 m/s and 6.6 x 10-7 m/s.
Flotation and heap leaching	SGS Lakefield and SGS Lakefield Oretest	Initial flotation testing and testing to evaluate the option of using heap leach methods to recover laterite nickel. Testing showed that approximately 70% of the nickel was likely recovered at a relatively low acid addition rate.

Table 13-2: Key Design Criteria
ACG Acquisition Company Limited – Santa Rita Mine

Item	Test	Unit	Value
Physical properties	UCS	MPa	86.6
	Crushing work index	kWh/t	23.2
	Bond work index-rod mill	kWh/t	18.4
	Bond work index-ball mill	kWh/t	20.4
	JK drop weight A x b	—	41.3
	SAG mill comminution SMC DWi	kWh/m3	7.48
	Abrasion index	—	0.346
Flotation	Optimum mill product size, P_{80}	µm	125
	Nickel feed grade	%	0.61
	Nickel concentrate grade	%	13.0
	Nickel recovery	%	~70
Thickening	Settling rate	t/m2h	0.95
	Underflow density	%w/w solids	65.0

Note: UCS = unconfined compressive strength, A x b = breakage parameters, SAG = semi-autogenous grinding, SMC = SAG mill comminution test, DWi = drop weight index

13.2.2 Mineralogy

Pontifex conducted mineralogical analyses of the flotation feed material and a number of the metallurgical testwork products with the following results:

- The dominant sulphide minerals in the Santa Rita deposit are pentlandite, pyrrhotite, pyrite, chalcopyrite and violarite. The major gangue materials were identified as olivine, orthopyroxene, serpentine and chrome spinel.
- The recoverable nickel (sulphide) was found to be predominantly in pentlandite, violarite and pyrite.
- Copper was primarily associated with chalcopyrite. Iron is most abundant in pyrite (~47%), less abundant in pentlandite, chalcopyrite and chrome spinel.
- The PGEs were identified as most likely to be in pentlandite, though due to the low concentrations in the samples, this was difficult to confirm.
- The investigation also indicated a number of key points about the gangue minerals including:
  - Between 0.24% Ni and 0.3% Ni is associated with olivine, between 0.05% and 0.1% Ni with orthopyroxene and approximately 0.09% Ni with chrome spinels;
  - Silicates contain approximately 110 ppm Co;
  - The majority of the iron occurs in olivine (11%–12%), serpentine (5%–9%) and orthopyroxene (8%).

Based on the mineralogical findings, in particular the deportment of nickel and magnesia, Mirabela Brazil subdivided the orebody into three domains, orthopyroxenite (P domain), olivine orthopyroxenite (O domain), and harzburgite (H domain).

In the P and O domains, most of the nickel is hosted in sulphides and, therefore, is recoverable. In the H domain, nickel is divided more evenly between sulphides and gangue minerals. Consequently, the P and O domains have a high proportion of recoverable nickel and the H domain has a lower proportion of recoverable nickel.

13.2.3 Review of Process Plant Performance

Monthly average nickel recovery for the Santa Rita process plant averaged 55% from 2011 to late 2014. The performance varied more than is typical for sulphide flotation, ranging from 44% to 63%. The site used the following formula to estimate the overall process plant recovery:

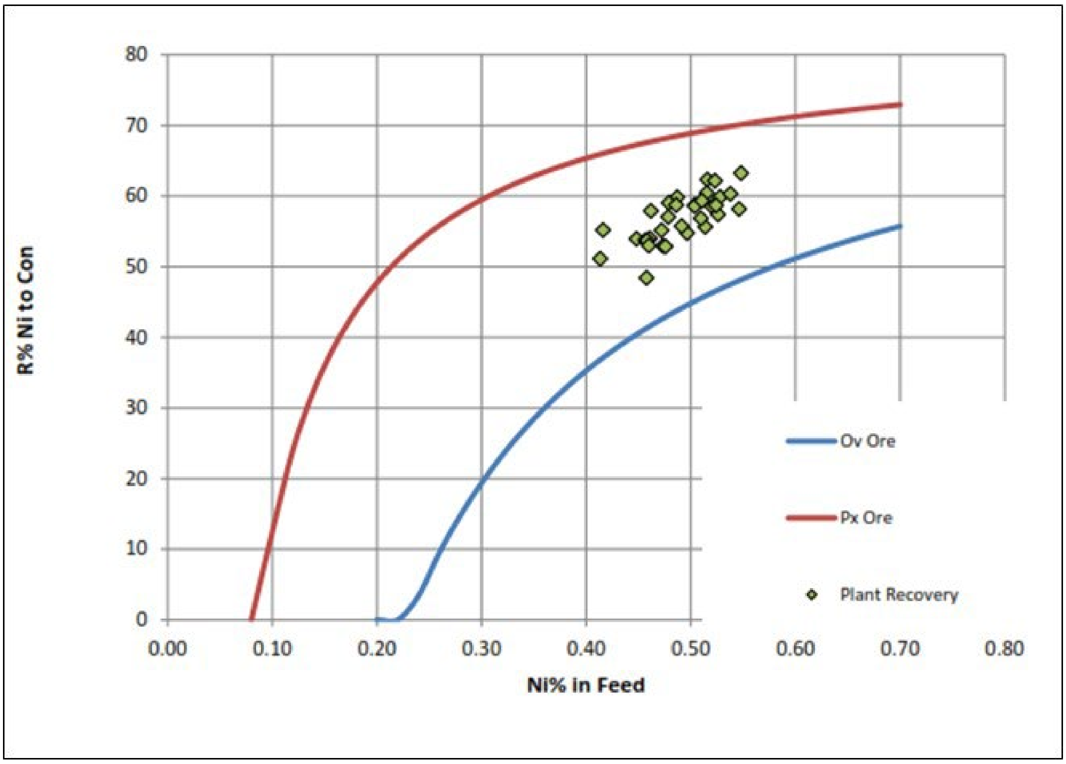
$$Recovery = [14.347 * \ln\left[\frac{Ni_T * S}{MgO^2}\right] + 169.2] * 0.96$$

This formula was developed empirically by the plant team to estimate the process plant recovery of the total nickel grade (NiRec) using the sulphur and MgO contents in addition to the total nickel assay. The formula was developed from plant performance data on a blend of rock types.

On the basis of work carried out during the course of updating the 2014 Mineral Resources and Mineral Reserve estimates, two domains were modelled, as for all practical purposes the unrecoverable silicate nickel component is of the order of 0.20% to 0.25% Ni for the olivine-dominant lithologies, and is of the order of 0.10% Ni for the pyroxene-dominant lithologies. The dunite, harzburgite, and olivine pyroxenite units were therefore grouped into one unit (olivine-dominant or Ov). The pyroxenite, websterite, and gabbro units were also grouped into one unit (pyroxenite-dominant or Px).

Using these two metallurgical domains, the recovery vs. head grade curves were constructed and compared with the historical metallurgical performance using a constant tailings approach, i.e., assuming the silicate nickel component is constant within each rock type. The actual grade-recovery curves fell between the two model lines (Figure 13-1). As the process plant feed has been a blend of the two principal metallurgical rock types over time, this was the expected outcome and confirmed the concept.

Using these assumptions, the only data that is required to estimate recovery is the total nickel assay and lithological category (Ov or Px). The fact that the recovery model (which is independent of the plant data) describes the process plant data indicates that it is both descriptive and predictive.



Source: RPA (2015).

Figure 13-1: Recovery versus Head Grade

An area of significant concern to the site personnel was the high number of ore types that were used in grade control maps and marked out for separate mucking. The procedure was expensive to follow and ineffective in providing a consistent feed to the process plant. It was proposed by site personnel that the material categories be reduced to the following four types:

- Pyroxenite-hosted ores
- Harzburgite-hosted ores
- Marginal-grade ore
- Waste

Site personnel discussed the concept of feeding a single ore type to the process plant on a campaign basis, accumulating the second ore type for later treatment. This strategy was not feasible at the time because the amount of recoverable nickel in the ore was not known with certainty.

13.3 Review of Operations from 2012 to 2016 and January 2020 to December 2022

A summary of the operating results from July 2012 to March 2016 (after implementation of desliming cyclones in the ball mill classification circuit) is provided in Table 13-3. In 2015, the process plant operated for 11 months. In 2016, the process plant operated for three months.

Table 13-3 shows a variation in annual total nickel recovery from 48.6% to 59.9% over the period 2012–2016. These results were calculated from the process plant mass balances and total nickel assays on the plant feed and concentrate. The nickel sulphide recovery was calculated from the geologist's estimate of the percentages of pyroxenite and harzburgite in the feed and the global assumption that the pyroxenite and harzburgite contained 0.1% and 0.23% respectively of nickel as silicate. The reason for using this assumption was the difficulty of assaying for nickel sulphides in the presence of nickel silicates. Also, over the indicated period the process plant operation was focused on total nickel recovery.

Table 13-3 also shows that the nickel sulphide recovery varied from 78.2% to 84.9% over the period July 2012 to March 2016. However, in the last year of operation the monthly nickel sulphide recoveries calculated from the method described in the paragraph above ranged from 86% to >100%. This coincided with a period when the estimated percentage of harzburgite in the process plant feed increased to 85% from January 2012 to June 2015. The reported nickel sulphide recoveries were corrected by the operations staff to between 84% and 85%. The cause of the recovery over-estimation was very likely an over-estimation of the percentage harzburgite in the plant feed; hence, the calculated percent nickel silicate content in the plant feed was too high, or inversely, the calculated percent NiS content was too low. (Note: in this report NiS is used as the % Ni associated with nickel sulphides and NiT is used as the % Ni in all associations). Subsequently, Mirabela Brazil developed nickel sulphide analytical techniques to avoid this issue. The average percent NiS recovery over the period July 2012 to June 2015 was 81% (prior to the increase in harzburgite content) with a monthly range of 71.2% to 87.8%. The maximum theoretical percent NiS recovery was approximately 90% due to losses of 8% to 10% in the desliming circuit.

The plant was re-commissioned in October 2019; the operating results from January 2020 to December 2022 are shown in Table 13-4. The average NiS recovery over this period was 79.1%. From October 2020 onwards operations stabilised. The average NiS head grade (January 2021 to December 2022) increased to an average of around 0.300% compared to 0.250% for 2019 and 2020. This coincided with an improvement in the NiS recovery over the same period to an average of 80.1% compared to 76.5%.

The only significant deleterious elements in the concentrate are magnesium oxide–silicate complexes. These can cause slag viscosity problems in smelting; hence, it is important to minimize the content of this material in the concentrate and maintain the Fe/MgO ratio within the ranges shown in Table 13-5 and Table 13-6 to avoid penalties.

The nickel concentrate also contained payable quantities of copper, cobalt, gold, platinum, and palladium as shown in Table 13-5 and Table 13-6.

Table 13-3: Summary of Operating Results (July 2012 to March 2016)
ACG Acquisition Company Limited – Santa Rita Mine

Year	Feed (t)	Total Ni in Feed (t)	NiT in Feed (%)	NiS in Feed (%)	Conc. Produced (t)	Ni in Conc. (t)	NiT in Conc. (%)	NiT Recovery (%)	NiS Recovery (%)
2012 (5 months)	2,971,182	15,673.66	0.527	0.383	63,412	9,340	14.73	59.6	82.0
2013	6,528,071	29,645.58	0.454	0.297	107,681	15,627	14.51	52.7	80.7
2014	5,944,071	24,783.47	0.417	0.259	86,684	12,048	13.90	48.6	78.2
2015 (11 months)	5,424,973	25,667.81	0.473	0.289	105,408	14,831	14.07	57.8	84.9
2016 (3 months)	1,106,210	5,708.38	0.516	0.298	23,762	3,417	14.38	59.9	84.3
Total	**21,974,507**	**101,478.91**	**—**	**—**	**386,947**	**55,263**	**—**	**54.5**	**81.4**

Note: NiT = total nickel, NiS = sulphide nickel, conc. = concentrate.

Table 13-4: Summary of Operating Results (January 2020 to December 2022)
ACG Acquisition Company Limited – Santa Rita Mine

Month/ Year	Feed (t)	Total Ni in Feed (t)	NiT in Feed (%)	NiS in Feed (%)	Conc. Produced (t)	Ni in Conc. (t)	NiT in Conc. (%)	NiT Recovery (%)	NiS Recovery (%)
Jan-20	319,500	1,165.65	0.365	0.263	4,644	639.53	13.77	54.86	76.14
Feb-20	301,157	1,063.28	0.353	0.255	4,210	595.42	14.14	56.00	77.57
Mar-20	357,419	1,266.53	0.354	0.254	4,803	643.68	13.40	50.82	70.99
Apr-20	304,462	1,036.51	0.340	0.241	4,349	575.20	13.23	55.49	78.42
May-20	267,101	974.61	0.365	0.241	3,902	530.40	13.59	54.42	82.30
Jun-20	467,481	1,755.43	0.376	0.268	7,207	983.64	13.65	56.03	78.52
Jul-20	411,529	1,454.96	0.354	0.254	5,887	784.59	13.33	53.93	75.06
Aug-20	366,465	1,214.44	0.331	0.223	4,459	605.26	13.57	49.84	73.93
Sep-20	367,605	1,335.11	0.363	0.252	5,274	697.70	13.23	52.26	75.33
Oct-20	444,402	1,745.61	0.393	0.269	6,848	921.96	13.46	52.82	77.16
Nov-20	392,184	1,580.48	0.403	0.278	6,273	842.75	13.43	53.32	77.34
Dec-20	457,227	1,890.61	0.413	0.295	7,703	1,052.45	13.66	55.67	78.04
Jan-21	506,144	2,118.37	0.419	0.300	8,990	1,213.46	13.50	57.28	79.96
Feb-21	479,739	1,881.88	0.392	0.297	8,202	1,125.14	13.72	59.79	79.04
Mar-21	538,314	2,048.93	0.381	0.286	9,139	1,214.89	13.29	59.29	78.95
Apr-21	528,042	2,265.12	0.429	0.322	10,046	1,357.50	13.52	59.93	79.87
May-21	425,888	1,831.17	0.430	0.316	8,002	1,108.39	13.85	60.53	82.26
Jun-21	512,482	2,071.09	0.404	0.309	9,204	1,256.46	13.65	60.67	79.31
Jul-21	474,133	1,905.41	0.402	0.314	8,707	1,175.25	13.50	61.68	79.00
Aug-21	533,416	2,053.65	0.385	0.306	9,597	1,303.45	13.58	63.47	79.84
Sep-21	532,700	1,899.23	0.357	0.296	9,232	1,230.05	13.32	64.77	78.03
Oct-21	553,888	2,140.14	0.386	0.298	9,758	1,313.72	13.46	61.38	79.53
Nov-21	453,300	1,838.74	0.406	0.303	7,945	1,081.16	13.61	58.80	78.06
Dec-21	511,190	2,258.66	0.442	0.326	9,598	1,321.95	13.77	58.53	79.23
Jan-22	513,680	2,273.55	0.443	0.324	10,144	1,361.64	13.42	59.89	81.74
Feb-22	489,051	2,310.76	0.472	0.338	9,575	1,329.37	13.88	57.53	80.42
Mar-22	483,971	2,034.86	0.420	0.306	8,307	1,161.11	13.98	57.06	78.38
Apr-22	527,687	2,317.01	0.439	0.310	9,349	1,309.80	14.01	56.53	80.09
May-22	588,663	2,409.48	0.409	0.300	10,025	1,394.76	13.91	57.89	78.92
Jun-22	556,287	2,427.76	0.436	0.322	10,196	1,437.68	14.10	59.22	80.30
Jul-22	586,324	2,492.21	0.425	0.311	11,021	1,483.54	13.46	59.53	81.41
Aug-22	528,135	2,112.61	0.400	0.298	9,645	1,267.98	13.15	60.02	80.61

Month/ Year	Feed (t)	Total Ni in Feed (t)	NiT in Feed (%)	NiS in Feed (%)	Conc. Produced (t)	Ni in Conc. (t)	NiT in Conc. (%)	NiT Recovery (%)	NiS Recovery (%)
Sep-22	583,925	2,219.80	0.380	0.279	9,565	1,279.71	13.38	57.65	78.64
Oct-22	546,340	1,972.45	0.361	0.265	8,755	1,175.94	13.43	59.62	81.12
Nov-22	574,242	2,136.18	0.372	0.268	9,488	1,272.05	13.41	59.55	82.66
Dec-22	572,337	2,152.0	0.376	0.297	10,771	1,440.08	13.37	66.92	84.67
Total	**17,056,407**	**67,654.29**	**0.397**	**0.292**	**290,821**	**39,487.65**	**13.58**	**58.37**	**79.31**

Note: NiT = total nickel, NiS = sulphide nickel, conc. = concentrate.

Table 13-5: Other Metal Recoveries and Grades (July 2012 to March 2016)
ACG Acquisition Company Limited – Santa Rita Mine

Element	Average Recovery (%)	Recovery Range (%)	Average Conc. Grade	Average Conc. Grade Range
Copper	68.4	55.6–80.8	3.9%	3.0–4.6%
Cobalt	28.7	21.8–42.7	0.26%	0.22–0.27%
Gold	n/c	n/c	1.2 g/t	0.9–1.6 g/t
Platinum	n/c	n/c	2.2 g/t	1.6–2.6 g/t
Palladium	n/c	n/c	1.2 g/t	0.9–1.7 g/t
Fe/MgO ratio	n/a	n/a	3.27	3.00–3.72

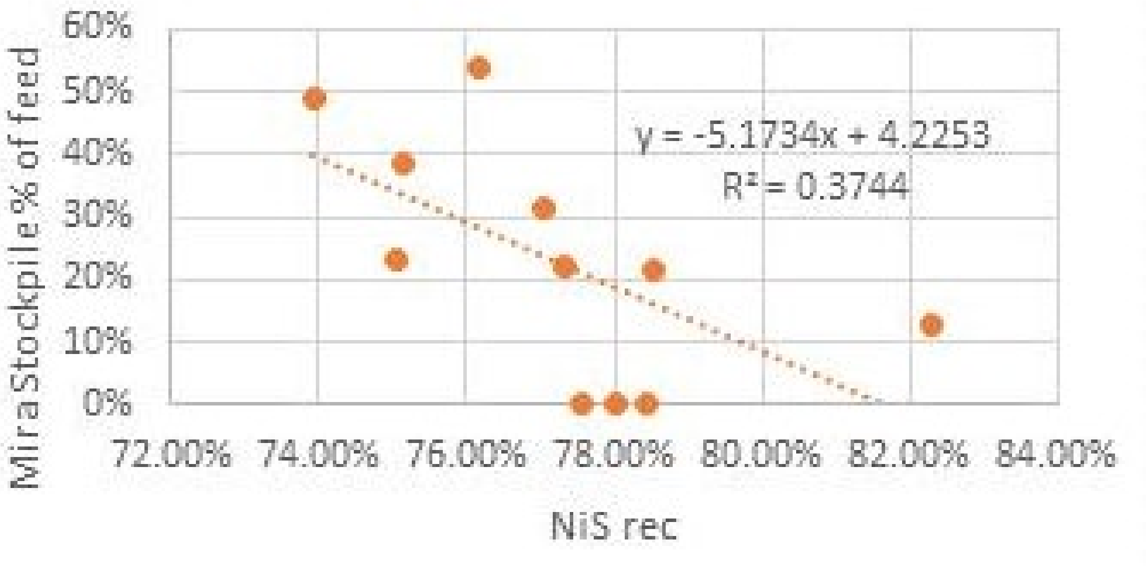
Note: n/c = not calculated; n/a = not applicable.

Table 13-6: Other Metal Recoveries and Grades (January 2020 to December 2022)
ACG Acquisition Company Limited – Santa Rita Mine

Element	Average Recovery (%)	Recovery Range (%)	Average Conc. Grade	Average Conc. Grade Range
Copper	77.5	68.6–84.2	4.4%	3.9–5.5%
Cobalt	33.7	26.1–39.8	0.25%	0.22–0.27%
Gold	n/c	n/c	1.0 g/t	0.8–1.1 g/t
Platinum	n/c	n/c	2.2 g/t	1.7–2.7 g/t
Palladium	n/c	n/c	1.5 g/t	0.9–1.8 g/t
Fe/MgO ratio	n/a	n/a	3.30	3.00–4.31

The first half of 2020 was a difficult period for the operation. Firstly, heavy seasonal rains flooded the open pit before adequate dewatering capacity could be installed. This restricted the rate at which ore which could be accessed was mined from the open pit and consequently increased the operation's processing of historically stockpiled material. This historically-stockpiled material has less certain lithological composition and may have experienced some degree of sulphide oxidation, both generally unhelpful to plant performance. Figure 13-2 demonstrates the impact of the percentage of stockpile material in the feed on NiS recovery.

Secondly, primary crushing throughput suffered when, in January 2020, the bottom shell of the gyratory crusher was found during a visual inspection to be cracked and requiring replacement. Recommissioning of the existing jaw crusher and securing additional mobile crushing capacity helped to restore sufficient reliability and throughput capacity to crushing activities on site. The bottom shell of the gyratory crusher was replaced in May 2020, and from June 2020 onwards the throughput began to stabilize. Over the period January 2022 to December 2022, the plant processed 6.59 Mt of ore compared to the schedule of 6.50 Mt.

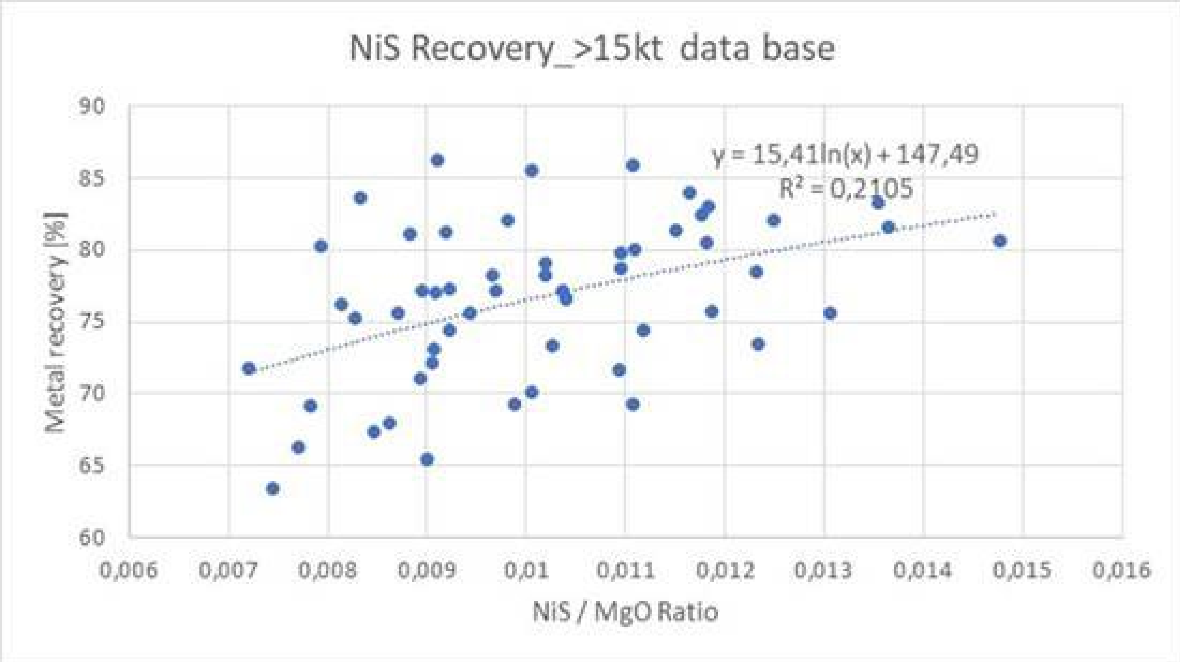


Source: Atlantic Nickel, 2021.

Figure 13-2: NiS Recovery vs % Old Stockpile Material in Feed

The use of historically stockpiled materials and large variations in plant throughput during this period affected flotation performance. From October 2020 through March 2021, as mining rates improved and the use of historically stockpiled material declined, improved NiS feed grades of 0.287% were observed compared to the 0.250% obtained during the nine months prior. This improvement and a more consistent period of plant throughput coincided with an improvement in the NiS recovery to an average of 78.4% compared to 76.5%. The recoveries of other metals are shown in Table 13-6.

Atlantic Nickel staff collected raw data from plant operations from June 1, 2020 to October 18, 2020 (131 data points). Data were culled when the plant treated less than 15,000 t/d (leaving 55 data points). The logic for this was to consider only the days when the operation was stable. Previous work has shown that the percentage of MgO in feed affects recovery. Figure 13-3 shows the relationship between the NiS recovery and the NiS/MgO ratio. While the R^2 value of 0.2105 is not strong, there is a trend between these variables. Atlantic Nickel used this regression equation for NiS recovery forecasting up to June 2022 when a more robust model was developed from the plant results over the period January 1, 2021 to December 30, 2021.



Source: Atlantic Nickel, 2021

Figure 13-3: NiS Recovery vs NiS/MgO Ratio for Culled Data

This model was based on a strong relationship between the enrichment ratio (%NiS in concentrate/%NiS in feed) and the % mass pull to the concentrate. The regression equation derived from the data was:

Enrichment ratio = 69.268*(% concentrate mass pull)$^{0.762}$ with an R^2 of 0.7931

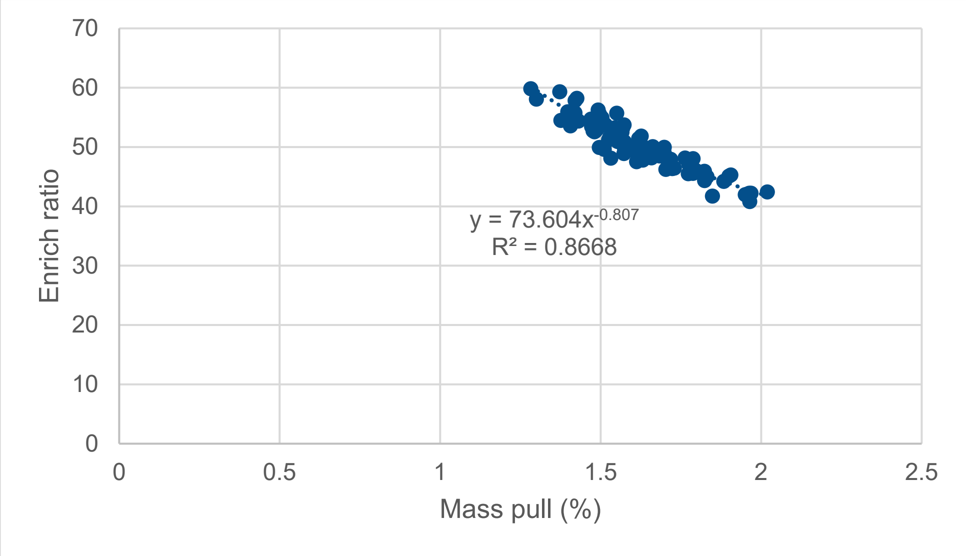
Table 13-4 shows that the %NiS in concentrate is relatively constant at around 13.5%; hence, using this equation at a 13.5% NiS concentrate grade the NiS recovery is:

Recovery = (13.5/Head Grade)*EXP(((LN((13.5/Head Grade) – LN(69.268)))/(-0.762))

Over the period September to December 2022, 90 plant daily data points were used to derive a new enrichment ratio versus concentrate mass pull equation. The results are shown in Figure 13-4 where the R^2 improved to 0.8668. At a 13.5% NiS concentrate grade the NiS recovery is:

NiS Rec = (13.5/NiS head grade)*EXP(((LN(13.5/NiS head grade)-LN(73.604)))/(-0.807))

This equation was used to determine the NiS recoveries in the LOM production schedule.



Source: Atlantic Nickel, 2022.

Figure 13-4: %NiS in Concentrate/%NiS Head Grade versus %Concentrate Mass Pull

13.4 Geometallurgical Testwork for Open Pit Ore

13.4.1 Introduction

Atlantic Nickel carried out a drilling campaign to provide samples of pyroxenite, olivine-pyroxenite, and harzburgite lithologies for a metallurgical testing program to characterize the main lithological types and confirm the experimental procedures in preparation for a geometallurgical variability program. The lithological testing program comprised six pyroxenite and six harzburgite samples taken at the surface and at depth from the north, central, and south zones in the pit. These samples were used for the comminution tests. The flotation tests were carried out on composites of pyroxenite, harzburgite, and olivine-pyroxenite.

The geometallurgical samples were taken from 14 drill holes and comprised 32 pyroxenite, 12 harzburgite, and seven olivine-pyroxenite samples.

All samples were sent to SGS Geosol. This laboratory carried out the sample preparation, chemical analysis, Bond protocol comminution testing, and the flotation testwork. Quantitative evaluation of materials by scanning electron microscopy (QEMSCAN) mineralogical analysis was conducted at SGS Lakefield in Canada, and the SMC protocol comminution testing was done at SGS Chile. JKTech of the University of Queensland, Australia analysed the SMC data. The results were reported by SGS Geosol in April 2021.

13.4.2 Lithology Testing

13.4.2.1 Mineralogy

Composites of pyroxenite, olivine pyroxenite, and harzburgite were subjected to QEMSCAN analysis to determine the mineral compositions and mineral associations.

In summary:

- There was good agreement between the chemical and QEMSCAN assays.
- The gangue minerals are mainly magnesium silicates (orthopyroxene, clinopyroxene, olivine and serpentine).

- Pentlandite and chalcopyrite are the main nickel and copper sulphide minerals.
- Pyrite and pyrrhotite are the main iron sulphides.
- The pentlandite grain sizes vary between 26 µm and 33 µm; chalcopyrite grain sizes vary between 24 µm and 26 µm.
- The gangue mineral grain sizes vary between 39 µm and 56 µm.
- Mineral liberation: Pentlandite liberation at a grind size P_{80} of 125 µm is 85% free and liberated in pyroxenite, 84% in olivine-pyroxenite and 76% in harzburgite; the respective liberations for chalcopyrite are 75%, 70%, and 46%.

The mineralogy shows that a grind size of 30 µm would be required to achieve full nickel and copper sulphide mineral liberation. This would not be economic and would lead to nickel and copper sulphide losses in slimes. The liberation data for harzburgite shows clearly why nickel/copper sulphide recoveries are lower in this lithology compared to pyroxenite and olivine-pyroxenite.

13.4.2.2 Comminution

Comminution tests were carried out on six blends of pyroxenite ore and six blends of harzburgite ore. The blends represented the following zones in the pit: north surface, north depth, central surface, central depth, south surface, and south depth. The results of the Bond tests on this material are shown in Table 13-7.

The overall trend is that the pyroxenite ore is harder and more abrasive than harzburgite ore. The pyroxenite north ore is the hardest and most abrasive with a hardening trend with depth. This trend is reversed with pyroxenite south ore where all indices are lower at depth. The pyroxenite central ore is harder for ball milling and more abrasive at depth but softer for crushing. The harzburgite north ore is the hardest and most abrasive of this lithology set. The surface ores do not show a large variation in the indices; however, at depth there is a definite softening trend from north to south in the ball mill work index.

SMC protocol testing was carried out using three pyroxenite and three harzburgite samples as shown in Table 13-8.

The DWi and the Axb multiplier (the latter is inversely related to ore hardness) show that the pyroxenite ore is harder than harzburgite and that the northern zone is harder for both lithologies. Modelling results for the comminution circuit using the SMC data are shown in Section 13.4.3.2.

Table 13-7: Results of Bond CWi, Ai and BWi Tests on Pyroxenite and Harzburgite Ore
ACG Acquisition Company Limited – Santa Rita Mine

Sample	CWi (kWh/t)	Ai	BWi (kWh/t)
Pyroxenite, north, surface	15.3	0.52	19.0
Pyroxenite, north, depth	16.6	0.62	19.5
Pyroxenite, central, surface	12.2	0.45	17.8
Pyroxenite, central, depth	9.0	0.54	18.8
Pyroxenite, south, surface	16.6	0.48	18.6
Pyroxenite, south, depth	13.4	0.46	17.7
Harzburgite, north, surface	11.0	0.14	15.0
Harzburgite, north, depth	10.0	0.21	17.2

Sample	CWi (kWh/t)	Ai	BWi (kWh/t)
Harzburgite, central, surface	9.9	0.07	15.2
Harzburgite, central, depth	8.2	0.20	16.4
Harzburgite, south, surface	9.4	0.11	14.6
Harzburgite, south, depth	10.8	0.12	14.1

Note. CWi = crushing work index, Ai = abrasion index, BWi - Bond ball mill index.

Table 13-8: Results of SMC Tests on Pyroxenite and Harzburgite Ore
ACG Acquisition Company Limited – Santa Rita Mine

Sample	DWi (kWh/m^3)	Axb	Ta
Pyroxenite- North	7.93	41.29	0.33
Pyroxenite- Central	6.63	49.30	0.39
Pyroxenite- South	7.29	43.98	0.35
Harzburgite - North	6.95	45.23	0.38
Harzburgite - Central	6.10	51.22	0.42
Harzburgite - South	6.57	46.65	0.39

Note: DWi signifies drop weight index, A, b and Ta parameters have no physical meaning but are ore hardness parameters used in SAG mill power calculations.

13.4.2.3 Flotation

Flotation tests were carried out with and without desliming.

13.4.2.3.1 Without Desliming

Flotation tests were carried under Atlantic Nickel's standard conditions using a 50:50 mix of sodium ethyl xanthate and C2430 as the collector, methyl isobutyl carbinol (MIBC) as the frother, a 50:50 mix of copper sulphate and citric acid as the activator, and sodium silicate as the dispersant. The circuit comprised one rougher stage and one scavenger stage with the concentrates combined.

The following work was carried out:

- A factorial experiment to test the effects of feed grind size P_{80}, desliming, pH and collector, activator and dispersant dosages;
- Re-cleaner tests to determine the impact of carboxy methyl cellulose (CMC) as an olivine depressant;
- Synergy tests using the best conditions to maximize recovery;
- Locked cycle tests (LCT).

Sixty factorial rougher-scavenger tests were carried out to determine the effect of the five variables listed above. The tests were carried out on four master composites (pyroxenite, olivine pyroxenite, harzburgite, and a blend). In summary, the results were:

- Decreasing the rougher feed P_{80} from 125 µm to 106 µm gave a 1% recovery increase for all composites.

- Increasing the dispersant dosage from 500 g/t to 800 g/t gave a 4% recovery increase with harzburgite and a minor concentrate grade improvement on the other composites.
- Varying the activator dosage from 50 g/t to 100 g/t had no impact.
- Increasing the collector dosage in the rougher cell from 80 g/t to 100 g/t gave a 7% recovery increase for the pyroxenite and olivine-pyroxenite composites with minimal change in the concentrate grade; the recovery increase on the blend was less than 2% and there was no effect on the harzburgite recovery.
- Lowering the pH from 9.5 to 8.5 improved the harzburgite recovery by 10% and by 2% in the blend; the effect on the other composites was not clear.

The best results from the above program in terms of NiS recovery and NiS grade in the rougher concentrate are shown in Table 13-9.

Table 13-9: Best Factorial Test Results
ACG Acquisition Company Limited – Santa Rita Mine

Lithology	NiS Recovery (%)	NiS Grade in Rougher Concentrate (%)	Main Variable Change
Pyroxenite	84.4	5.04	Rougher collector from 80 to 100 g/t
Olivine-pyroxenite	85.2	7.74	As above
Harzburgite	60.8	3.65	pH reduced from 9.5 to 8.5
Blend	76.9	6.12	pH 8.5

13.4.2.3.2 With Desliming

Desliming was carried out by cycloning the laboratory mill product with a 40 mm diameter cyclone. A series of 48 rougher-scavenger flotation tests were carried out after desliming the mill products with P_{80} of 150 µm, 125 µm, and 106 µm. In summary, the results were:

- The NiS and NiT assays in the slimes were higher than the respective head assays for pyroxenite, olivine-pyroxenite, and the blend. The assays were similar for harzburgite.
- Nickel losses to the slimes were: pyroxenite and olivine-pyroxenite - 9% to 13% of the NiS; harzburgite losses - 7%.
- Based on un-deslimed fresh feed, the recoveries and grades were inferior to those shown in Table 13-9 as can be seen in Table 13-10.
- Increasing the collector dosage in the roughers provided no recovery improvement.

The best results from this work are shown in Table 13-10.

Table 13-10: Best Test Results After Desliming
ACG Acquisition Company Limited – Santa Rita Mine

Lithology	NiS Recovery (%)	NiS Grade in Rougher Concentrate (%)	Main Variable Change
Pyroxenite	82.3	4.34	Standard conditions
Olivine-pyroxenite	80.6	6.64	As above

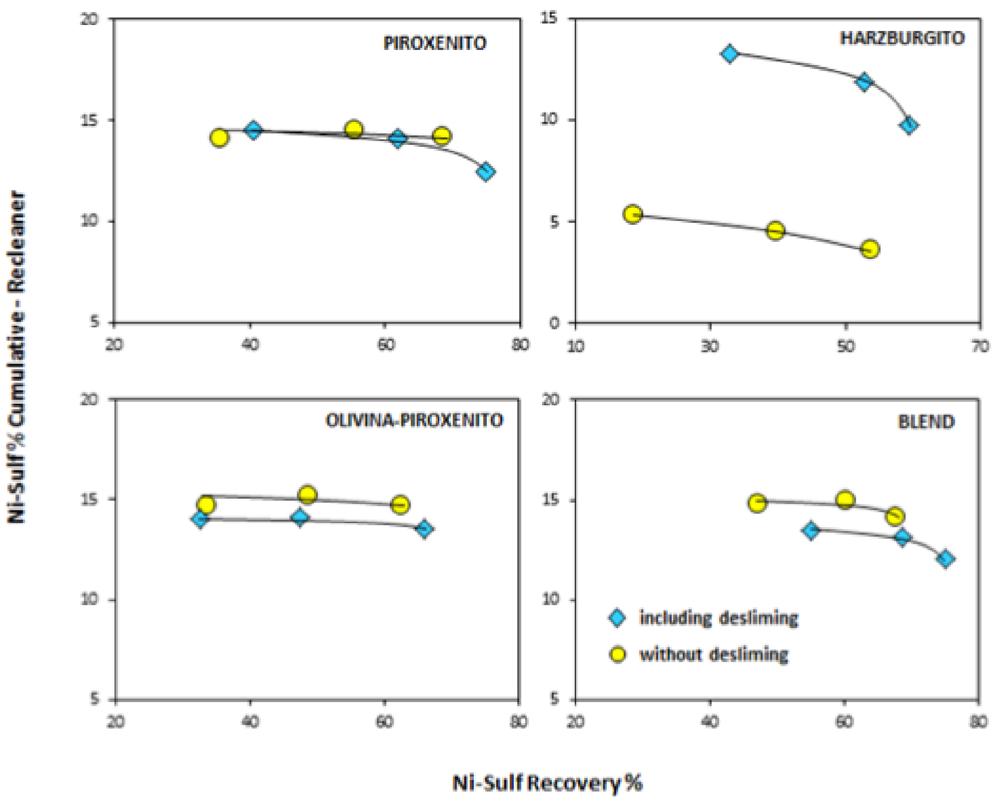
Lithology	NiS Recovery (%)	NiS Grade in Rougher Concentrate (%)	Main Variable Change
Harzburgite	55.7	4.12	106 µm primary grind size
Blend	75.8	4.86	Standard conditions

13.4.2.3.3 Cleaner Flotation

Cleaner flotation tests were carried out on the four master composites to determine the efficacy of CMC as an olivine depressant. An addition of 2.5 g/t showed significant improvements in concentrate grade and NiS cleaner recovery compared to zero addition. For pyroxenite the recovery increase was 12.4% with a 1.7% improvement in concentrate grade. The respective data for the other composites were: olivine-pyroxenite 6.8% and 1.7%; harzburgite 15.0% and -0.2%; blend 1.9% and 1.4%.

13.4.2.3.4 Synergy Tests

A series of tests were carried out to maximize the recovery in the four master composites using some of the best conditions determined from the previous tests. The circuit comprised rougher-scavengers, cleaner and re-cleaner with kinetic tests carried out on the re-cleaner. Cleaner tailings and re-cleaner tailings were not recycled. Tests were carried out with and without desliming. The grade–recovery curves are shown in Figure 13-5. They show that desliming gives inferior results except for the harzburgite composite.



Source: SGS Geosol, 2020.

Note. Piroxenito = pyroxenite, harzburgito – harzburgite, olivine-piroxenito = olivine-pyroxenite.

Figure 13-5: Grade Recovery of the Re-cleaner Concentrate in the Synergy Test

13.4.2.3.5 LCTs

Each master composite was tested with and without desliming. The circuit comprised roughing and scavenging, cleaning, and re-cleaning. The rougher and scavenger concentrates were combined and sent to the cleaner. The cleaner tailings were returned to the rougher, the cleaner concentrate passed to the re-cleaner, and the re-cleaner tailings were returned to the cleaner. Eight cycles were completed for each test.

The tests did not reach steady state. The NiS grade of the re-cleaner (final) concentrate declined in each of the eight cycles due to a build-up of silica and magnesia. For example, the silica and magnesia grades in the first cycle re-cleaner concentrate for pyroxene and olivine-pyroxene were 5%–6% and 2.5%–3.5%, respectively. After eight cycles these grades increased to 22%–24% and around 12%, respectively.

13.4.3 Geometallurgical Variability Testing

13.4.3.1 Mineralogy

Electron probe micro-analysis (EPMA) was carried on the blend, two pyroxenite, one olivine-pyroxenite, and one harzburgite variability samples. The metal contents of the minerals are shown in Table 13-11.

Table 13-11: Metal Content of Minerals
ACG Acquisition Company Limited – Santa Rita Mine

Sample	NiS %	Ni.Refrc %	S %	Fe %	Cu %	Co %	Si %	Mg %	Al %	Ca %
Pentlandite	34.0	-	33.5	31.7	0.06	0.45	-	-	-	-
Chalcopyrite	0.06	-	34.6	30.1	34.7	0.05	-	-	-	-
Pyrite	0.16	-	52.8	45.6	0.65	0.99	-	-	-	-
Pyrrhotite	0.20	-	37.8	62.4	0.05	0.07	-	-	-	-
Olivine	-	0.35	-	10.9	-	-	18.8	27.6	0.00	0.00
Orthopyroxene	-	0.09	-	7.72	-	-	25.9	18.8	0.96	0.61
Clinopyroxene	-	0.05	-	2.48	-	-	24.9	9.95	1.50	15.6
Serpentine	-	0.23	-	5.95	-	-	17.8	22.3	0.24	0.05

The pentlandite contains 0.45% cobalt and minor copper in addition to 34% NiS. The chalcopyrite contains 34.7% copper and only minor nickel and cobalt, the pyrite contains minor nickel and 0.65% copper and 0.99% cobalt. Pyrrhotite contains minor nickel, copper, and cobalt.

The gangue minerals all contain nickel, which is not amenable to flotation in this form.

The grain size distributions for the mineral were consistent with those described above in the mineralogy of the lithology samples. However, the liberation characteristics for the variability samples were worse than the lithology samples. For pentlandite, the average percentage of liberated and free particles was only 68% (Table 13-12). Chalcopyrite was lower at 44% (Table 13-13). Most of the pentlandite lost to tailings is in complex particles that are locked with other minerals and with a low exposed surface area for bubble capture (74% in olivine-pyroxenite, 81% in harzburgite, and 92% in pyroxenite). The loss of free pentlandite is also significant (20% in olivine-pyroxenite, 6% for harzburgite, and 5% for pyroxenite).

Table 13-12: Pentlandite Association
ACG Acquisition Company Limited – Santa Rita Mine

Sample	Free Pent. %	Lib. Pent. %	Pent.:Chalco. %	Pent.:FeSulf. %	Pent.:Olv./ Pyrox. %	Pent.:Serp./ Talc %	Complex %	SUM %
OPGM-01	74.1	5.35	2.49	7.25	0.50	0.25	8.83	98.8
OPGM-02	62.3	11.1	1.10	12.8	0.51	0.25	10.8	98.8
OPGM-19	60.5	10.7	0.75	4.36	0.03	4.34	18.9	99.5
OPGM-27	51.2	13.3	0.78	6.36	0.29	7.99	19.6	99.6
OPGM-29	37.3	8.97	0.90	22.0	0.57	0.16	27.7	97.7
OPGM-30	57.5	12.7	1.14	14.1	0.42	0.20	13.1	99.2
OPGM-32	24.8	17.8	1.90	17.8	0.39	0.18	35.7	98.7
OPGM-42	49.8	14.8	0.42	18.6	0.30	0.00	14.8	98.6
OPGM-43	79.5	5.13	0.65	4.13	0.43	0.10	9.33	99.3
OPGM-44	57.3	12.1	0.69	2.02	0.61	1.54	25.4	99.6
OPGM-49	68.2	4.70	1.63	7.51	0.58	0.12	16.8	99.6
OPGM-50	64.7	19.4	0.41	3.30	1.26	0.17	10.3	99.6
OPGM-51	57.1	4.96	0.86	21.8	0.07	0.45	13.4	98.7
BLEND	55.2	19.9	3.99	9.00	0.19	0.11	11.4	99.7
AVG. OPGM	57.3	10.8	1.06	10.9	0.46	1.21	17.3	99.0

Note: P_{80} 125 µm, open pit

Table 13-13: Chalcopyrite Association
ACG Acquisition Company Limited – Santa Rita Mine

Sample	Free Chalco. %	Lib. Chalco. %	Chalco.:Pent. %	Chalco.:FeSulf. %	Chalco.:Olv./ Pyrox. %	Chalco:Serp./ Talc %	Complex %	SUM %
OPGM-01	81.2	3.90	4.96	1.71	0.99	0.02	6.80	99.6
OPGM-02	29.8	3.51	1.46	0.53	0.08	0.13	63.9	99.4
OPGM-19	27.0	4.07	1.63	1.36	2.80	0.74	61.9	99.5
OPGM-27	39.2	5.34	1.83	2.43	1.90	1.13	47.2	99.1
OPGM-29	19.7	21.4	1.03	0.13	0.62	0.25	56.3	99.4
OPGM-30	46.2	2.12	6.30	0.89	0.73	0.41	42.7	99.3
OPGM-32	14.5	18.5	4.86	1.69	1.20	0.34	58.7	99.8
OPGM-42	36.7	3.72	5.59	0.70	0.37	0.00	50.7	97.8
OPGM-43	61.2	1.29	1.17	4.24	0.54	0.09	31.2	99.7
OPGM-44	12.8	10.9	4.29	4.15	1.17	0.73	66.0	100.0
OPGM-49	51.1	1.63	4.06	10.9	2.81	0.00	28.8	99.3

Sample	Free Chalco. %	Lib. Chalco. %	Chalco.:Pent. %	Chalco.:FeSulf. %	Chalco.:Olv./ Pyrox. %	Chalco:Serp./ Talc %	Complex %	SUM %
OPGM-50	35.1	9.95	1.95	12.3	1.19	0.32	38.1	98.8
OPGM-51	30.2	3.47	4.03	0.00	0.54	11.1	50.3	99.7
BLEND	47.7	0.37	12.2	3.66	1.73	1.02	32.2	98.9
AVG. OPGM	37.3	6.91	3.32	3.16	1.15	1.17	46.4	99.3

Note: P_{80} 125 µm, open pit

13.4.3.2 Comminution

Bond ball mill indices (BWi) were determined on each of the 51 variability samples. Bond Ai and SMC tests were carried out on 10 samples.

13.4.3.2.1 Bond BWi Results

A summary of the results is shown in Table 13-14.

Table 13-14: Summary of Bond BWi Results
ACG Acquisition Company Limited – Santa Rita Mine

Lithology	BWi Avg. (kWh/t	BWi Variance (kWh/t)
Pyroxenite	19.2	15.5–22.1
Harzburgite	16.2	14.2–17.6
Olivine-pyroxenite	18.7	16.7–20.0

13.4.3.2.2 SMC and Bond Ai Results

A summary of the results is shown in Table 13-15.

Table 13-15: Summary of Bond Ai and SMC Results
ACG Acquisition Company Limited – Santa Rita Mine

Lithology	Ai Avg.	Ai Variance	DWi Avg. (kWh/m^3)	DWi Variance (kWh/m^3)	A*b Avg.	A*b Variance	Ta Avg.	Ta Variance
Pyroxenite	0.20	0.14–0.34	8.5	4.9–10.7	41.1	30.1–66.5	0.33	0.29–0.53
Harzburgite	0.08	0.04–0.14	6.8	6.3–7.2	45.9	42.7–48.1	0.38	0.32–0.38
Olivine-pyroxenite	0.23	Only one sample	8.0	n/a	40.9	n/a	0.32	0.32

Note: DWi signifies drop weight index, A, b and Ta parameters have no physical meaning but are ore hardness parameters used in SAG mill power calculations

In general, the variability samples are slightly harder in all indices than the lithology samples. The trend, however, is the same in that pyroxenite is significantly harder than harzburgite. Olivine-pyroxenite is similar to pyroxenite but only seven samples were tested for BWi and one for the Ai and SMC tests.

13.4.3.2.3 JKSimMet Simulations

JKSimMet carried out a comminution circuit survey in February 2021. Pyroxenite north ore (the hardest ore) was being treated at the time of the survey. Circuit performance simulations were performed based on the survey results and the SMC tests reported in Section 13.4.3.2.2. The base case simulation treating pyroxenite north ore predicted a throughput of 855 t/h with a flotation feed P_{80} of 150 µm. However, the SAG power draw was close to the maximum motor power and the ball mill power draws were at 72% of maximum. It was commented that the SAG mill was being operated similar to an autogenous mill with a high total load of 33% and a low ball load of 8%.

Two other simulations were carried out for an ore with an Axb of 30, i.e., significantly harder than the values shown in Table 13-15. The first simulation used a SAG load of 33% (as above). The throughput fell to 755 t/h with the SAG motor operating a maximum rated power. No change was seen in the ball mill power draw. The second simulation used a 25% volume SAG mill load but with a higher ball charge. The throughput increased to 955 t/h with the SAG mill operating at 94% of full motor load. Again, there was no change in the ball mill power draw.

The required throughput to meet the LOM production plan maximum throughput of 6.6 Mt/a is 842 t/h with a plant availability of 89.5%.

13.4.3.3 Flotation

The variability testwork comprised:

- Confirmation of the flotation test conditions established in the lithology testing program but with extended rougher flotation time; tests were carried out in triplicate on the blend, pyroxenite and harzburgite composites.
- Conducting the standard test on 51 variability samples
- LCTs on the blend.

13.4.3.3.1 Confirmation Tests

The work confirmed that the standard test was reproducible with approximately a 2% NiS recovery variance within the triplicated tests at a fixed concentrate grade. The standard test was, therefore, used for the variability tests.

13.4.3.3.2 Variability Tests

The variability tests were carried out according to the standard test procedure indicated in the confirmation tests. The NiS and copper rougher average recoveries, grades, and ranges are shown in Table 13-16.

Table 13-16: Variability Rougher Recoveries and Grades
ACG Acquisition Company Limited – Santa Rita Mine

Lithology	NiS Avg. Rec. (%)	NiS Rec. Range (%)	Cu Avg. Rec. (%)	Cu Rec. Range (%)	NiS Avg. Grade (%)	NiS Grade Range (%)	Cu Avg. Grade (%)	Cu Grade Range (%)
Pyroxenite	87.8	73.2–94.9	85.0	54.3–97.5	3.96	0.98–9.20	1.45	0.3–3.21
Harzburgite	60.9	31.4–78.9	74.3	55.9–98.3	2.29	0.42–4.73	0.61	0.08–1.52
Olivine-pyroxenite	83.8	62.2–92.2	83.5	74.1–96.3	4.21	1.0–6.69	1.18	0.15–2.49
Blend	84.9	—	95.0	—	4.14	—	1.36	—

The NiS recoveries showed a wide variation in the three lithologies: 22% for pyroxenite, 48% for harzburgite, and 30% for olivine-pyroxenite. Similarly, there were also wide variations in the rougher concentrate grades. The confirmation tests showed a high level of reproducibility with the standard test; hence, the variability is more likely to be attributable to significant differences in mineralogy and grades in the feed samples rather than experimental variation.

The weighted average of the NiS recoveries considering 32 pyroxenite, 12 harzburgite, and seven olivine-pyroxenite samples was 80.9% at a weighted average rougher concentrate grade of 3.60%. The blend significantly outperformed the weighted average results, particularly with the copper recovery (95%). The lithological composition of the blend is similar to the calculated weighted composition of the variability samples and the head assays of the metals and gangue minerals are also similar. This indicates that there is a benefit to treating a blend of lithologies rather than campaigning individual lithologies.

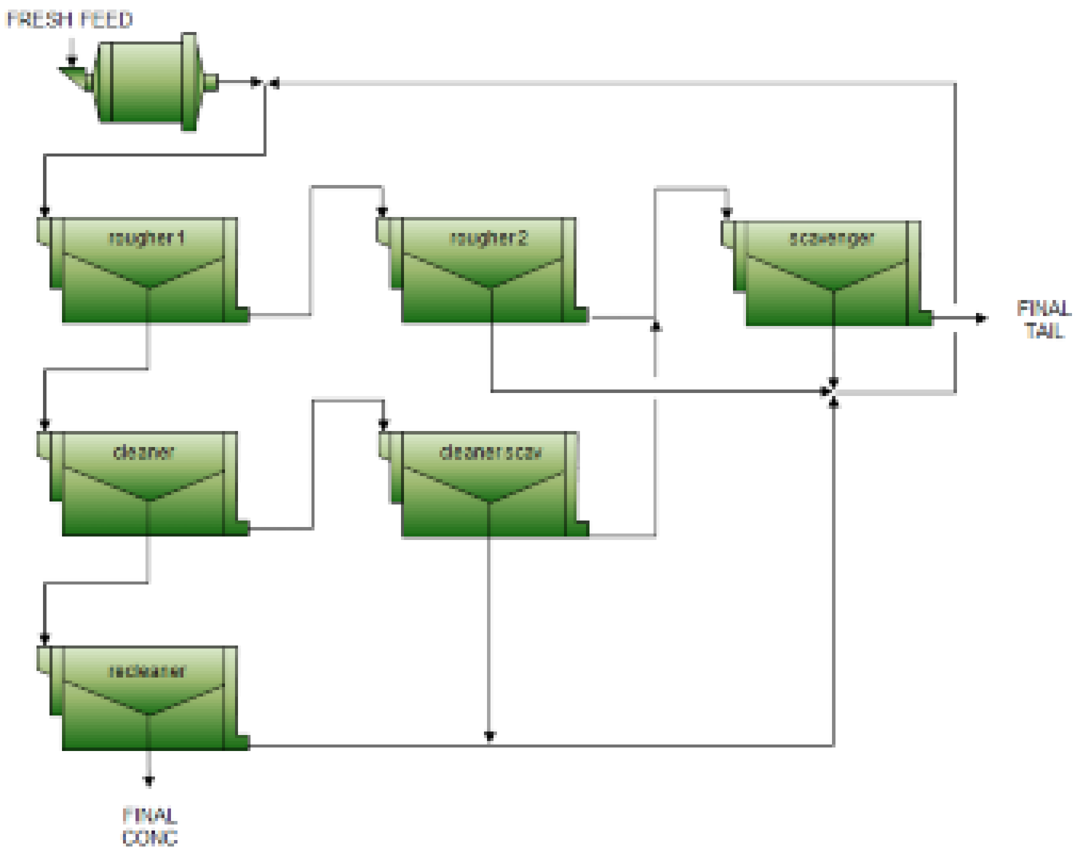
13.4.3.3.3 LCTs

As noted in paragraph 13.4.2.3.5, initial LCT work was not successful due to a build-up of gangue minerals, cycle by cycle, in the final concentrate. Three new tests were carried out with different flowsheets. The best result was obtained with the flowsheet shown in Figure 13-6.

A summary of the results is shown in Table 13-17. The results of the final unsuccessful test in the previous series are shown for comparison. A brief description of the flowsheet for each test follows:

- Test 8 (previous series):
  - No rougher 2 or cleaner-scavenger, scavenger concentrate to cleaner feed, re-cleaner tailings recycled to cleaner feed
- Test 9 (start of new series):
  - Rougher 2 added, rougher 2 concentrate, scavenger concentrate and cleaner tailings recycled to rougher 1 feed, re-cleaner tailings recycled to cleaner feed, cleaner–scavenger tailings recycled to scavenger flotation
- Test 10:
  - Rougher 2 and scavenger concentrate plus cleaner tailings and re-cleaner tailings recycled to rougher 1 feed
- Test 15 (Figure 13-6):

- o Cleaner-scavenger stage added, rougher 2 concentrate, scavenger concentrate, cleaner-scavenger concentrate, and re-cleaner tailings recycled to rougher 1 feed, cleaner-scavenger tailings recycled to scavenger flotation



Source: SGS Geosol, 2021

Figure 13-6: Flowsheet for LCT 15

Table 13-17: Summary of LCT Results
ACG Acquisition Company Limited – Santa Rita Mine

Test No.	NiS Rec. (%)	Cu Rec. (%)	NiS Grade (%)	Cu Grade (%)	SiO_2 Grade (%)	MgO Grade (%)
8	80.6	89.1	10.7	3.0	25.7	13.8
9	81.8	82.2	9.9	2.8	22.5	12.1
10	76.0	67.4	11.8	3.1	15.3	8.0
15	77.0	72.7	14.8	4.2	11.7	6.0

Test 9 appears to be anomalous compared to Test 8 with lower SiO_2 and MgO grades but with lower NiS and Cu grades and similar NiS recoveries.

Test 10 has significantly lower recovery compared to Tests 8 and 9, a small improvement in NiS concentrate grade but with significantly lower SiO_2 and MgO grades.

Test 15 produced the best NiS and Cu concentrate grades at a recovery that is in line with the current plant performance. The lower SiO_2 and MgO grades were commensurate with the higher metal grades. With an NiS recovery of 77.0% and an NiS/MgO ratio of 0.0106, the result falls on the regression line shown in Figure 13-3.

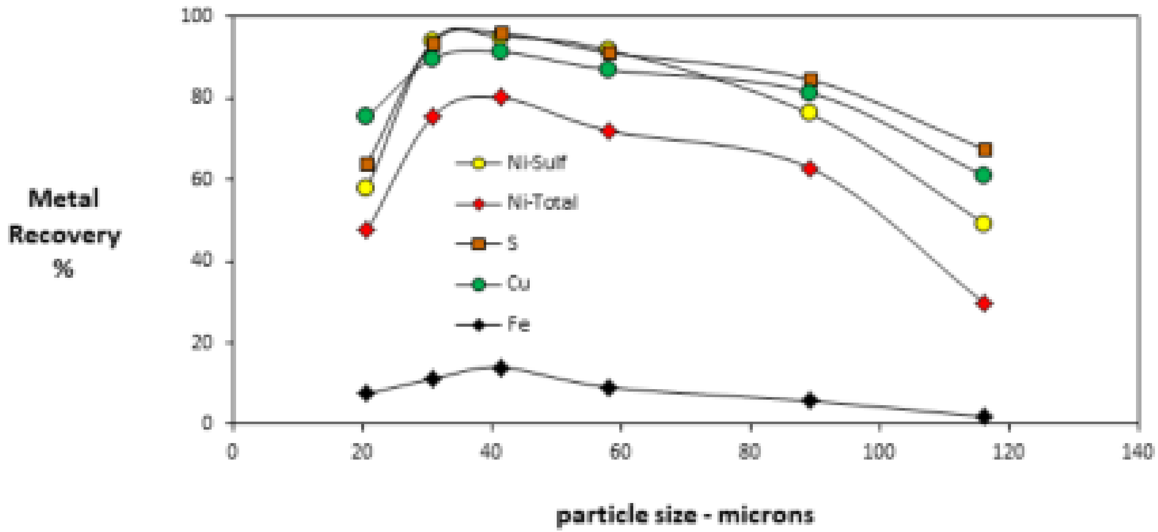
The major differences between Test 15 and the previous tests were:

- The introduction of a cleaner-scavenger stage
- The recycle of the cleaner-scavenger tailings to the scavenger feed

In the previous tests most of the recycle streams returned to rougher 1 feed. The Test 15 flowsheet provided a shorter route for the rejection of gangue minerals to final tailings and prevented the build-up of gangue through the cycles, as seen previously.

13.4.3.3.4 Particle Size Recovery

The final concentrate and tailings from LCT-15 were submitted to wet screening and chemical analysis. The results summarised in Figure 13-7 indicate a range from 40 µm to 90 µm where sulphide flotation is more effective.



Source: SGS Geosol, 2021.

Figure 13-7: Metal Recovery by Particle Size

13.4.4 Tailings Thickening and Rheology Testing

Thickening tests were carried out on 10 tailings samples without using flocculant and 10 more samples with flocculant. Without flocculant, the settling rates were very slow, in the range of 0.4 m/h to 2.8 m/h. With flocculant, the settling rate improved to 25 m/h with solids densities of 70%.

The yield stress versus tailings % solids curve shows that 55% solids would be a safe operating point for tailings pumping.

13.5 Metallurgical Testing on Underground Mineralised Material

13.5.1 Introduction

Mirabela Brazil carried out a drilling program in 2019 on the underground material to provide information for a mineral resource estimate and samples for analysis and flotation testing in the on-site laboratory.

Further testwork was carried out at SGS Geosol in two stages (see Sections 13.5.3 to 13.5.5). The first stage tested samples denominated upper and lower, and the second stage tested grindability and flotation variability samples. SGS Geosol reported results for the first stage in April 2021 and the second stage in November 2021.

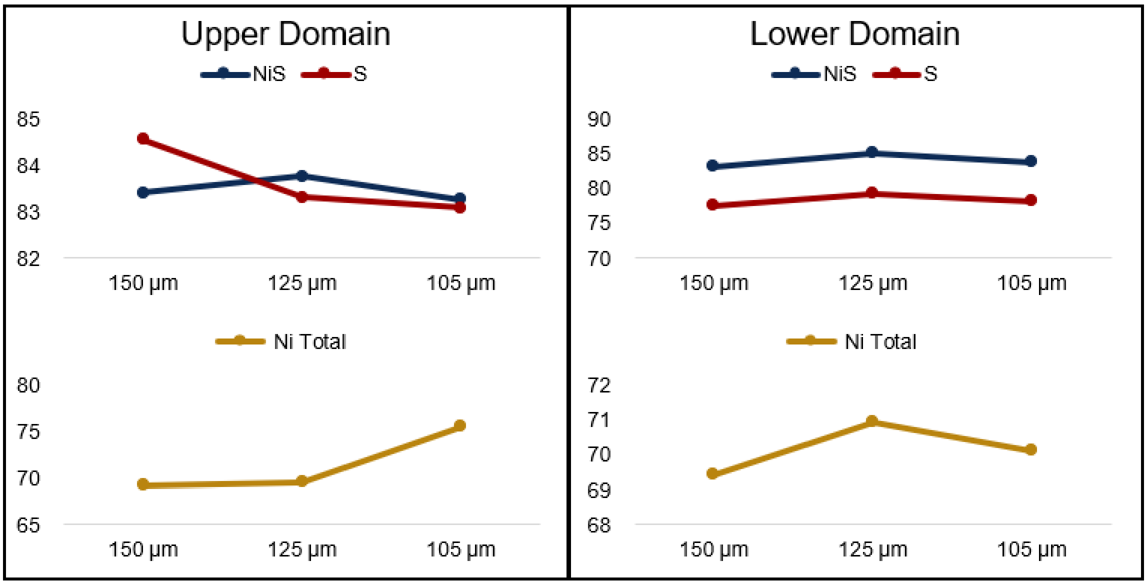
13.5.2 Flotation Results from Testing in the Mirabela Brazil Laboratory

Tests were carried out to determine:

- The optimum flotation feed size
- The optimum reagent additions
- Flotation kinetics

13.5.2.1 Flotation Feed Size

The rougher recoveries are shown in Figure 13-8. The NiS recoveries peaked at between 84% and 85% at a grind size of 125 µm. This size was selected for the remaining work. It was noted that the grinding time in the laboratory rod mill to reach 125 µm was 26% longer than for open pit ore.



Source: Atlantic Nickel, 2020.

Figure 13-8: Recovery of NiS, S and Ni Total by Grind Size

13.5.2.2 Optimum Reagent Addition

Sequential tests were carried out to test three dispersant levels, three activator levels, and three collector levels. The results are shown in Table 13-18 and Table 13-19.

Table 13-18: Rougher Recoveries and Grades for NiS, Ni Total and S (upper domain)
ACG Acquisition Company Limited – Santa Rita Mine

Reagent	Dosage (g/t)	Rec. NiS (%)	Grade NiS (%)	Rec. Ni (%)	Grade Ni (%)	Rec S (%)	Grade S (%)
Dispersant	300	84.5	10.5	71.9	10.8	81.5	22.1
	500	83.8	10.1	69.6	10.1	83.3	21.7

Reagent	Dosage (g/t)	Rec. NiS (%)	Grade NiS (%)	Rec. Ni (%)	Grade Ni (%)	Rec S (%)	Grade S (%)
	800	84.6	10.0	71.4	10.2	82.8	21.3
	60	83.7	10.2	70.2	10.3	79.7	21.0
Activator	80	83.8	10.1	69.6	10.1	83.3	21.7
	100	83.6	10.4	69.5	10.4	80.1	21.6
	80+20	83.8	10.1	69.6	10.1	83.3	21.7
Collector	100+20	85.7	9.4	73.2	9.6	82.4	19.6
	120+20	85.8	8.8	71.4	8.8	82.5	18.4

Table 13-19: Rougher Recoveries and Grades for NiS, Ni Total and S (lower domain)
ACG Acquisition Company Limited – Santa Rita Mine

Reagent	Dosage (g/t)	Rec. NiS (%)	Grade NiS (%)	Rec. Ni (%)	Grade Ni (%)	Rec S (%)	Grade S (%)
	300	85.1	11.2	72.8	11.4	81.7	22.6
Dispersant	500	85.1	9.8	70.9	9.8	79.3	19.2
	800	85.2	10.6	72.1	10.7	83.0	21.8
	60	84.3	10.8	71.0	10.9	79.9	21.5
Activator	80	85.1	9.8	70.9	9.8	79.3	19.2
	100	84.2	11.0	70.3	11.0	80.3	22.1
	80+20	85.1	9.8	70.9	9.8	79.3	19.2
Collector	100+20	82.7	9.9	83.4	11.9	75.9	19.1
	120+20	86.4	9.3	72.1	9.3	82.6	18.7

The results for the variations in dispersant and activator additions are within experimental error; however, the highest collector additions gave the highest recoveries but at a lower concentrate grade. Overall, the recoveries are similar to the recovery shown for the open pit blend in Table 13-16, although the underground material provided more than double the rougher concentrate grade.

13.5.2.3 Flotation Kinetics

The NiS recovery began to plateau at 7.5 minutes and increased by only 1% to 2% after 15 minutes. Conversely, the MgO recovery continued to rise linearly over the same period. The conclusion from this work is that the industrial plant has sufficient flotation capacity to treat this material.

13.5.3 SGS Geosol Testwork

13.5.3.1 Introduction

13.5.3.1.1 Upper and Lower Samples

Sample shipments were made to SGS Geosol in July 2020 and September 2020. The first shipment was NQ (47.6 mm) core and the second shipment was half core from 15 holes in the upper level of the resource and another 15 holes from the lower level. The testing program comprised assaying, mineralogical examinations, comminution testing, flotation testing, and tailings testing. The results were issued in early 2021.

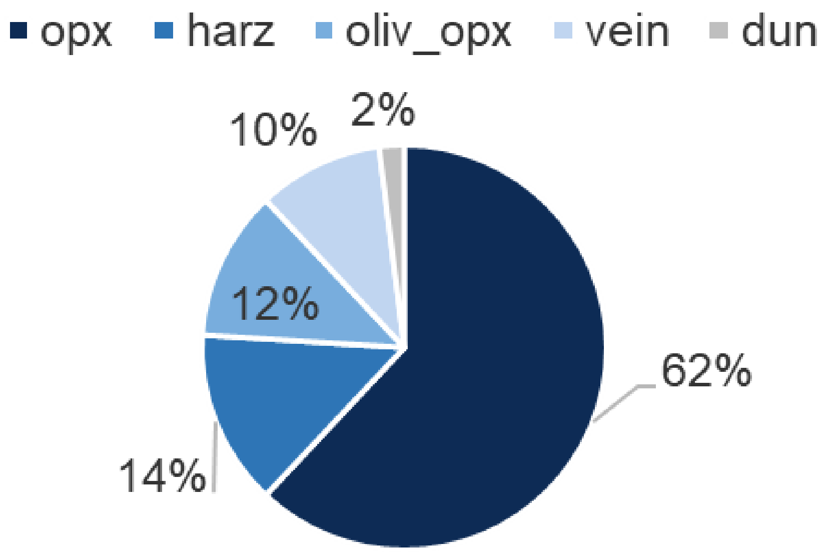
13.5.3.1.2 Grindability and Flotation Variability UGGM Samples

Grindability and flotation variability testwork was conducted on a total of 45 samples from the Santa Rita deposit, including 40 variability samples and five composites representing different periods of the life of the mine. Sample preparation, chemical analysis, Bond BWi, Bond Abrasion, and flotation testwork was conducted at SGS Geosol in Brazil. Mineralogical analysis via EPMA and QEMSCAN was conducted at SGS Canada, and SMC and rheology testwork was conducted at SGS Chile. The results were issued in late 2021.

13.5.4 Upper and Lower Samples

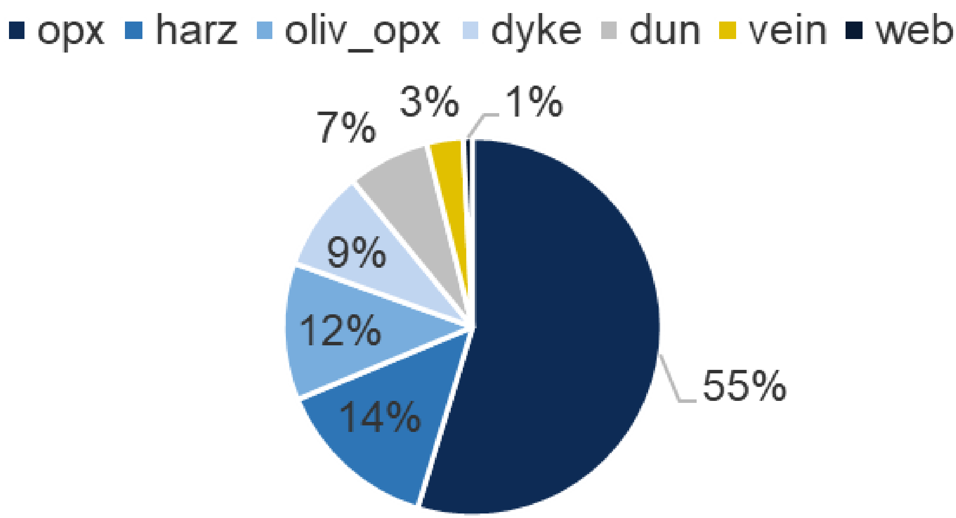
13.5.4.1 Sample Identification

Based on the orientation of the deposit and the proposed sub-level caving mining method, the deposit was divided into upper and lower domains. The lithologies were the same as those found in the open pit and the distributions of these in composites made from samples from the upper and lower domains are shown in Figure 13-9 and Figure 13-10.



Source: Atlantic Nickel, 2020.

Figure 13-9: Lithological Distribution in the Upper Domain Flotation Composite



Source: Atlantic Nickel, 2020.

Figure 13-10: Lithological Distribution in the Lower Domain Flotation Composite

13.5.4.2 Head Assays

The head assays for the upper- and lower-level composites are shown in Table 13-20. The most notable points are that there is little variation between the upper and lower composites and the NiS assays are approximately 60% higher than for the open pit ore.

Table 13-20: Head Assays for Upper and Lower Level Underground Composites
ACG Acquisition Company Limited – Santa Rita Mine

Head Assay: Atomic Absorption, X-ray Fluorescence, LECO and Fire Assay

Sample	NiS %	NiT %	S %	Fe %	Cu %	Co %	SiO_2 %	MgO %	Al_2O_3 %	CaO %	Au ppm	Pd ppm	Pt ppm
Upper	0.55	0.67	1.19	8.44	0.19	0.02	51.1	29.0	3.35	2.20	0.08	0.04	0.10
Lower	0.54	0.67	1.19	9.05	0.16	0.02	48.0	28.4	3.26	2.68	0.06	0.05	0.10

Head Assay ICP

	Ag ppm	As ppm	Ba ppm	Cd ppm	Cr ppm	Sr ppm	Th ppm	Ti ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
Upper	<3	<10	28	<3	1,903	7.67	<20	0.10	<20	61.7	<3	57.0	6.33
Lower	<3	<10	23	<3	1,665	19.0	<20	0.19	<20	84.7	4.67	62.3	15.7

13.5.4.3 Mineralogy

An electron probe micro-analyser was used to determine the metal contents of the main minerals. These results are shown in Table 13-21. The results are very similar to those for the open pit ore and show that pentlandite and chalcopyrite are the main nickel-bearing and copper-bearing minerals. The gangue minerals olivine, orthopyroxene, clinopyroxene, and serpentine all contain refractory nickel.

The mineral associations of the LCT feed, concentrate and tailings streams are shown in Section 13.5.4.6.4. The analysis shows that the upper and lower composites are practically the same. Compared to the open pit blend, the underground composites are richer in pentlandite, chalcopyrite, pyrite and pyrrhotite, similar in olivine, orthopyroxene, clinopyroxene, plagioclase and chrome-spinel, amphibole and mica but lower in serpentine and talc.

The grain size distributions were similar to the open pit ore with the mean size 48 µm for pentlandite and 30 µm for chalcopyrite.

Table 13-21: Metal Content of Minerals by EPMA
ACG Acquisition Company Limited – Santa Rita Mine

Sample	NiS %	Ni.Refrc. %	S %	Fe %	Cu %	Co %	Si %	Mg %	Al %	Ca %
Pentlandite	34.7	-	33.0	31.4	0.04	0.32	-	-	-	-
Chalcopyrite	0.03	-	34.5	31.3	33.6	0.06	-	-	-	-
Pyrite	0.17	-	52.9	46.2	0.29	0.97	-	-	-	-
Pyrrhotite	0.40	-	37.2	62.0	0.01	0.07	-	-	-	-
Olivine	-	0.31	-	10.2	-	-	19.0	27.5	0.00	0.00
Orthopyroxene	-	0.08	-	8.30	-	-	25.6	17.9	0.98	0.91
Clinopyroxene	-	0.04	-	4.43	-	-	24.4	9.40	1.69	14.5
Serpentine	-	0.10	-	7.19	-	-	23.2	16.4	1.22	0.67

13.5.4.4 Comminution

Comminution testing was carried out on the upper and lower composites using the SMC protocols and the Bond suite of tests including the crushing work index (CWi), abrasion index (Ai), and BWi. The results are shown in Table 13-22.

The SMC tests show the underground material is softer at depth for SAG milling and, overall, slightly softer than the open pit lithology composites shown in Table 13-8. The CWi values show moderate hardness similar to the open pit pyroxene south deep material. The Ai values show relatively high abrasiveness similar to the pyroxene north lithology, which is the most abrasive and hardest of the open pit ore. The BWi values are slightly higher than for pyroxene north and indicate a hard ore for ball milling.

Table 13-22: Comminution Testing Results Summary
ACG Acquisition Company Limited – Santa Rita Mine

Composite	DWi (kWh/m^3)	Axb	Ta	CWi (kWh/t)	Ai	BWi (kWh/t)
Upper	6.7	49.6	0.39	12.9	0.22	20.7
Lower	5.8	57.8	0.45	13.1	0.50	20.4

Note: DWi signifies drop weight index, A, b and Ta parameters have no physical meaning but are ore hardness parameters used in SAG mill power calculations, CWi signifies crushing work index, BWi signifies Bond ball mil work index

13.5.4.5 JKSimMet Simulations

JKSimMet carried out a simulation on each of the upper and lower composites. The throughput for the upper composite was calculated at 955 t/h with a SAG mill motor power draw of 7,938 kW, close to the maximum of 8,000 kW. For the lower composite, the throughput was also 955 t/h with a SAG motor power draw of 7,859 kW. The base case with open pit ore gave 855 t/h.

The simulations assumed the current operating conditions for the SAG mill, i.e., 8% ball load and 33% volumetric load. If the volumetric load was reduced to 25% with a higher ball load per JKSimMet's recommendations for open pit ore, then a similar throughput should be achievable with the underground material at a lower SAG power draw.

To achieve the preliminary production forecast of 6.25 Mt/a (plan for the first five years after underground mining ramp-up), an hourly throughput of 797 t/h is required at a plant availability of 89.5%.

13.5.4.6 Flotation

13.5.4.6.1 Standard Flotation Tests

Atlantic Nickel's standard flotation test, described above for open pit ore, was applied in triplicate to the upper and lower underground composites. The tests comprised two rougher stages and a scavenger stage. Excellent reproducibility was achieved. The averaged results from the tests are shown in Table 13-23. The recoveries shown in Table 13-23 are higher than those shown in Table 13-18 and Table 13-19 but at lower concentrate grades; however, in both sets of results the recoveries obtained from the lower composite are higher than for the upper composite.

Table 13-23: Standard Flotation Test Results Summary
ACG Acquisition Company Limited – Santa Rita Mine

Composite	Ni Rec. (%)	Cu Rec. (%)	NiS Grade (%)	Cu Grade (%)
Upper	86.5	87.9	5.64	2.02
Lower	88.5	92.9	6.43	2.02

13.5.4.6.2 Factorial Tests

Twenty-four tests were carried out with four values for each of the grind size P_{80}, collector and dispersant. The activator dosage remained constant. No effect was seen on the NiS recovery.

13.5.4.6.3 Synergy Tests

The purpose of the tests was to optimize the NiS grade-recovery curve for the cleaner, cleaner-scavenger, and re-cleaner stages by varying the collector dosages and testing CMC as a gangue depressant. The tests comprised:

- Rougher 1, rougher 2, and scavenger
- Rougher 1 and 2 concentrates feeding the cleaner
- Cleaner, cleaner-scavenger
- Cleaner concentrate feeding the re-cleaner
- Re-cleaning in three stages to determine the recovery kinetics
- Roughing, cleaning, and re-cleaning tested in open circuit

For both composites, the results showed:

- Adding collector to the re-cleaner leads to slightly lower concentrate grade compared to adding collector in the cleaner.
- Adding CMC reduced the magnesium and silica assays in the final concentrate without affecting the NiS recovery.

13.5.4.6.4 LCTs

Four tests were carried out on underground material using the flowsheet shown in Figure 13-6. The first test, LCT 11, was carried out on the lower composite; collector was added to the cleaner-scavenger but not to the cleaner or re-cleaner. The test did not reach steady state.

A second test (LCT 12) was carried out on the lower composite with collector added to the cleaner and re-cleaner and with CMC added to the cleaner. LCT 13 was carried out on the upper composite using the same conditions as LCT 12. LCT 14 was also carried out on the upper composite but with the cleaner-scavenger in open circuit. This test produced significantly lower NiS recovery and concentrate grade than LCT 13 showing that recirculation is required.

The results for LCT 12 and LCT 13 are shown in Table 13-24.

The mineral associations for pentlandite and chalcopyrite are shown in Table 13-25 and Table 13-26, respectively. The percentage of free and liberated pentlandite in the feed for both composites at 79% is sufficient for good rougher flotation recovery. The major loss to tailings (62% to 64%) occurs in complex particles where fine pentlandite grains are occluded in gangue minerals. For copper, free and liberated grains represent 57%–60% with 3%–4% associated with pentlandite. The majority of losses to tailings occurs in complex particles.

Table 13-24: Summary of LCT Results on Underground Material
ACG Acquisition Company Limited – Santa Rita Mine

Test No. & Composite	NiS Rec. (%)	Cu Rec. (%)	NiS Grade (%)	Cu Grade (%)	SiO_2 Grade (%)	MgO Grade (%)
12 (lower)	77.5	66.4	14.9	3.8	6.7	3.4
13 (upper)	82.6	76.2	14.3	4.6	9.3	4.6

Table 13-25: Pentlandite Mineral Association
ACG Acquisition Company Limited – Santa Rita Mine

Sample	Free Pent. (%)	Lib. Pent. (%)	Pent.:Chalco. (%)	Pent.:FeSulf. (%)	Pent.:Olv./Pyrox. (%)	Pent.:Serp./Talc (%)	Complex (%)
Upper	69.3	9.09	1.05	6.59	6.24	0.12	6.95
Upper-conc.	61.5	14.8	3.31	9.25	0.66	0.02	10.4
Upper-Tailing	4.07	0.44	0.00	0.47	31.9	0.29	62.1
Lower	73.2	6.30	0.97	5.81	6.60	0.14	6.43
Lower-conc.	73.1	8.65	2.03	9.37	0.67	0.02	5.97
Lower-Tailing	2.78	0.00	0.00	0.49	32.8	0.02	63.8

Notes: P_{80} 125 µm, underground

Pent. – pentlandite, chalco. – chalcopyrite, olv./pyrox. – olivine/pyroxenite, serp. - serpentinite

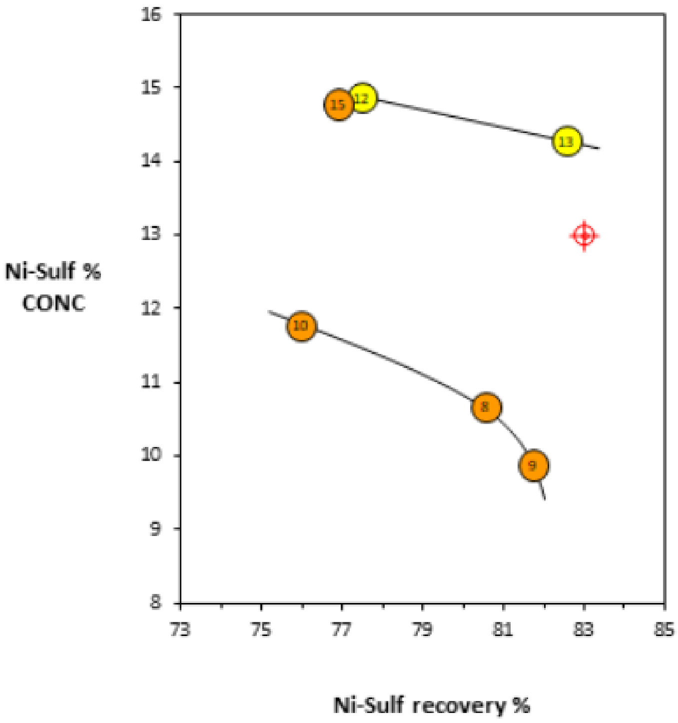
Table 13-26: Chalcopyrite Mineral Association
ACG Acquisition Company Limited – Santa Rita Mine

Sample	Free Chalco. (%)	Lib. Chalco. (%)	Chalco.:Pent. (%)	Chalco.:FeSulf. (%)	Chalco.:Olv./Pyrox. (%)	Chalco:Serp./Talc (%)	Complex (%)
Upper	55.5	5.14	4.51	5.04	10.9	0.22	17.2
Upper-conc.	56.5	7.41	6.81	8.48	4.07	0.06	15.8
Upper-Tailing	1.25	1.22	0.00	0.00	44.4	0.07	52.3
Lower	55.4	2.04	3.01	7.37	16.2	0.07	15.0
Lower-conc.	55.2	7.06	6.29	12.8	3.36	0.02	14.9
Lower-Tailing	1.58	0.14	0.00	0.00	43.6	0.00	53.7

Notes: P_{80} 125 µm, underground

Pent. – pentlandite, chalco. – chalcopyrite, olv./pyrox. – olivine/pyroxenite, serp. - serpentinite

Figure 13-11 shows the grade–recovery curve for LCTs 12 and 13 and for LCT 15 (the best test on open pit ore). In these tests, collector was added to the cleaner and re-cleaner stages in contrast to tests 8, 9, and 10 where no collector was added and the grade–recovery curve is much lower.



Source: SGS Geosol, 2021.

Figure 13-11: Grade/Recovery Curves for Locked Cycle Testwork

13.5.4.7 Tailings Thickening and Rheology Testing – Underground Material

Thickening tests were carried out on tailings from the upper and lower composites. The results were very similar. Without flocculant, the settling rates were slow at 1.2 m/h to 1.3 m/h with a settled solids density of 72%. With flocculant the settling rates improved to 26 m/h at final settled densities between 70% and 73%.

The rheology testing showed that the yield stress increases dramatically between 60% and 65% solids density. This shows that a safe operating range for pumping the tailings is between 55% and 60% solids.

The data are similar to that generated for the open pit ore and indicates that the existing 35 m diameter tailings thickener will be suitable for the underground material.

13.5.5 UGGM Samples Grindability and Flotation Variability Testwork

13.5.5.1 Sample Preparation and Identification

Sample preparation and testwork for the underground variability samples from the Santa Rita deposit included the following:

- Receipt of 40 variability samples, half core NQ.
- Preparation of the 40 variability samples and five composites representing periods in the LOM plan.
- Conduct the SMC grindability test on 25 samples.
- Conduct the Bond Abrasion test on 15 samples.
- Conduct the Bond Ball Mill test on all 45 samples.
- Preparation for grinding and flotation testwork: homogenize the remaining material and split into 1 kg sub-samples.
- Determine the head assay and grinding time for all 45 samples.
- Conduct mineralogical analysis via QEMSCAN on 10 variability samples.
- Grind 2 kg of all 45 samples to P_{80} of 125 µm and conduct the standard flotation test (rougher 1 + rougher 2 + scavenger), including chemical analysis of the products.
- Conduct rheology testwork on the five composites.
- Conduct the MABA (acid base accounting) environmental test on the flotation tailings generated by the composites.

Experimental results were mass balanced via the BILMAT software to improve the reliability of the recovery calculation. The bulk of the project (sample preparation, chemical analysis, Bond Abrasion, Bond BWi, grinding, flotation and MABA, was conducted at SGS Geosol in Brazil, mineralogical analysis via EPMA and QEMSCAN was conducted at SGS Canada, and SMC and rheology testwork were conducted at SGS Chile.

The samples were grouped in five consecutive periods of the life of the mine (2028 to 2034, 2035 to 2038, 2039 to 2042, 2043 to 2046, and 2047 to 2052) with eight samples in each group. All samples were received in the form of half core NQ, with individual sample weight ranging from 50 kg to 70 kg.

The sample provenance is shown in Table 13-27.

Table 13-27: Sample Provenance
ACG Acquisition Company Limited – Santa Rita Mine

Sample	Hole	Lithology	From (m)	To (m)	Weight (kg)	LOM Comp.
UGGM-31	MBS-876	opx	195	213	51	2028-2034
UGGM-32	MBS-871	opx	480	495	65	
UGGM-33	MBS-640	opx	400	415	67	
UGGM-34	MBS-647	harz	485	500	61	
UGGM-35	MBS-657	opx	456	471	62	
UGGM-36	MBS-821	opx	375	390	65	
UGGM-37	MBS-695	opx	462	477	60	
UGGM-38	MBS-931	opx	475	490	66	
UGGM-39	MBS-940	harz	554	575	51	2035-2038
UGGM-40	MBS-936	harz	608	628	55	
UGGM-41	MBS-937	opx	570	590	55	
UGGM-42	MBS-865	opx	564	585	57	
UGGM-43	MBS-1025	opx	560	580	59	
UGGM-44	MBS-1029	opx	605	625	58	
UGGM-45	MBS-1103	opx	545	565	54	
UGGM-46	MBS-1107	opx	580	610	57	
UGGM-47	MBS-1105	harz	677	697	57	2039-2042
UGGM-48	MBS-1055	opx	705	725	53	
UGGM-49	MBS-1104	opx	680	700	61	
UGGM-50	MBS-1054	opx	706	726	51	
UGGM-51	MBS-1024	oliv-opx	680	700	57	
UGGM-52	MBS-1039	opx	717	737	53	
UGGM-53	MBS-1026	harz	651	671	62	
UGGM-54	MBS-1021	opx	620	642	54	
UGGM-55	MBS-1080	oliv-opx	887	907	52	2043-2046
UGGM-56	MBS-1048	oliv-opx	780	802	60	
UGGM-57	MBS-1052	opx	767	789	57	
UGGM-58	MBS-1051	harz	761	781	58	
UGGM-59	MBS-1058	opx	866	887	52	
UGGM-60	MBS-1109	opx	739	760	62	
UGGM-61	MBS-1086	opx	775	795	51	
UGGM-62	MBS-1062	opx	880	900	52	
UGGM-63	MBS-1081	harz	1,005	1,025	53	2047-2053

Sample	Hole	Lithology	From (m)	To (m)	Weight (kg)	LOM Comp.
UGGM-64	MBS-1056	opx	940	960	49	
UGGM-65	MBS-1076	opx	1,015	1,035	55	
UGGM-66	MBS-1063	opx	1,025	1,045	56	
UGGM-67	MBS-1064	opx	980	1,002	52	
UGGM-68	MBS-1062	opx	932	952	51	
UGGM-69	MBS-1061	oliv-opx	997	1,020	59	
UGGM-70	MBS-1085	harz	1,070	1,093	65	

Note. oliv-opx – olivine-pyroxenite, harz - harzburgite

13.5.5.2 Assay Methods

The following methods were used for chemical analysis of the geometallurgical samples, flotation concentrates and tailings:

- XRF83B: X-ray fluorescence for NiT, copper, cobalt, iron, silicon, chromium, magnesium, titanium, aluminum, calcium, potassium, and manganese;
- AAS04B: NiS via atomic absorption;
- CSA17V: Total sulphur via LECO;
- FAI515: Palladium, platinum, and gold via fire assay and atomic absorption;
- ICP40B: Silver, arsenic, barium, beryllium, bismuth, cadmium, calcium, lithium, molybdenum, sodium, lead, antimony, strontium, thorium, thallium, uranium, tungsten, yttrium, zinc, and zircon by ICP scan.

Official certificates of chemical analysis were provided to Atlantic Nickel by SGS.

13.5.5.3 Grindability Testwork

13.5.5.3.1 SAG Mill Comminution Test (SMC)

Hard ores exhibit higher DWi and lower Axb values. The results summarised in Table 13-28 indicate DWi values ranging from 1.6 kWh/m^3 for UGGM-58 to 9.6 kWh/m^3 for UGGM-60 and A x b values from 137 for UGM-69 to 34 for UGM-60.

13.5.5.3.2 Bond Abrasion Index (Ai)

The results summarised in Table 13-28 indicate Ai values ranging from 0.19 for sample UGGM-63 to 0.45 for UGGM-42 (most abrasive in the group of samples).

13.5.5.3.3 Bond Ball Mill Work Index (BWi)

The results summarised in Table 13-28 indicate BWi values ranging from 15.3 kWh/t for sample UGGM-34 to 24.5 kWh/t for UGGM-66 (hardest in the set).

The average result for A x b of 81 shows the material is soft for SAG milling; however, the average BWi of 20.6 kWh/t shows it is hard for ball milling.

Table 13-28 shows that, on average, the material tested was softer for SAG milling, harder for ball milling and slightly more abrasive than open pit material.

Table 13-28: Grindability Results Summary
ACG Acquisition Company Limited – Santa Rita Mine

Sample	DWi (kWh/m³)	Axb	Ta	Ai	BWi (kWh/t)
2028-2034	4.0	87.0	0.65	0.26	19.9
2035-2038	4.2	85.6	0.63	0.33	19.9
2039-2042	5.9	60.4	0.44	0.28	20.2
2043-2046	6.0	59.3	0.43	0.29	20.9
2047-2052	3.6	95.1	0.72	0.27	21.0
UGGM-31	-	-	-	0.19	19.8
UGGM-32	-	-	-	-	21.7
UGGM-33	5.6	60.2	0.46	-	17.9
UGGM-34	-	-	-	-	15.3
UGGM-35	4.7	70.9	0.56	-	20.7
UGGM-36	4.0	85.6	0.65	0.29	19.8
UGGM-37	7.2	46.1	0.36	-	20.1
UGGM-38	-	-	-	-	21.0
UGGM-39	-	-	-	-	18.1
UGGM-40	-	-	-	-	18.5
UGGM-41	-	-	-	-	19.9
UGGM-42	7.0	50.0	0.37	0.45	21.8
UGGM-43	-	-	-	-	20.4
UGGM-44	6.6	50.3	0.39	-	21.6
UGGM-45	5.4	62.6	0.48	0.37	21.6
UGGM-46	6.4	52.9	0.41	-	20.3
UGGM-47	3.0	118	0.86	-	19.0
UGGM-48	-	-	-	-	21.7
UGGM-49	9.0	37.0	0.28	-	21.4
UGGM-50	-	-	-	-	20.4
UGGM-51	-	-	-	0.28	20.1
UGGM-52	5.7	58.1	0.45	-	21.9
UGGM-53	-	-	-	0.30	20.1
UGGM-54	6.7	51.7	0.39		20.7
UGGM-55	-	-	-	-	22.3
UGGM-56	2.0	174	1.27	-	19.1
UGGM-57	6.4	52.2	0.40	-	21.9
UGGM-58	1.6	211	1.59	0.24	19.4

Sample	DWi (kWh/m³)	Axb	Ta	Ai	BWi (kWh/t)
UGGM-59	-	-	-	0.34	22.4
UGGM-60	9.6	34.0	0.27	-	20.3
UGGM-61	-	-	-	-	20.5
UGGM-62	-	-	-	-	22.4
UGGM-63	3.0	114	0.85	0.19	18.9
UGGM-64	4.1	81.3	0.63	-	23.9
UGGM-65	-	-	-	-	22.2
UGGM-66	4.1	83.2	0.62	-	24.5
UGGM-67	-	-	-	-	22.5
UGGM-68	-	-	-	-	22.8
UGGM-69	2.5	137	1.02	0.22	20.4
UGGM-70	-	-	-	-	19.9
Avg.	5.1	81	0.61	0.29	20.6

Note. DWi signifies drop weight index, A, b and Ta parameters have no physical meaning but are ore hardness parameters used in SAG mill power calculations, BWi signifies Bond ball mill work index.

13.5.5.4 Flotation

13.5.5.4.1 Sample Preparation and Characterisation

Sample Preparation

Samples were ground to P_{80} of 125 µm for flotation testing; the time required to reach this size varied from 11.15 minutes to 29.45 minutes.

Head Assay

The head assay determination indicate that:

- The NiS assays, which refers to the nickel exclusively in pentlandite, ranged from 0.06% for UGGM-32 to 1.10% for UGGM-63.
- The total nickel assays, NiT, which refers to all the elemental nickel in a sample regardless of mineralogical source, ranged from 0.50% for UGGM-42 to 1.14% for UGGM-63.
- The copper head assays ranged from 0.11% for UGGM-47 to 0.40% for UGGM-37.
- The cobalt assays were between 0.01% and 0.03% for all samples.
- Sulphur ranged from 0.58% for UGGM-47 to 2.13% for UGGM-63.
- Sample UGGM-50 exhibited the lowest MgO assay, at 23.4%. All samples of the harzburgite lithology (UGGM-34, UGGM-39, UGGM-40, UGGM-47, UGGM-53, UGGM-58, UGGM-63, UGGM-70) and the majority of the olivine-pyroxenite (oliv-opx) samples (UGGM-51, UGGM-56 and UGGM-69) exhibited MgO above 30%.
- Sample UGGM-63 was the richest in gold, palladium and platinum, at 1.15 ppm, 0.67 ppm and 0.18 ppm, respectively. The gold assay was 0.27 ppm for sample UGGM-38 and 0.15 ppm for UGGM-70. All other samples exhibited gold assay below 0.15 ppm.
- Apart from UGGM-63, all other samples exhibited palladium assays below 0.15 ppm.

- The platinum assays were between 0.20 ppm and 0.30 ppm for samples UGGM-34, UGGM-39, UGGM-53, UGGM-58, and UGGM-70. All these samples were harzburgite lithology. All other samples exhibited platinum assay below 0.20 ppm.
- Silver and undesirable elements such as arsenic, cadmium and uranium, were below detection limits for all samples.

Mineralogy

Mineralogical analysis via EMPA (electron microprobe) and QEMSCAN (scanning electron microscopy) was conducted to determine the modal composition, mineral grain size and liberation for ten variability samples.

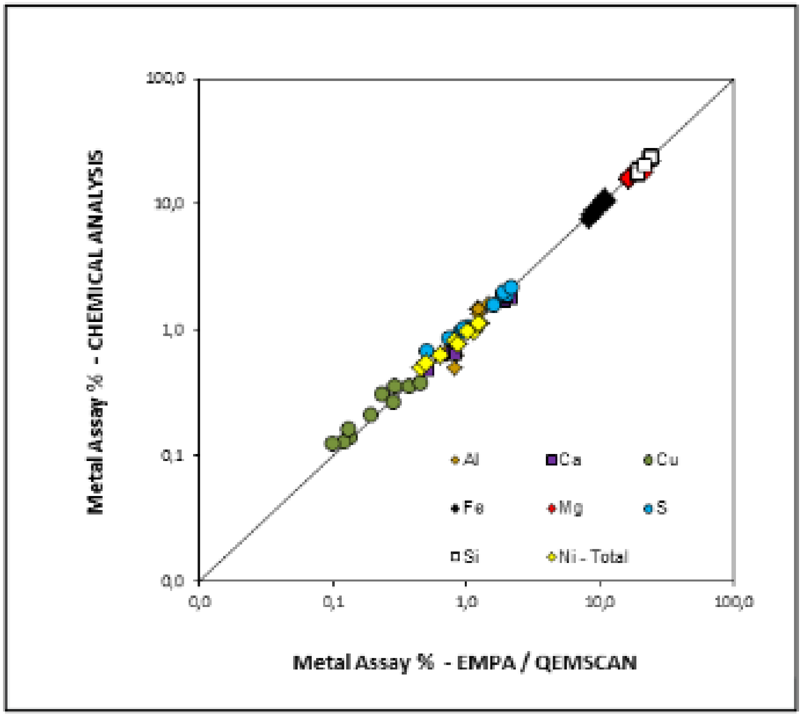
The EMPA results demonstrate that:

- Pentlandite and chalcopyrite are the main nickel-bearing and copper-bearing minerals.
- Pyrite and pentlandite are the main cobalt-bearing minerals.
- The metal content of pentlandite, chalcopyrite, pyrite, and pyrrhotite is practically in stoichiometric proportion (Ni_5Fe4S_8, $CuFeS_2$, FeS_2, and FeS).
- The gangue consists mostly of olivine and orthopyroxene, which carry significant amounts of nickel as part of the crystal structure. This form of nickel is refractory. It cannot be floated and is considered non-recoverable.

The QEMSCAN results demonstrate that:

- The pentlandite content is in general three times higher than the chalcopyrite content.
- The pyrite and pyrrhotite assays are similar in the majority of the samples.
- The orthopyroxene content is an order of magnitude higher than the other minerals.
- The serpentine content is very low in all samples.
- In terms of modal composition, the olivine content is the main factor differentiating the lithologies, with values below 5% for pyroxenite and above 60% for harzburgite. Sample UGGM-69 was the only olivine-pyroxenite sample examined, with an olivine content of 47.8%. The orthopyroxene content decreases as the olivine increases, so that the sum of the assays of these two minerals is fairly constant and close to 86% for the samples examined.

Combining the metal content measured by EPMA with the modal composition measured by QEMSCAN allows the metal assays to be back-calculated for the samples submitted to mineralogical analysis. As can be seen in Figure 13-12, the back-calculated values compare very well with the assays given by chemical analysis.



Source: SGS Canada, 2021

Figure 13-12: Assay Reconciliation Results

Grain Size Distribution

The grain size distribution of a given mineral encompasses free and liberated particles and inclusions of that mineral in locked particles. Grain size distributions for pentlandite, chalcopyrite, and olivine-pyroxene were determined in the ten variability samples. The results indicate that:

- The mean grain size of pentlandite ranged from 32 µm for UGGM-52 to 60 µm for UGGM-58.
- The mean grain size of chalcopyrite ranged from 26 µm for UGGM-45 to 44 µm for UGGM-63.
- The mean grain size of the olivine-pyroxene gangue ranged from 85 µm for UGGM-59 to 95 µm for UGGM-63.

Therefore, full liberation of the valuable minerals in the Santa Rita ore is not easy to attain, since it would require grinding to 30 µm; should the ore be floated at this fine grind, additional nickel sulphide losses would occur due to slower flotation kinetics.

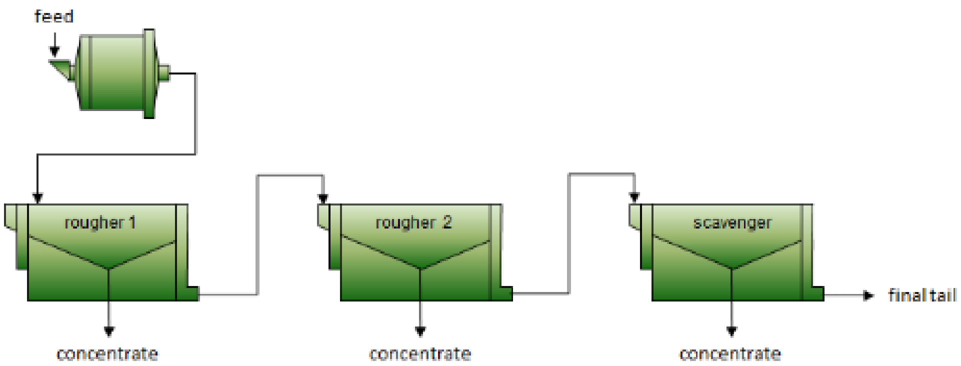
Mineral Association

The association of a mineral represents the mass distribution of that mineral to different particle locking classes. The results for the ten samples tested indicate that:

- Pentlandite liberation (free + liberated pentlandite) is close to 80% in the majority of the samples, except for UGGM-52 and UGGM-53 with 67% and 95% liberation, respectively.
- Chalcopyrite liberation is low, ranging from less than 40% for UGGM-34 to 73% for UGGM-58.
- The main association for both pentlandite and chalcopyrite is the binary with olivine/pyroxenes and complex particles.

13.5.5.4.2 Flotation Testing

The standard flotation test was conducted on all variability samples and composite samples using a Denver D12 laboratory flotation cell with sodium ethyl xanthate plus C2430 (50%:50%) as the collector, MIBC as the frother, copper sulphate and citric acid (50%:50%) as the activator, and sodium silicate as the dispersant. As per Figure 13-13, the test encompassed rougher 1, rougher 2 and scavenger stages. The standard conditions, optimised in previous work (SGS Geosol, 2020), are given in Table 13-29. The head sample, the flotation concentrates and the final tailings were analysed by XRF, LECO, and AAS. The experimental masses and assays were reconciled via the BILMAT software to improve the reliability of the recovery estimation.



Source: SGS Geosol, 2021

Figure 13-13: Standard Flotation Test Flowsheet

Table 13-29: Standard Flotation Conditions
ACG Acquisition Company Limited – Santa Rita Mine

Stage	Cell (L)	Air (L/m)	RPM	Time (min.)	Collector SEX+C2430 (g/t)	Frother MIBC* (g/t)	Activator $CuSO_4$+CA (g/t)	Dispersant Na_2SO_3 (g/t)	Depressor CMC (g/t)	pH
Rougher 1	4.0	4.0	1,300	5.00	100	10	80	800	-	natural
Rougher 2	4.0	4.0	1,300	5.00	20	-	-	-	-	natural
Scavenger	4.0	4.0	1,300	5.00	20	-	-	-	-	natural

Note: Feed P_{80} = 125 µm at 35% solids

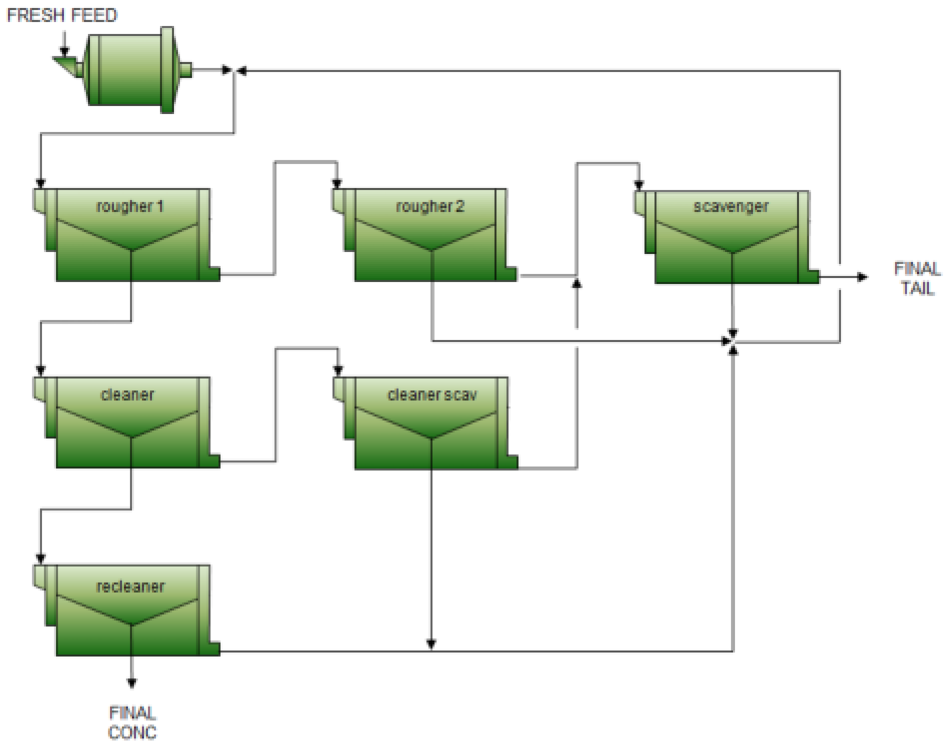
* No frother addition for harzburgite samples

All 45 samples were submitted to the standard flotation test. The mass balanced results indicate that:

- The highest and lowest NiS combined concentrate grades (rougher 1 + rougher 2 + scavenger) occurred for UGGM-45 and UGGM-34 at 12.2% and 5.06%, respectively. The NiS grade was above 7% for all LOM composites.
- The highest and lowest NiS recoveries occurred for UGGM-70 and UGGM-34 at 95.3% and 70.3%, respectively. The NiS recovery was above 90% for all LOM composites.
- The highest and lowest copper concentrate grades occurred for UGGM-37 and UGGM-34 at 4.75% and 1.19%, respectively. The copper assay was above 2% for all LOM composites.

- The highest and lowest copper recoveries occurred for UGGM-63 and UGGM-58 at 86.2% and 61.9%, respectively. Copper recoveries were above 85% for all LOM composites.
- There was a strong correlation between the NiS and NiT assays in the final concentrate, also between sulphur and iron assays. There is also a strong correlation between the SiO_2 and MgO recoveries, as well as between Al_2O_3 and CaO recoveries.

A series of LCTs were conducted on the LOM composites using the circuit shown in Figure 13-14, including rougher, cleaner and re-cleaner stages, with all recycle streams returning to the rougher feed, except for the cleaner-scavenger tailings which were directed to the scavenger feed. This circuit configuration was optimised by preliminary LCT work. The LCT results are summarised in Table 13-30). The NiS recoveries and grades are significantly better than those achieved with the open pit ore LCTs (Figure 13-14)



Source: SGS Geosol, 2021

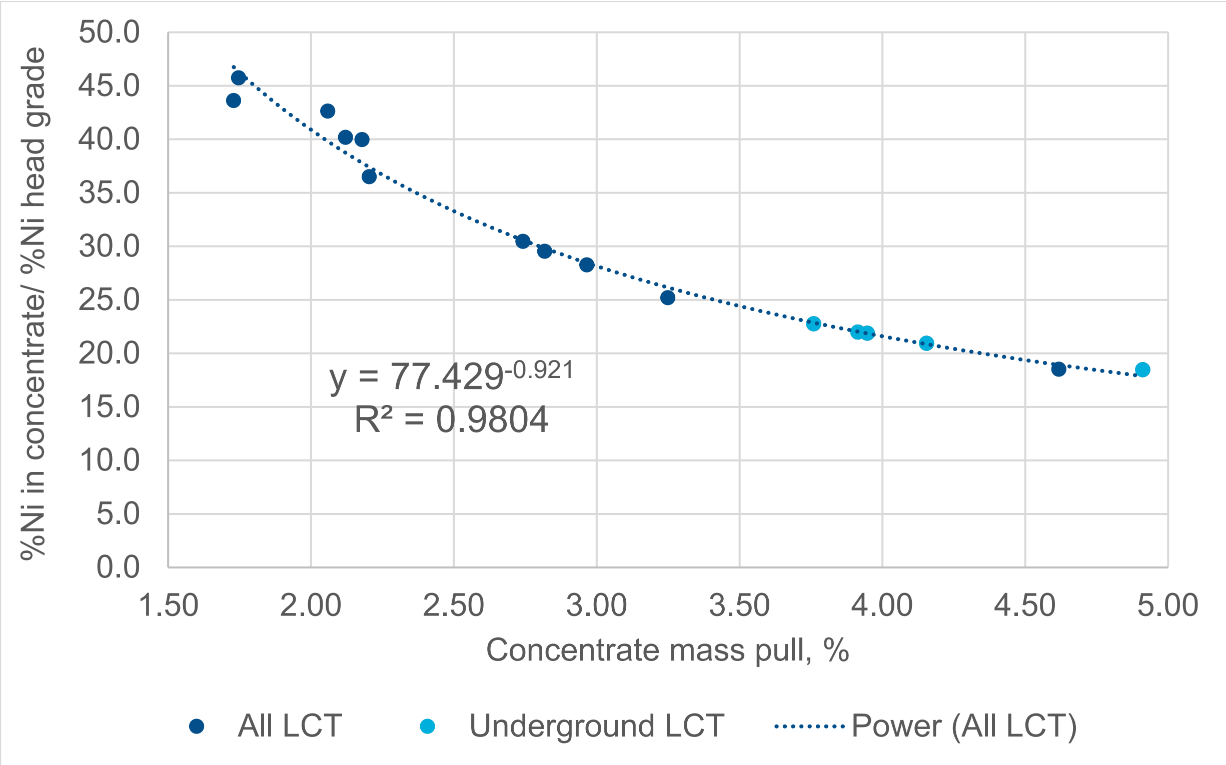
Figure 13-14: LCT Flowsheet

Table 13-30: Summary of LCT Results
ACG Acquisition Company Limited – Santa Rita Mine

LCT	NiS		NiT		Copper		Cobalt		Sulphur		MgO	
	Conc. (%)	Rec. (%)	Conc. (%)	Rec. (%)	Conc. (%)	Rec. (%)	Conc. (%)	Rec. (%)	Conc. (%)	Rec. (%)	Conc. (%)	Rec. (%)
LCT 20 COMP 2047-2052	14.6	88.0	14.7	73.2	3.77	77.6	0.31	91.9	30.7	89.6	4.27	0.57
LCT 21 COMP 2043-2046	13.3	90.6	13.3	77.5	3.33	82.8	0.29	93.6	28.1	92.0	5.18	0.83
LCT 22 COMP 2039-2042	14.5	87.0	14.5	72.6	3.87	78.1	0.32	91.3	30.0	88.9	4.61	0.57
LCT 23 COMP 2035-2038	13.8	88.3	13.9	74.9	3.89	72.7	0.35	92.7	30.4	88.9	3.88	0.50

LCT	NiS		NiT		Copper		Cobalt		Sulphur		MgO	
	Conc. (%)	Rec. (%)	Conc. (%)	Rec. (%)	Conc. (%)	Rec. (%)	Conc. (%)	Rec. (%)	Conc. (%)	Rec. (%)	Conc. (%)	Rec. (%)
LCT 24 COMP 2028-2034	14.9	84.8	14.9	73.2	5.85	94.3	0.38	84.9	31.6	86.4	3.31	0.45

The concentration ratio was plotted against the concentrate mass pull from the LCT results for the underground material and the open pit ore to determine a recovery equation. The results are shown in Figure 13-15.



Source: SGS Geosol, 2021

Figure 13-15: %NiS in Concentrate/%NiS Head Grade versus %Concentrate Mass Pull

The underground and open pit data fit very well on the above curve with a high R^2 value of 0.9804. The resulting NiS recovery equation at an NiS concentrate grade of 13.85% is:

Recovery = (13.85/%NiS Head Grade)*EXP((LN((13.85/%NiS Head Grade)) – LN(77.429)/(-0.921)

This equation was used to determine the NiS recoveries in the LOM underground production schedule.

13.5.5.5 Settling and Rheology Testwork

Settling and rheology testwork was conducted at SGS Chile on the LOM period composites. The settling tests were conducted at an initial solids content of 15%. The results are summarised in Table 13-31.

The rheology of the samples was determined by two different methods: Vane and Cup. The rheology testing showed that the yield stress increases at 60% solids density. This indicates that a safe operating range for pumping the tailings is around 55% solids. These results are similar to those achieved with open pit ore samples.

Table 13-31: Settling Test Results
ACG Acquisition Company Limited – Santa Rita Mine

Sample	Flocculant	Settling Speed (m/h)	Final Solids (%)	Unit Area (m^2/t/d)
2028-2034	None	0.85	69.6	6.14
2035-2038	None	0.95	71.5	5.63
2039-2042	None	1.07	70.6	4.90
2043-2046	None	0.83	74.3	6.45
2047-2052	None	1.20	76.4	4.45
Average	None	0.98	72.5	5.51
2028-2034	RF505 5 g/t	24.7	65.9	0.21
2035-2038	RF505 5 g/t	25.4	72.7	0.21
2039-2042	RF505 5 g/t	25.0	71.2	0.21
2043-2046	RF505 5 g/t	25.4	72.4	0.21
2047-2052	RF505 5 g/t	25.7	73.8	0.21
Average	RF505 5 g/t	25.3	71.2	0.21

13.6 Palestina Prospect

13.6.1 Introduction

Staff from Santa Rita carried out a scoping level metallurgical testwork program on RC drilling rejects from a drilling campaign carried out in 2020 on the Palestina prospect. The purpose of the testwork was to determine if the flotation behaviour of the Palestina material was similar to Santa Rita ore and if the existing Santa Rita plant would be adequate for the treatment of this material. The work was completed in March 2021.

13.6.2 Samples

The samples were selected by the Santa Rita exploration team. Five bags containing 132 kg of samples were delivered to the Santa Rita laboratory comprising material from the following drill holes:

- Bag 1: holes 642025 to 642029, 642031 to 642033
- Bag 2: holes 642034 & 642035, 606036, 588037, 570038, 552039, 516041
- Bag 3: 638700 to 638709
- Bag 4: 638711 to 638718
- Bag 5: 638719, 638721 to 638727

No lithological information was provided.

The samples were crushed to 2 mm, blended and split into two 64 kg lots, one for testing in the Santa Rita laboratory and the other for external testing.

13.6.3 Testing Program

Santa Rita's standard grinding and flotation procedures were used for the tests. The following results were obtained:

- Grinding: grinding of the samples was carried in a laboratory rod mill. The grinding time required to reduce the material from 2 mm to a P_{80} of 125 µm was similar to the Santa Rita ore, which indicates the Bond ball mill work index is likely to be in the same range.
- Flotation feed size: the optimum size was a P_{80} of 125 µm, the same as for the Santa Rita ore.
- Chemical analysis by size fraction: the analyses were carried out on material ground to a P_{80} of 125 µm. The NiS, copper, gold, and PGMs all show significantly higher grades in the 38 µm fraction than the overall head grade. The Santa Rita ore behaves similarly.
- Reagent additions: three addition levels of dispersant, activator and collector were tested. The Santa Rita standard additions gave the best results. The NiS recovery to the rougher concentrate was 78.4% compared to 82%–83% for Santa Rita ore. The lower recovery is probably due to the lower head grade. The rougher concentrate gold and PGM grades and recoveries are shown in Table 13-32. The sum of the gold and PGM grades is about five times higher than for the Santa Rita ore using the same test.
- Flotation kinetics: these were similar to the Santa Rita ore.

Table 13-32: Gold and PGM Grades and Recoveries, Palestina
ACG Acquisition Company Limited – Santa Rita Mine

Item	Au	Pd	Pd
Rougher conc. grade, ppm	1.73	5.71	2.09
Rougher recovery, %	57.1	47.5	69.0

13.6.4 Santa Rita Plant Capacity to Treat Palestina Material

The above results indicate that the Santa Rita plant should have the capacity to treat Palestina material at a similar throughput. A metallurgical testing program similar in scope to the one carried out at SGS Geosol on the Santa Rita underground material should be carried out to confirm this.

13.7 CP Comments on "Item 13: Mineral Processing and Metallurgical Testwork"

The CP notes the following:

- The process plant performance data from January 2020 to December 2022 are shown in Table 13-4. The NiS recovery over the period was 79.1%. The average concentrate grade was steady at around 13.5% NiT. The NiS recoveries in 2022 have been consistently around 80.8%.
- Atlantic Nickel staff collected plant data over the period January 2021 to December 2021 and from September 2022 to December 2022 with the objective of determining a robust formula to predict NiS recovery. A strong relationship was found between the enrichment ratio (%NiS in concentrate/%NiS in feed) versus the % mass pull to the concentrate. At a fixed concentrate grade, the recovery can be calculated. The R2 correlation coefficient for the Q4 2022 model is 0.87 compared to 0.79 for the 2021 model and around 0.21 for the previous model. The new model is suitable for calculating the LOM open pit ore recovery.

- Comminution testwork was carried out on composites of the three main open pit lithologies and on variability samples. The pyroxenite material in the north of the pit is the hardest material and harzburgite is the softest. Tests following the SMC protocols and the Bond suite gave the same conclusion. JKTech used a plant survey and these results to model plant performance. The base case calculated a throughput of 855 t/h versus the LOM production requirement of up to 842 t/h at 89.5% availability. The average throughput from December 2021 to December 2022 was 839 t/h considering 89.5% plant availability.
- Rougher–scavenger flotation testing was carried out on the three main open pit lithology composites, 51 variability samples and a blend of the variability samples. The lithology testing confirmed that pyroxenite and orthopyroxenite perform better than harzburgite. The variability samples showed large variations in recovery and concentrate grade. LCTs carried out on the variable sample blend gave NiS recoveries between 76% and 82% at concentrate grades between 9.9% NiS and 14.8% NiS. The CP is of the opinion that sufficient comminution and flotation variability testing has been carried out to predict plant performance.
- Mineralogical examinations showed that for a sample ground to 125 µm, the mean size of the particles was 48 µm for pentlandite and 30 µm for chalcopyrite. Finer grinding would lead to slime losses. The majority of losses to tailings occurs in complex particles with fine metal sulphides occluded in gangue minerals.
- The upper and lower composite underground material and the underground variability samples showed similar particle size data to the open pit ore. The pentlandite content was approximately 60% higher.
- The comminution data for the underground upper and lower composites showed they were softer for crushing and SAG milling than the open pit ore but harder for ball milling. The tests carried out on the LOM period composites confirmed these results. JKTech calculated a throughput of 955 t/h for the upper and lower composites. The required throughput is 797 t/h for the first 5 years of underground operation at 89.5% availability to attain a production level of 6.25 Mt/a. The CP considers that the plant is capable of this throughput; however, it is recommended that the JKTech report be updated with the comminution data from the variability and LOM period composites testing.
- Rougher-scavenger flotation testing on the upper and lower underground composites showed similar results to the previous Atlantic Nickel tests on open pit ore but with higher recovery and lower rougher concentrate grade. The tests on the underground variability samples also showed generally higher recoveries but at similar rougher concentrate grades.
- LCTs on the underground upper and lower composites gave similar results to the open pit blend material. However, the LCTs on the underground LOM period composites gave better results with NiS recoveries in the range 85% to 91% at concentrate grades between 13.3% and 14.9% NiS. Atlantic Nickel staff plotted the enrichment ratio (%NiS in concentrate/%NiS in feed) versus the % mass pull to the concentrate for the open pit and underground LCTs. The R^2 correlation coefficient for the resulting curve is 0.9804. The CP considers this model to be suitable for calculating the LOM underground material recovery.
- The only deleterious element in the concentrate that could lead to downstream treatment penalties is MgO; this is controlled by efficient cleaner flotation and has not been an issue to date.

14.0 MINERAL RESOURCE ESTIMATES

14.1 Introduction

The Mineral Resource estimate for Santa Rita, as of December 31, 2022, was completed by MTS. GeoEstima reviewed and adopted the procedures and parameters used by MTS to estimate the resources of the open pit and underground models.

Open pit and underground Mineral Resource models were completed for the Santa Rita nickel–copper deposit:

- **Open pit model:** the open pit Mineral Resource model was completed in July 2019 to support Mineral Resource estimation assuming open pit mining methods. The open pit model included drill data completed by Atlantic Nickel up to June 23, 2019.
- **Underground model:** a second Mineral Resource model was completed in March 2021 to determine Mineral Resources potentially amenable to underground mining methods. The underground model included drill hole data completed by Atlantic Nickel between June 2019 and February 2021. The database close-out date for the underground model was February 25, 2021.

After the completion of the block models, both models were combined into the same file.

The methodology used for the two models was similar and included:

- Construction of a lithology domain model.
- Construction of a grade shell to constrain the grade estimation.
- Calculation of nominal drill spacing used to control estimations and determine resource classification.
- Construction of a surface for local varying anisotropy to control the search ellipse during interpolations.
- Estimate a sulphur indicator model to define the low and high-sulphur domains.
- Estimate indicator and ordinary kriging (OK) models for total nickel (NiT%), sulphide nickel (NiS%), copper (Cu%), cobalt (Co%), and magnesium oxide (MgO%) to define the low and high-grade domains of each one.
- Estimate sulphur, NiT, NiS, copper, MgO, cobalt, palladium (Pd ppm), platinum (Pt ppm), gold (Au ppm), and iron (Fe %) grades for both domains, and calculate the final grade based on the grades and indicator value of each domain.
- Assign density by lithology domain.
- Validate the estimation using trend analysis, statistical, and visual checks.

The geology models for the open pit and underground were constructed in Leapfrog Geo. Both geology models were reviewed and accepted by GeoEstima.

The grade shells for the open pit and underground models were defined based on the NiT, S, and MgO content, and were constructed using Leapfrog Geo software. In addition, the indicator models for the open pit and underground models were completed using Vulcan software.

The Mineral Resource estimates for the open pit and underground models were estimated using Vulcan software and were checked by GeoEstima using Leapfrog Geo/Edge. The models include grade estimates for 10 variables (NiT, NiS, Cu, Co, Pd, Pt, Au, MgO, Fe, and S), and a mean density value was assigned by lithology domain due to limited data.

The open pit model was depleted using the December 31, 2022 topography. The current underground Mineral Resource was reported considering all the blocks inside of the Mineral Resource shape, instead of applying an NSR cut-off value to the blocks. Consequently, the underground resource includes all of the mineralised blocks, classified as Measured, Indicated, and Inferred, and also waste blocks that are inside of the underground Mineral Resource shapes.

The Mineral Resource estimates reported in this CPR follow Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves dated May 10, 2014 (the CIM (2014) definitions).

The CP reviewed the Mineral Resource assumptions, input parameters, geological interpretation, block modelling, and reporting procedures, and is of the opinion that the Mineral Resource estimate is appropriate for the style of mineralisation and that the block model is reasonable and acceptable to support the December 31, 2022, Mineral Resource estimate.

The CP is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimate.

A summary of the open pit and underground Mineral Resources for the Santa Rita deposit is provided in Table 14-1.

Table 14-1: Summary of Mineral Resources – December 31, 2022
ACG Acquisition Company Limited – Santa Rita Mine

Category	Method	Tonnage (kt)	Grade N (%)	Grade Cu (%)	Grade Co (%)	Grade Pd (g/t)	Grade Pt (g/t)	Grade Au (g/t)	Grade NSR (US$/t)	Contained Metal NiS (kt)	Contained Metal Cu (kt)	Contained Metal Co (kt)	Contained Metal Pd (koz)	Contained Metal Pt (koz)	Contained Metal Au (koz)
Measured	OP	7,044	0.40	0.13	0.01	0.03	0.07	0.04	34.26	28.3	9.4	0.8	7.7	16.6	10.1
	UG	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0
	Stockpile	870	0.22	0.10	0.09	0.03	0.06	0.04	23.19	1.9	0.9	0.8	0.8	1.7	1.1
	Sub-total	7,914	0.38	0.13	0.02	0.03	0.07	0.04	33.04	30.2	10.3	1.6	8.5	18.2	11.3
Indicated	OP	36,343	0.31	0.12	0.01	0.03	0.06	0.04	26.90	112.9	41.8	3.4	36.1	73.8	49.5
	UG	105,859	0.54	0.18	0.01	0.04	0.10	0.06	45.68	568.2	187.5	13.6	135.8	331.0	216.8
	Stockpile	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-total	142,202	0.48	0.16	0.01	0.04	0.09	0.06	40.88	681.1	229.3	17.0	171.8	404.8	266.3
Measured + Indicated	**OP**	**43,388**	**0.33**	**0.12**	**0.01**	**0.03**	**0.06**	**0.04**	**28.10**	**141.2**	**51.3**	**4.2**	**43.8**	**90.4**	**59.7**
	UG	**105,859**	**0.54**	**0.18**	**0.01**	**0.04**	**0.10**	**0.06**	**45.68**	**568.2**	**187.5**	**13.6**	**135.8**	**331.0**	**216.8**
	Stockpile	**870**	**0.22**	**0.10**	**0.09**	**0.03**	**0.06**	**0.04**	**23.19**	**1.9**	**0.9**	**0.8**	**0.8**	**1.7**	**1.1**
	Sub-total	**150,117**	**0.47**	**0.16**	**0.01**	**0.04**	**0.09**	**0.06**	**40.47**	**711.3**	**239.6**	**18.6**	**180.4**	**423.0**	**277.5**
Inferred	OP	45	0.25	0.10	0.01	0.02	0.05	0.03	21.82	0.1	0.0	0.0	0.0	0.1	0.0
	UG	130,852	0.54	0.17	0.01	0.05	0.10	0.06	45.52	702.3	224.5	17.3	210.6	426.8	259.2
	Stockpile	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-total	130,898	0.54	0.17	0.01	0.05	0.10	0.06	45.51	702.5	224.5	17.3	210.7	426.8	259.2

Notes:

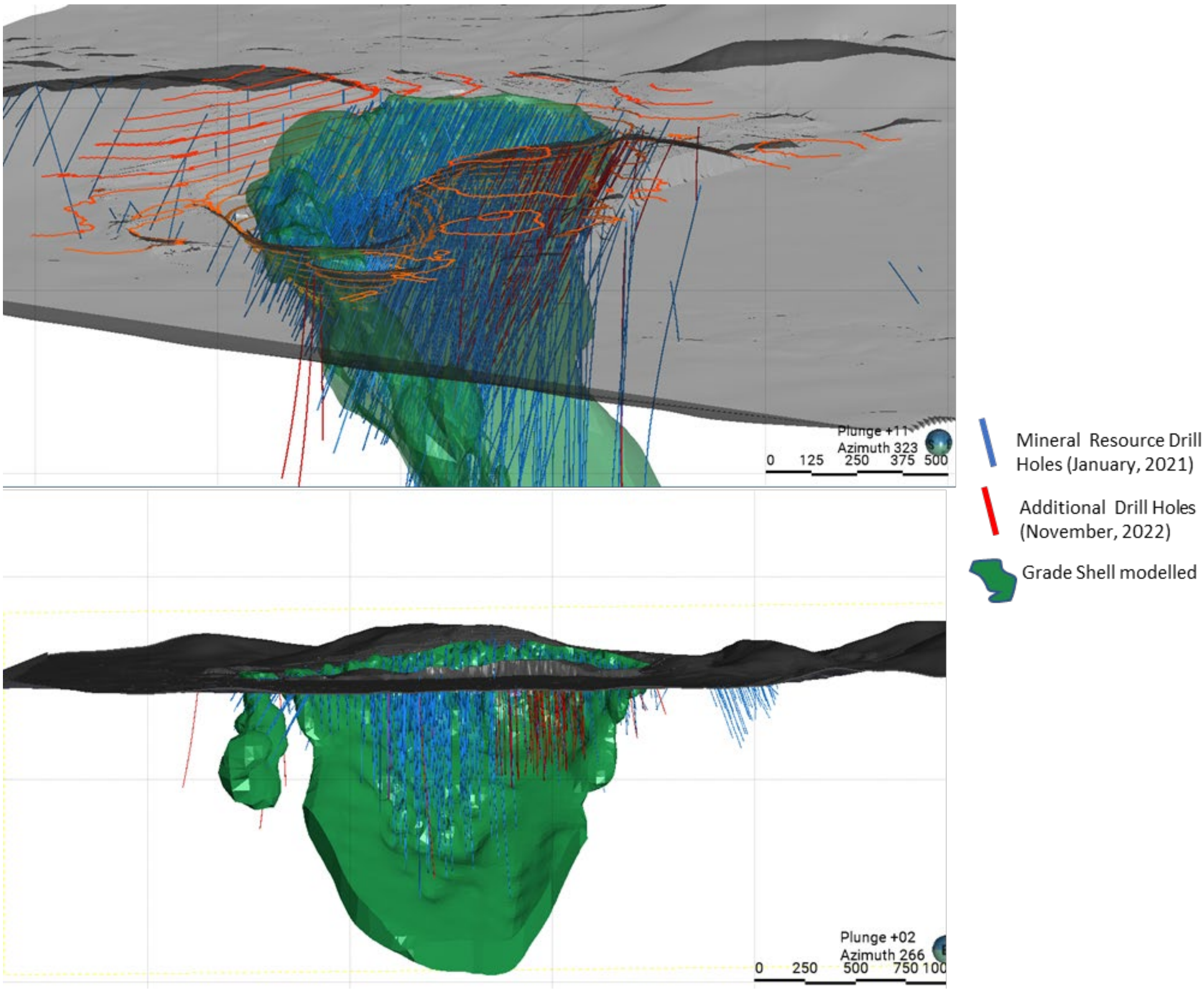
1. CIM (2014) definitions were followed for Mineral Resources.
2. The Competent Person for the Mineral Resources estimate is Orlando Rojas, B.Geo., AIG (N° 5543), a GeoEstima SpA employee.
3. The Mineral Resource estimates have an effective date of December 31, 2022.
4. Mineral Resources are estimated at a net smelter return (NSR) cut-off value of US$8.91/t for open pit, and US$30.00/t for underground.
5. Mineral Resources are estimated using metal prices of US$6.50/lb Ni, US$3.00/lb Cu and US$20.00/lb Co.
6. Open pit and underground Mineral Resources are reporting within a conceptual open pit and underground constraining shapes for material below the pit.
7. All blocks within underground constraining shapes have been included within the Mineral Resource estimate.
8. Minimum widths are 5 m for the open pit and 45 m for the underground.
9. The metallurgical recoveries used are 83% for NiS; 70% for Cu; 29% for Co.
10. Bulk density varies depending on mineralisation domain from 2.5 g/cm³ to 3.5 g/cm³.
11. Mineral Resources are reported inclusive of those Mineral Resources converted to Mineral Reserves.
12. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
13. Numbers may not add due to rounding.

14.2 Resources Database

Atlantic Nickel is migrating the database from acQuire system to Fusion, however, when the block model was updated, the database was in acQuire system. The resource database contains drilling information and analytical results up to June 23, 2019 for open pit model and up to February 25, 2021 for the underground model. Information received after these dates was not included in the Mineral Resource estimate. Table 14-2 summarizes the drill holes considered in Mineral Resource estimation, and Figure 14-1 shows the drill hole location.

Table 14-2: Mineral Resources Drill Holes as of February 25, 2021
ACG Acquisition Company Limited – Santa Rita Mine

Year	Company	Drill Hole Type	Number of Holes	Metreage (m)
1988	Caraíba Metais	DDH	4	465
1989	CBPM	DDH	3	787
2004	Mirabela Brazil	DDH	14	2,666
2005		DDH	83	18,164
2006		DDH	165	41,505
2007		DDH	183	50,587
2008		DDH	116	51,052
2011		DDH	5	3,598
2012		DDH	10	6,548
2018	Atlantic Nickel	DDH	31	14,248
		RC	267	22,141
2019		DDH	81	61,134
		RC	68	8,611
2020		DDH	19	17,644
2021		DDH	3	2,898
	Total Drill Holes		**1,052**	**302,047**



Source: GeoEstima, 2023.

Figure 14-1: 3D View of Santa Rita and Drill Holes

GeoEstima received the data from Atlantic Nickel in Microsoft Excel and in CSV format. Data was amalgamated, parsed as required, and imported into Leapfrog Geo software for review.

The drill hole database comprises coordinate, length, azimuth, dip, lithology, density, and assay data. For the grade estimation, unsampled intervals within mineralisation wireframes were replaced with zero grades. Detection limit text values (e.g., “<0.05”) were replaced with numerical values that were half of the analytical detection limit.

For the purpose of the Mineral Resource estimate, the drill hole data were limited to those assays located inside the mineralisation wireframes. This includes 17,194 samples of RC and approximately 169,310 samples from DDH, totalling 200,701 m.

The CP conducted a number of checks on the resource database as discussed in Section 12, Data Verification. The CP is of the opinion that the database is of high quality and in accordance with industry standards and is appropriate to support Mineral Resource estimation.

14.3 Geological Modelling

The geology model for the open pit and underground model was developed in Leapfrog Geo and consisted of seven lithology domains defined by logging. Table 14-3 summarizes the domains and domain coding for the model and composites.

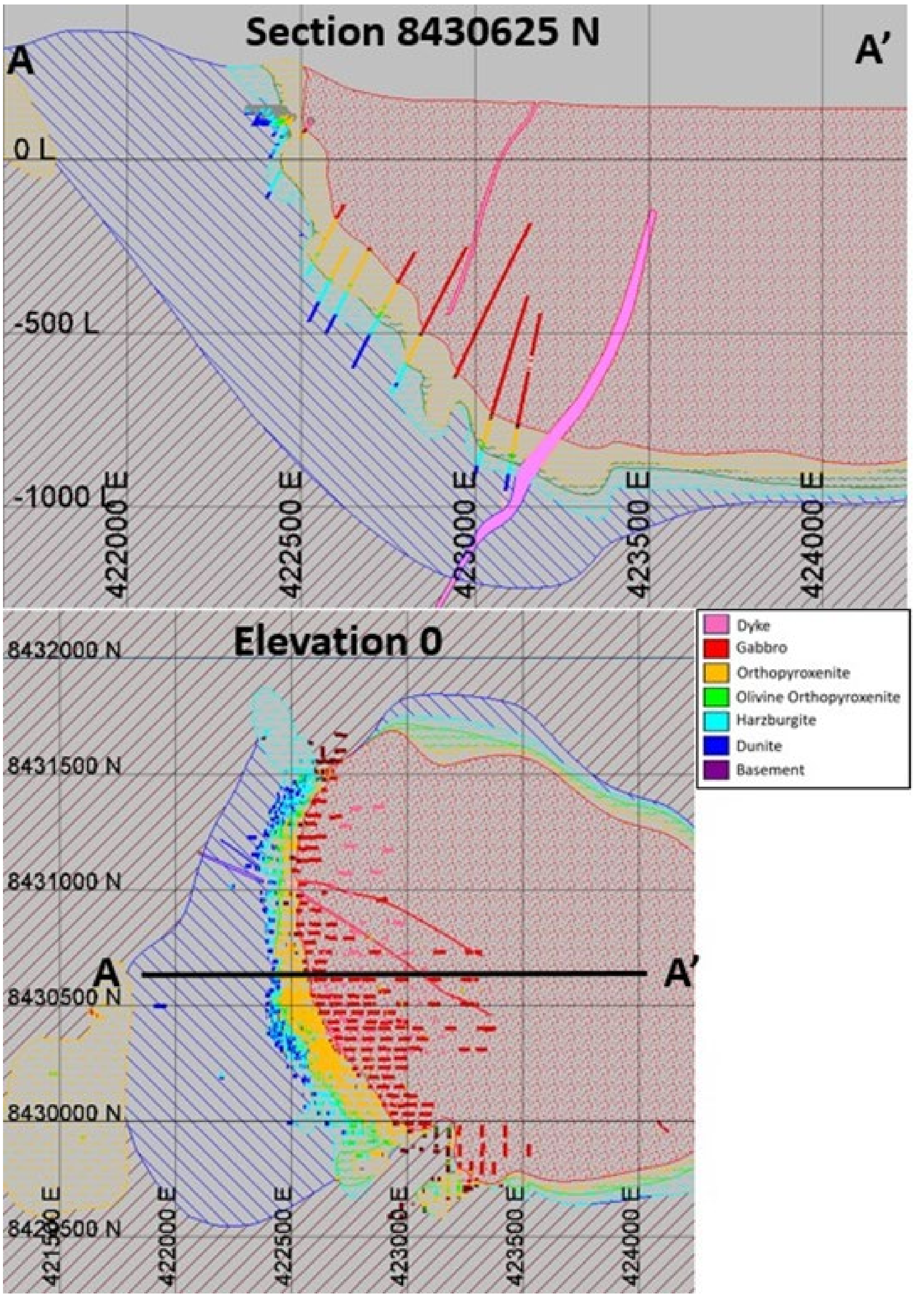
For the open pit model, the structural data was not available at the time of open pit model construction. A cross-section and plan view of the open pit geology model are shown in Figure 14-2.

Table 14-3: Summary Lithology Codes for Open Pit and Underground Models
ACG Acquisition Company Limited – Santa Rita Mine

Lithology Domains	Litho Code	Comment
Dike	50	
Gabbro	40	
Orthopyroxene	30	Includes websterite & pyroxenite
Olivine–orthopyroxene	22	
Harzburgite	21	
Dunite	10	
Basement	5	

The underground geology model includes data from additional drill holes completed between June 2019 and February 2021. The geology model included dykes that have been identified in the open pit. Figure 14-3 shows a section and plan of the underground geology model.

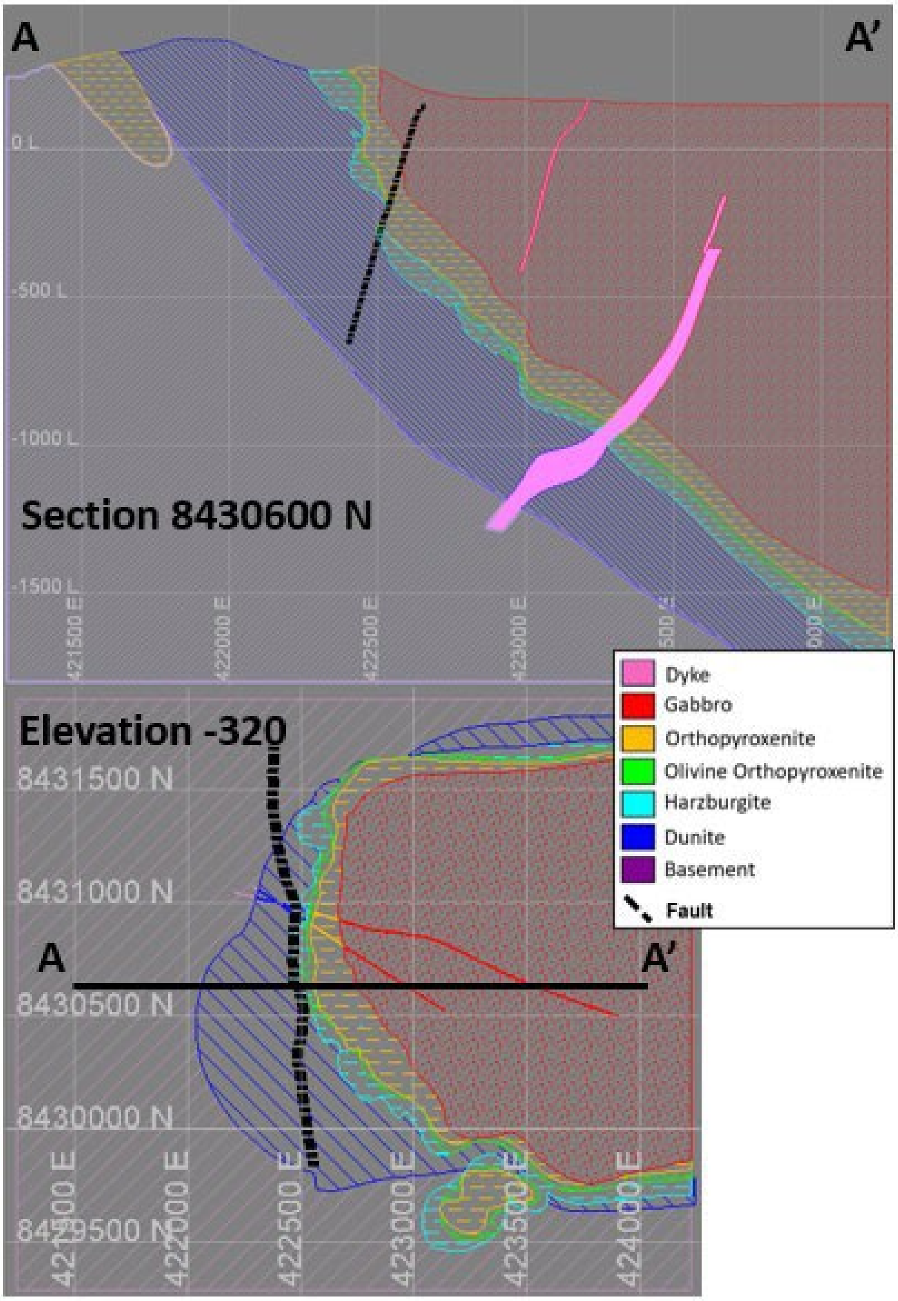
The wireframe solids representing the seven lithology domains were imported into Vulcan and used to code the lithology domains in the block model and composite files (*lith2019* for the open pit model and *lith2021* for the underground model).



Source: MTS, 2021.

Note. Section looks north. Plan looks down.

Figure 14-2: Section and Plan View of Open Pit Geology Model



Source: MTS, 2021.

Figure 14-3: Section and Plan View of the Underground Geology Model

14.4 Exploratory Data Analysis

MTS performed an exploratory data analysis using plugins for SGeMS software, that included box plots, histograms, probability plots, decile analysis (for top cutting), and summary statistics:

- Box plots were constructed for 3.0 m and 6.0 m composites within the grade shell by lithology domain. Box plots were constructed for each of the 10 elements to be estimated. The lithology domains with the highest mean sulphur, NiS, copper, and cobalt grades are harzburgite (21), olivine-orthopyroxene (22), and orthopyroxene (30). Box plots comparing the high-sulphur and low- sulphur domains were also constructed.
- Histograms and probability plots were constructed for the 3.0 m and 6.0 m composites within the grade shell. The plots for sulphur, NiS, NiT, copper, MgO, and iron show multiple populations.

GeoEstima reviewed the statistics parameters for raw data and considered to validate the different grade shell domains and later, the block model estimate. Table 14-4 presents a summary of raw assay statistics.

Table 14-4: Raw Assay Statistics
ACG Acquisition Company Limited – Santa Rita Mine

Element	Total Samples	Mean	STD	CV	Variance	Minimum	Maximum
Co (ppm)	136,920	136.35	49.81	0.37	2,481.16	0.00	1,860.00
Cu (%)	136,920	0.09	0.11	1.23	0.01	0.00	4.44
NiS (%)	136,920	0.28	0.30	1.08	0.09	0.00	9.38
NiT (%)	136,920	0.39	0.30	0.76	0.09	0.00	10.15
Pd (ppm)	136,920	0.03	0.06	2.03	0.00	0.00	3.24
Pt (ppm)	136,920	0.06	0.09	1.66	0.01	0.00	3.77

14.5 Composites

MTS composited the assays to 3.0 m and 6.0 m using the grade shells for control. The compositing process included a selection file that identified only drill holes with assay data. The composite length corresponds to half of the parent block size height for the deposit. Figure 14-4 presents the length distribution. The 3.0 m composites were used for grade estimation and nearest-neighbour (NN) validation. The 6.0 m composites were used for indicator kriging and NN validation.

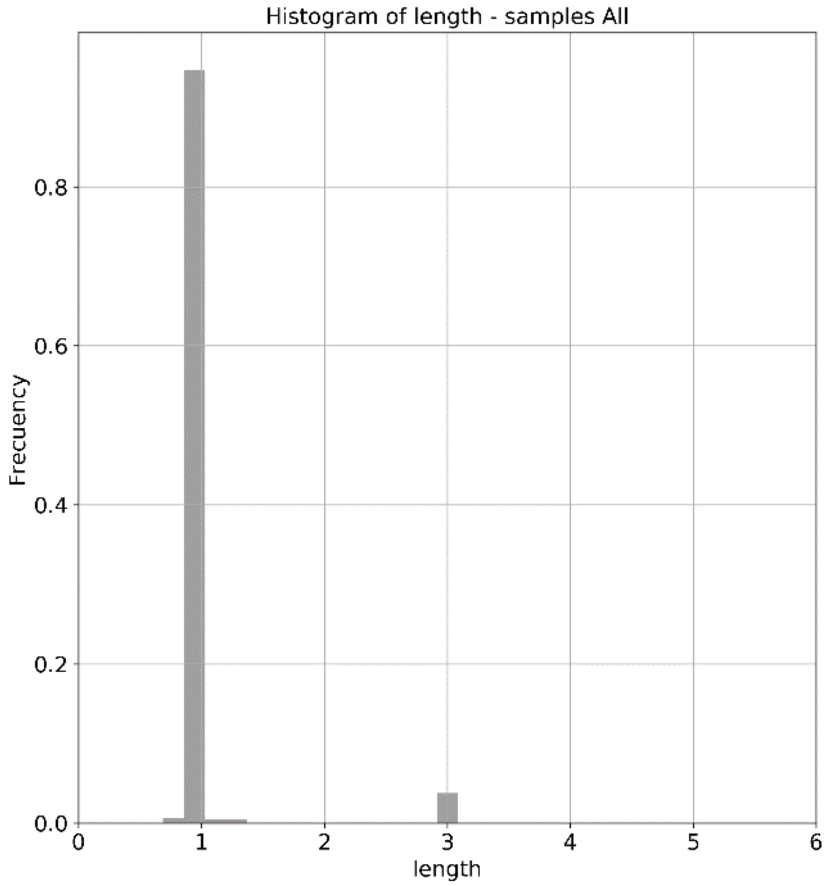


Figure 14-4: Histogram of sample length for Santa Rita

The composite files included grades for NiT%, NiS%, Cu%, Co ppm, Pt ppm, Pd ppm, Au ppm, MgO%, Fe%, and S%. The grade shells and lithology domains were back tagged into the composite files for validation and used for exploratory data analysis.

The statistics for 3.0 m composites are presented in Table 14-5.

Table 14-5: Composite Statistics for Santa Rita
ACG Acquisition Company Limited – Santa Rita Mine

Element	Total sample	Mean	STD	CV	Variance	Minimum	Maximum
Co (ppm)	49,624	136.11	45.87	0.34	2104.57	0	690.891
Cu (%)	49,624	0.09	0.09	1.11	0.01	0	2.704
NiS (%)	49,624	0.28	0.28	1.00	0.08	0	4.71
NiT (%)	49,624	0.39	0.28	0.70	0.08	0	4.779
Pd (ppm)	49,624	0.03	0.05	1.83	0.003	0	2.653
Pt (ppm)	49,624	0.06	0.08	1.49	0.01	0	1.983

14.6 Top Cut Analysis

A top cutting analysis for 3.0 m composites was completed to investigate the impact of high grades. The analysis included histograms, probability plots, and a decile analysis. The decile analysis indicated that no capping was required; however, probability plots indicated the presence of outliers at the 99th percentile. GeoEstima reproduced the capping analysis and observed the same data distribution, with few outlier samples above the 99th percentile. Figure 14-5 to Figure 14-8 present the p-plots for open pit model.

Different top-cutting strategies were implemented to address outliers during open pit and underground estimation. For open pit resources, a capping of high grades was applied to 3.0 m composites at the 99th percentile in estimation pass 2 and at the 95th percentile in estimation passes 3 and 4 to reduce the effect of high-grade composites smearing into areas with less dense drilling. No capping was implemented for sulphur and iron. A lower cap of 1% was implemented for MgO (Table 14-6).

For the underground model, GeoEstima implemented an outlier strategy and included the strategy in estimation pass 5 (Table 14-7). A top cut was applied to 3.0 m composites at the 99th percentile in estimation pass 2 and at the 95th percentile in estimation passes 3, 4, and 5.

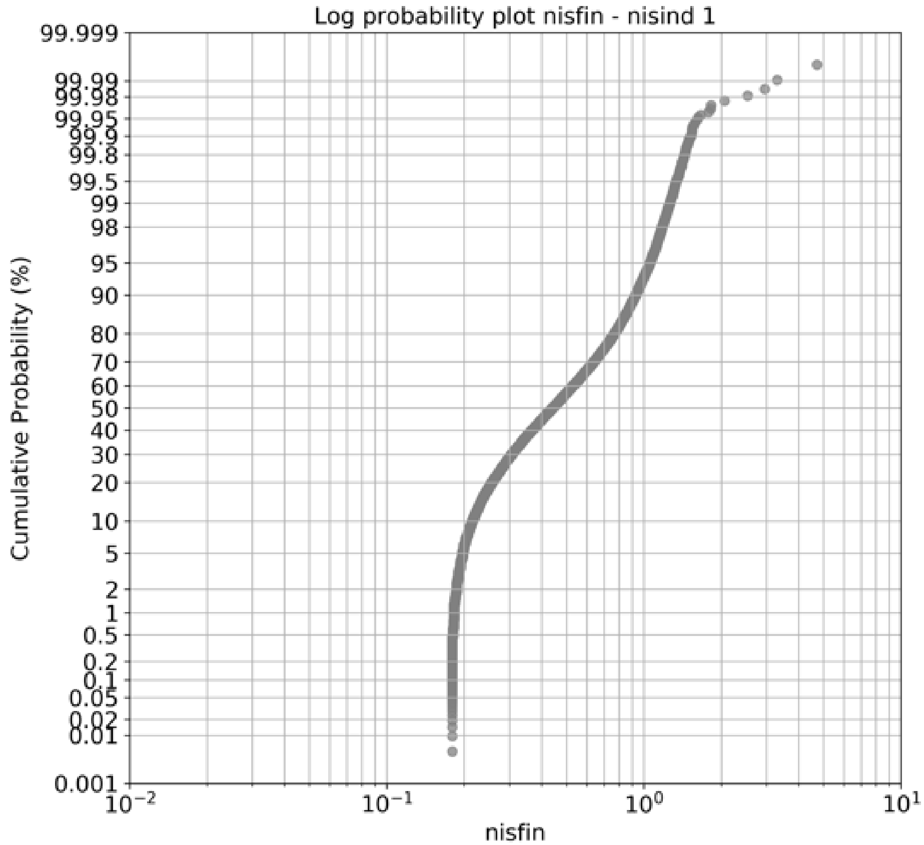


Figure 14-5: Capping Analysis for NiS – High Sulphur Domain

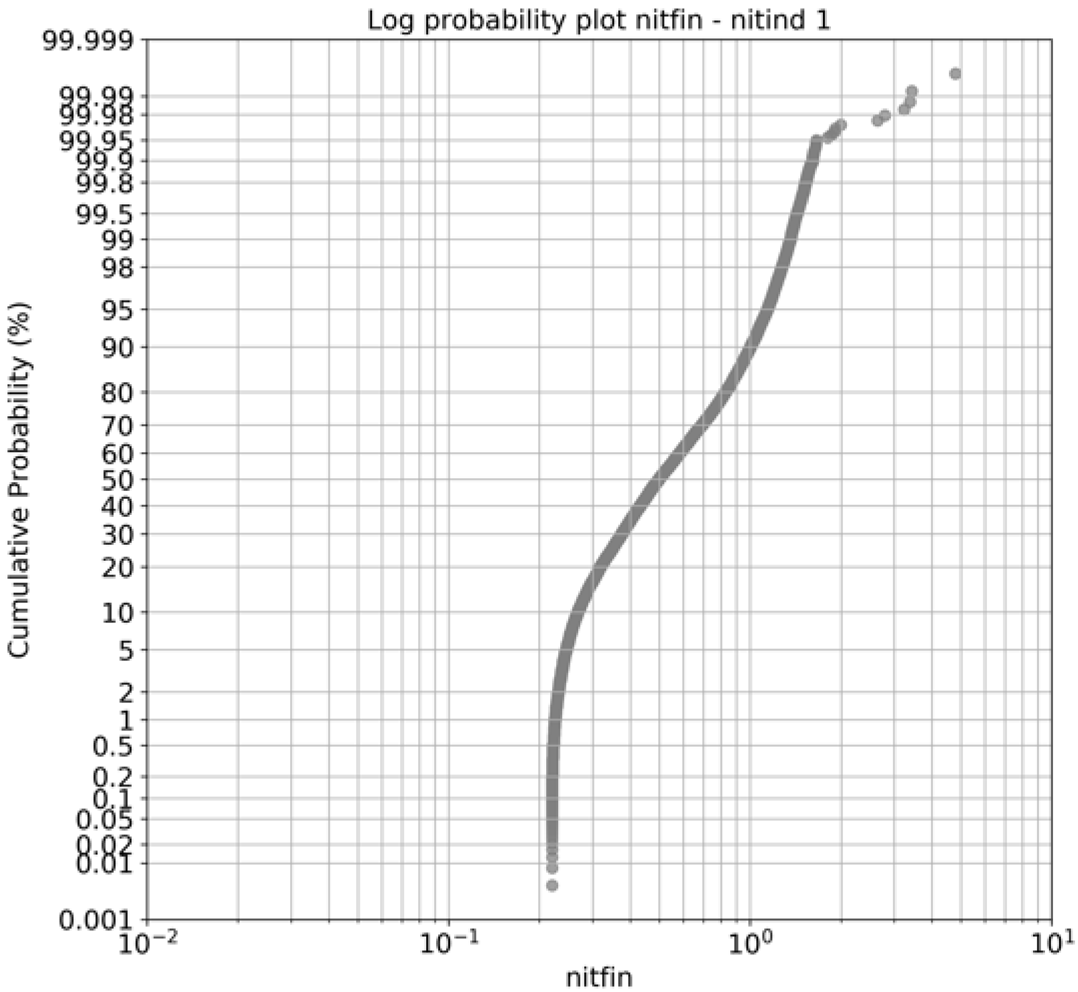


Figure 14-6: Capping Analysis for NiT – High Sulphur Domain

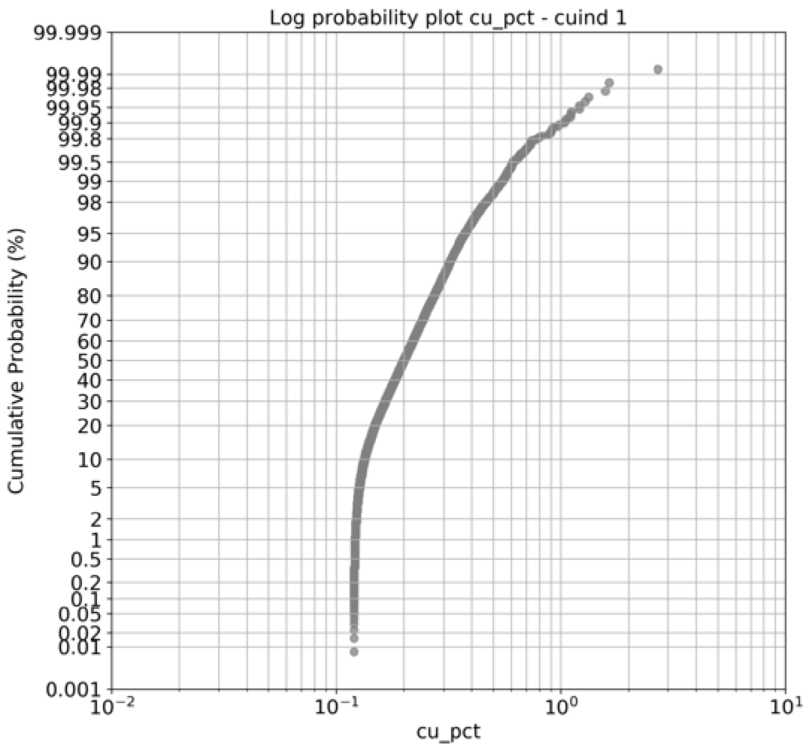


Figure 14-7: Capping Analysis for Cu – High Sulphur Domain

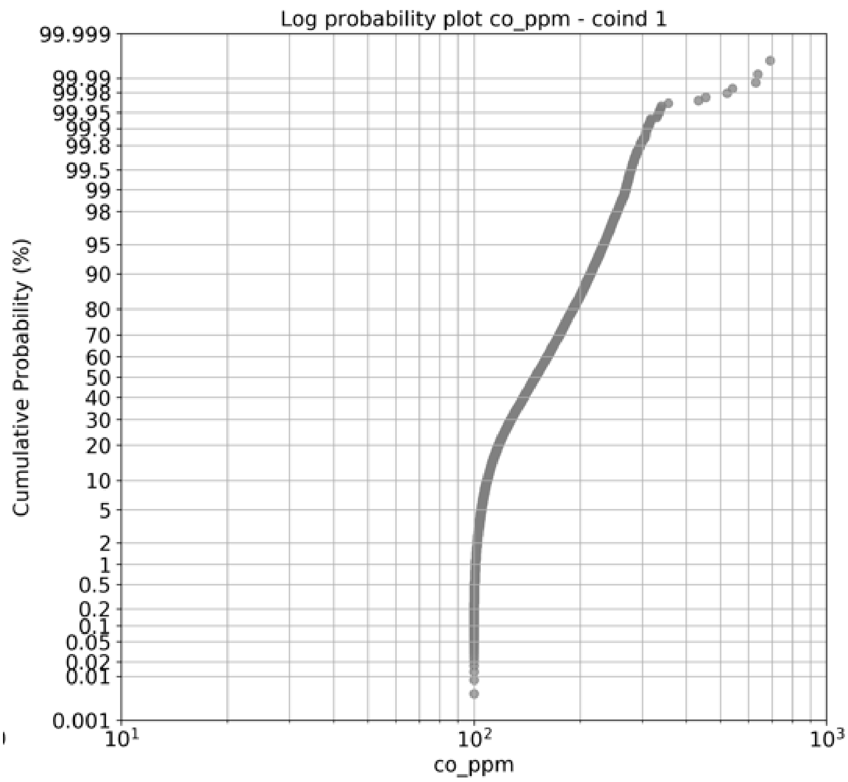


Figure 14-8: Capping Analysis for Co – High Sulphur Domain

Table 14-6: Top Cutting Strategy, Open Pit Model
ACG Acquisition Company Limited – Santa Rita Mine

Variable	Pass	Top Cut Grade OK	Top Cut Grade High-Sulphur Domain	Top Cut Low Sulphur Domain
NiT (%)	1	-	-	-
	2	1.60	1.60	0.80
	3	1.20	1.20	0.55
	4	1.00	1.00	0.40
NiS (%)	1	-	-	-
	2	1.60	1.60	0.70
	3	1.00	1.00	0.40
	4	0.90	0.90	0.20
Cu (%)	1	-	-	-
	2	1.00	1.00	N/A
	3	0.30	0.30	0.20
	4	0.28	0.28	0.15
S	All	-	-	-
MgO (Low Cap) (%)	1	1.00	1.00	1.00
	2	1.00	1.00	1.00
	3	1.00	1.00	1.00
	4	1.00	1.00	1.00
Co (ppm)	1	-	-	-
	2	-	-	-
	3	225	225	-
	4	125	125	-
Pd (ppm)	1	-	-	-
	2	-	-	-
	3	0.125	N/A	N/A
	4	0.100	-	-
Pt (ppm)	1	-	-	-
	2	-	-	-
	3	0.200	N/A	N/A
	4	0.150	-	-
Au (ppm)	1	-	-	-
	2	-	-	-
	3	0.150	N/A	N/A
	4	0.100	-	-

Variable	Pass	Top Cut Grade OK	Top Cut Grade High-Sulphur Domain	Top Cut Low Sulphur Domain
Fe	All	-	N/A	N/A

Table 14-7: Top Cutting Strategy, Underground Model
ACG Acquisition Company Limited – Santa Rita Mine

Variable	Pass	Top Cut OK	Top Cut High-grade	Top Cut Low-Grade
NiT (%)	1	-	-	-
	2	1.60	1.60	0.80
	3	1.20	1.20	0.55
	4	1.00	1.00	0.40
	5	1.00	1.00	0.40
NiS (%)	1	-	-	-
	2	1.60	1.60	0.70
	3	1.00	1.00	0.40
	4	0.90	0.90	0.20
	5	0.90	0.90	0.20
Cu (%)	1	-	-	-
	2	1.00	1.00	-
	3	0.30	0.30	0.20
	4	0.28	0.28	0.15
	5	0.28	0.28	0.15
S (%)	All	-	-	-
MgO (Low Cap) (%)	1	1.00	1.00	1.00
	2	1.00	1.00	1.00
	3	1.00	1.00	1.00
	4	1.00	1.00	1.00
	5	1.00	1.00	1.00

The metal at risk was determined by comparing mean grades for capped and uncapped estimates. Table 14-8 summarizes the metal at risk for the open pit model. The metal at risk for NiT and NiS was less than 1%. For copper, the metal at risk was 3.3%. Table 14-9 summarizes the metal at risk for the underground model. The metal at risk for the underground model is 3% for NiS, 9% for copper, and 7% for platinum and gold.

Table 14-8: Metal at Risk Losses, Open Pit Model
ACG Acquisition Company Limited – Santa Rita Mine

Element	Mean Capped	Mean No Cap	Metal at Risk (%)
NiT (%)	0.52	0.52	0.3
NiS (%)	0.41	0.41	0.5
Cu (%)	0.144	0.149	3.3
S (%)	N/A		
MgO (%)	N/A		
Co (ppm)	100 ppm		

Table 14-9: Metal at Risk Losses, Underground Model
ACG Acquisition Company Limited – Santa Rita Mine

Element	Mean Capped	Mean No Cap	Metal at Risk (%)
NiT (%)	0.54	0.55	-2.17
NiS (%)	0.44	0.45	-3.12
Cu (%)	0.14	0.16	-8.86
Co (%)	148.3	151.3	-1.98
Pt (ppm)	0.087	0.094	-7.45
Pd (ppm)	0.042	0.043	-2.33
Au (ppm)	0.056	0.06	-6.67

14.7 Bulk Density

The density database includes 18,170 density determinations. Data were filtered according to the model considered the open pit model included only data below topography dated January 2021 and above the -350 elevation and the underground model included only data below the open pit Mineral Resource shell (15,029 density determinations).

Histograms and probability plots were constructed by lithology domain. After inspection of the plots, the data were trimmed for low and high outliers. The final density was assigned by lithology domains and was determined based on the trimmed data. After the cut-off date of the database, no further samples were added to the block model evaluation.

The density data are summarised by lithology domain in Table 14-10 and Table 14-11, open pit and underground model respectively. The CP considers that density can be assigned when the coefficient of variation (CV) is less than 0.05. The CVs for dunite and basement lithologies are slightly elevated but were considered acceptable for Mineral Resource estimation purposes.

Table 14-10: Density by Lithology Domain, Open Pit Model
ACG Acquisition Company Limited – Santa Rita Mine

Lithology Domains	Total Samples	Mean	CV	Low Trim	High Trim	Samples Excluded	Trimmed Mean	Trimmed CV
Dike	136	3.00	0.1	2.7	3.2	5	2.99	0.03
Gabbro	5,612	2.96	0	2.5	3.4	32	2.96	0.02
Orthopyroxene	2,798	3.26	0.1	2.8	3.5	135	3.29	0.02
Olivine-Orthopyroxene	387	3.24	0.1	2.8	3.5	17	3.27	0.03
Harzburgite	1,588	3.12	0.1	2.75	3.5	94	3.15	0.04
Dunite	761	3.01	0.7	2.5	3.5	10	3.01	0.06
Basement	449	2.82	0.1	2.55	3.3	13	2.81	0.06

Table 14-11: Density by Lithology Domain, Underground Model
ACG Acquisition Company Limited – Santa Rita Mine

Lithology Domains	Total Samples	Mean	CV	Low Trim	High Trim	Samples Excluded	Trimmed Mean	Trimmed CV
Dike	271	3	0.06	2.7	3.2	5	2.99	0.03
Gabbro	6,397	2.97	0.03	2.5	3.4	23	2.97	0.03
Orthopyroxene	3,740	3.27	0.05	2.8	3.5	156	3.3	0.03
Olivine-Orthopyroxene	552	3.24	0.06	2.8	3.5	26	3.27	0.04
Harzburgite	2,080	3.17	0.06	2.7	3.5	89	3.19	0.05
Dunite	1,510	3.15	0.09	2.5	3.5	47	3.15	0.08
Basement	479	2.84	0.07	2.55	3.5	5	2.84	0.07

14.8 Grade Shells

Two grade shell wireframe solids were constructed in Leapfrog to control the grade estimation. The majority of the drilling completed before 2018 does not include NiS analyses, and the grade shells were constructed with assay data for NiT, sulphur, and MgO assay data. NiS data were considered when available.

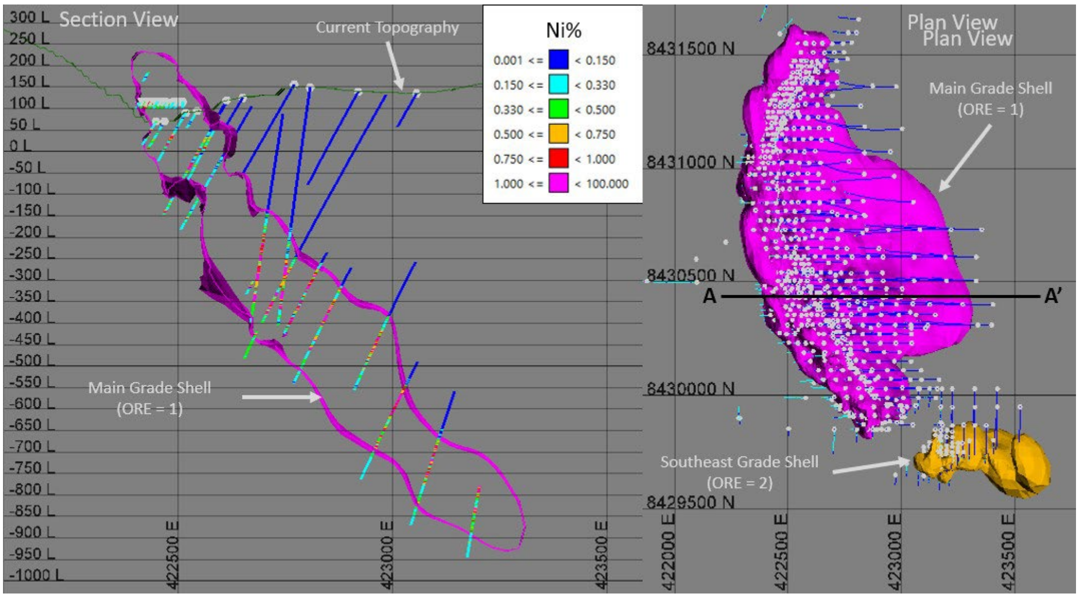
The general methodology for constructing the grade shells included:

- NiT >0.10%: NiT provided a definition for the hanging wall of the grade shell and generally defines the base of the gabbro. NiT is less useful defining the footwall of the grade shell because of significant nickel present in silicates in the harzburgite and dunite lithology domains.
- Sulphur >0.05%: the sulphur values, in association with NiT, better define the lower contact (footwall) of the grade shell. High NiT values in association with low sulphur values indicates

nickel is present as nickel silicates. Low sulphur areas within the grade shell were isolated using indicator kriging (IK).

- MgO <35.0%: the MgO values were used primarily to assist definition of the lower contact.

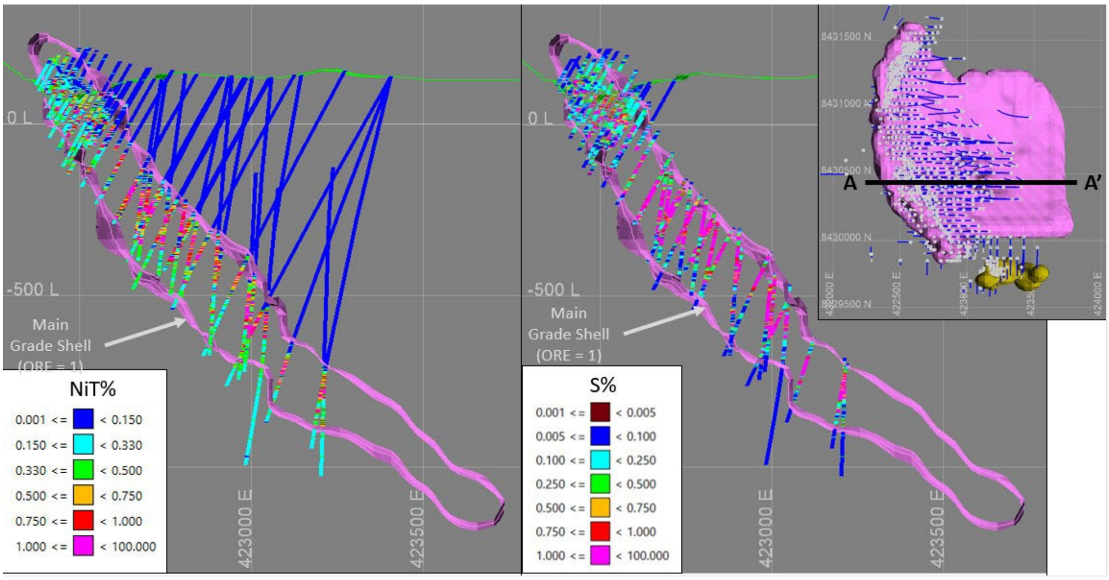
The grade shell intersections were modelled in Leapfrog Geo and the final grade shells were imported into Vulcan software. The grade shell was extended down dip +650 m to provide guidance for future step-out drilling. Figure 14-9 shows the grade shells for the open pit model and Figure 14-10 a section for underground grade shell model that include the additional drilling obtained after June 2019.



Source: MTS, 2021.

Note. Section looks north. Plan looks down.

Figure 14-9: Grade Shell; Section 8,430,420N (A-A'), Open Pit Model



Source: MTS, 2021.

Note. Section looks north. Plan view looks down.

Figure 14-10: Grade Shell, Underground Model, Section 8,430,420N

14.9 Indicator Model

Multiple populations in sulphur, NiT, NiS, copper, cobalt, and MgO indicate an indicator model is appropriate. The indicator models were constructed using 6.0 m length composites, boundary by the grade shell model, and includes indicator estimates for sulphur, NiT, NiS, copper, cobalt, and MgO.

14.9.1 Indicator Thresholds

Indicator thresholds were determined using histograms and probability plots and visual inspection of composite grades in cross section. GeoEstima reproduced the p-plots and agree with limits defined by MTS (Figure 14-11 to Figure 14-15).

The 3.0 m and 6.0 m composites were coded with indicator threshold to identify high-grade and low-grade composites. Table 14-12 summarizes the indicator thresholds coded to the composite data for the open pit and underground model.

Table 14-12: Santa Rita Indicator Threshold, Open Pit and Underground Model
ACG Acquisition Company Limited – Santa Rita Mine

Composite Indicator Fields	Indicator = 0	Indicator = 1
Nitind	< 0.22%	≥ 0.22%
Nisind	< 0.18%	≥ 0.18%
Cuind	< 0.15%	≥ 0.15%
Sind	< 0.25%	≥ 0.25%
Mgoind	< 29.0%	≥ 29.0%
Coind	< 100 ppm	≥ 100 ppm

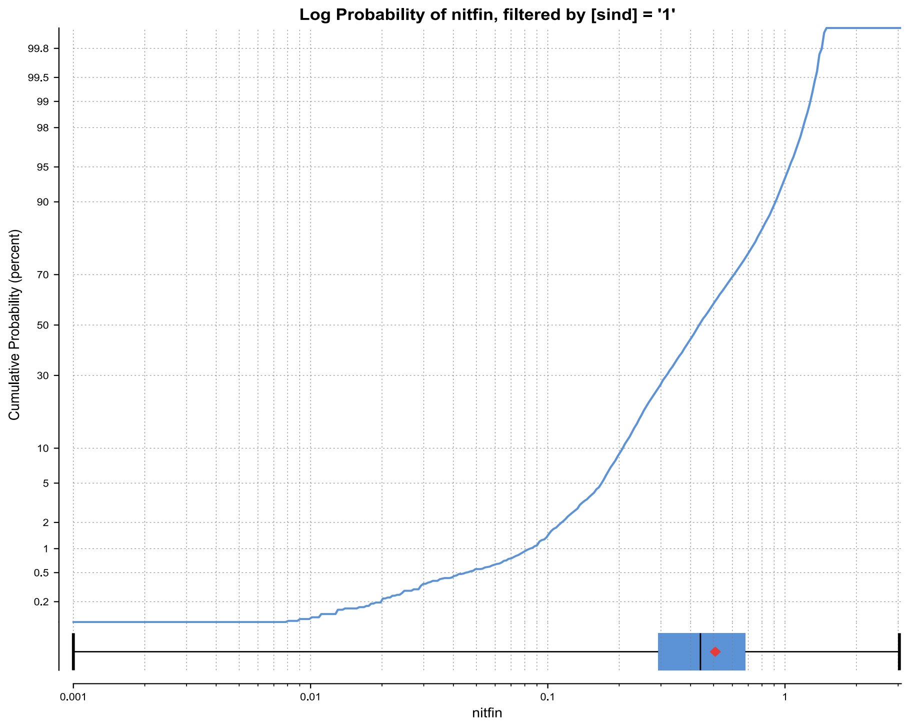


Figure 14-11: Probability Plots for NiT Indicator Threshold

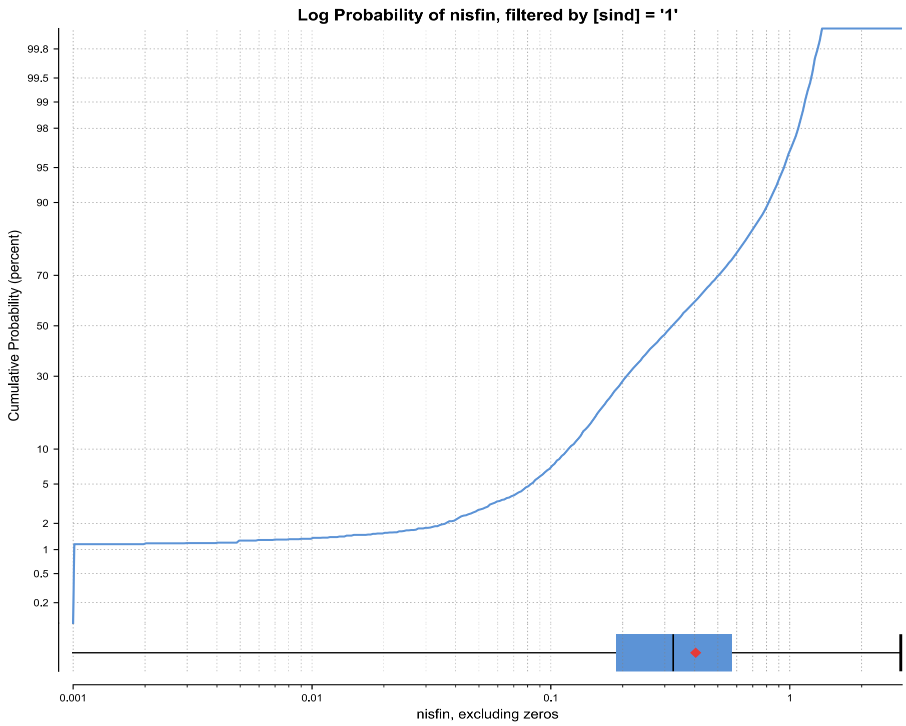


Figure 14-12: Probability Plots for NiS Indicator Threshold

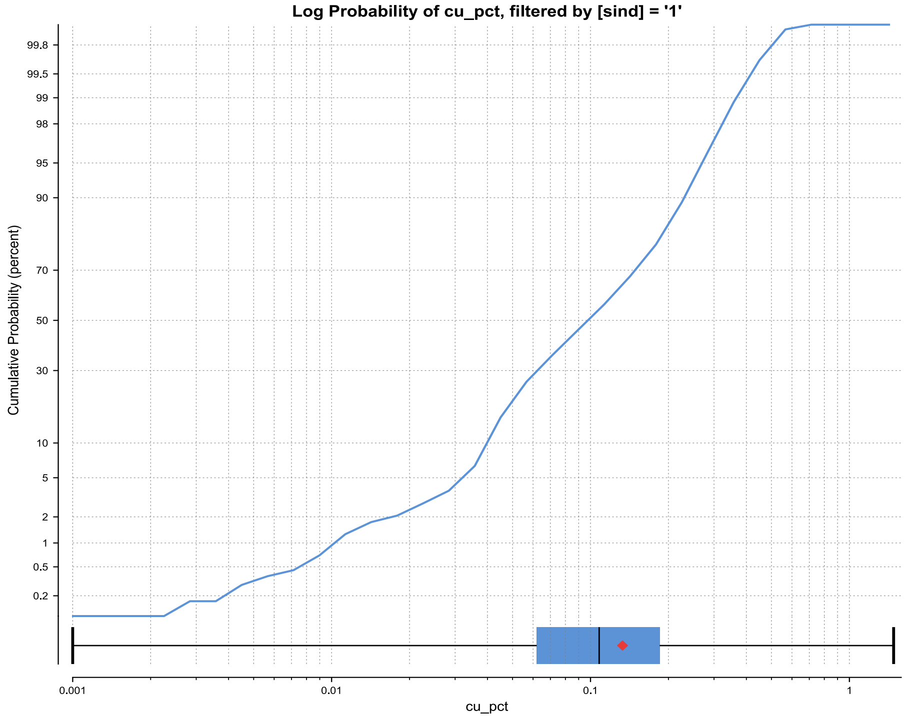


Figure 14-13: Probability Plots for Cu Indicator Threshold

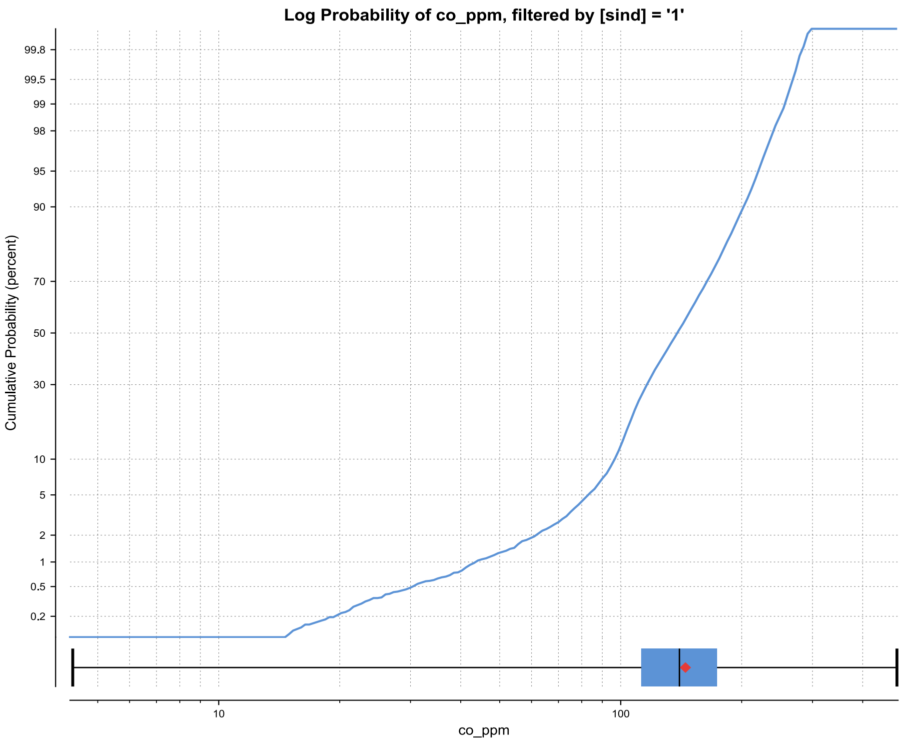


Figure 14-14: Probability Plots for Indicator Co Threshold – Santa Rita

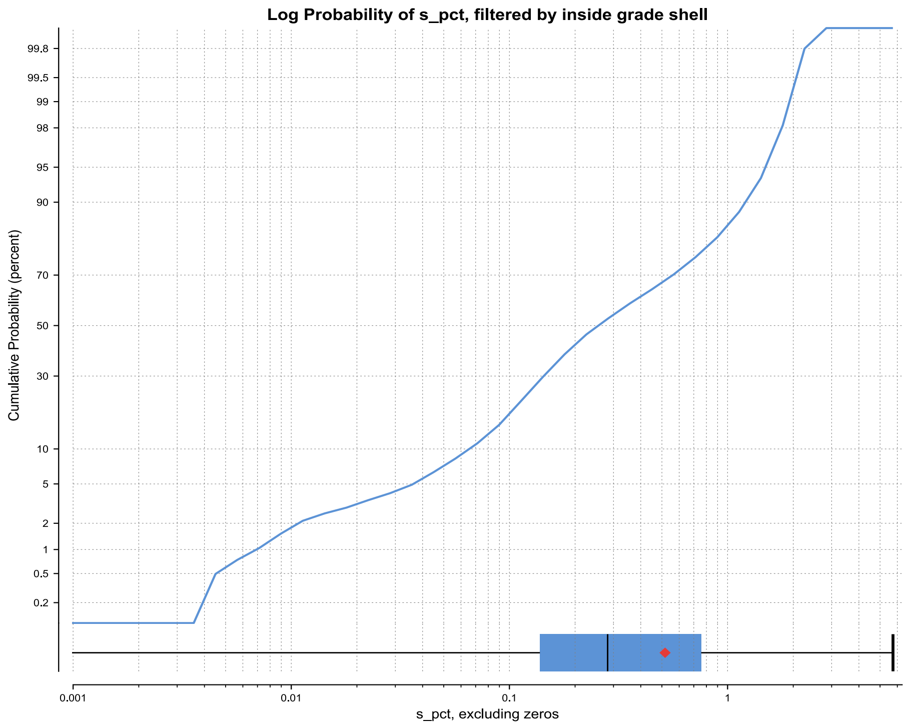


Figure 14-15: Probability Plots for S Indicator Threshold

14.9.2 Indicator Variograms

Indicator variograms (correlograms) were modelled for sulphur, NiT, NiS, copper, cobalt, and MgO using SAGE2001 software and Vulcan Data Analyser software. The variogram models included a maximum of three spherical structures. A downhole indicator variogram was used to determine the C0 (nugget). The indicator variograms are summarised in Table 14-13 to Table 14-15.

Table 14-13: Indicator Variograms, Open Pit Model
ACG Acquisition Company Limited – Santa Rita Mine

Variable	C0	C1	Range (m)			Rotation (°)			C2	Range (m)			Rotation (°)		
			Major	Semi Major	Minor	Z	Y	X		Major	Semi Major	Minor	Z	Y	X
S	0.33	0.41	29.7	54.8	55.9	0	-55	13	0.26	223.9	383.1	86.1	0	-55	13
NiT	0.23	0.46	62.3	70.9	24.9	0	-60	41	0.31	395.4	270.8	73.9	0	-60	10
NiS	0.32	0.5	57	51	29.3	0	-52	7	0.18	301.6	249.4	91.8	0	-52	46
Cu	0.27	0.56	28.8	26	28.3	0	-55	7	0.17	337.8	213	112.8	0	-55	7
MgO	0.16	0.34	47	92.3	49.1	0	-55	-43	0.5	858.2	598.8	72	0	-55	11
Co	0.35	0.56	20	15	20	0	-50	58	0	425	315	83	0	-50	-6

Table 14-14: Indicator Variograms, S, NiT, NiS, Cu, MgO, Co, Underground Model
ACG Acquisition Company Limited – Santa Rita Mine

			Range (m)			Rotation (°)				Range (m)			Rotation (°)				Range (m)			Rotation (°)		
Variable	**C0**	**C1**	**Major**	**Semi-Major**	**Minor**	**Bearing (az of x)**	**Plunge (about y, LHR)**	**Dip (about x, LHR)**	**C2**	**Major**	**Semi-Major**	**Minor**	**Bearing (az of x)**	**Plunge (about y, LHR)**	**Dip (about x, LHR)**	**C3**	**Major**	**Semi-Major**	**Minor**	**Bearing (az of x)**	**Plunge (about y, LHR)**	**Dip (about x, LHR)**
S	0.3	0.2	18	18	15	90	-55	0	0.3	80	60	60	90	-55	0	0.1	300	300	120	90	-55	0
NiT	0.2	0.2	17	15	15	90	-55	0	0.4	75	50	60	90	-55	0	0.3	200	300	75	90	-55	0
NiS	0.3	0.2	20	20	18	90	-55	0	0.2	60	70	75	90	-55	0	0.2	150	125	75	90	-55	0
Cu	0.4	0.2	20	15	15	90	-55	0	0.4	60	50	50	90	-55	0	0.2	350	200	150	90	-55	0
MgO	0.1	0.4	20	18	20	90	-55	0	0.3	100	150	100	90	-55	0	0.3	250	350	220	90	-55	0
Co	0.3	0.3	15	20	15	90	-55	0	0.2	55	60	60	90	-55	0	0.2	350	250	150	90	-55	0

Notes:

1. LHR = left-hand rule
2. The rotations are based on the Vulcan system

Table 14-15: Indicator Variograms, S, NiT, NiS, Cu, MgO, Co, Underground Model, Zone 1
ACG Acquisition Company Limited – Santa Rita Mine

			Range (m)			Rotation (°)				Range (m)			Rotation (°)				Range (m)			Rotation (°)		
Variable	**C0**	**C1**	**Major**	**Semi-Major**	**Minor**	**Bearing (az of x)**	**Plunge (about y, LHR)**	**Dip (about x, LHR)**	**C2**	**Major**	**Semi-Major**	**Minor**	**Bearing (az of x)**	**Plunge (about y, LHR)**	**Dip (about x, LHR)**	**C3**	**Major**	**Semi-Major**	**Minor**	**Bearing (az of x)**	**Plunge (about y, LHR)**	**Dip (about x, LHR)**
NiT	0.4	0.4	15	15	10	90	-55	0	0.2	150	150	75	90	-55	0	0.1	400	350	250	90	-55	0
NiS	0.5	0.3	15	10	10	90	-55	0	0.2	30	25	50	90	-55	0	0.1	300	200	150	90	-55	0
Cu	0.3	0.4	21	10	18	90	-55	0	0.2	75	40	50	90	-55	0	0.1	350	250	200	90	-55	0
Co	0.4	0.4	10	10	10	90	-55	0	0.2	40	40	60	90	-55	0	0.1	400	300	200	90	-55	0

Notes:

1. LHR = left-hand rule
2. The rotations are based on the Vulcan system

14.9.3 Indicator Kriging Parameters

IK was used for sulphur, NiT, NiS, copper, cobalt, and MgO. An NN and distance to the closest sample was captured during the IK procedure and was used for validation. Search criteria for the IK interpolation are summarised in Table 14-16 and Table 14-17.

Table 14-16: Indicator Kriging Search Parameters, Open Pit
ACG Acquisition Company Limited – Santa Rita Mine

Variable	Pass	Orientation			Search Range (m)			Samples		
		Bearing	Plunge	Dip	Major	Semi Major	Minor	About X	C2	Major
S, NiT, NiS, Cu, MgO, Co	1	LVB	LVP	LVD	50	25	15	4	7	3
	2				75	35	20	4	7	3
	3				200	100	50	4	6	3
	4				500	240	120	4	5	3

Notes:

1. LVB: local varying anisotropy bearing
2. LVP: local varying anisotropy plunge
3. LVD: local varying anisotropy dip

Table 14-17: Indicator Kriging Search Parameters, Underground Model and Underground Model Zone 1
ACG Acquisition Company Limited – Santa Rita Mine

Variable	Pass	Orientation			Range (m)			Samples		
		Bearing	Plunge	Dip	Major	Semi-Major	Minor	Min	Max	Max DH
S, NiT, NiS, Cu, MgO, Co	1	LVB	LVP	LVD	50	25	15	4	7	3
	2				75	35	20	4	7	3
	3				200	100	50	4	6	3
	4				500	240	120	3	5	3

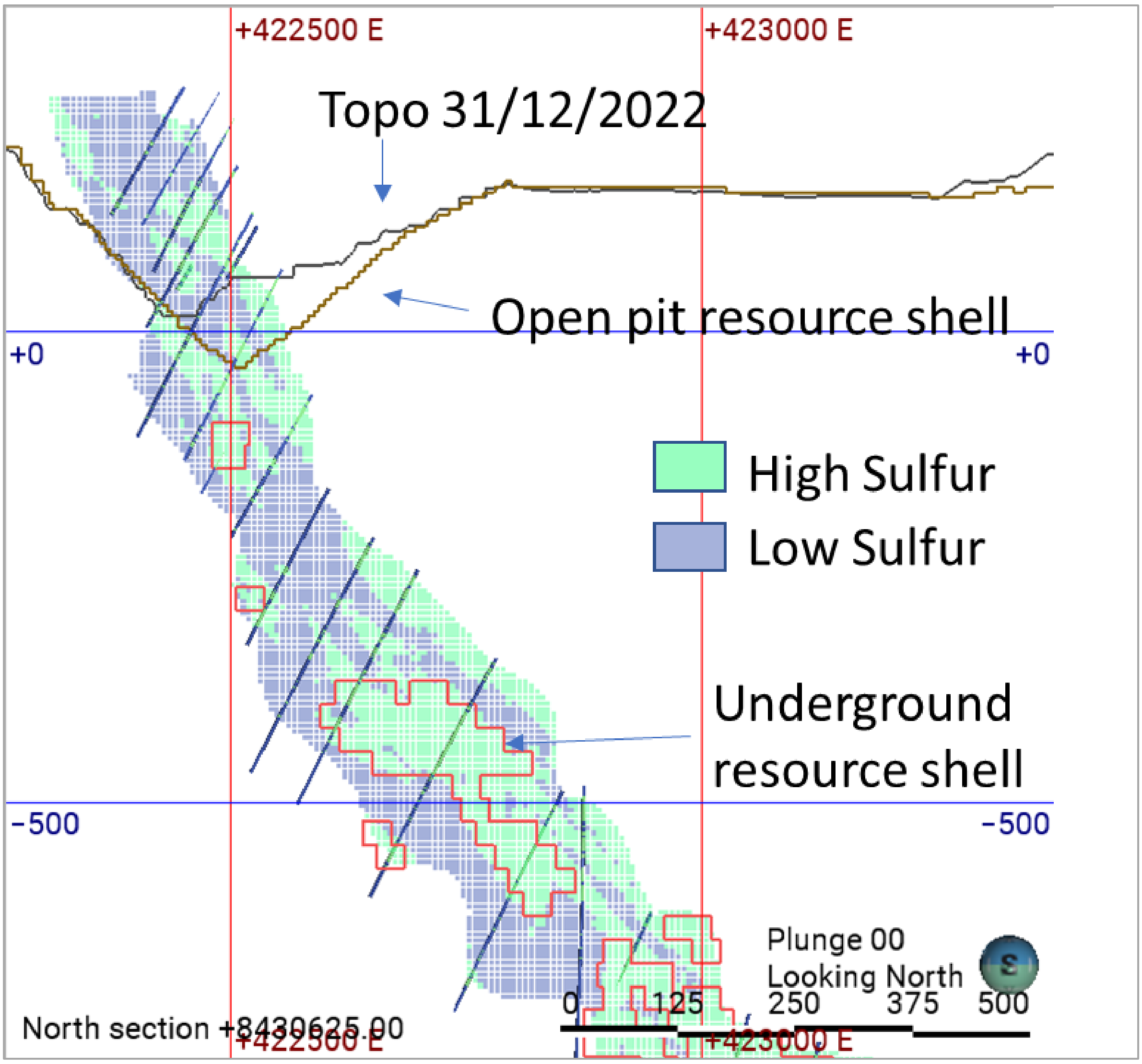
Notes:

1. LVB: local varying anisotropy bearing
2. LVP: local varying anisotropy plunge
3. LVD: local varying anisotropy dip

14.9.4 Indicator Kriged Model for Sulphur

The sulphur indicator model was constructed to define high-sulphur and low-sulphur domains. The IK methodology permits the grade shells to be divided into high-sulphur and low-sulphur domains and provides for better estimation of sulphide mineralisation for nickel, copper, and cobalt.

The probability threshold to define the high-sulphur domain was determined using distance– volume plots that compared the indicator model and a NN indicator model. For open pit model a value of 0.55 was selected as an appropriate threshold to define the high-sulphur domain and for underground model a value of 0.53 was selected as an appropriate probability. Blocks with a probability indicator above or equal the selected value were assigned to the high-sulphur domain (zone = 1). Blocks with a probability below were assigned to the low-sulphur domain (zone = 3). Blocks coded zone = 2 are dike and considered to be barren. Figure 14-16 shows the zone coding for the grade shell blocks. The composite data were identified for high-sulphur and low-sulphur domains by backtagging the block probability estimates and block zone codes into the composite files.



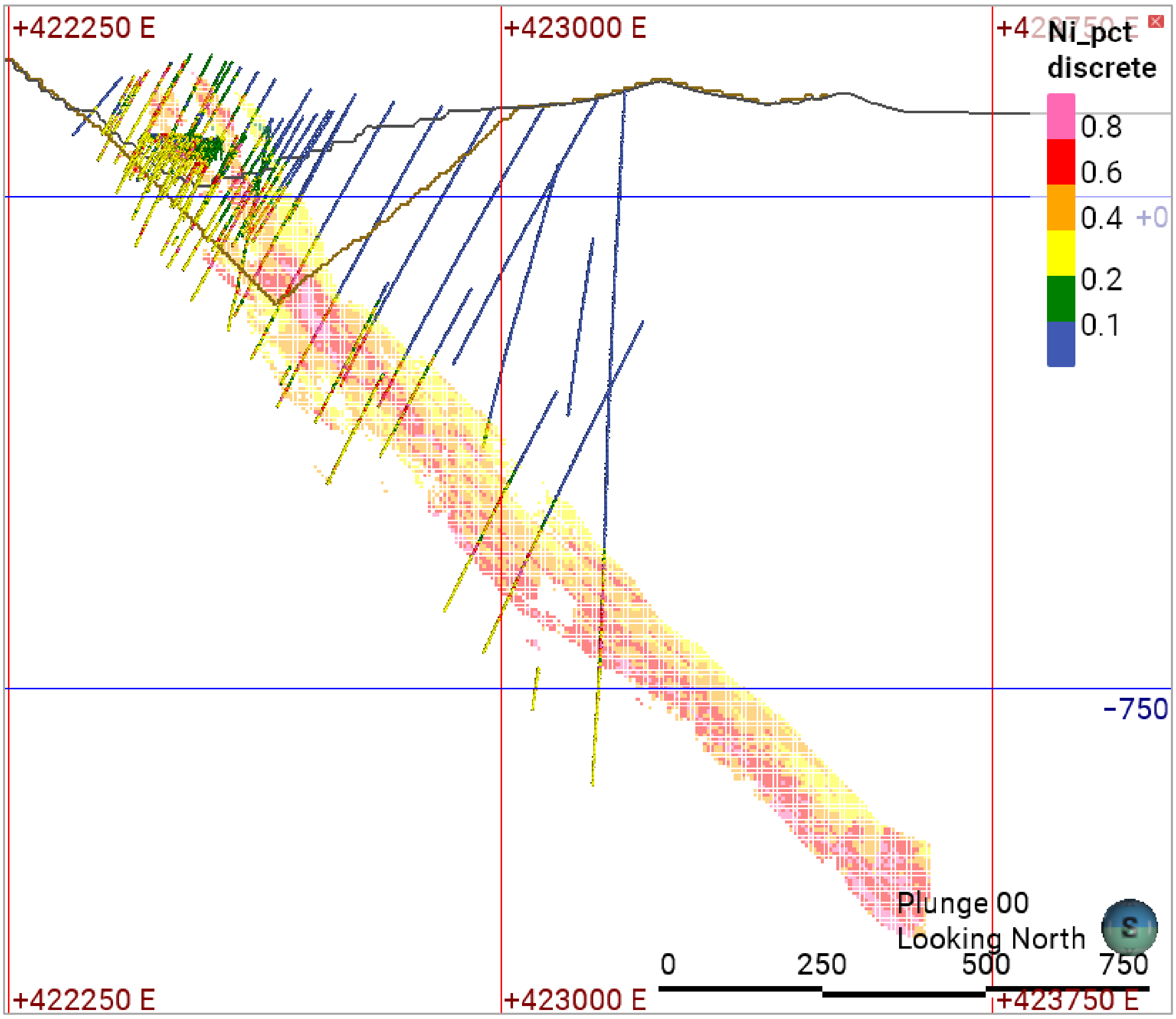
Source: GeoEstima, 2023.

Figure 14-16: Section Looking North Showing the Sulphur Domains

14.9.5 Indicator Kriging Models for NiT, NiS, Cu, and Co (Zone 1)

IK for NiT, NiS, copper, and cobalt was completed for blocks within the high-sulphur domain. The IK models were used to define high-grade and low-grade composite samples within the zone = 1 composites.

Indicator variograms were modelled for NiT, NiS, copper and cobalt using the zone = 1 composites and probability indicators were estimated into zone = 1 blocks. The probability thresholds defining high-grade and low-grade sub-sets were determined using distance–volume plots for each of the four variables. The composite data were identified for high-grade and low-grade sub-sets by backtagging the block probability estimates from the high-sulphur domain (zone = 1) into the composite files.



Source: GeoEstima, 2023.

Figure 14-17: NiT Grades Inside High Sulphur Domain

14.9.6 MgO Indicator Model

MgO is a deleterious element and important because high MgO values in economic grade mineralisation can have adverse effects in ore processing. It was observed that MgO is not correlated to sulphur values and an independent MgO IK model was constructed.

A MgO IK model was completed for the total grade shell volume (Zone = 1 and Zone =3). MgO indicators were estimated into the grade shell blocks. The probability threshold defining MgO high-grade and MgO low-grade was determined using a distance–volume plot comparing the IK and NN models.

A probability threshold of 0.49 was chosen to define the MgO high-grade and MgO low-grade domains in open pit models and probability threshold of 0.50 was chosen for high-grade domain in underground model. Blocks with MgO probabilities ≥ 0.49 or ≥ 0.50 were coded mgzone = 1 (high-grade) and blocks with MgO probabilities < 0.49 and < 0.50 were coded mgzone = 3 (low-grade), for open pit and underground model respectively. The composite data were identified for high-grade and low-grade MgO sub-sets by backtagging the block probability estimates into the composite files.

14.9.7 Summary of Indicators

The probability thresholds for the open pit model that defined the high- and low-grade for the six variables are summarised in Table 14-18. The probability estimates were backtagged into the composite files to permit high-grade and low-grade filtering during grade estimation.

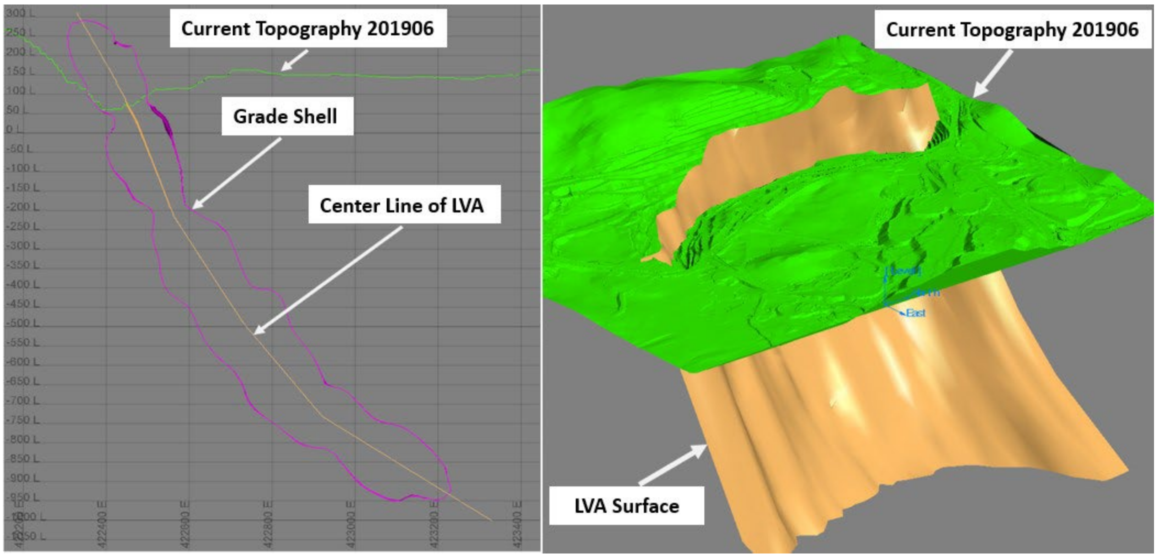
Table 14-18: Summary of Probability High-and Low-Grade Thresholds
ACG Acquisition Company Limited – Santa Rita Mine

Element	Model	Block Model Variable	High-Grade Domain	Low-Grade Domain	Threshold
Co	Open Pit	COINDZ1	≥ 0.65	< 0.65	Zone 1
	Underground		< 0.66	≥ 0.66	Zone 1
Cu	Open Pit	CUINDZ1	≥ 0.65	< 0.65	Zone 1
	Underground		< 0.51	≥ 0.51	Zone 1
MgO	Open Pit	MGOIND	≥ 0.49	< 0.49	Zone 1 + Zone 3
	Underground		< 0.50	≥ 0.50	Zone 1 + Zone 3
NiS	Open Pit	NISINDZ1	≥ 0.50	< 0.50	Zone 1
	Underground		< 0.50	≥ 0.50	Zone 1
NiT	Open Pit	NITINDZ1	≥ 0.65	< 0.65	Zone 1
	Underground		< 0.66	≥ 0.66	Zone 1
S	Open Pit	SIND	≥ 0.55	< 0.55	Zone 1 + Zone 3
	Underground		< 0.53	≥ 0.53	Zone 1 + Zone 3

14.9.8 Local Varying Anisotropy Surface

MTS implemented local varying anisotropy (LVA) constructed from a single surface to improve searching and the estimation results. A centreline was interpreted through the grade shell on east–west cross sections at 20 m intervals and a wireframe surface was constructed from the polylines (Figure 14-18). The LVA surface was used to code each block of the block model with bearing (LVB), plunge (LVP), and dip (LVD). The local varying anisotropy data were used to orient the search ellipse for sample selection during grade estimation.

GeoEstima reviewed and accepted the surfaces and ellipsoids used for grade estimation.



Source: MTS, 2021.

Figure 14-18: Local Varying Anisotropy Surface, Open Pit Model

14.10 Block Model

The wireframes were filled with blocks in Vulcan. The block model parent cells measure 6 m by 6 m by 6 m and has no sub-cells. Block model parameters are presented in Table 14-19.

Table 14-19: Block Model Setup
ACG Acquisition Company Limited – Santa Rita Mine

Parameter	X	Y	Z
Origin (m)	421,700	8,429,300	-1,496
Block Size (m)	6	6	6
Number of Blocks	380	417	316

14.11 Grade Estimation

Grade estimates were completed for NiT, NiS, copper, cobalt, platinum, palladium, gold, MgO, iron, and sulphur in Vulcan software. Grade estimates for NiT, NiS, copper, cobalt, platinum, palladium, gold, and iron were limited to the high-sulphur domain (zone = 1). An NN grade estimate and an OK estimate for zone = 1 were completed for model validation.

Grade estimation for sulphur was completed for both zones 1 and 3. Estimation was completed for the high- and low-grade domains using OK. Additional estimates by OK and NN were completed for validation.

Grade estimation for MgO was completed for both mgzones 1 and 3. Estimation was completed for MgO high-grade and MgO low-grade domains using OK. Additional estimates by OK and NN were completed for validation.

Grade estimates for platinum, palladium, gold, and iron were completed for only Zone = 1 using OK. A NN estimate was completed for validation.

The determination of sulphide cobalt (CoS) was based on the NiS/NiT ratio. The final CoS value was determined with the formula:

$$CoS\ (\%) = \frac{Co_{fin}(\text{ppm})\ *\ (\text{NiS/NiT}))}{10{,}000}$$

Each variable was estimated independently in four passes for the open pit model and in five passes for underground model with expanding searches for each pass. Variograms for the estimation are summarised in Table 14-20 and Table 14-21. The search and sample counts for each pass are summarised in Table 14-22 and Table 14-23.

All variables were estimated using OK and the final grades were calculated based on the proportions of each indicator domain (high-grade and low-grade sulphur). For all domains and variables, an NN estimate was performed to support the model validation.

Table 14-20: Grade Variograms, S, NiT, NiS, Cu, MgO, Co, Pd, Pt, Au, and Fe, Open Pit Model ACG Acquisition Company Limited – Santa Rita Mine

			Range (m)			Rotation (°)				Range (m)			Rotation (°)		
Variable	C0	C1	Major	Semi Major	Minor	Z	Y	X	C2	Major	Semi Major	Minor	Z	Y	X
S HG	0.1	0.73	21.9	22.5	19.4	0	-55	14	0.17	533	341	119	0	-55	50
S LG	0.28	0.45	48.5	115.5	71.9	0	-55	3	0.27	167	1423	270	0	-55	-24
NiT HG	0.15	0.65	63.1	20.3	45.0	0	-55	106	0.21	637	350	231	0	-55	-44
NiT LG	0.25	0.55	46.0	23.2	46.6	0	-55	20	0.2	255	750	67.9	0	-55	26
NiS HG	0.15	0.75	18.4	20.0	17.1	0	-55	59	0.1	465	658	145	0	-55	47
NiS LG	0.15	0.8	9.4	9.8	8.8	0	-55	-3	0.05	173	183	80.7	0	-55	215
Cu HG	0.2	0.7	14.1	14.5	12.4	0	-55	84	0.1	290	337	66.9	0	-55	49
Cu LG	0.25	0.67	29.4	1.8	16.3	0	-55	109	0.08	71.2	40.9	115	0	-55	-31
MgO HG	0.13	0.57	47.4	60.8	75.2	0	-48	27	0.3	1,000	1,000	174	0	-48	27
MgO LG	0.15	0.65	19.4	56.6	31.8	0	-50	9	0.2	234	236	257	0	-50	107
Co HG	0.15	0.57	40.0	20.0	15.0	0	-50	15	0.28	600	300	200	0	-50	15
Co LG	0.2	0.65	30.0	30.0	5.0	0	-50	-11	0.25	200	150	50	0	-50	-11
Pd	0.1	0.5	40.0	25.0	15.0	0	-50	75	0.4	500	300	200	0	-50	60
Pt	0.1	0.6	35.0	35.0	20.0	0	-50	25	0.3	500	500	150	0	-50	25
Au	0.25	0.5	40.0	40.0	15.0	0	-50	20	0.25	500	500	125	0	-50	35
Fe	0.15	0.55	30.0	25.0	20.0	0	-50	15	0.3	300	200	200	0	-50	15

Note: HG = high grade, LG = low grade

Table 14-21: Grade Variograms, S, NiT, NiS, Cu, MgO, Co, Pd, Pt, Au, and Fe, Underground Model
ACG Acquisition Company Limited – Santa Rita Mine

			Range (m)			Rotation (°)				Range (m)			Rotation (°)				Range (m)			Rotation (°)		
Variable	C0	C1	Major	Semi-Major	Minor	Bearing (az of x)	Plunge (about y, LHR)	Dip (about x, LHR)	C2	Major	Semi-Major	Minor	Bearing (az of x)	Plunge (about y, LHR)	Dip (about x, LHR)	C3	Major	Semi-Major	Minor	Bearing (az of x)	Plunge (about y, LHR)	Dip (about x, LHR)
S HG	0.1	0.6	15	15	10	90	-55	0	0.3	65	60	60	90	-55	0	0.1	450	300	265	90	-55	0
S LG	0.2	0.6	20	16	12	90	-55	0	0.2	50	45	35	90	-55	0	0.1	200	250	200	90	-55	0
S	0.1	0.5	20	15	12	90	-55	0	0.3	75	60	80	90	-55	0	0.2	450	350	200	90	-55	0
NiT HG	0.1	0.6	15	22	15	90	-55	0	0.2	80	40	80	90	-55	0	0.2	450	300	180	90	-55	0
NiT LG	0.2	0.3	15	15	12	90	-55	0	0.4	60	150	150	90	-55	0	0.1	300	250	200	90	-55	0
NiT	0.1	0.3	15	10	12	90	-55	0	0.4	75	90	55	90	-55	0	0.3	450	350	250	90	-55	0
NiS HG	0.2	0.3	15	15	12	90	-55	0	0.4	60	50	60	90	-55	0	0.1	400	350	150	90	-55	0
NiS LG	0.3	0.3	10	8	10	90	-55	0	0.2	25	25	25	90	-55	0	0.3	150	100	120	90	-55	0
NiS	0.1	0.3	17	10	10	90	-55	0	0.4	90	30	55	90	-55	0	0.2	400	400	250	90	-55	0
Cu HG	0.3	0.6	8	12	8	90	-55	0	0.1	25	50	60	90	-55	0	0.1	350	300	200	90	-55	0
Cu LG	0.3	0.2	15	12	10	90	-55	0	0.4	60	75	20	90	-55	0	0.2	300	200	250	90	-55	0
Cu	0.2	0.3	15	10	10	90	-55	0	0.3	60	25	60	90	-55	0	0.2	150	300	250	90	-55	0
Co HG	0.1	0.4	10	10	10	90	-55	0	0.3	50	50	50	90	-55	0	0.2	450	350	200	90	-55	0
Co LG	0.1	0.2	20	20	10	90	-55	0	0.2	75	50	40	90	-55	0	0.6	400	350	250	90	-55	0
Co	0.1	0.1	20	10	10	90	-55	0	0.4	70	60	30	90	-55	0	0.5	450	400	300	90	-55	0
MgO HG	0.1	0.4	10	10	8	90	-55	0	0.3	50	50	80	90	-55	0	0.3	450	400	300	90	-55	0

			Range (m)			Rotation (°)				Range (m)			Rotation (°)				Range (m)			Rotation (°)		
Variable	**C0**	**C1**	**Major**	**Semi-Major**	**Minor**	**Bearing (az of x)**	**Plunge (about y, LHR)**	**Dip (about x, LHR)**	**C2**	**Major**	**Semi-Major**	**Minor**	**Bearing (az of x)**	**Plunge (about y, LHR)**	**Dip (about x, LHR)**	**C3**	**Major**	**Semi-Major**	**Minor**	**Bearing (az of x)**	**Plunge (about y, LHR)**	**Dip (about x, LHR)**
MgO LG	0.1	0.2	15	12	10	90	-55	0	0.5	75	40	80	90	-55	0	0.2	300	250	250	90	-55	0
MgO	0.1	0.8	20	10	10	90	-55	0	0.4	70	30	50	90	-55	0	0.5	450	300	300	90	-55	0
Pd	0.2	0.4	15	15	10	90	-55	0	0.3	105	120	75	90	-55	0	0.2	400	250	300	90	-55	0
Pt	0.2	0.3	15	14	15	90	-55	0	0.3	55	75	60	90	-55	0	0.3	300	350	200	90	-55	0
Au	0.3	0.2	15	15	12	90	-55	0	0.3	80	120	100	90	-55	0	0.2	300	350	200	90	-55	0
Fe	0.1	0.4	15	20	20	90	-55	0	0.3	60	60	90	90	-55	0	0.2	300	350	190	90	-55	0

Table 14-22: Estimation Plan, Open Pit Model
ACG Acquisition Company Limited – Santa Rita Mine

Variable	Pass	Range (m)			Range (m)			Rotation (°)		
		Plunge	Dip	Minor	Major	Semi Major	Minor	Z	Y	X
NiT, NiS, Cu	1				50	25	15	7	10	3
	2				75	35	20	6	10	3
	3	LVB	LVP	LVD	200	100	50	5	10	3
	4				500	240	120	3	8	3
MgO, S	1				50	25	15	8	14	5
	2				75	35	20	8	14	5
	3	LVB	LVP	LVD	200	100	50	8	12	5
	4				500	240	120	8	10	4
Co, Au, Pt, Pd, Fe	1				50	25	15	8	14	6
	2				75	35	20	8	14	6
	3	LVB	LVP	LVD	200	100	50	8	12	6
	4				500	240	120	8	10	6

Notes:

1. LVB: local varying anisotropy bearing
2. LVP: local varying anisotropy plunge
3. LVD: local varying anisotropy dip

Table 14-23: Grade Estimation Search Criteria, S, NiT, NiS, Cu, MgO, Co, Underground Model
ACG Acquisition Company Limited – Santa Rita Mine

Variable	Pass	Orientation			Range (m)			Samples		
		Bearing	Plunge	Dip	Major	Semi-Major	Minor	Min	Max	Max DH
NiT, NiTHG, NiTLG NiS, NiSHG, NiSLG Cu, CuHG, CuLG Co, CoHG, CoLG	1				50	25	15	7	10	3
	2				75	35	20	6	10	3
	3	LVB	LVP	LVD	200	100	50	5	10	3
	4				500	240	120	3	8	2
	5				650	325	120	3	8	2
S, SHG, SLG, MgO, MgOHG, MgOLG	1				50	25	15	8	14	5
	2				75	35	20	8	14	5
	3	LVB	LVP	LVD	200	100	50	8	12	5
	4				500	240	120	6	10	4
	5				650	325	120	6	10	4

Variable	Pass	Orientation			Range (m)			Samples		
		Bearing	Plunge	Dip	Major	Semi-Major	Minor	Min	Max	Max DH
	1				50	25	15	7	14	3
	2				75	35	20	6	14	3
Pt, Pd, Au	3	LVB	LVP	LVD	200	100	50	5	14	3
	4				500	240	120	3	8	2
	5				650	325	120	3	8	2
	1				50	25	15	7	10	3
	2				75	35	20	6	10	3
Fe	3	LVB	LVP	LVD	200	100	50	5	10	3
	4				500	240	120	3	8	2
	5				650	325	120	3	8	2

Notes:

1. LVB: local varying anisotropy bearing
2. LVP: local varying anisotropy plunge
3. LVD: local varying anisotropy dip

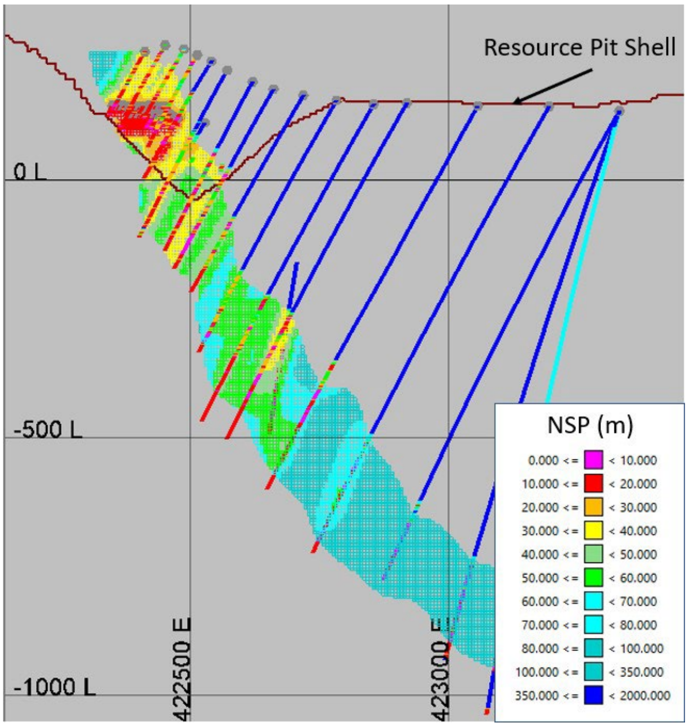
The final grades for the block model were calculated by combining the high-grade and low-grade portions of NiT, NiS, Cu, Co, S, and MgO based on the block probability. Formulas were adjusted for each variable to tune the grade estimation for global bias, local bias and change-of-support (Hermitian correction or HERCO).

14.12 Mineral Resource Classification

Definitions for resource categories used in this report are consistent with those defined by CIM (2014) and adopted by NI 43-101. In the CIM classification, a Mineral Resource is defined as "a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction". Mineral Resources are classified into Measured, Indicated, and Inferred categories. A Mineral Reserve is defined as the "economically mineable part of a Measured and/or Indicated Mineral Resource" demonstrated by studies at Pre-Feasibility or Feasibility level as appropriate. Mineral Reserves are classified into Proven and Probable categories.

The Mineral Resource classification was determined using the nominal drill spacing and visual inspection and for open pit model a confidence limit investigation.

The nominal drill spacing was calculated for each block within the grade shell using plugins for SGeMS software. The nominal drill spacing calculation determines the nominal drill spacing for the closest three drill holes for each block (Figure 14-19). The nominal drill spacing calculation for the open pit model only used drill holes with assay data.



Source: MTS, 2021.

Note. Section looks north. NSP = nominal drill spacing.

Figure 14-19: Nominal Drill Spacing, Section 8,430,625N, Open Pit Model

The confidence limit study was completed based on NiS grades and used an annual production rate of 6.5 Mt. Measured Mineral Resources are determined using a 90% confidence level of ±15% on a quarterly production increment. Indicated Mineral Resources are determined using a 90% confidence level of ±15% on an annual production increment.

The confidence limit investigation suggested a nominal drill spacing for Measured Mineral Resources is determined to be < 30 m. The confidence limit investigation for Indicated Mineral Resources was undefined due to the low CV of NIS (CV = 0.70). Using the confidence limit study and inspection of cross sections, a nominal drill spacing for Measured Mineral Resources was chosen to be less than 30 m. The nominal drill spacing for Indicated Mineral Resources was chosen to be 30 m to 55 m. A nominal drill spacing of 55 m to 200 m was chosen for Inferred Mineral Resources.

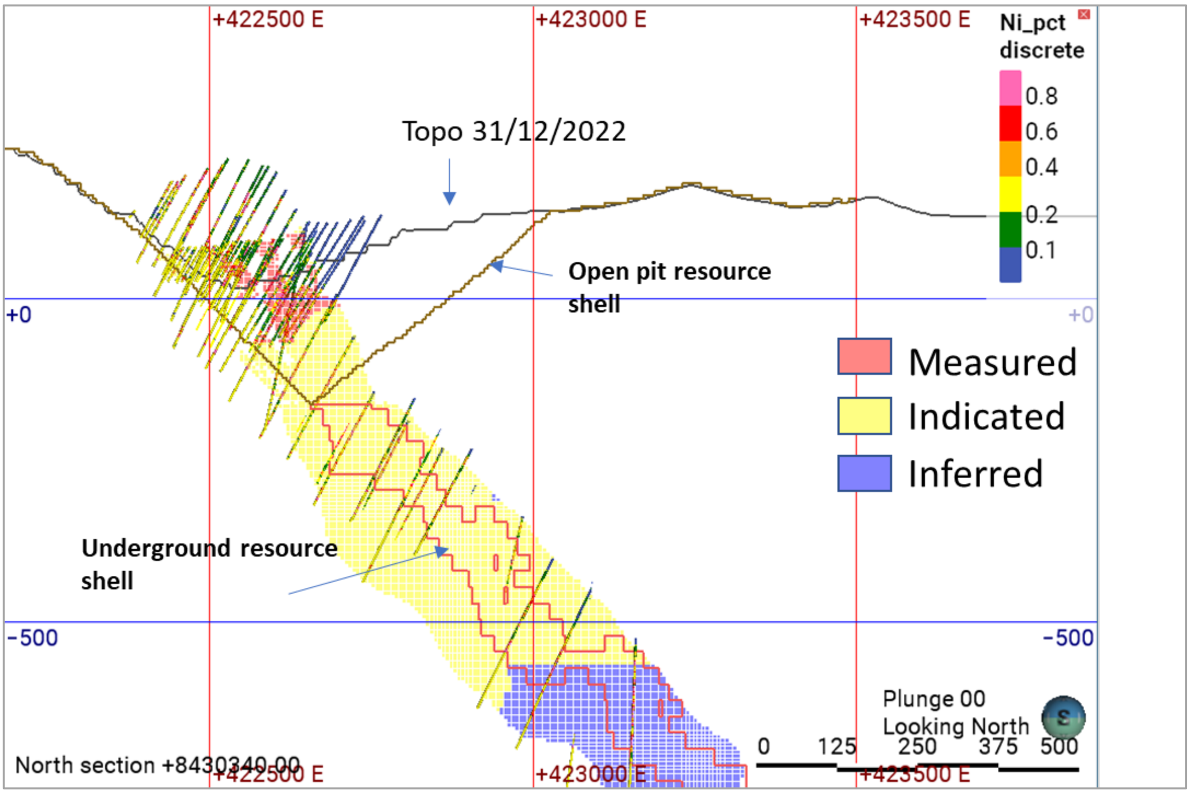
A preliminary classification was carried out based on the nominal drill spacings summarised in Table 14-24.

Table 14-24: Mineral Resource Classification
ACG Acquisition Company Limited – Santa Rita Mine

Classification	Drill Spacing (m)
Measured	0–30
Indicated	30–55
Inferred	55–200

The preliminary classification was inspected in cross section and plan. For open pit model, wireframes defining Measured and Indicated Mineral Resources were constructed to address isolated blocks and areas of stripping. Generally, the wireframes downgraded the Measured classification to Indicated and Indicated classification to Inferred. In the underground model, wireframes defining Indicated and Inferred Mineral Resources were constructed to address isolated blocks and areas of stripping. All blocks above the bottom of the open pit shell were set to unclassified with the assumption blocks in walls of the open pit would not be mineable.

Figure 14-20 shows the final resource classification for the open pit and underground model. The figure also shows NiS in drill holes and the constraining pit shell.



Source: GeoEstima, 2023.

Figure 14-20: Mineral Resource Classification, Open Pit and Underground Model

14.13 Block Model Validation

GeoEstima carried out a number of block model validation procedures including:

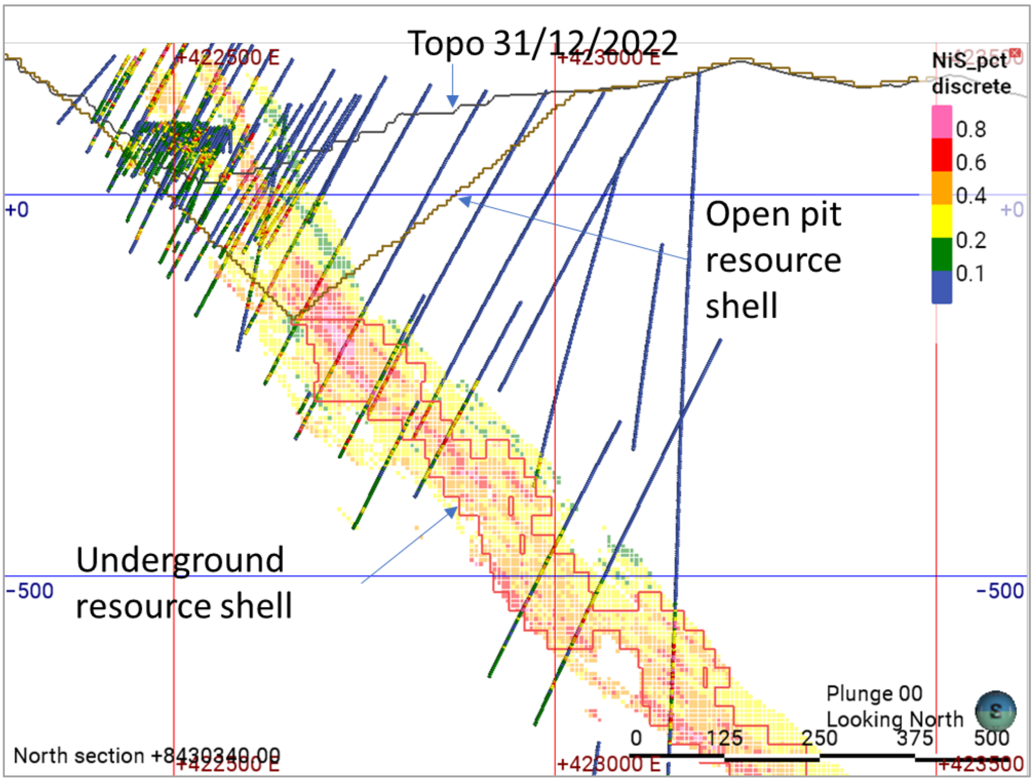
- Comparison between OK and NN mean grades.
- Visual inspection of cross-sections and plan-sections comparing estimated grades to the composites.
- Swath plots.

The final block grades were checked for global bias by comparing the average grade (at 0.0 cut- off) with NN. The global biases are within recommended guidelines of ±5% (relative percent) for Measured and Indicated Resources (Table 14-25).

Table 14-25: Comparison Between Estimates – OK/NN
ACG Acquisition Company Limited – Santa Rita Mine

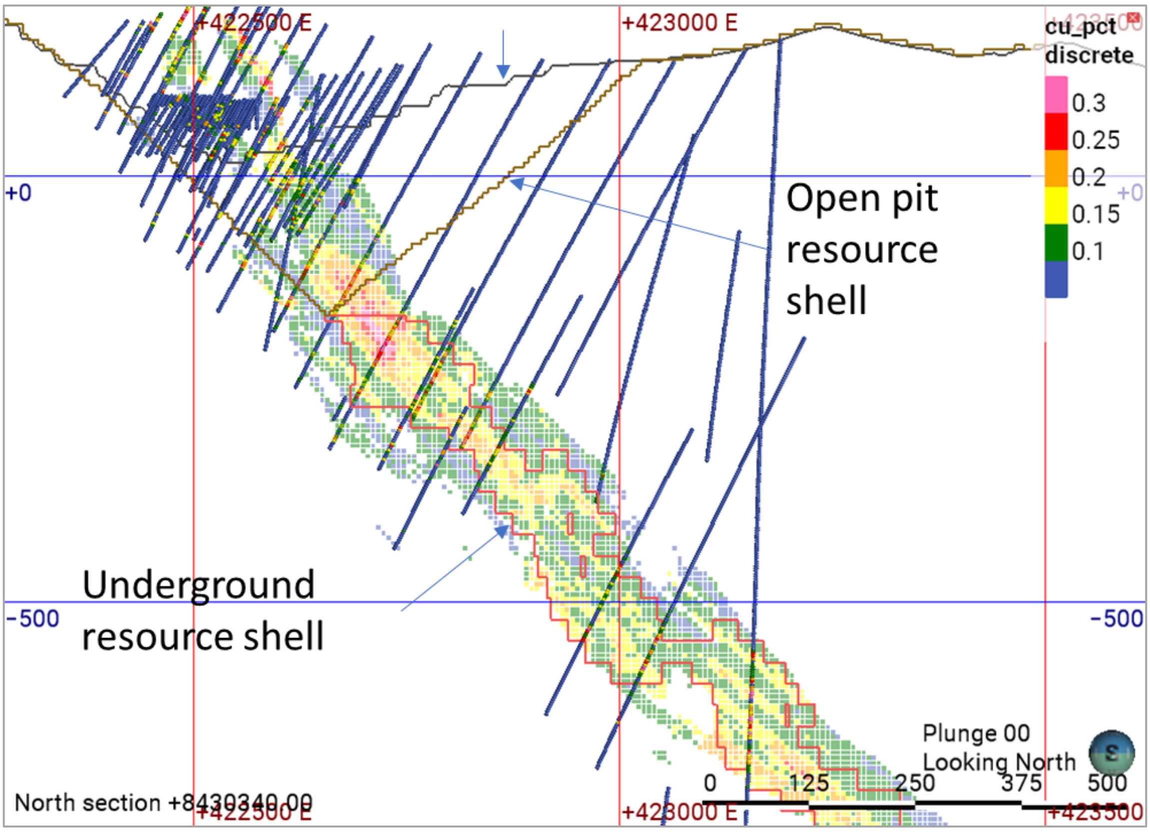
Grades	OK			NN			Relative bias
	Mean	STD	CV	Mean	STD	CV	
NiS (%)	0.44	0.20	0.45	0.46	0.29	0.63	-5.2%
Cu (%)	0.15	0.06	0.40	0.15	0.08	0.55	-0.7%
Co (%)	0.01	0.00	0.30	0.01	0.00	0.36	-1.3%

The visual inspection of composite and block grades revealed that the spatial grade correlation is reasonable for Ni, Cu, and Co (Figure 14-21 and Figure 14-22).



Source: GeoEstima, 2023.

Figure 14-21: Section Looking North Showing NiS Blocks Versus Composite Grades



Source: GeoEstima, 2023.

Figure 14-22: Section Looking North Showing Cu Blocks Versus Composite Grades

Swath plots (Figure 14-23 to Figure 14-25) show acceptable agreement between NN and OK estimates for NiS, Cu, and Co.

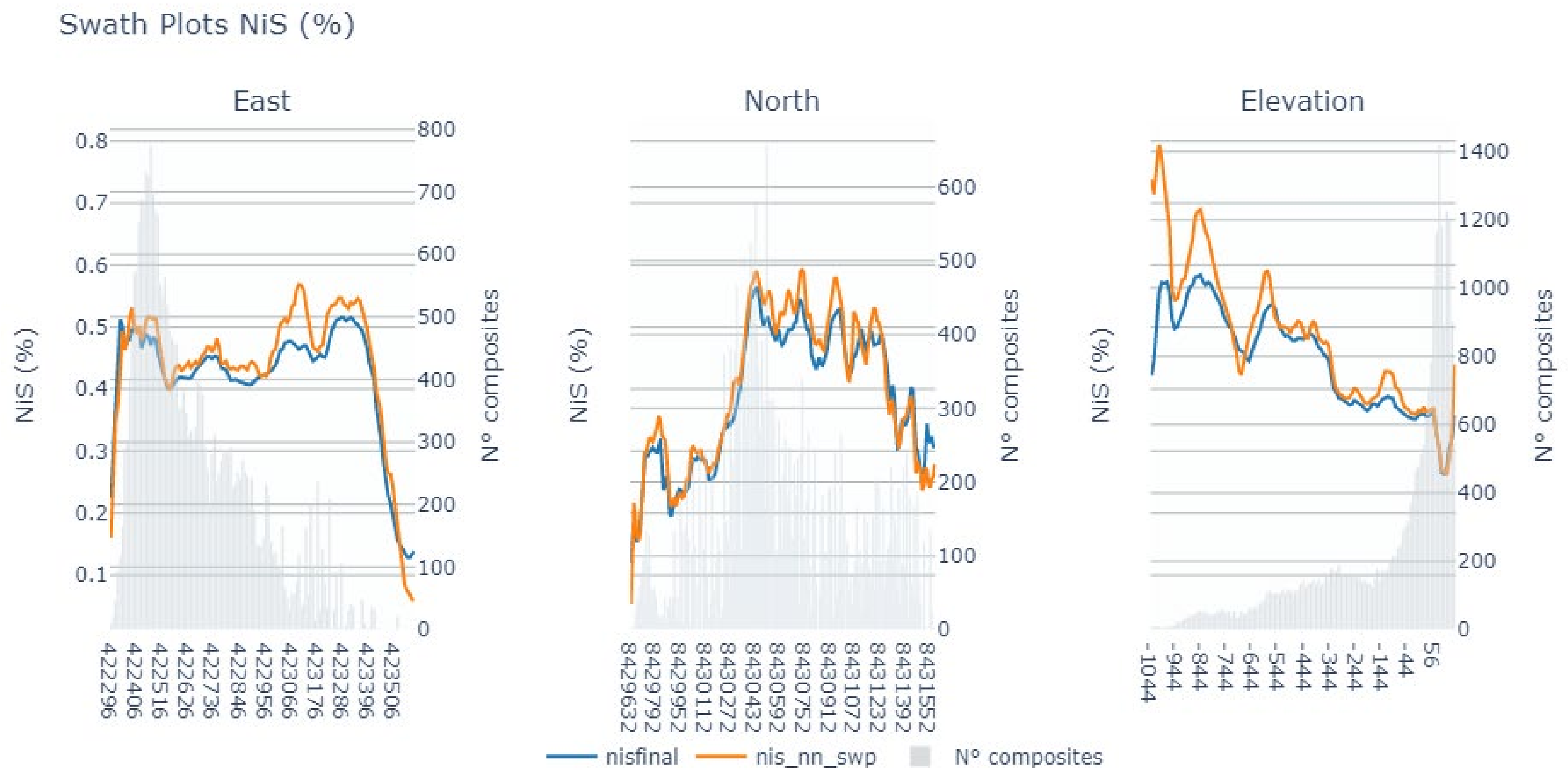


Figure 14-23: Swath Plot: NiS Grade Variation along X, Y, and Z

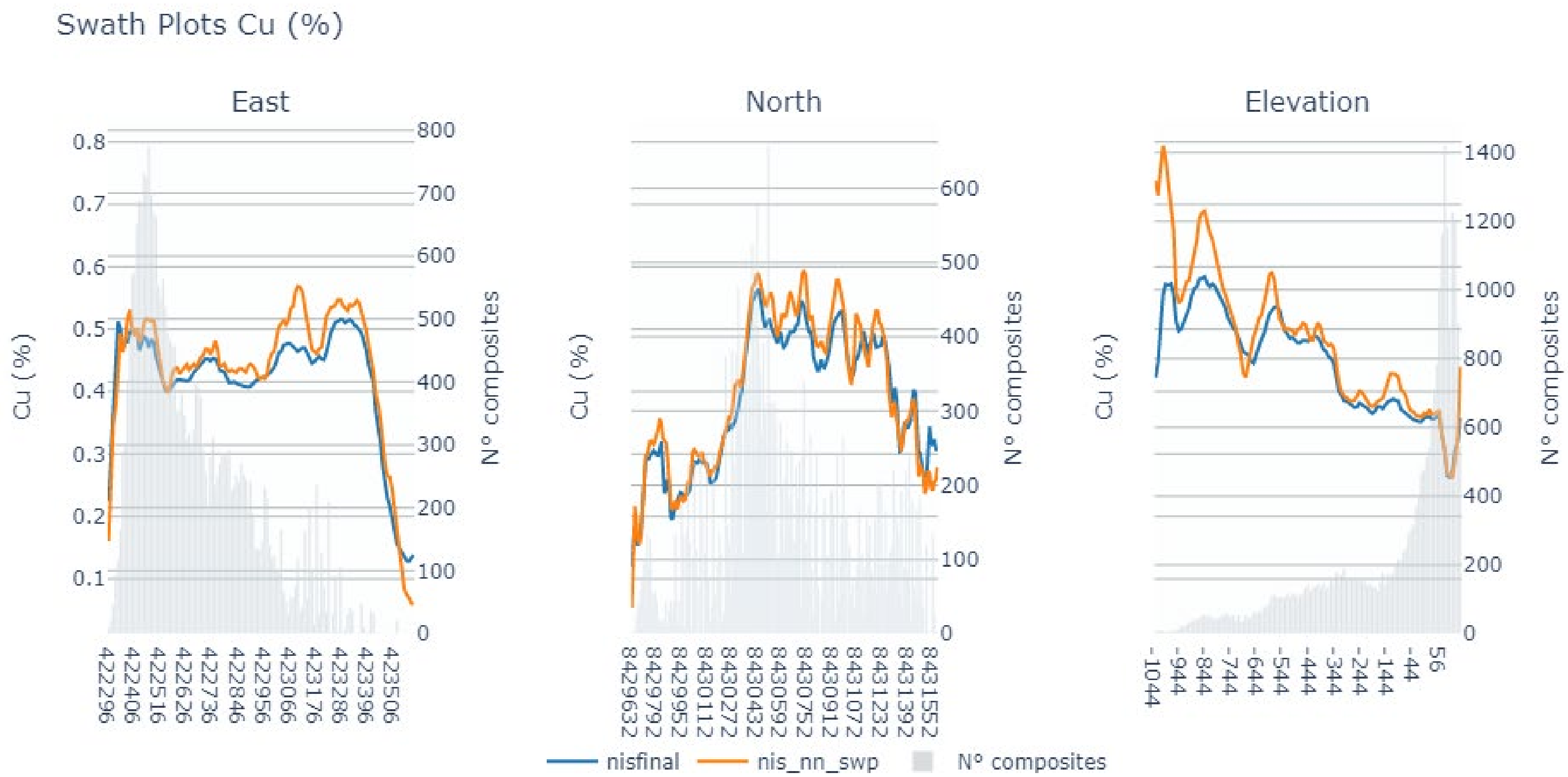


Figure 14-24: Swath Plot: Cu Grade Variation along X, Y, and Z

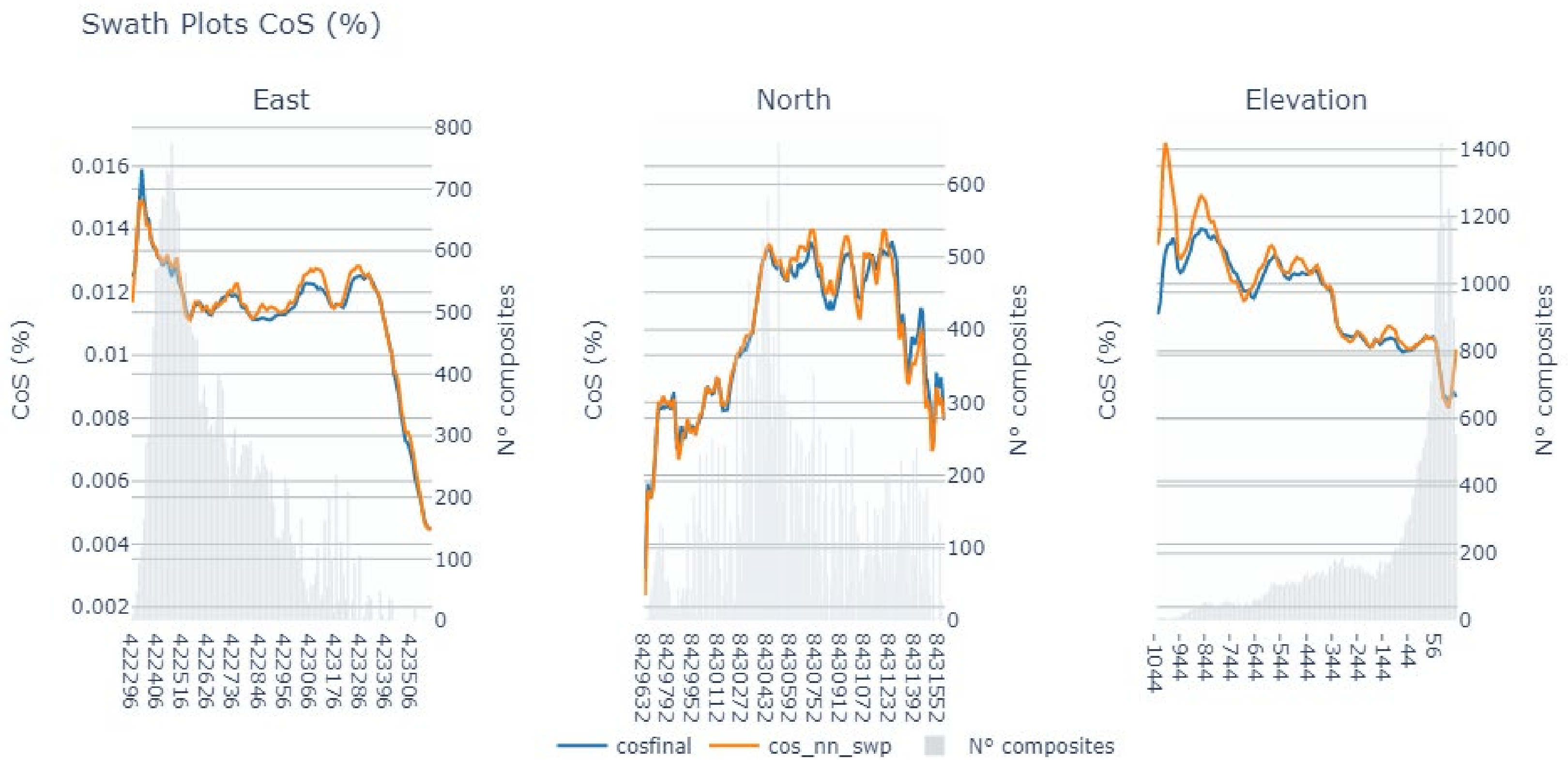


Figure 14-25: Swath Plot: Co Grade Variation along X, Y, and Z.

Additionally, MTS carried out a change-of-support HERCO comparisons plots were prepared for NiS and copper. A 45 m x 45 m x 24 m (x, y, z) SMU was used for to simulate the stope size used in the Datamine Mineral Reserve Optimizer software (MRO) analysis. The HERCO analysis was limited to NiS and copper, since these are the major payable elements, and for blocks classified as Indicated Mineral Resources. No Measured Mineral Resources were classified in the underground model. The HERCO plots for NiS and copper show acceptable profiles.

14.14 Net Smelter Return Calculation

An NSR value was calculated for each block based on the sales agreements for the Atlantic Nickel concentrates from 2021. The NSR calculation included metal prices, recoveries, and payable values (Table 14-26). A NSR was calculated for each block using the block grade for NiS, copper, and CoS. The NSR calculation uses the formula:

NSR = (73.832 * NiS) + (31.482 * Cu) + (36.922 * CoS)

Table 14-26: NSR Input Parameters
ACG Acquisition Company Limited – Santa Rita Mine

Assumptions	Unit	Ni	Cu	Co
Metal price	$/lb	6.5	3	
Concentrate type	Type	Ni–Cu concentrate	Ni–Cu concentrate	Ni–Cu concentrate
Recovery	%	83	73	29
Concentrate grade	%	13.85	4.17	0.24
Payable	%	91	80	35
Penalties (MgO)	$/t concentrate	14		
Moisture	%	8	8	8
Transportation	$/t Concentrate	87.44		
Smelting	$/t Concentrate	210		
Refining	$/lb	0.92	0.45	3.5
NSR coefficient	$ per grade %	73.832	31.482	36.922

Note: Current metal price prediction is higher than used in 2021. The consensus long-term forecast prices for Mineral Resources are around US$11.00/lb for nickel, US$4.50/lb for copper, US$30/lb for cobalt.

14.15 Reasonable Prospects for Eventual Economic Extraction

The assessment of reasonable prospects for eventual economic extraction (RPEEE) was based on the application of a pit shell obtained by the Lerchs–Grossmann (LG) method. This pit shell was built based on the following metal prices: US$6.50/lb for nickel, US$3.00/lb for copper, and US$20.00/lb for cobalt. Historically, the mine also received concentrate credits for platinum, palladium, and gold but metallurgical recoveries are not defined, and these products are not included in the NSR calculation. The NSR cut-off value for the open pit mine was US$8.91/t.

Atlantic Nickel used actual production data to estimate operating costs and determine a NSR cut-off of US$8.91/t for open pit mining.

A Whittle pit optimisation was used to define the pit shell constraining the Mineral Resource estimates. The mining, processing and general and administrative (G&A) cost assumptions are summarised in Table 14-27.

Table 14-27: Pit Optimisation Parameters
ACG Acquisition Company Limited – Santa Rita Mine

Area	Item	Unit	Parameter
Metal price	NiS	US$/lb	6.5
	Cu	US$/lb	3
	Co	US$/lb	20
Operating costs	Mining	US$/t material	3
	Processing & G&A	US$/t processed	8.5
Metallurgical recovery	NiS	%	83
	Cu	%	70
	Co	%	29
Selling cost	NiS	US$/lb	1.86
	Cu	US$/lb	0
	Co	US$/lb	0

It should be noted that the above resource metal prices and recoveries are different than those used for Mineral Reserves in Section 15. The pit optimisation parameters for Mineral Reserves (Section 15) include metal prices of US$8.15/lb nickel, US$3.50/lb copper, US$25.00/lb cobalt, US$1,375/oz palladium, US$1,100/oz platinum, and US$1,550/oz gold, with process recoveries of 83.2% nickel, 75% copper and 38% cobalt. The NSR cut-off value was determined to be US$11.04/t.

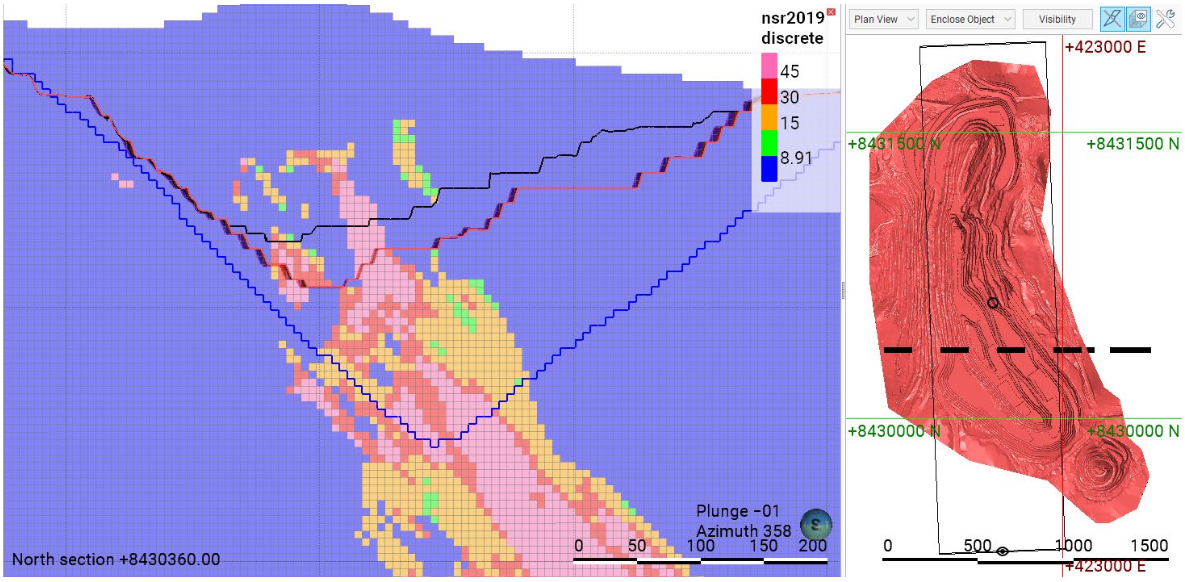
Given the above, the resource pit shell was reviewed with respect to the reserve pit design. It was observed that, despite the different prices used, more than 99% of the Mineral Reserve pit-design is situated within the Mineral Resource pit shell (Figure 14-26). GeoEstima also confirmed that the resource estimates remain essentially the same at higher metal prices and costs. The potential impact of higher prices and recoveries in the resource estimates was assessed by defining the mineral resources using the same pit shell as a constraint and applying the updated NSR (see the formula below) to blocks and the new cut-off NSR equal to US$11.04/t. The results show insignificant differences, probably because the higher prices and recoveries are compensated by a higher cost used to calculate the cut-off NSR value. The 2022 NSR calculations were based on the follow formula:

$$NSR\ 2022 = 93.118\ NiS + 40.345\ Cu + 63.041\ Co$$

For underground Mineral Resources, an MRO shell was constructed to constrain the Mineral Resource estimate. Inputs to the MRO are summarised in Table 14-28. An oblique view through the resulting model is included as Figure 14-27.

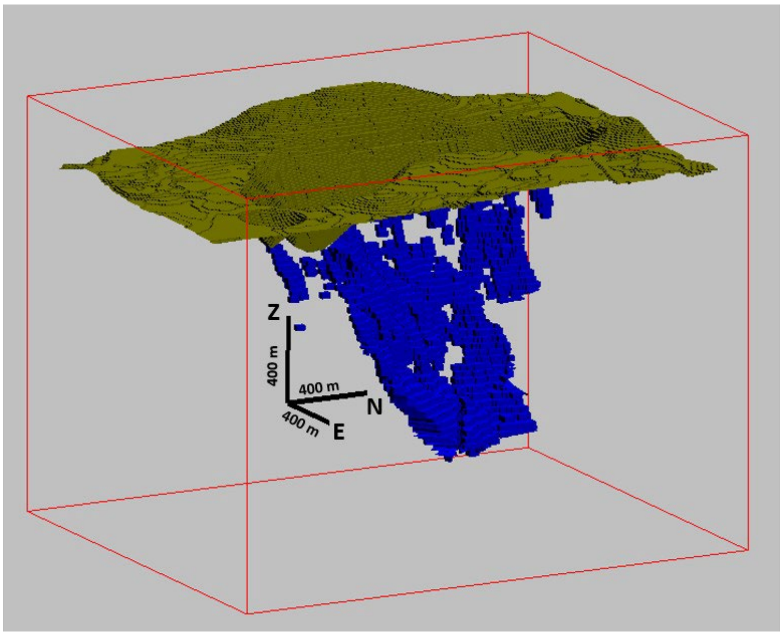
Table 14-28: MRO Inputs
ACG Acquisition Company Limited – Santa Rita Mine

Classification	Drill Spacing (m)
Minimum mining unit	30 m, 45 m, 25 m (x, y, z)
Maximum waste percentage	100%
NSR cut-off for mineralised material/waste determination	US$30.00/t
Cut-off for minimum mining unit	US$30.00/t



Note. Black: current surface; red: mineral reserve pit shell; blue: mineral resource pit shell

Figure 14-26: Current Surface, Mineral Reserve Pit Shell and Mineral Resource Pit Shell Comparison



Source: MTS, 2021.

Figure 14-27: MRO Oblique Section View

14.16 Mineral Resource Reporting

The Mineral Resources for the Santa Rita open pit operation and underground project are summarised in Table 14-1. Mineral Resources potentially amenable to open pit mining methods are reported inclusive of those Mineral Resources converted to Mineral Reserves and have an effective date of December 31, 2022. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. Mineral Resources potentially amenable to underground mining methods have an effective date December 31, 2022. Mineral Resource estimates for open pit were depleted for actual production up to December 31, 2022.

GeoEstima reviewed the resource shapes for underground and is of the opinion that they should be updated after the limit between open pit and underground is better defined with more trade-off studies.

The current underground Mineral Resource was reported considering all the blocks inside of the Mineral Resource shape, instead of applying an NSR cut-off value to the blocks. Consequently, the underground resource includes all of the mineralised blocks, classified as Measured, Indicated, and Inferred, and also waste blocks that are inside of the underground Mineral Resource shapes.

14.17 CP Comments on Item 14 "Mineral Resource Estimate"

GeoEstima makes the following recommendations:

1. Update the Mineral Resource estimate at Santa Rita with the ongoing drilling information added since 2021, as well as the updated metal prices and costs. The new drilling may better define the mineralisation extents, mainly in the deeper portion of the deposit, and it will upgrade the Mineral Resource classification in some areas.
2. Review the NSR parameters to include the platinum group elements (PGE) (Pd and Pt), as well as the cut-off value for open pit and underground shapes, aiming to update the RPEEE criteria.

- Integrate the post-mineralisation faults into the geological model, improving the shape modelling of mineralised zones. This activity will mainly impact the modelling of the deeper zone of the deposit.

15.0 MINERAL RESERVE ESTIMATE

15.1 Mineral Reserve Summary

The Mineral Reserve estimate is that portion of the Mineral Resource estimate that is identified as having demonstrated economic viability within a pit design and incorporates modifying factors such as mining recovery, waste dilution, process recovery, and other economic considerations. The Mineral Reserve estimate forms the basis for the production plan and economic model.

No Inferred Mineral Resources have been used in the estimation of the Mineral Reserve.

The Mineral Reserves were audited by the CP using two methodologies.

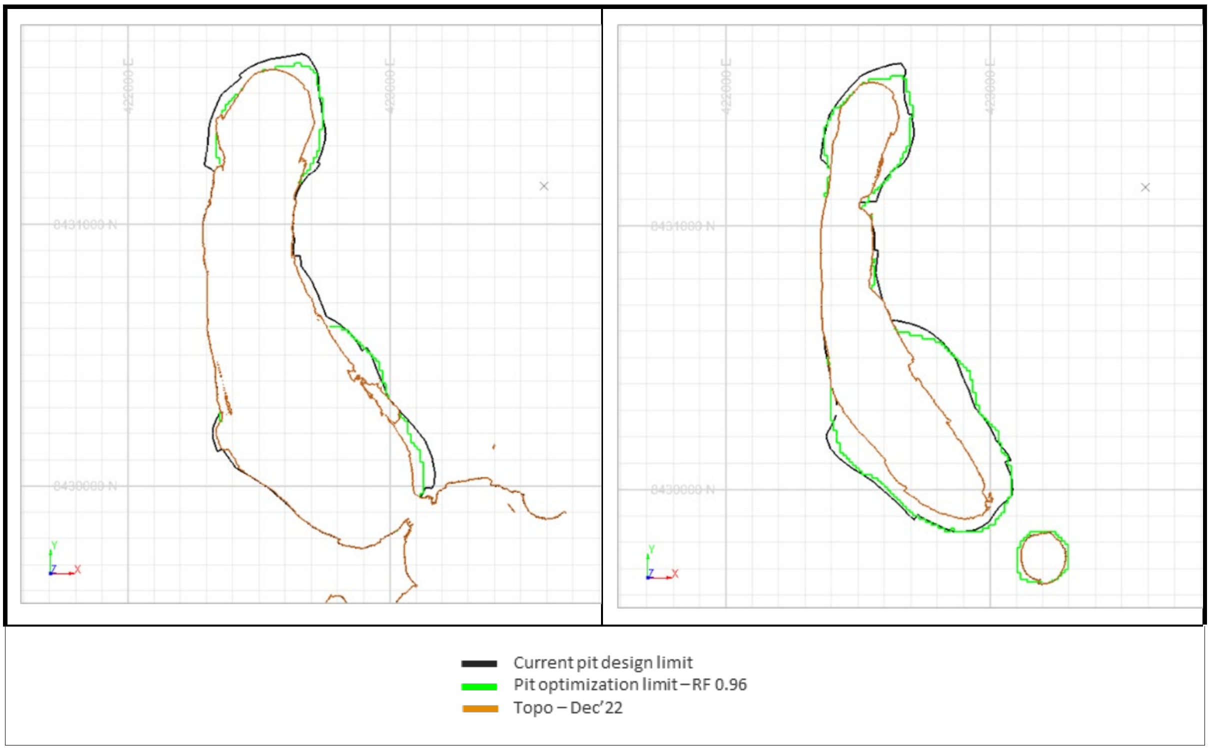
The first method utilised a 2021 internal Technical Report Mineral Reserve based on starting open pit bench faces as of October 1, 2021, that were depleted by actual mining for the period October 2021 to the end of 2022. The Mineral Reserve in the 2021 internal Technical Report was based on an NSR cut-off value of $8.91/t that used cost assumptions of US$5.17/t processing, US$1.17/t royalties, US$1.41/t site G&A, and US$0.62/t corporate G&A. Metal prices were US$6.50/lb nickel, US$3.00/lb copper, US$20.00/lb cobalt, US$1,000/oz palladium, US$800/oz platinum, and US$1,250/oz gold, with process recoveries of 83% nickel, 70% copper, and 29% cobalt with no credit for palladium, platinum or gold. The resulting tonnage of ore after depletion was 36.36 Mt. This compared within 0.8% of the 36.07 Mt that was indicated by querying the diluted block model using an NSR cut-off value of $8.91/t inside the pit design with starting bench faces as of the end of 2022.

A second method was conducted using a revised open pit design that accounts for an underground portal location on the upper northwest benches and two wall segments that were re-designed in the central portion of the east side of the open pit. Using an NSR cut-off value of $8.91/t and starting bench faces as of January 1, 2023, the ore tonnage within the new pit design was determined to be 33.97 Mt. This tonnage was used for the 2023 budget.

The diluted block model was updated with 2023 parameters and the resulting pit optimisation shell limits were compared to the re-designed open pit limits. Starting bench faces for this CPR were as of January 1, 2023. The pit optimisation parameters included metal prices of US$8.15/lb nickel, US$3.50/lb copper, US$25.00/lb cobalt, US$1,375/oz palladium, US$1,100/oz platinum and US$1,550/oz gold, with process recoveries of 83.2% nickel, 75% copper, and 38% cobalt with no credit for palladium, platinum, or gold. The NSR cut-off value was determined to be US$11.04/t. As can be seen in Figure 15-1 the pit optimisation limits closely matched the new pit design. The revenue factor used for the optimisation limits in Figure 15-1 was 0.96. The Mineral Reserve tonnage of 33.97 Mt was therefore accepted as being valid using 2023 parameters.

The Proven and Probable Mineral Reserve estimate for the Santa Rita Mine is summarised in Table 15-1 and includes 869,000 t of stockpiled ore. Approximately 23% of the Mineral Reserve is in the Proven classification as of December 31, 2022.

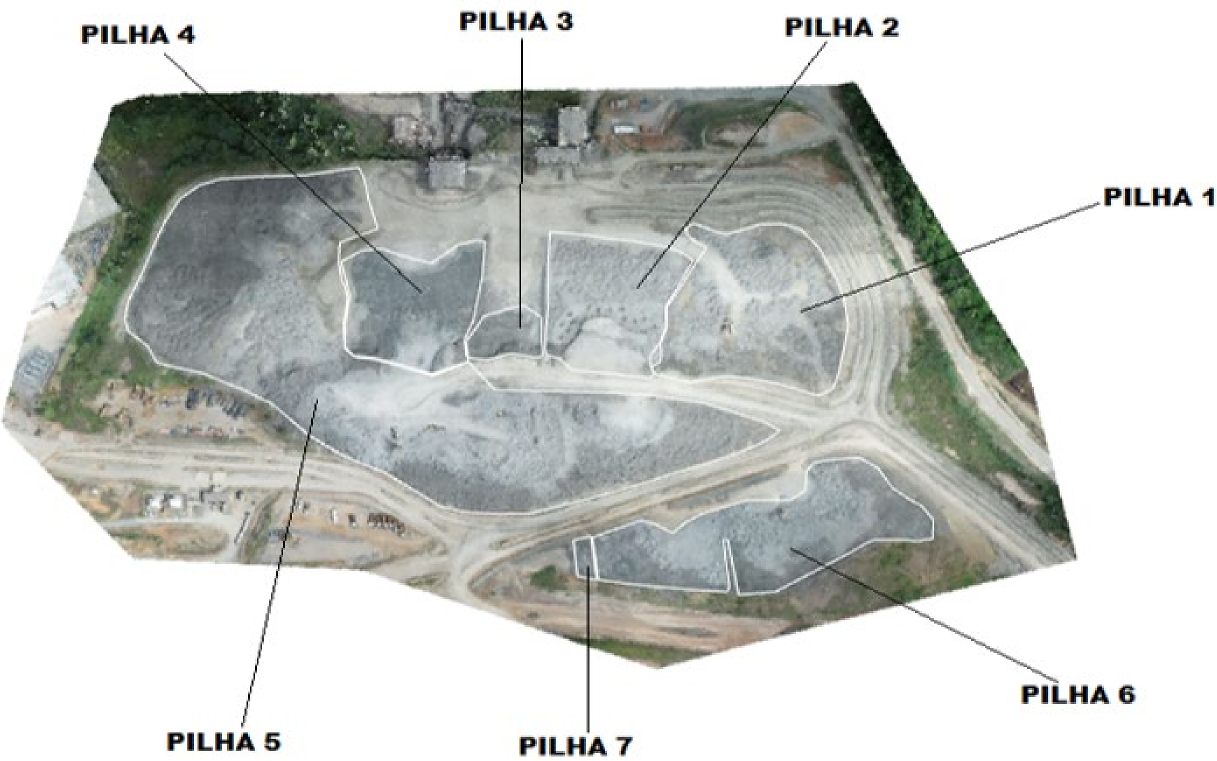
The 869,000 t of stockpiled ore are stored in the vicinity of the run-of-mine (ROM) pad, near the primary crushers. There are eight separate stockpiles that have been created since mining was re-started at the Santa Rita Mine in 2019. An aerial view of seven of the stockpiles is presented in Figure 15-2 (the eighth stockpile is located outside of the ROM pad). Review of survey and grade control data support overall average grades of the stockpiles of 0.22% Ni, 0.10% Cu, and 0.09% Co.



Source: Atlantic Nickel 2023.

Note. Left plan view is at elevation 132.5 m, right plan view is at elevation 92.5 m.

Figure 15-1: Plan View Comparison of Pit Limits



Source: Atlantic Nickel 2023.

Note. Pilha = stockpile.

Figure 15-2: Aerial View of Ore Stockpiles Near the Primary Crushers

Table 15-1: Santa Rita Mineral Reserve Estimate – December 31, 2022
ACG Acquisition Company Limited – Santa Rita Mine

Classification	Tonnage (kt)	NSR Value (US$/t)	Grade						Contained Metal					
			NiS (%)	Cu (%)	Co (%)	Pd (g/t)	Pt (g/t)	Au (g/t)	NiS (kt)	Cu (kt)	Co (kt)	Pd (koz)	Pt (koz)	Au (koz)
Proven	7,980	38.41	0.35	0.12	0.01	0.03	0.07	0.04	28.2	9.4	0.8	7.7	17.7	10.3
Probable	26,862	31.31	0.30	0.11	0.01	0.03	0.06	0.04	80.6	29.5	2.7	25.9	51.8	34.5
Total Proven and Probable	34,842	32.94	0.31	0.11	0.01	0.03	0.06	0.04	108.8	39.0	3.5	33.6	69.5	44.8

Notes:

1. The Competent Person for the Mineral Reserve estimate is Andrew Bradfield, P.Eng., of P&E Mining Consultants Inc. The estimate has an effective date of December 31, 2022.
2. Mineral Reserves are defined within a mine plan and incorporate mining dilution and ore losses that result in a reduction of 1.4% of the tonnage and a 6% reduction in the nickel sulphide (NiS) contained metal with no reduction in other contained metals.
3. Mineral Reserves are based on Measured and Indicated Mineral Resource classifications only.
4. Mineral Reserves are based on metal prices of US$8.15/lb nickel, US$3.50/lb copper, US$25.00/lb cobalt, US$1,375/oz palladium, US$1,100/oz platinum, and US$1,550/oz gold and are constrained within an optimised pit shell and design that uses 39° to 46° overall wall slopes, and process recoveries of 83% nickel, 75% copper, and 38% cobalt with no credit for palladium, platinum, or gold.
5. An NSR cut-off value of $11.04/t is estimated to differentiate ore from waste and is based on cost assumptions of US$5.67/t processing, US$1.96/t site general and administrative, and US$3.41/t sustaining capital costs.
6. Proven Mineral Reserves include stockpiled ore of 0.87 Mt at 0.22% Ni, 0.10% Cu, 0.09% Co, 0.03 g/t Pd, 0.06 g/t Pt and 0.04 g/t Au.
7. The estimate of Mineral Reserves may be materially affected by metal prices, operating costs, process recovery, US$/R$ exchange rate, environmental, permitting, legal, title, taxation, socio-political, marketing, infrastructure development, or other relevant issues.
8. Totals may not sum due to rounding.

15.2 Other Stockpiles

Other historical mineralised material stockpiles exist at the mine site. Two large stockpiles in particular have been surveyed and are estimated to contain approximately 5.7 Mt of material. Atlantic Nickel plans to drill and sample the material to allow a Mineral Resource estimate to be completed.

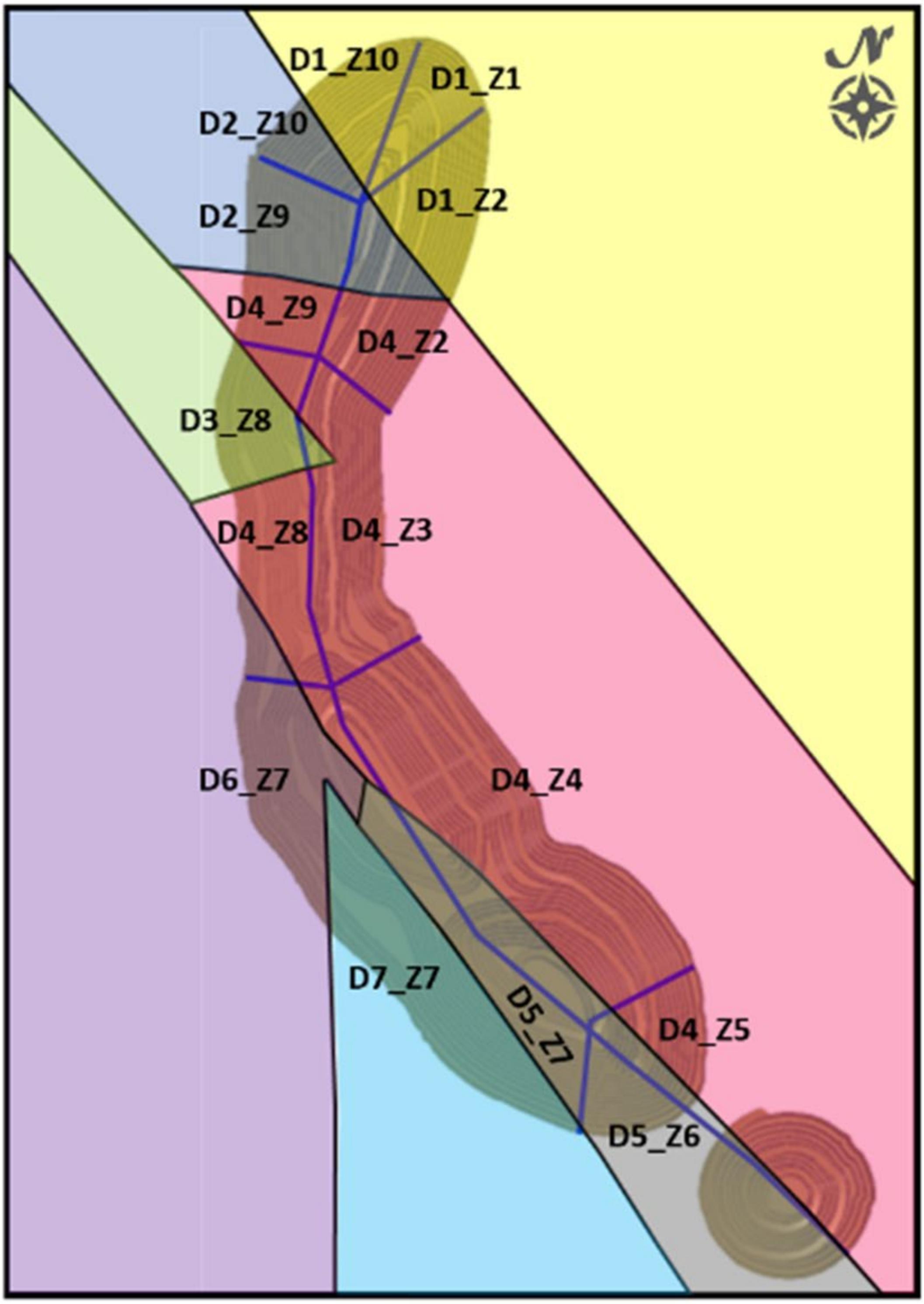
15.3 Geotechnical Studies

A geotechnical pit slope design evaluation was carried out by Stantec (2019) using historical and geotechnical data collected at the time. Appropriate bench face angles (BFA) were determined based on a kinematic evaluation using discontinuity orientations measured from the oriented core, televiewer data, and mapping data from previous studies.

The rock mass model was divided into several geotechnical domains, with similar geological, structural, and material property characteristics. Based primarily on geological structures and pit wall orientations, the final pit was further divided into several sectors for analysis (Figure 15-3).

Bench configurations as well as inter-ramp angles (IRA) and overall slope angles (OSA) were assessed separately for each sector and domain. The pit slopes were evaluated kinematically for bench scale, and used empirical design chart methods for review of the stability of IRA and OSA.

For this level of design, a reliability of 80% (or 20% probability of failure) was considered acceptable for bench-scale failures based on the level of risk that has been used at similar mine projects.



Source: Stantec, 2019.

Figure 15-3: Geotechnical Design Sectors

Results of the pit slope analysis were combined to produce a coherent and complete set of design criteria for a rational final slope profile with allowances for dewatering requirements, safety catch berms, and access. Design recommendations were developed for bench configuration as well as inter-ramp and overall pit slope angles. Pit slope recommendations are summarised in Table 15-2.

Industry conventions recommend that inter-ramp slopes be kept to a maximum height of approximately 100 m to 130 m, with a 25 m to 30 m wide geotechnical "safety berm". For the Santa Rita open pit, the maximum inter-ramp height is 120 m with a geotechnical ramp width of 25 m.

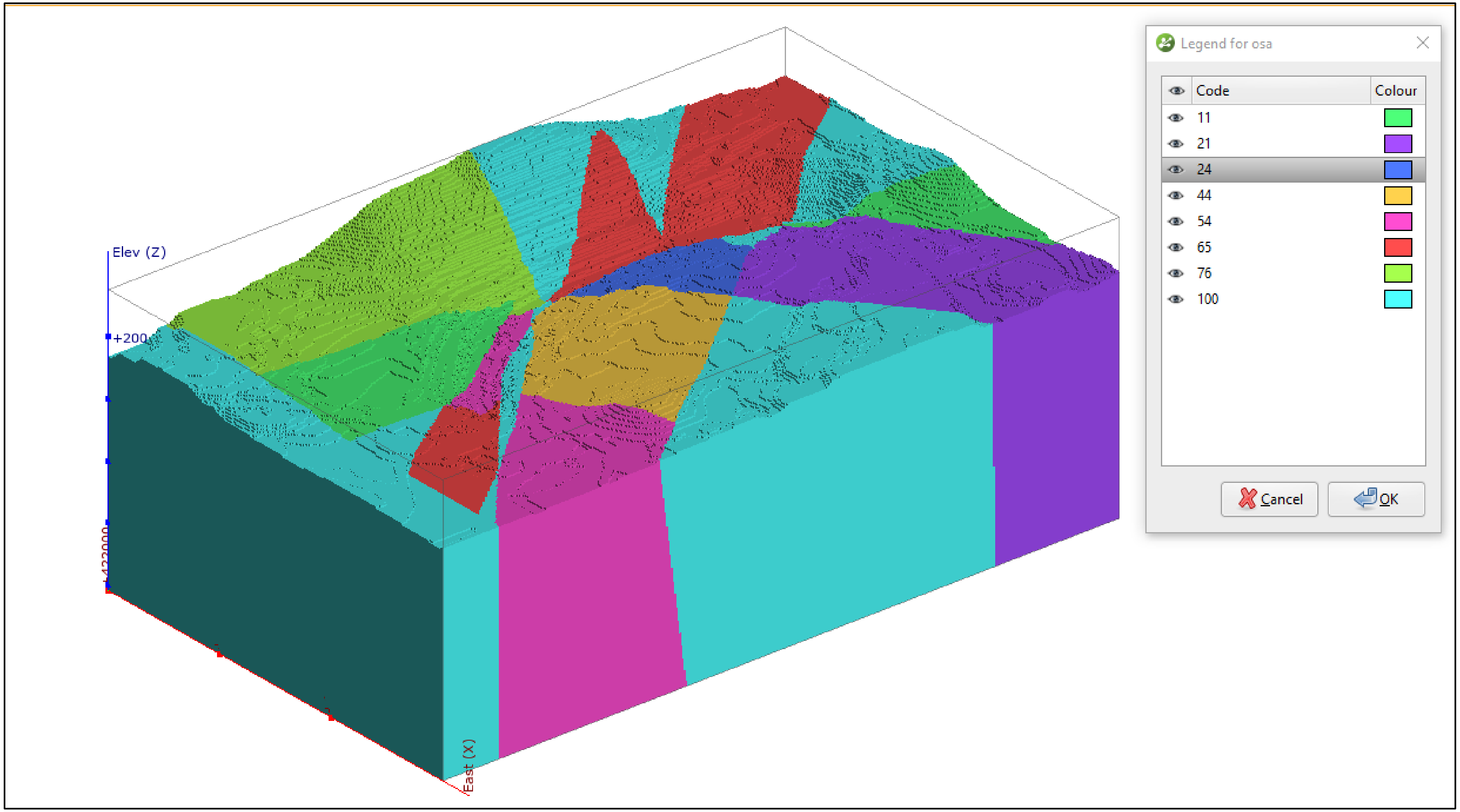
Table 15-3 describes the pit slope criteria used for pit optimisation. Figure 15-4 shows the sector locations. For all pit sectors, the slopes used in the optimisation were adjusted (i.e., slightly flattened) from the geotechnical design inter-ramp slopes to account for the placement of haulage ramps in the final pit wall design.

Table 15-2: Design Pit Slopes by Sector
ACG Acquisition Company Limited – Santa Rita Mine

Sector	Bench Scale			IRA	
	BFA (°)	Berm Width (m)	Berm Height (m)	Crest–Toe (°)	Toe–Toe (°)
Z1-D1	75	6.5	12	52.9	51.0
Z2-D1	75	7.0	12	51.6	49.6
Z2-D4	70	7.3	12	47.7	45.9
Z3-D4	70	7.3	12	47.7	45.9
Z4-D4	75	6.8	12	52.2	50.3
Z5-D4	70	7.0	12	48.4	46.6
Z6-D5	75	5.8	12	55.0	53.1
Z7-D5	70	7.0	12	48.4	46.6
Z7-D6	70	7.8	12	46.5	44.6
Z7-D7	75	6.5	12	52.9	51.0
Z8-D3	75	5.8	12	55.0	53.1
Z8-D4	75	5.8	12	55.0	53.1
Z9-D2	75	5.8	12	55.0	53.1
Z9-D4	75	5.8	12	55.0	53.1
Z10-D2	75	5.8	12	55.0	53.1

Table 15-3: Optimisation Pit Slopes
ACG Acquisition Company Limited – Santa Rita Mine

Sector No.	OSA (°)
76	39
24	40
54	41
21	43
44	44
11	44
65	46
100	44



Source: Atlantic Nickel, 2019

Figure 15-4: Pit Optimisation Slope Sectors

15.4 2021 Pit Optimisation and Design

The 2021 open pit Mineral Reserve was developed in a three-step process.

- A pit optimisation was completed, and a pit shell was selected to be used as the basis for the open pit design.
- An operational open pit design was prepared that incorporates catch benches, detailed wall slopes based on geotechnical assessment, and truck haulage ramps.
- Within this open pit design, the Mineral Reserve tonnage was estimated for those diluted and extractable tonnes that meet or exceed the economic NSR cut-off criteria.

A series of open pit optimisation analyses were completed to help select the optimal open pit. Table 15-4 summarizes the optimisation parameters used. Open pit optimisation was performed using Whittle software on the original block model size of 6 m x 6 m x 6 m. A constraint was applied on the west wall of the pit for safety reasons. For final open pit design selection, an optimisation was completed on a re-blocked model of 12 m x 12 m x 12 m, given that the final pit design considers a bench height of 12 m.

Table 15-4: Open Pit Optimisation Parameters
ACG Acquisition Company Limited – Santa Rita Mine

Area	Item	Unit	Parameter
Metal Price	NiS	US$/lb	6.50
	Cu	US$/lb	3.00
	Co	US$/lb	20.00
Operating Costs	Mining	US$/t material mined	3.00
	Processing & G&A	US$/t processed	8.50
Metallurgical Recovery	NiS	%	83.0
	Cu	%	70.0
	Co	%	29.0
Selling Cost	NiS	US$/lb	1.86
	Cu	US$/lb	0
	Co	US$/lb	0

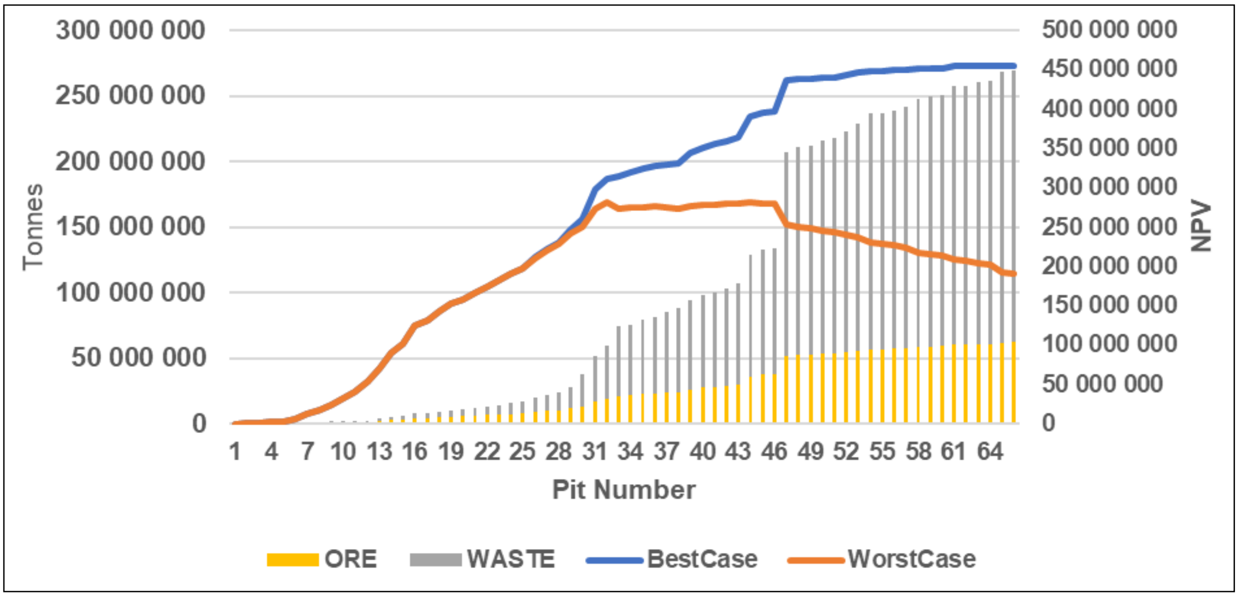
Note: G&A = general and administrative.

15.4.1 Pit Optimisation Results

The pit optimisation analysis examined a series of metal revenue factors, ranging from 31% (Pit 1) to 100% (Pit 66) to assess the sensitivity of the open pit size to metal prices. A revenue factor applies the same percent change to metal price to nickel, copper, and cobalt metals and hence to the entire NSR value varies simultaneously.

The results of the open pit optimisation are presented in a series of graphs that examine the open pit size at different revenue factors. Low revenue factors would represent small open pits that would be economic at low ore tonnage, low metal prices, consisting of either high grades, low stripping ratios, or both. Higher revenue factor pits will be larger in size since higher metal prices can cause marginal Mineral Resources to become economic, thereby expanding the size of the open pit.

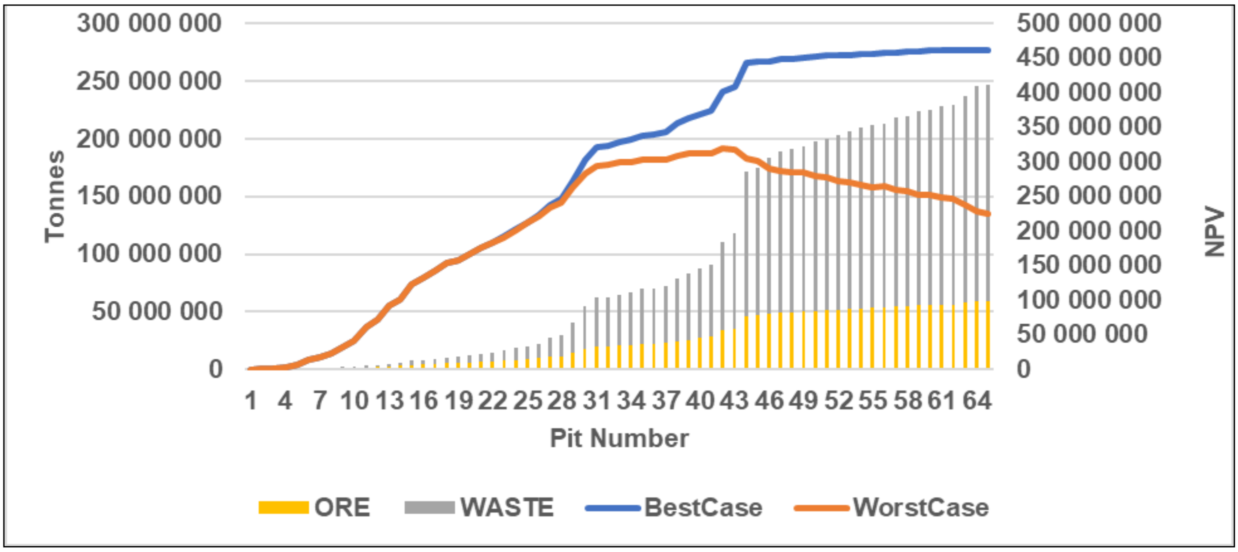
Given the underground potential at Santa Rita, the first step was to introduce an underground process stream in the Whittle open pit optimisation. This evaluation gave a worst-case result of 37.56 Mt at a stripping ratio of 2.57:1 based on Pit 46, and a best-case result of 55.23 Mt at a stripping ratio of 3.13:1 based on Pit 53. The optimal net present value (NPV) of the selected case would likely fall somewhere between these two pit shells (Figure 15-5).



Source: Atlantic Nickel, 2019

Figure 15-5: Initial Open Pit Optimisation Results

The location of the proposed underground stopes was used to exclude these blocks from the Whittle open pit optimisation. This resulted in the pit-by-pit graph shown in Figure 15-6.



Source: Atlantic Nickel, 2019

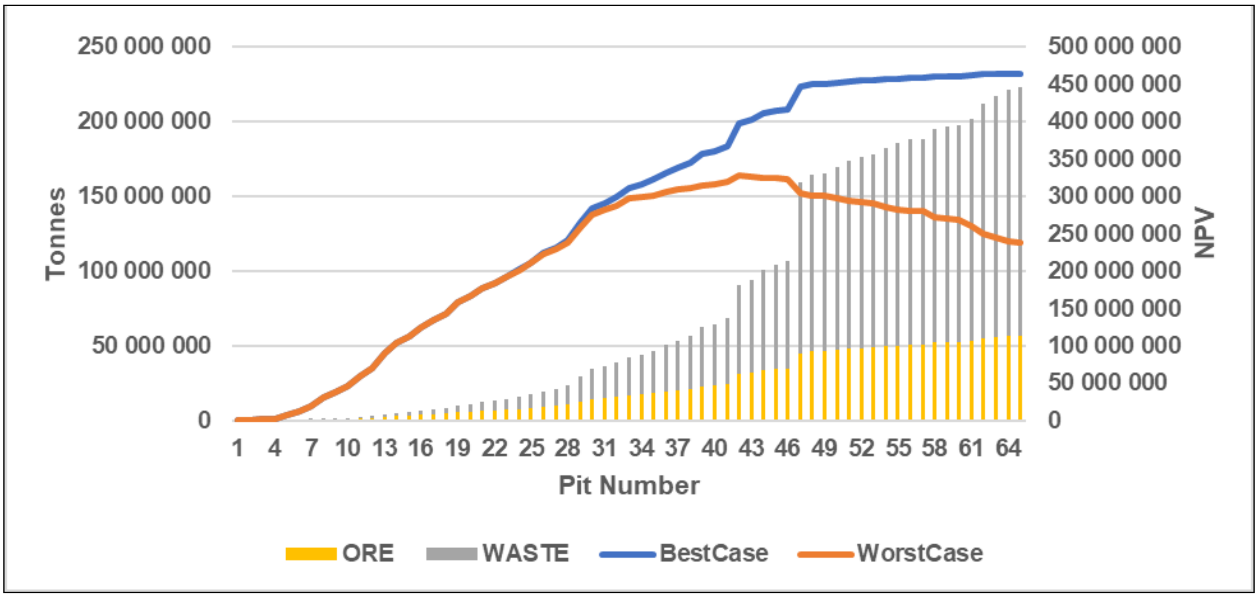
Figure 15-6: Open Pit Optimisation Results Accounting for Underground Stopes

The result gave a range of potential pit limits from Pit 43 to Pit 65, ranging from 35 Mt to 59 Mt. To select the optimal shell, a series of five mine plans and schedules were developed and analysed economically. The plans were based on the phased pit shells shown in Table 15-5. Since the 45 Mt and 50 Mt plans gave similar results, the larger 50 Mt shell was selected for the open pit design to provide flexibility.

Table 15-5: Open Pit Plan Selection
ACG Acquisition Company Limited – Santa Rita Mine

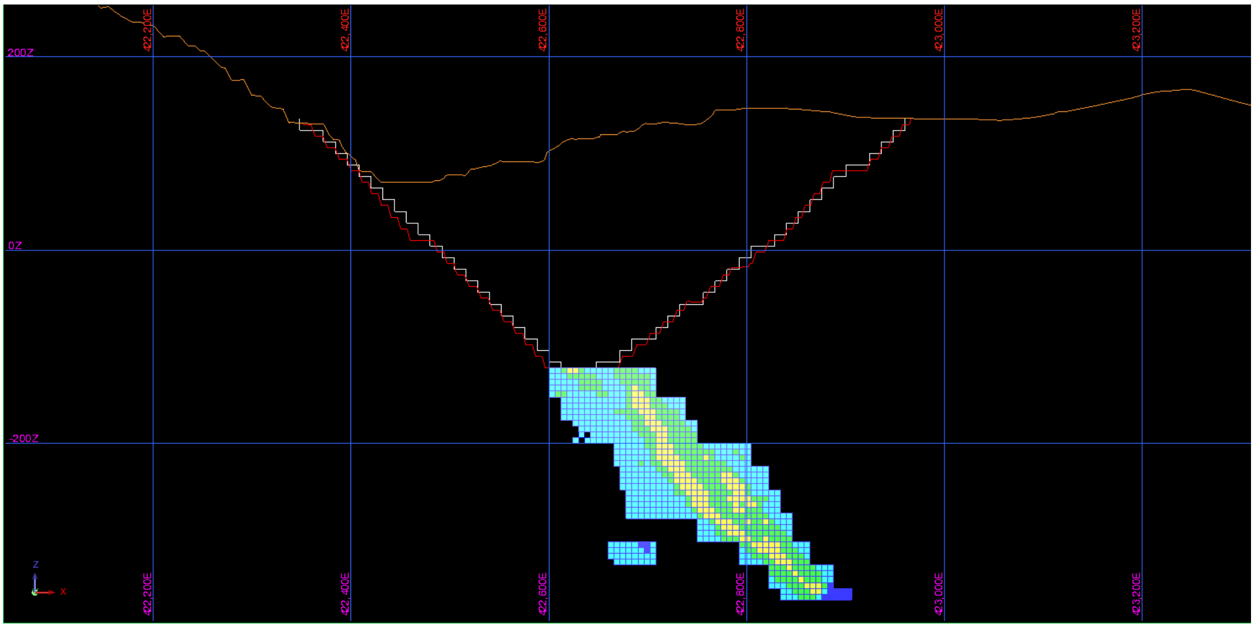
Plan (Mt)	Open Pit Shell Selections
35	21 29 39 43
45	21 29 39 43 45
50	21 29 39 43 50
55	21 29 39 43 45 60
60	21 29 39 43 45 60 65

The block model was then re-blocked into 12 m x 12 m x 12 m blocks and the open pit optimisation was re-run to verify the previous result. The results are shown in Figure 15-7, indicating a very similar optimal open pit shell result, i.e., Pit 55 for that particular run. Both open pit shells are shown on the cross-section in Figure 15-8, confirming their similarity. Pit 55 was selected as the optimal open pit shell for the mine design.



Source: Atlantic Nickel, 2019

Figure 15-7: Open Pit Optimisation Results



Source: Atlantic Nickel, 2019.

Notes: Re-blocks are 12 m x 12 m x 12 m. Section looking north.

Figure 15-8: Cross Section of Open Pit Selected Using Re-blocked Model

15.4.2 Open Pit Design

An operational open pit was designed in 2021 that incorporated catch berms and haulage ramps and applied inter-ramp angles based on a geotechnical analysis.

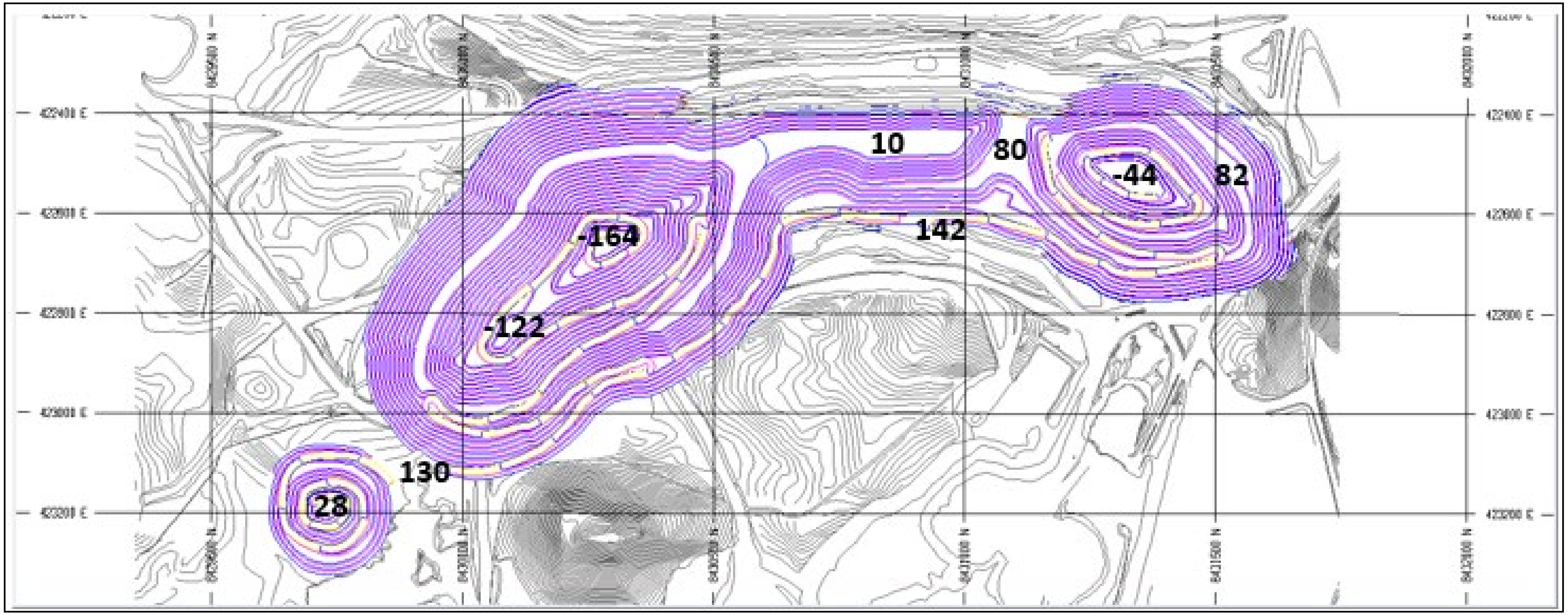
Ramps of 12.5 m width with a 10% gradient were considered for the open pit design to accommodate haul trucks with capacities of 42 t (2.7 m wide). The design included two exit points on the east side of the open pit, reducing the average haulage distance for waste rock and allowing a flexible traffic flow.

The open pit slope specifications are defined by open pit wall sectors, as listed in Table 15-2. In addition, an inter-ramp safety bench of 25 m width each 120 m height was incorporated.

The resulting final open pit design and open pit floor elevations are shown in Figure 15-9.

The final open pit design is 2,160 m long in the north–south direction and 620 m wide in the east–west direction. The deepest bottom elevation is 164 MASL. The highest wall elevation is approximately 470 MASL on the west side. The footprint of the open pit is approximately 80.6 ha.

For scheduling purposes, the final open pit design has been subdivided into 10 phases, however, this phasing does not impact the Mineral Reserve. Pit phases and scheduling are discussed in Section 16 of this CPR.



Source: Atlantic Nickel, 2021.

Note: Elevations, in metres above sea level, shown in bold font. Looking West. North is to the right.

Figure 15-9: 2021 Final Open Pit Design

15.4.3 Dilution and Ore Loss

In order to estimate the process plant feed tonnage and grade, mining dilution and mining ore loss factors need to be applied to the in-situ tonnage to be mined.

The amount of open pit dilution that occurs during mining will be dependent on the mineable width of the mineralised domains and the approach used to define the ore/waste digging limits.

In addition to the internal dilution inherent in the Mineral Resource block modelling process, a block edge unplanned dilution approach was applied to the block model. This approach generated the diluted variables for the mineral grades as well as a diluted bulk density.

Unplanned dilution can occur due to sampling errors, mixing during blasting, overbreak of ore/waste contacts during mining thin zones, and delivery of waste and ore to the incorrect locations.

The block edge dilution applied represents 1.05 m transferred with the neighbouring block for each side of a 6 m x 6 m by 6 m block. The transfer was 0.25 m vertically to upper and lower blocks. The cut-off grade is then applied to the diluted blocks. The amount of ore loss will be the same as the amount of dilution added in order to balance the volume in a block.

This dilution methodology resulted in a reduction of 1.4% of the Measured and Indicated in-pit Mineral Resource tonnage and a 6% reduction in the nickel sulphide contained metal with no reduction in copper and cobalt contained metal.

15.4.4 2021 Cut-off Value Basis

The economic cut-off value used is an NSR value that is populated in the diluted block model. An analysis was undertaken to determine the break-even cut-off value for defining ore and waste. The marginal cut-off value is the minimum NSR value required to pay for the cost of processing the material and G&A.

An overall marginal cut-off NSR of US$8.91/t was calculated based on the following costs:

- Processing cost: US$ 5.17/t
- Royalties: US$ 1.71/t
- Site G&A: US$ 1.41/t
- Corporate G&A: US$ 0.62/t

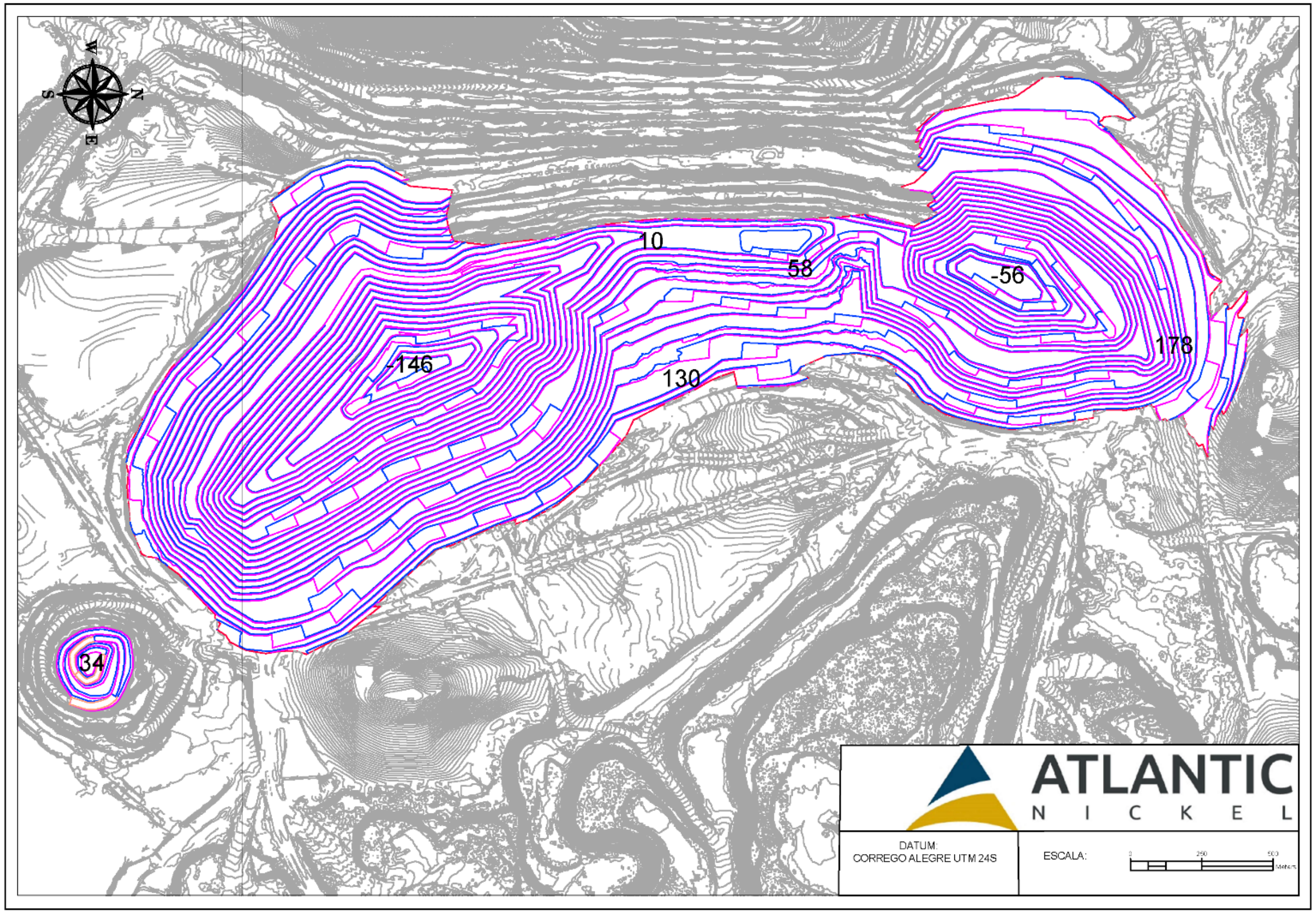
15.5 2023 Open Pit Design and NSR Cut-off Value Basis

15.5.1 2023 Open Pit Design

The 2023 open pit design was subsequently modified for three reasons:

- Underground mining studies indicated that the best location for a portal location is on an upper bench in the northwest corner of the open pit, close to surface, in Phase 8 north. The revision was made in late 2021.
- Failure of a segment of the open pit wall in the central portion of the east side in November 2021 resulted in a modification to Phase 10 centre in late 2021.
- Failure of a segment of the open pit wall in the central portion of the east side in August 2022 resulted in a modification to Phase 10N centre in late 2022.

These revisions can be seen in the 2023 open pit design presented in Figure 15-10.



Source: Atlantic Nickel, 2023.

Note: Elevations are indicated in metres above sea level.

Figure 15-10: 2023 Final Open Pit Design

15.5.2 2023 NSR Cut-off Value Basis

The parameters used for 2023 open pit optimisations are presented in Table 15-6. It was determined that a revenue factor of 0.96 closely matched the final open pit design, and an NSR cut-off value of US$11.04/t was accepted as a reasonable basis to determine Mineral Reserves. The average NSR value of the ore in the 0.96 revenue factor open pit shell was US$32.78/t which reconciles well with the average NSR value of US$32.94/t in Table 15-1.

Table 15-6: 2023 Pit Optimisation Parameters
ACG Acquisition Company Limited – Santa Rita Mine

Parameter	Value	Units	Notes
Mining Cost	2.51	US$/t mined	
Processing Cost	5.67	US$/t ore processed	
Sustaining Capex	3.41	US$/t ore processed	
G&A Cost	1.96	US$/t ore processed	
Process Cost & G&A	11.04	US$/t ore processed	Used for NSR cut-off value, Mineral Reserves, in-situ value calculation, and open pit limit design
Process Plant Recovery (%)			
Ni 83.2, Cu 75.0, Co 38.0			
Metal Prices (US$)			
Ni 8.15/lb, Cu 3.50/lb, Co 25.0/lb, Au 1,550/oz, Pt 1,100/oz, Pd 1,375/oz			
Royalties			
NSR	5.75	%	Government, landowners and Appian
Gross Revenue	2.51	%	
Concentrate Parameters and Costs			
Concentrate Grades			
Ni 13.5%, Cu 4.5%, Co 0.25%, Au 1.03 g/t, Pt 2.26 g/t, Pd 1.67 g/t			
Cu Concentrate Moisture	8.0	%	
Concentrate Transport Cost	134.3	US$/wmt	
Smelting Cost	217.5	US$/dmt	
Smelter Payable (%)			
Ni 91.0, Cu 80.0, Co 35.0, Au 65.0%, Pt 70.0, Pd 70.0			
MgO Penalty	20.0	US$/dmt	
Refining Charges (US$)			
Ni 1.16/lb, Cu 0.45/lb, Co 3.50/lb, Au 45/oz, Pt 45/oz, Pd 45/oz			

15.6 CP Comments on "Item 15: Mineral Reserve Estimates"

The estimate of Mineral Reserves may be materially affected by metal prices, US$/R$ exchange rate, environmental, permitting, legal, title, taxation, socio-political, marketing, infrastructure development, or other relevant issues. Any one of the preceding items has the potential to render the Mineral Reserves uneconomic. However, there is a low risk that the Mineral Reserve estimate could be materially affected by mining, metallurgical, infrastructure, permitting, and other relevant factors, since the mine is currently in production, has an operating history, and recommenced shipping concentrates at the beginning of 2020.

16.0 MINING METHODS

16.1 Introduction

The Santa Rita open pit mining operation mainly encompasses a single large open pit that is mined with conventional mining equipment. The open pit was planned to be completed in 10 phases, of which six phases remain as of December 31, 2022. A small satellite open pit located to the southeast of the main open pit has also been mined. The primary crusher area is located to the north of the open pit and the main waste rock storage facility (WRSF) is on the east side (Figure 16-1).

The basis for the Santa Rita production plan is the Measured and Indicated Mineral Resources contained in the updated Mineral Resource model.

16.2 Geotechnical Considerations

The geotechnical mine design criteria are described in Section 15.3. Slope stability is an essential part of mine safety and sustainability of the mining operation.

Daily inspections of the open pit mine are undertaken to verify the stability conditions. Bench inspections and clean-up are some of these activities. In addition, mine drainage and piezometer monitoring are undertaken.

Further to the visual slope inspections, Atlantic Nickel uses ground radar SSR FX™, SSR XT™ and GMS Robotic™ units to monitor pit slope movement in real time. These systems constantly monitor surface displacements and rock falls for geotechnical risk management. Both the GMS Robotic™ and radar units operate as stand-alone equipment and connect directly with the main office. Specialised software receives all monitoring data to verify if any displacement occurs, and then alerts mine operations. Radar monitoring is conducted 24/7 in a remote monitoring room.

Failure of a wedge-shaped segment of the open pit wall in the central portion of the east side in November 2021 resulted in a modification to the Phase 10 centre open pit design in late 2021. Material between the 70 m and 130 m levels, with a width of approximately 200 m, was vertically displaced by approximately 1.5 m. The modified open pit design resulted in 2.6 Mt mined outside the previously defined pit limit. There were no accidents associated with the displacement, and the displaced material was mined-out over a period of approximately eight months. No new movement in the area has been detected by radar or visual inspections.

Failure of a 200 kt segment of the open pit wall in the central portion of the east side in August 2022 resulted in a modification to the Phase 10N centre design in late 2022. The deformation had been identified 30 days earlier by the radar system. Santa Rita's geotechnical engineers followed the evolution of the accumulated displacement and rate of deformation. Inspections, monitoring, and communication between mining teams were intensified while continuous analysis was conducted to predict the time of the displacement. The area was isolated, and the event occurred as predicted by inverse velocity methodology, without injury or equipment damage.

Risks are continuously being mitigated through 24/7 monitoring of three ground radar systems covering the open pit area, more than 40 prisms deployed in the pit monitored by high precision total robotic stations, automated piezometric monitoring, automated in-situ monitoring (inclinometers and time domain reflectometry), continuous mapping of the faults and structures, a geotechnical drilling campaign, additional slope stability studies, and updates of the geotechnical model and dewatering/depressurization program.

A photograph of the existing open pit is shown in Figure 16-2.

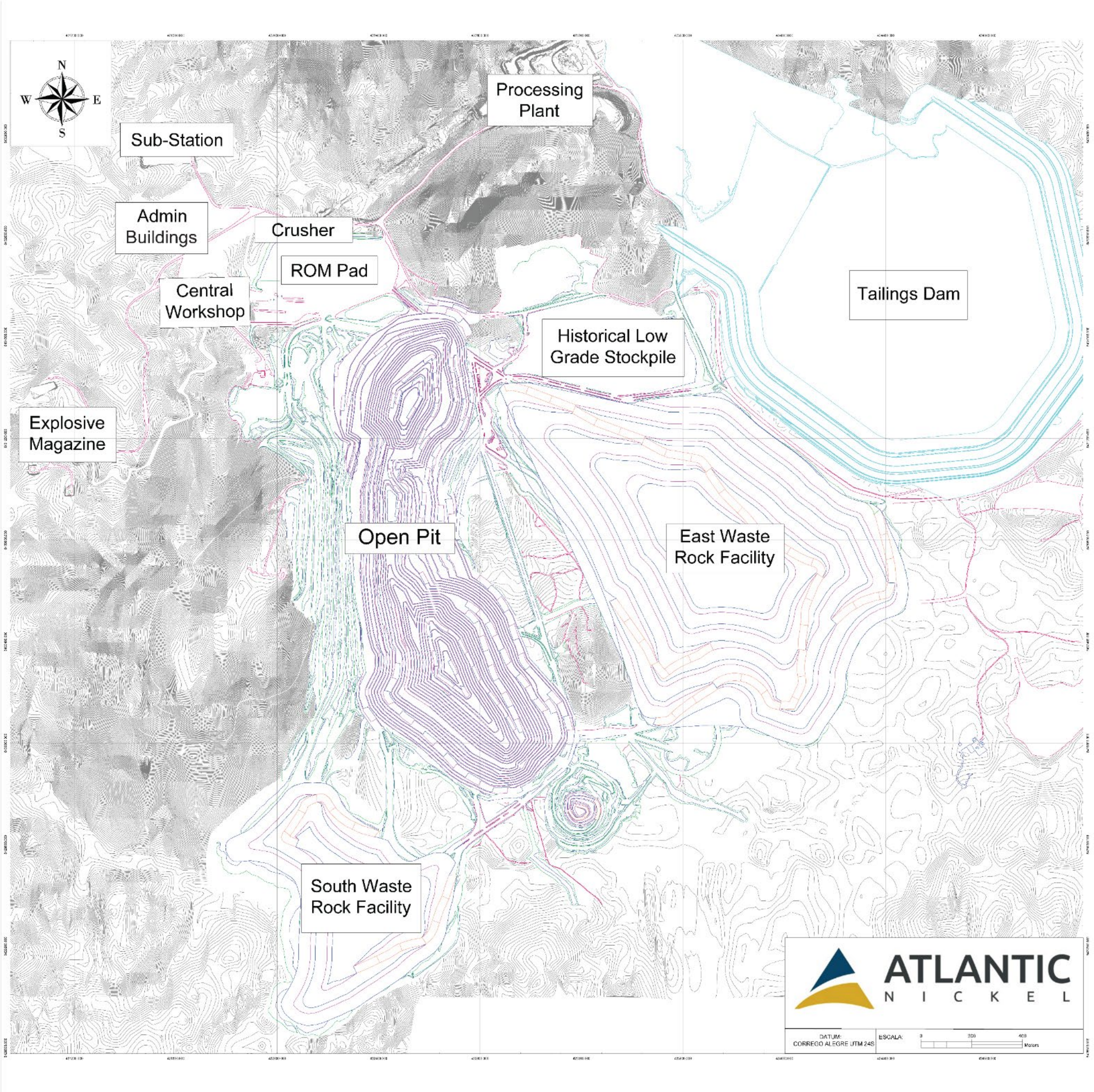
16.3 Pit Design and Mining Phases

The design aspects of the Santa Rita open pit are described in Section 15. The final open pit was subdivided into 10 phases for production scheduling purposes which allows waste stripping quantities to be distributed over time. This also helps avoid large fluctuations in both annual total mined tonnages and mine equipment requirements.

A plan view of the open pit phase locations is shown in Figure 16-3. Mining may occur simultaneously in multiple phases in order to meet the waste stripping and process plant ore delivery targets.

16.4 Production Schedules

Production schedules have been developed for mining operations and mineral processing. The schedules define the annual tonnages of ore and waste movement requirements. Ore stockpiles are used to normalize ore feed rate and grade to the processing plant.



Source: Atlantic Nickel, 2023.

Figure 16-1: General Open Pit Mine Layout

Source: Photograph by Atlantic Nickel, 2023.

Figure 16-2 Existing Open Pit Wall, Looking South

Source: Atlantic Nickel, 2023.

Figure 16-3: Remaining Open Pit Phases

The mining phases are incorporated into a yearly production plan, targeting a production feed rate of 6.5 Mt/a to the process plant. A stockpiling strategy is used, designed to optimize the throughput rate and metal recovery.

Four ore type stockpiles are defined based on NSR cut-off values, lithology type (based on MgO grade), and head grade ranges (high-grade and low-grade based on NiS%). Ore types include lithologies based on MgO% (peridotite >29% MgO and pyroxenite <29% MgO). The high-grade versus low-grade boundary is approximately 0.35% NiS.

The open pit remaining mine life is approximately six years, ending in 2028.

The mine and process plant production schedules are shown in Table 16-1.

Table 16-1: Open Pit Production Schedule
ACG Acquisition Company Limited – Santa Rita Mine

Mine Plan	Unit	2023	2024	2025	2026	2027	2028	Total
Ore mined	kt	6,602	5,660	7,349	7,023	7,340	0	33,973
Waste rock mined	kt	27,518	25,625	22,438	14,660	4,493	0	94,734
Stripping ratio	W:O	4.17	4.53	3.05	2.09	0.61	0	2.79
Total material mined	kt	34,120	31,285	29,787	21,683	11,833	0	128,707
Stockpile movement[1]	kt	2	(840)	982	523	840	(2,376)	0
Process plant feed	kt	6,600	6,500	6,367	6,500	6,500	2,376	34,842
NiS grade	%	0.27	0.28	0.30	0.32	0.34%	0.32	0.31
Cu grade	%	0.10	0.10	0.11	0.11	0.13	0.12	0.11
Co grade	%	0.01	0.02	0.01	0.01	0.01	0.01	0.01
Pd grade	g/t	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Pt grade	g/t	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Au grade	g/t	0.04	0.04	0.04	0.04	0.04	0.04	0.04

Note:

1. Ore stockpile as of December 31, 2022 is estimated at 869 kt.

16.5 Open Pit Mining

16.5.1 Introduction

Mining operations use standard open pit methods with drilling, blasting, loading, and hauling. Bench heights are 6 m in ore and 12 m in waste. Mining is contracted to two mining contractors until Q2 2023 at which time the mine will transition to Owner operated. The transition will be completed by the end of 2024.

Production drilling by the contractor is done using Furukawa 1,500 drills with 4.5 in. diameter bits in ore and waste rock. For the switch to Owner fleet, the equipment will change to Sandvik DX 800 for ore and Sandvik DP1500i for waste rock. The drill pattern varies in ore and waste. Smaller drills are used for pre-splitting and open pit wall control.

There are a range of backhoe excavator sizes and types operating at the mine; 70 t excavators with 4.0 m^3 buckets are primarily used in waste rock and 50 t excavators with 3.0 m^3 buckets are used in ore at the open pit phase bottoms to improve selectivity due to restricted working conditions. The mine uses 35 t to 40 t haul trucks.

In order to improve ore recovery at the open pit bottom, the bottom benches will be developed with 25 m wide, 12% ramps. Although blasting will be done in 6 m high benches, loading will be done using 4 m slices to take blast swelling into account.

The equipment production capacities are summarised in Table 16-2.

Table 16-2: Equipment Production Productivity
ACG Acquisition Company Limited – Santa Rita Mine

Rate/Productivity Assumption	Units	Amount
Blast hole drilling	metres/day/drill	161
Haulage truck productivity	tonnes/day/truck	1,194
Excavator loading productivity	tonnes/day/backhoe	7,640

16.5.2 Drilling and Blasting

The production drills use 114.3 mm (4.5 in.) diameter drill holes and the drill pattern depends on the material type.

Ore is typically drilled at a pattern of 2.8 m x 3.2 m with 0.5 m sub-drill. Waste rock is usually drilled at a pattern of 3.1 m by 3.6 m, with 0.7 m sub-drill. Typical blast pattern parameters are shown in Table 16-3 and explosive supplies are presented in Table 16-4.

Table 16-3: Blast Pattern Parameters
ACG Acquisition Company Limited – Santa Rita Mine

Rock	Units	Ore	Waste
Crest burden	m	1.40	1.70
Burden (B)	m	2.80	3.09
Spacing (S)	m	3.20	3.56
Hole diameter Ø	in.	4.50	4.50
Stem height	m	1.60	2.50
Sub-drilling (SD)	m	0.50	0.70
Bench height (BH)	m	6.00	12.00
Hole length	m	6.50	12.70
Bench face angle	°	65-75	50-70
Explosive column height (C)	m	4.50	10.70

Table 16-4: Explosives Supplies
ACG Acquisition Company Limited – Santa Rita Mine

Explosives	Units	Type
Booster	g	450
Cartridge	ea	2 1/4 x 24 inch
Cartridge	ea	1 1/4 x 24 inch
Bulk emulsion	kg	1.10 to 1.15 g/cm^3
Electronic detonator	ea	Daveytronic
Detonator	ms	400 ms
Detonating cord	g/m	NP10

16.5.3 Loading and Hauling

The open pit production plan objective is to supply the process plant at 6.5 Mt/a ore. Table 16-5 shows required open pit equipment fleet over the life of mine, and Figure 16-4 shows typical mining equipment in operation.

The 70 t hydraulic excavators are used for waste rock loading, and the 50 t hydraulic excavators are used for ore loading. Wheel front-end loaders are used for miscellaneous clean-up jobs and as backups to the excavators.

A peak fleet of 80 haul trucks with capacities of 36 t and 48 t will be used to transport material to either the WRSFs or to the primary crusher and ore stockpiles. Cycle times for haulage calculations have been determined for each mining period using Fast2Mine™ software.

Mine equipment is assumed to operate 20 hours per day, and approximately 6,000 hours per year. Twenty days per year of production loss are assumed due to weather-related disruption such as heavy rainfall and fog.

The assumed availability is 90% for excavators and 85% for haul trucks and drills, while the estimated utilisation is 88% for excavators, 88% for haul trucks, and 70% for drills.

Table 16-5: Open Pit Mining Equipment Fleet
ACG Acquisition Company Limited – Santa Rita Mine

Area	Equipment	Model	Capacity	2023	2024	2025	2026	2027	2028
Loading	Hydraulic excavator	Komatsu PC 350	35 t	1	1	1	1	1	
	Hydraulic excavator	Komatsu PC 500	50 t	2	5	5	5	2	
	Hydraulic excavator	Komatsu PC 800	70 t	5	10	9	6	2	
Hauling	Truck	Mercedes Benz AROCS 4851K/45	48 t	18	37	37	32	9	
	Truck	Volvo FMX 500 8x4	36 t	20	43	43	39	16	4
Drilling	Drill	Sandvik DX 800	4.5"	2	2	2	2	2	
	Drill	Sandvik DP 1500i	4.5"	7	14	14	11	8	
Mine Infrastructure	Bulldozer	Komatsu D155AX-8	40 t	3	3	2	1	0	
	Bulldozer	Komatsu D85EX-15EO	28 t	0	4	3	3	2	
	Bulldozer	Komatsu D61EX-23MO	20 t	3	3	3	3	3	1
	Motor grader	Komatsu GD655-5	16 t	1	3	3	2	2	
	Hydraulic excavator	Komatsu PC350	35 t	2	7	7	7	7	2

Area	Equipment	Model	Capacity	2023	2024	2025	2026	2027	2028
	Hydraulic breaker	Epiroc HB 3100	3.1 t	0	4	4	4	4	
	Wheel Loader	Komatsu WA380-6	18 t	2	2	2	2	2	1
	Water truck	Volvo VM270	20,000 L	2	5	5	4	3	
	Truck tractor	Volvo FH460	70 t	1	2	2	2	2	

Source: Photograph by Atlantic Nickel, 2019.

Figure 16-4: Open Pit Mining Equipment

16.5.4 Auxiliary Pit Services and Support Equipment

The primary mining operations are supported by a fleet of equipment consisting of bulldozers with ripper attachments, graders, water trucks, fuel trucks, maintenance vehicles, and service vehicles. A list of major and support equipment for auxiliary services is provided in Table 16-6.

Table 16-6: Auxiliary Services Equipment Fleet
ACG Acquisition Company Limited – Santa Rita Mine

	Equipment	Model	Capacity	2023	2024	2025	2026	2027	2028
Mine infrastructure	Munck truck	Volvo VM270	12 t	1	2	2	2	2	
	Oiler truck conveyor	Volvo VM270	10,000 L	3	4	4	4	3	1
	Lighting tower	MTower	450 Lm/W	9	15	15	10	5	
Facilities (plant, TSF, roads)	Wheel loader	Komatsu WA 380	23 t	1	1	1	1	1	1
	Hydraulic excavators	Komatsu PC210LC	21 t	1	1	1	1	1	1
	Backhoe loaders	BobCat B760	8 t	2	3	3	3	3	2
	Motor grader	Komatsu GD655-5	16 t	1	1	1	1	1	1
	Water truck	Volvo VM270	20,000 L	1	1	1	1	1	1
	Trucks 8 x 4	Volvo FMX500	36 t	2	2	2	2	2	2
	Fork-lift	Clark C70L/D	7 t	1	1	1	1	1	1
	Road roller	Dynapac CA25D	11 t	1	1	1	1	1	1
	Skid steer loaders	BobCat S570	2.9 t	1	1	1	1	1	1
	Hydraulic excavator long reach	Komatsu PC350LC	35 t	1	1	1	1	1	1
	Dump truck	Volvo 270	25 t	3	3	3	3	3	3
	Wheel loader	Komatsu WA320	15 t	1	1	1	1	1	1

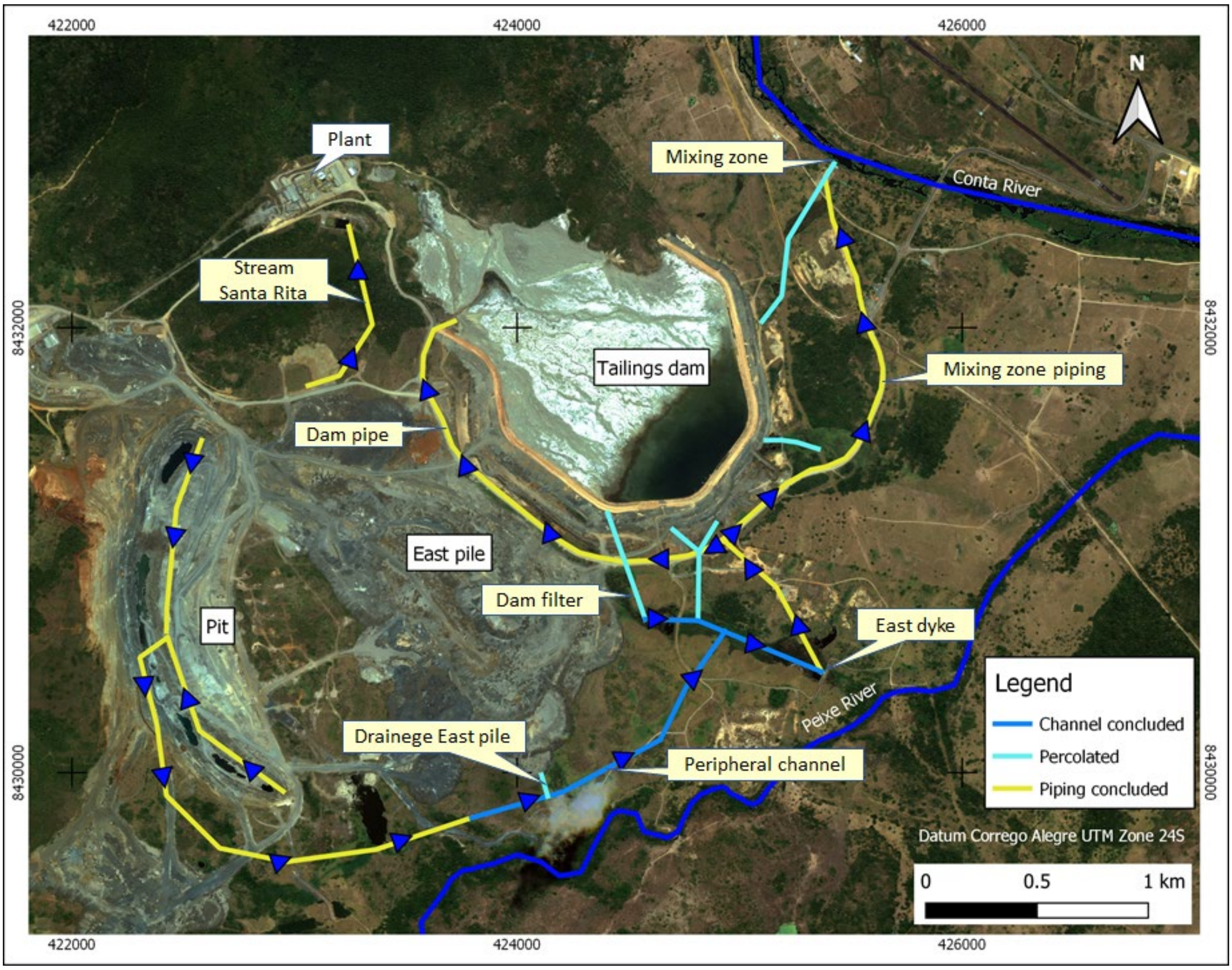
16.5.5 Grade Control

Grade control uses drill cutting samples collected from blast holes. Dig plan polygons are prepared by the Mine Planning group.

The Geology Department oversees the blast hole sampling, and every week the geologists prepare a dig plan for each polygon. This plan is the basis for the detailed extraction program, which determines the polygon mining sequence, the material destination, and allows forecasting of the daily ore grade and tonnage.

16.5.6 Pit Dewatering

Open pit dewatering consists of in-pit pumping systems. The majority of the groundwater and surface run-off flows to the open pit bottom. The open pit area intersects a north–south-trending fault system, which acts as a water conduit to the open pit. A combination of run-off from areas up-gradient of the open pit, precipitation falling within the open pit, and groundwater inflows accounts for the total volume of water to be handled by the dewatering system. Water is collected at the bottom of each open pit phase in sumps, pumped to the open pit rim, and subsequently channelled to the East dike (Figure 16-5).



Source: Atlantic Nickel, 2019.

Figure 16-5: Surface Water Drainage Plan

A contractor was hired in 2020 to install pumps in each open pit area designed to pump water flow to the surface using generator power. The pumping system is equipped with four pumps, three with a capacity of 300 m^3/hr and one of 400 m^3/hr. A drainage area update is under review to assess surface water management measures. Consulting firm FloSolutions SAC (FloSolutions) is assisting Atlantic Nickel in this regard.

16.5.7 Owner's Mine Technical Services

The Owner's mining team provides support and technical services (see Section 16.6). Specifically, the Owner's team undertakes the following activities:

- Mineral Resource estimation;
- Mine planning;
- Grade control;
- Grade and tonnage reconciliation;

- Survey control;
- Geotechnical evaluation and monitoring;
- Infill grade drilling and geochemical analysis;
- Mid-term and short term geometallurgy programs;
- Open pit dewatering system.

16.6 Support Facilities

The mine support facilities are described in Section 18 (Infrastructure) and consist of the following:

- A truck maintenance shop housing four bays and other facilities;
- A truck wash building;
- An emergency vehicle storage and warehouse building;
- Mine supervision and technical office building;
- An explosive storage area for blasting agents and blasting supplies;
- A fuelling station;
- A laydown area for spare tires, buckets, and large components.

16.7 Mining Manpower

The mining manpower consists of mine supervision and technical support as well as mine operators and shift supervision. Table 16-7 lists the mining manpower requirements.

Table 16-7: Mining Manpower Requirements
ACG Acquisition Company Limited – Santa Rita Mine

Item	With Contractor January 1, 2023	Owner-Operated December 2023	Owner-Operated December 2024
Owner	94	563	1,410
Contractor	1,607	902	55
Total	1,701	1,465	1,465

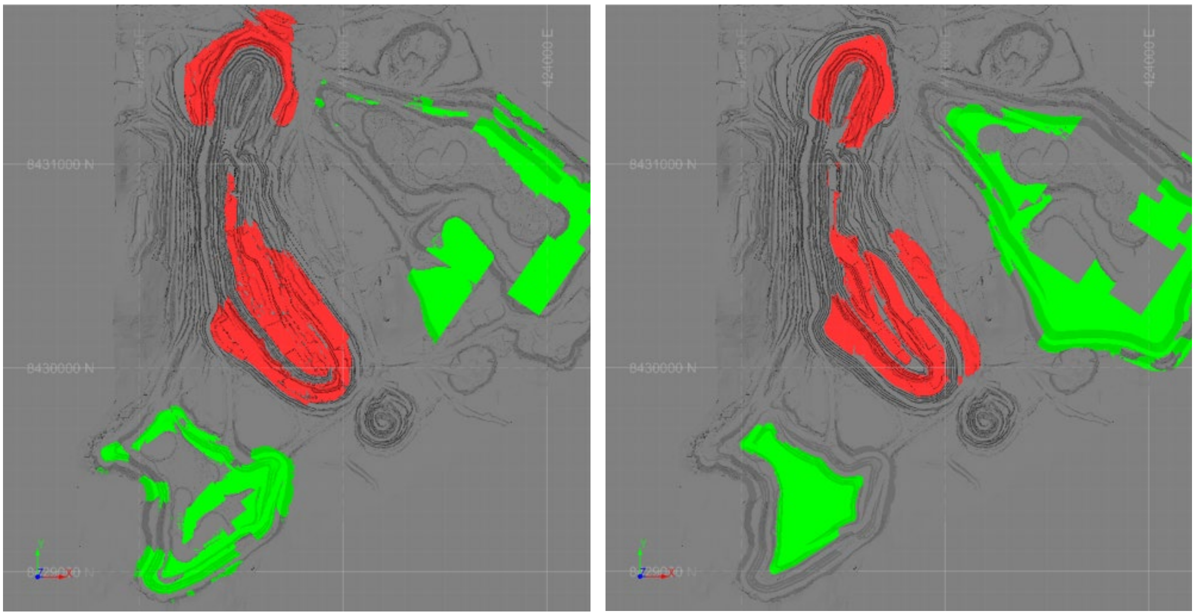
The office and technical support staff generally work five days per week with weekends off. Grade control technicians work on a four-day cycle to provide daily coverage at the mine.

The mine operators work eight-hour day and night shifts on a four-day work cycle, consisting of 23 days on and seven days off.

Office staffing levels will remain fixed each year, however, the equipment operator requirements will fluctuate with production targets and productivity changes.

16.8 Mine Plans

Annual open pit mine plans are presented in Figure 16-6 to Figure 16-8. In these figures, mining operations are shown in red and waste rock placement locations are shown in green.

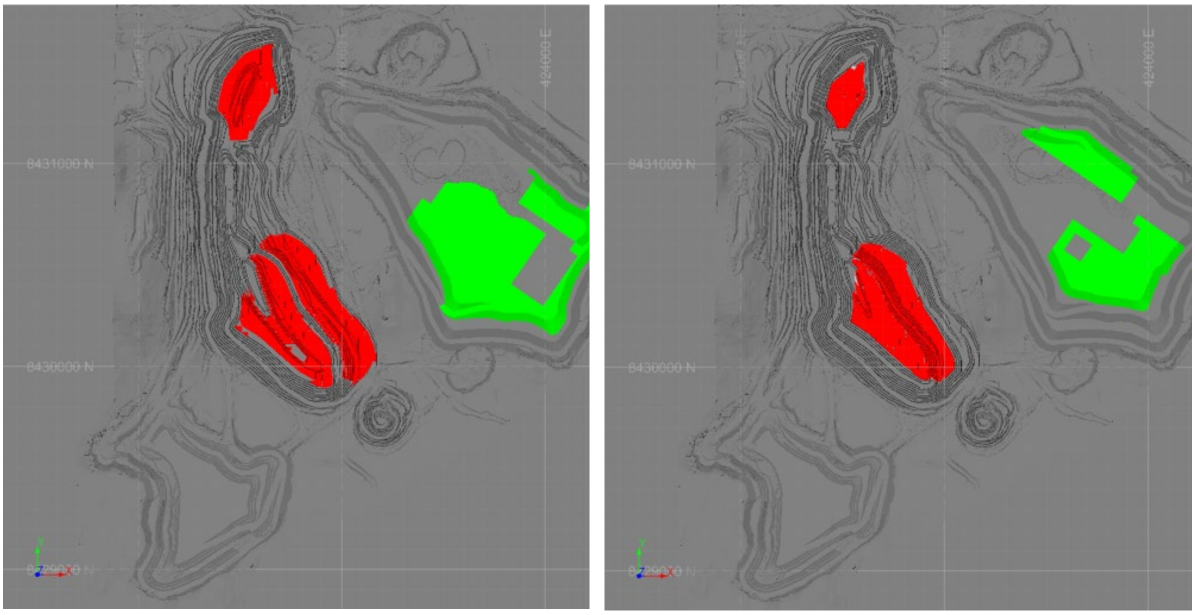


Source: Atlantic Nickel, 2023.

Notes:

1. Mining operations are shown in red and waste rock placement locations are shown in green.
2. Figure north is to top of page.
3. 2023 is on left, 2024 is on right.

Figure 16-6: Open Pit Mine Plans for Years 2023 and 2024

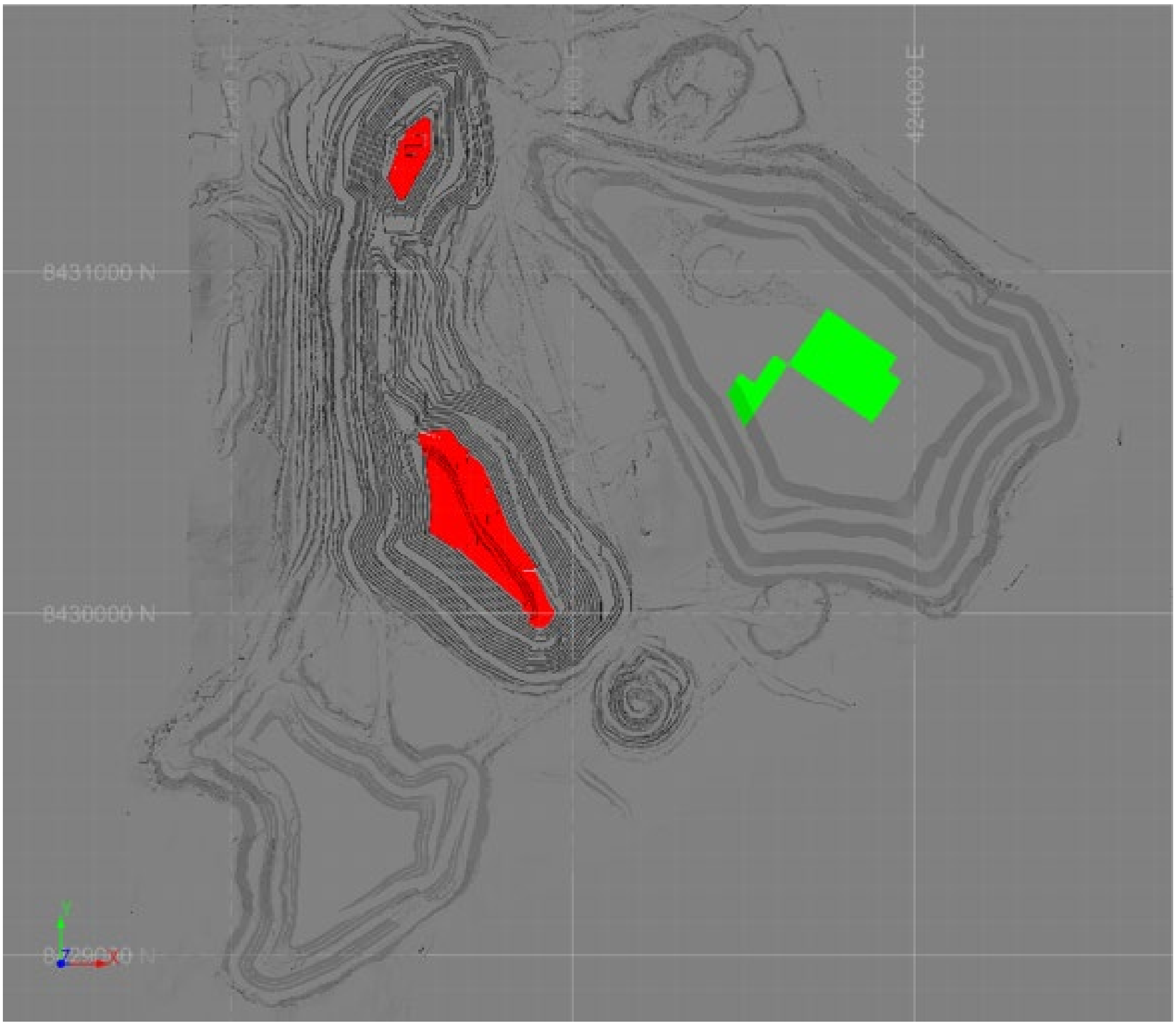


Source: Atlantic Nickel, 2023.

Notes:

1. Mining operations are shown in red and waste rock placement locations are shown in green.
2. Figure north is to top of page.
3. 2025 is on left, 2026 is on right.

Figure 16-7: Open Pit Mine Plans for Years 2025 and 2026



Source: Atlantic Nickel, 2023.

Notes:

1. Mining operations are shown in red and waste rock placement locations are shown in green.
2. Figure north is to top of page.

Figure 16-8: Open Pit Mine Plan for Year 2027

16.9 CP Comments on "Item 16: Mining Methods"

The Santa Rita open pit mining operations were re-started in August 2019 and have been in production since. The mine has gained experience and efficiency. The open pit mine plan is based on contractor mining with transition to Atlantic Nickel Owner-operated mining beginning in Q2 2023. Atlantic Nickel plans to have all its equipment, personnel, and facilities in place by the end of 2024. The CP is not aware of any issues that could materially impact open pit mine production at Santa Rita.

17.0 RECOVERY METHODS

17.1 Introduction

Information in this sub-section is obtained from RPA (2015), operating results from 2012 to 2016 and from January 2020 to December 2022, information gathered by the CP during a site visit on July 23 to 24, 2019, information provided by Atlantic Nickel for this 2022 update, and direct communication with Santa Rita staff.

The Santa Rita process plant consists of crushing, grinding, flotation, thickening. and filtration unit operations to produce a saleable nickel concentrate. Flotation tailings are pumped to a tailings storage facility. Figure 17-1 shows the current flowsheet.

Payable metals such as platinum, palladium, and gold are also contained in the concentrate along with nickel, copper, and cobalt. The majority of revenue is generated by nickel.

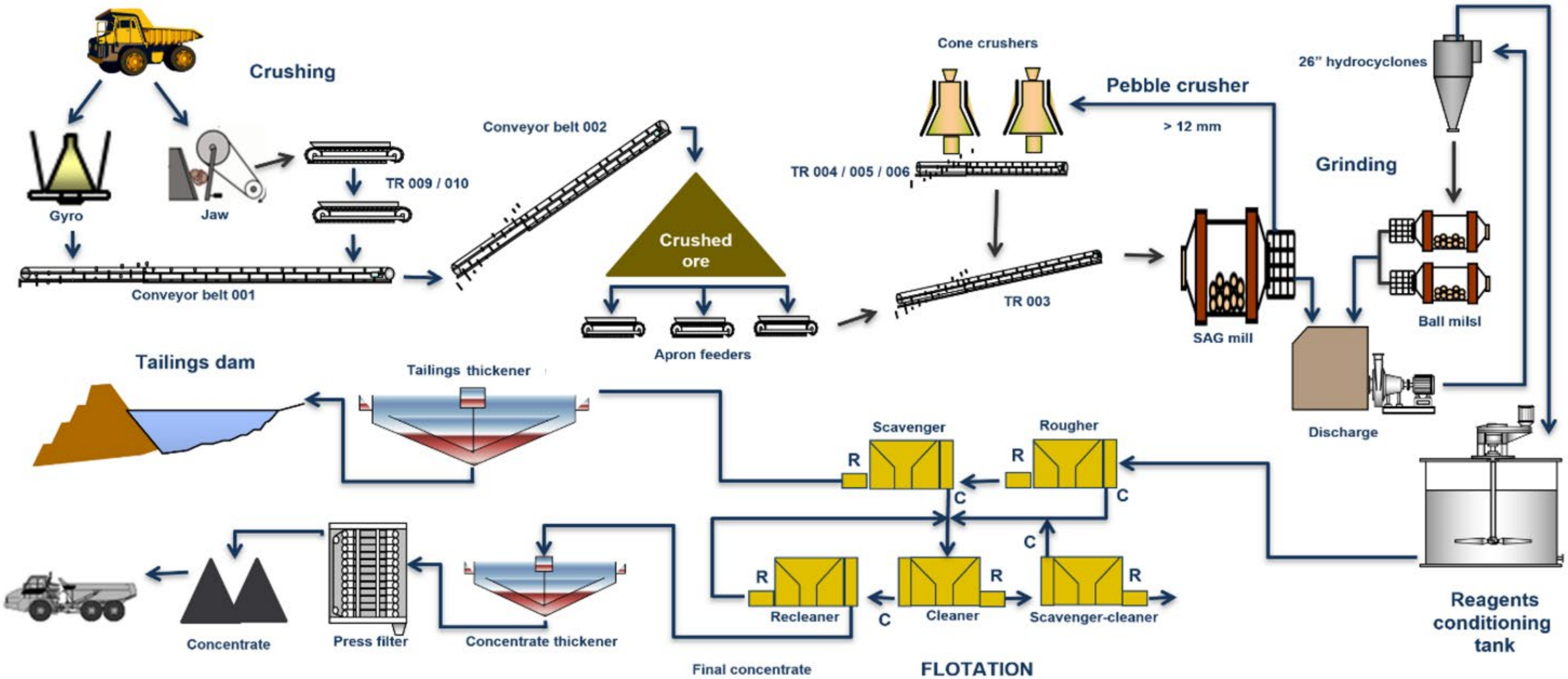
The initial nameplate capacity was 4.6 Mt/a; this was expanded to 6.5 Mt/a in 2012 with the addition of a desliming circuit, pebble crushing, a second ball mill, and a pressure filter. Over the 12 month period from January 2022 to December 2022 the plant processed 6.59 Mt of ore.

Since the start-up of the process plant in October 2019, the desliming circuit has not been operated. Plant technical staff conducted statistical studies of process plant data and bench scale flotation tests to compare results with and without desliming. These both demonstrated that desliming makes no difference to nickel recovery. This conclusion was supported by testwork carried out by SGS Geosol in 2020.

17.2 Process Description

17.2.1 Crushing and Grinding

Ore from the open pit mine is most commonly placed in a crusher stockpile area for blending to achieve target recoverable nickel and MgO values in the feed (ore that is not fed directly to the crusher stockpile is sent to the low grade and marginal grade stockpiles). Ore is also reclaimed from the low grade and marginal grade stockpiles and is either dumped directly into one of the two primary crushing circuits or placed on the crusher stockpile area for blending. The blended feed from the stockpile area is fed to primary crushing. The primary gyratory crusher (a Metso 50/65 MK II gyratory crusher) crushes from a nominal F_{80} size of 800 mm to a P_{80} size of 140 mm to 150 mm at a design rate of approximately 1,500 t/h. The second primary crusher (a Metso C-160 jaw crusher) is located close to the primary gyratory crusher, it has a nominal throughput rate of 750 t/h, and produces a crushed product with a nominal P_{80} size of 152 mm.



Source: Atlantic Nickel, 2021.

Figure 17-1: Process Plant Flowsheet

Prior to the shutdown in 2016, fragmentation problems were experienced in the pit, which resulted in oversize boulders entering the gyratory crusher. This caused a lot of downtime and prompted the installation of the Metso jaw crusher. Since the 2019 start-up, the mine has carried out continuous improvements in drilling and blasting practices which has resulted in better fragmentation. Before the plant re-start, the gyratory crusher was overhauled and fitted with new concave and mantle liners. However, shortly after the re-start, problems were experienced with the bottom shell; this was replaced in May 2020. Since then, operations have stabilised.

The primary crushed ore is conveyed to an open stockpile with a total capacity of 67,000 t (84 hours; live capacity 15,000 t, 19 hours). Three feeders extract the ore from beneath the stockpile at a controlled rate for feed to the SAG mill. The feed is controlled by adjustment of the pulling rate from the feeders to maintain the throughput at around 832 t/h. When the primary crusher is not operating, a bulldozer and/or excavator pushes ore towards the centre feeders to maintain feed to the mill.

The SAG mill is a 30 ft diameter by 16.4 ft long Outotec mill with an 8 MW motor. The design target transfer size (T_{80}) is 4 mm at a nominal throughput of 832 t/h.

Two Metso HP400 pebble crushers operate in closed circuit with the SAG mill to crush oversize from the SAG mill (material in the size range -70 mm to +12 mm).

Material <12 mm flows to a common pump box shared by the SAG mill and ball mill circuits. Material from this pump box is pumped to a single cluster of ten 26 in. diameter cyclones, allowing the two 20 ft diameter x 28.5 ft long 5.8 MW Outotec ball mills to operate in closed circuit to produce a nominal flotation feed product with a P_{80} of approximately 125 µm.

17.2.2 Deslime Circuit

The deslime circuit has three stages. The primary stage consists of two clusters of ten 20 in. diameter cyclones with a total of ten cyclones normally operating. The second stage consists of two clusters of twenty 10 in. diameter cyclones with the underflow reporting to flotation feed and the overflow reporting back to the 20 in. cyclone feed. This stage was taken out of the circuit in November 2014 because it returned very little mass to the 20 in. cyclone feed and caused circuit instability. The third stage consists of 256 x 4 in. diameter cyclones in 12 clusters. This stage takes feed from the overflow of the 20 in. cyclones with the underflow being directed to the conditioning tanks and the overflow directed to tailings. The target P_{80} for the 4 in. diameter cyclone overflow is 10 µm but is normally closer to 20 µm. This material is pumped directly to the tailings dam as opposed to the tailings thickener.

The deslime circuit has not been operated since the start-up in 2019 but could be re-started if high slimes-generating ore is encountered.

17.2.3 Conditioning Circuit and Reagents

The conditioning circuit has three conditioning tanks. The primary conditioning tank is used to condition the flotation feed with activator; the two other tanks are used to condition the rougher flotation feed to each bank of rougher cells with collector and frother.

Between 300 g/t and 500 g/t of 50% sodium silicate solution is added as a dispersant/pH modifier to the flotation feed. Between 60 g/t and 100 g/t of activator is added to the primary conditioner tank. Sodium ethyl xanthate mixed 1:1 with di-isobutyl dithiophosphate is used as the collector and added to the feed to the secondary conditioner tanks.

17.2.4 Flotation

The rougher/scavenger flotation circuit consists of two rows of six 160 m^3 Outotec tank cells. The concentrate from each cell is fed to parallel launders so that the cells can be used either as rougher or scavenger cells. The scavenger circuit concentrate can be directed back to the rougher feed or to the cleaner circuit feed; the scavenger circuit tailings report to the tailings thickener. The rougher concentrate, along with the re-cleaner tailings and cleaner–scavenger concentrate, report to the cleaner circuit, which consists of six 70 m^3 cleaner cells and three 70 m^3 cleaner-scavenger cells. The cleaner–scavenger tailings are returned to the rougher feed. Cleaner concentrate reports to four 30 m^3 re-cleaner cells.

17.2.5 Concentrate Thickening and Filtration

The final concentrate is thickened in a 15 m diameter concentrate thickener to a density of approximately 65% w/w solids, from where it is pumped to storage tanks ready for filtration. The concentrate is filtered using a Larox 33 t/h pressure filter. Following filtration, the final concentrate is trucked to the port of Ilhéus where it is loaded onto ships for transport to market.

17.2.6 Tailings Thickening

The final tailings are thickened in a 35 m diameter thickener to a density of 55% to 60% w/w solids and are then pumped to the TSF for final deposition. Thickener overflow water is recirculated for use within the process plant. Reclaim water from the TSF is also recirculated for use within the process plant.

17.2.7 Associated Facilities

17.2.7.1 Metallurgical Testing Laboratory

The concentrator has a metallurgical testing laboratory equipped with sample preparation and laboratory-scale grinding equipment and flotation cells.

17.2.7.2 Pilot Plant

The concentrator has a pilot plant with crushing, grinding, and flotation equipment. The pilot plant capacity is up to 400 kg/h. This is an ideal facility for testing circuit variations and different reagent combinations without compromising the main plant operation.

17.2.7.3 Assay Laboratory

The site has a well-equipped assay laboratory that services exploration, geology, the mine, process plant, and environmental. The laboratory includes sample preparation and equipment for wet chemical analysis, XRF, AA, ICP, and LECO (sulphur assays).

17.3 Energy, Water, and Process Materials Requirements

17.3.1 Water Requirements

The process plant requires approximately 1,600 m^3/h of water, derived from three sources:

- The Contas River: up to 700 m^3/h can be pumped; however, the normal consumption is 500 m^3/h, and represents the total new make-up water to the process plant.
- The TSF normally supplies between 800 m^3/h and 900 m^3/h.
- The tailings thickener overflow provides in the order of 400 m^3/h to 500 m^3/h.

17.3.2 Power Requirement

The process plant power requirement is 21.1 MW. Power is provided from the national grid.

17.3.3 Grinding Balls and Reagent Consumptions

The consumptions of grinding balls and reagents are shown in Table 17-1.

Table 17-1: Grinding Balls and Reagent Consumption
ACG Acquisition Company Limited – Santa Rita Mine

Item	Consumption (g/t plant feed)
Grinding	
5 inch balls	261
2.5 inch balls	225
CMC depressant	11
Flotation	
Copper sulphate	46
Sodium ethyl xanthate	67
Sodium di-alkyl dithiophosphate	67
Sodium silicate	579
Citric acid	46
Thickening	
Flocculant	10

17.4 Operations since the October 2019 Start-Up

Upon completion of site refurbishment activities, the plant was re-commissioned in October 2019. The ramp-up of operations proceeded faster than planned in the early months of the re-start and resulted in production of Santa Rita's first full shipment of concentrate by January 2020, two months ahead of plan.

In the first half of 2020, however, operational setbacks caused plant ramp-up performance to suffer. Firstly, heavy seasonal rains flooded the open pit before adequate dewatering capacity could be installed. This restricted the rate at which ore which could be accessed was mined from the open pit and consequently increased the operation's processing of historically stockpiled material. This historically stockpiled material has less certain lithological composition and may have experienced some degree of sulphide oxidation, both generally unhelpful to plant performance. The pit dewatering systems referenced in Section 16.5.6 were installed in 2020.

Secondly, primary crushing throughput suffered when, in January 2020, the bottom shell of the gyratory crusher was found to be cracked during a visual inspection and required replacement. Re-commissioning of the existing jaw crusher and securing additional mobile crushing capacity helped to restore sufficient reliability and throughput capacity to crushing activities on site. The bottom shell of the gyratory crusher was replaced in May 2020.

The use of historically stockpiled materials and large variations in plant throughput during this period affected flotation performance. From October 2020 through March 2021, as mining rates improved and the use of historically stockpiled material declined, improved NiS feed grades of 0.287% were observed compared to the 0.250% obtained during the prior nine months. This improvement and a more consistent period of plant throughput coincided with an improvement in the NiS recovery to an average of 78.4% compared to 76.5%. Production data from January 2020 to December 2022 is provided in Section 13.

17.5 CP Comments on "Item 17: Recovery Methods"

17.5.1 Comments

The process plant re-started in October 2019 and from January 2020 to December 2022 treated 17.06 Mt of ore, producing 290,821 t of nickel concentrate containing 39,488 t of nickel. The average overall nickel recovery was 58% and the average nickel sulphide recovery was 79%. The plant is currently operating at its design capacity of 6.5 Mt/a.

The NiS recovery has improved since January 2020, especially during 2022. The recovery increased from 80.2% in Q1 2022 to an average of 81.3% from June to December 2022. The improvement is due to the following:

- Improvements in control algorithms for the SAG and ball mills
- Adjustment in the cyclone operating pressure;
- Reducing fines generated in grinding;
- Change in the classification solids percent parameters;
- Better knowledge of the flotation kinetics per stage;
- Improvements in flotation control;
- Use of a different collector resulting in better recovery;
- Training of process, operation and maintenance teams;
- Operational stability leading to increased equipment availability.

The expected performance for 2023 takes these improvements into account.

17.5.2 Recommendations

JKTech carried out a comminution survey in February 2021 and made several recommendations for potential improvements based on the results of this work. The key recommendations were to:

1. Decrease the SAG mill total volumetric load to 25% and increase the ball load to decrease fines generation and decrease the load on the SAG mill.
2. Review the SAG mill grate design to increase the pebble port size to further decrease fines generation. This change could be made during a scheduled liner change with minimal additional expenditure.
3. Upgrade the cyclone feed pumping capacity to allow a target of 55% solids; then, increase water addition to achieve this density (and improve cyclone efficiency).

The CP agrees with recommendations 1 and 2 as they will avoid the SAG mill becoming a throughput restriction.

The plant technical staff have stated that a new load and impact meter has been purchased and they are now in a position to carry out the load test in 2023 in a safe manner (avoiding breakage of mill liners). The grate slot width has not yet been increased as the current focus is to increase the grate life. The current opening is 70 mm and the pebble port size is 90 mm (the maximum size feed for the pebble crushers). There is a concern that increasing the slot width would reduce the grate life.

The CP also agrees with recommendation 3 because higher cyclone efficiency will assist in minimising slimes production and nickel losses. The site stated that the amount of water added in the grinding circuit has been increased without the need to re-power the cyclone feed pumps and that an ongoing study has shown that good classification efficiency is being achieved.

The CP recommends that the JKTech February 2021 report be updated with the comminution results from testwork carried out in 2022 on underground variability samples and LOM period composites. The site stated that this has still to be done.

The CP recommended in 2021 that consideration be given to operating the cleaner-scavenger circuit in open circuit instead of returning the cleaner-scavenger tailings to the rougher feed. The LCTs carried out at SGS in 2021 showed that reducing the recycle prevented the build-up of gangue minerals in the concentrate. This phenomenon has not been reported in the plant; however, it may be possible to improve the concentrate grade with minimal loss of recovery. Additional cleaner-scavenger capacity may be required to maintain the recovery. This could be tested directly on the scavenger circuit feed and tailings in the on-site pilot plant. This test has not yet been performed nor has a test to increase the scavenger cleaning capacity. The plant staff report that efforts are being made first to reduce the fines generation in the grinding circuit.

18.0 PROJECT INFRASTRUCTURE

18.1 Introduction

The Santa Rita Mine has all the necessary infrastructure in place to support a large open pit mining and mineral processing operation. A site infrastructure layout plan is presented in Figure 18-1.

18.2 Road and Logistics

The open pit mining operations are located in Itagibá municipality of Bahia state, Brazil, approximately 360 km southwest of Salvador, with good access to essential infrastructure (power, rail, roads, and port).

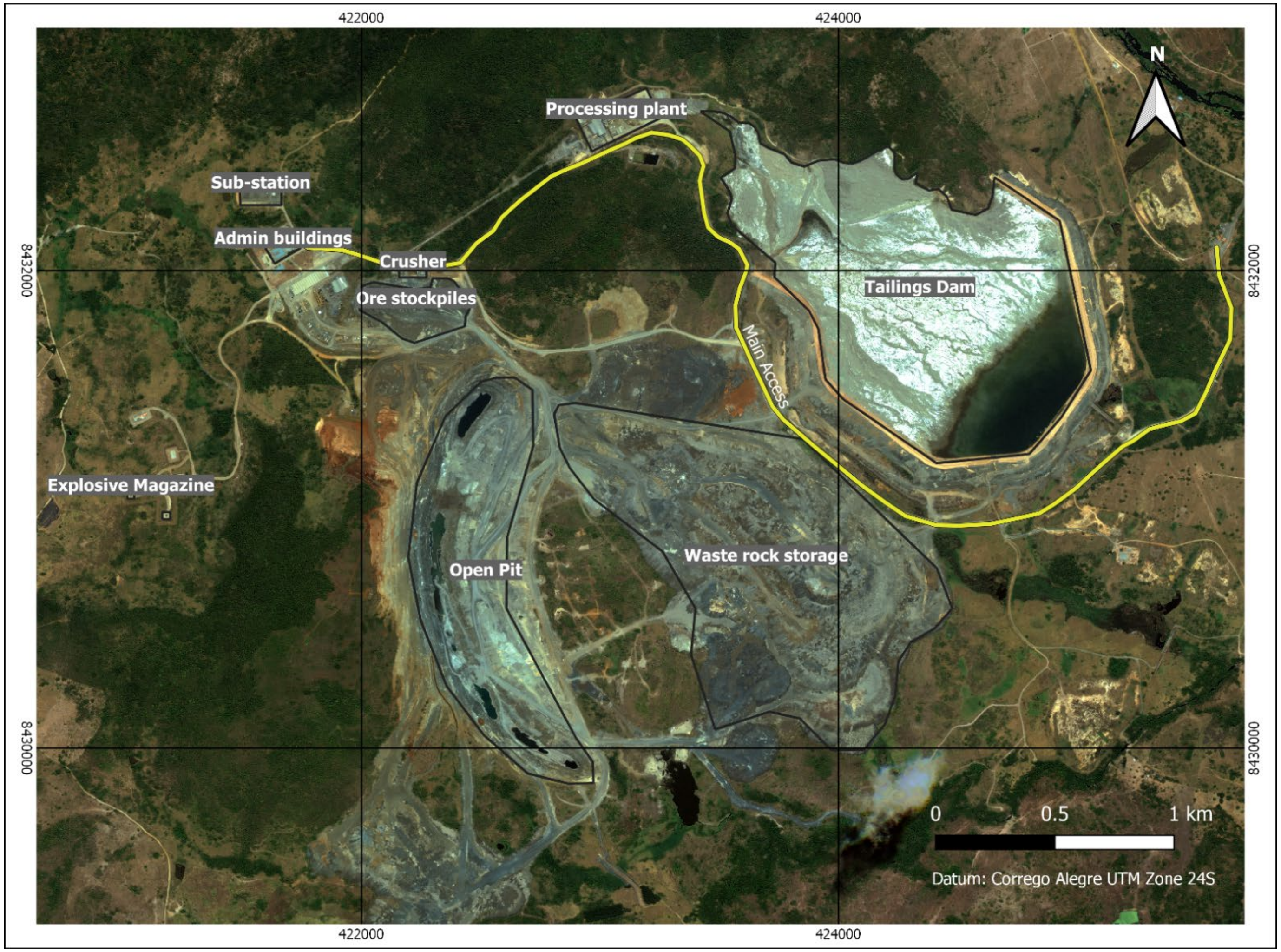
The Santa Rita Mine is approximately two kilometres from the paved BR330 main highway. The nearby cities of Ipiaú (population 46,000) and Itagibá (population 15,600) provide commercial and industrial support services such as transportation, civil contracting and construction, and are a good source of skilled and unskilled labour.

The nearby highway network provides access to the port of Ilhéus and the port of Salvador on paved roads. These ports are used for the importation of certain operating supplies and consumables and export of concentrate.

The nickel concentrates are stored, loaded onto ships and exported to contracted customers at Ilhéus Port, approximately 140 km from the site.

The closest commercial airport is in Ilhéus, a two-and-a-half-hour drive from the mine.

Figure 18-2 shows inset details of the export corridor and Figure 18-3 shows details of the process plant area.

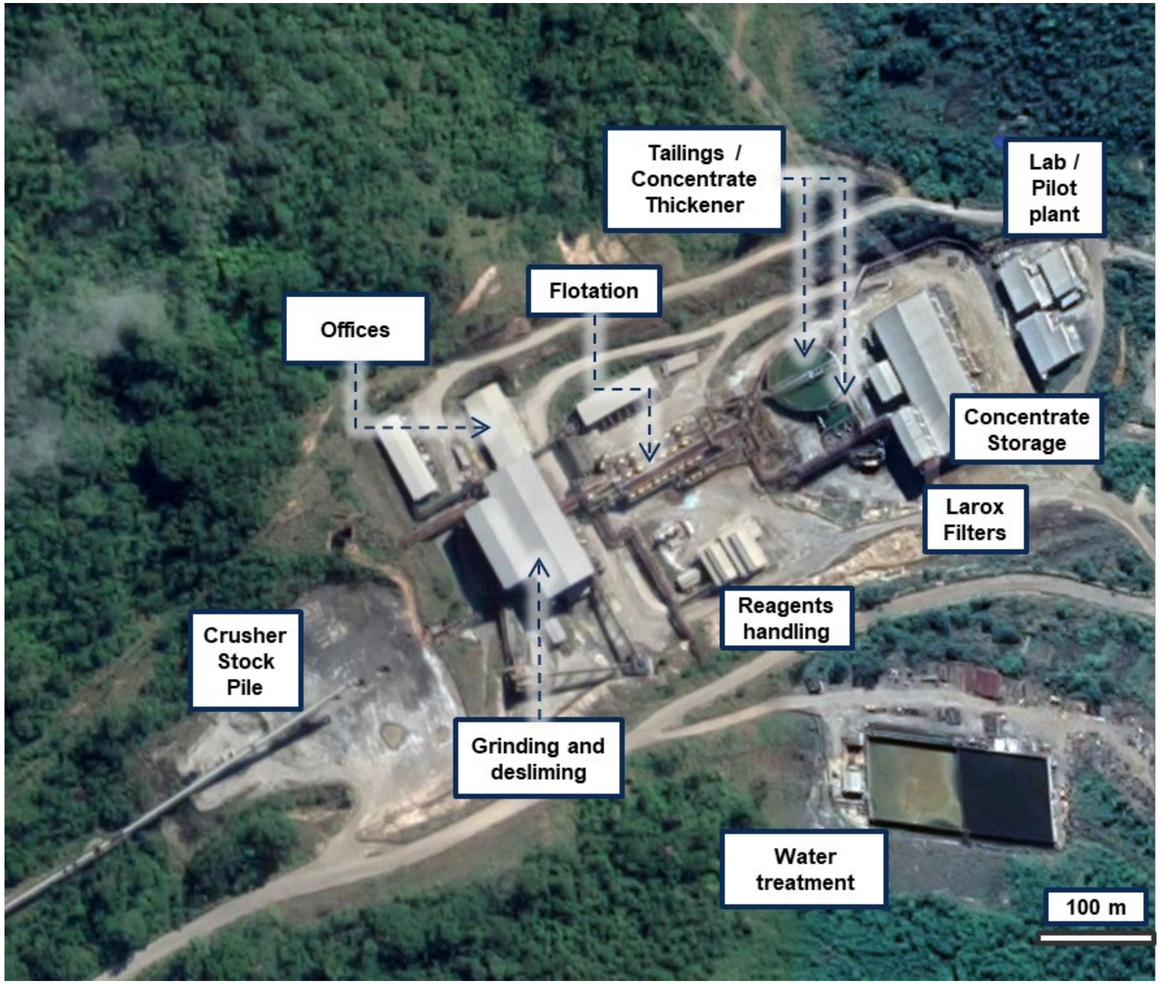


Source: Atlantic Nickel, 2021.

Figure 18-1: Project Layout Plan

Source: Atlantic Nickel, 2019.

Figure 18-2: Port Locations (inset details of export corridor)



Source: Atlantic Nickel, 2019.

Figure 18-3: Process Plant Area

18.3 Tailings Storage Facility

The tailings storage facility is discussed in Section 20.3.

18.4 Built Infrastructure

The existing on-site infrastructure to support the mining and processing sites includes the following:

- Site roads;
- TSF;
- Open pit mine;
- Waste rock storage facilities (East and South);
- Ore stockpiles;
- Primary crushers/process plant/concentrator;
- Conveyor system;
- Powerlines;
- Water pipelines;
- Site buildings, including:
    - Administration offices;
    - Gate house (including truck scale);
    - Bus station;
    - Maintenance buildings (electro/mechanical and mobile equipment);
    - Warehouse;
    - Washroom and change rooms;
    - Kitchen and canteen;
    - Healthcare and firefighting department;
    - Assay laboratory;
    - Metallurgical laboratory.
- Consumables storage;
- Security and fencing;
- Explosives magazines;
- Parking area;
- Water and mine site sewage treatment facilities;
- Data and communications infrastructure.

18.5 Camp and Accommodations

There are no on-site accommodations. Employees reside in the nearby communities.

18.6 Power and Electrical

Electrical power is generated by a hydroelectric power plant that is located approximately 20 km from the operations (refer to Figure 18-2). The power plant is connected to the mine via a 230 kV transmission line that can provide up to 40 MW.

In 2022, the average power draw was estimated at 25 MW. The power demand breakdown is:

- Mine: 1.04 MW;
- Process plant: 23.22 MW;
- General administration: 0.84 MW.

There are two 30/40 MVA transformers in a substation at the mine site to adjust the voltage to 13.8 kV. Electrical power is then distributed to the process plant and mine.

The substation has firefighting systems and high-reliability relays for circuit protection. These features protect the electrical power supply from major outages.

Three emergency 500 kVA diesel generators provide back-up power in the event of grid power failures.

18.7 Fuel

All open pit equipment is fuelled by diesel fuel service trucks at the mine. Administrative vehicles are fuelled at the mine gasoline station.

18.8 Communications

Communications throughout the operations are by radio and telephone.

18.9 Waste Rock Storage Facilities

18.9.1 Location and Capacity

There are two existing WRSFs, located to the east and south of the open pit (refer to Figure 18-1). The East WRSF is the primary waste rock storage area and the South WRSF is a secondary storage area.

A net swell factor of 30% (swell factor 40% and 10% compaction) was used to calculate the storage volumes required in the WRSFs and stockpiles. The East and South WRSFs are estimated to have a capacity of 142.83 Mt to a maximum height of 150 m, which is sufficient to store the LOM waste rock production.

The WRSF capacity was estimated assuming a constant net swell factor of 30%. If the actual swell is greater than expected, then additional WRSF space will be required. Operating experience, monitoring, and changes in the LOM plan will indicate if additional capacity will need to be designed and licensed.

18.9.2 Design

Geotechnical investigations for the East WRSF were performed by Recursos Hídricos e Geotecnia Ltda (VOGBR) in 2007, including a program of 30 geotechnical drill holes, to characterize the foundation rock. In December 2007, VOGBR developed a basic design for the WRSF that was based on all available data and information at the time.

In January 2012, TEC3 Geotechnics and Water Resources (TEC3) commenced a study to update the East WRSF design parameters. The work included a new geological-geotechnical characterisation, design and geometric studies, drainage system design, stability analyses and sizing of the sediment containment system and other hydraulic structures. The TEC3 study defined the following design parameters for the East WRSF:

- Maximum height of individual benches: 30 m
- Maximum allowable height of facility: 212 m
- Bench face angle: 37°
- Minimum berm width: 12 m
- Overall average slope angle of the facility: 32°
- Minimum width of ramp accesses, and ramp gradient: 30 m and 10%, respectively
- Overall factor of safety: 1.5

Stability analyses verified the final designed WRSF geometry met the safety criteria established by the Brazilian Association of Technical Standards (Associação Brasileira de Normas Técnicas, or ABNT) NBR 13,029 technical standard (ABNT, 2006).

The construction sequence entails tipping the waste rock over the bench crest or end dumping on the bench. For safety reasons, the process of tipping the material over the crest must be done in two lifts, each at a maximum height of 15 m, for the formation of a final 30 m bench height. Both construction methods require a minimum berm width of 12 m.

18.10 Stockpiles

Ore stockpiles and ore bins near the primary crusher are mainly used for short-term operational ore control and emergency ore handling purposes and are not intended to provide longer-term storage capacity. Consequently, no oxidation or recovery issues are reported or expected.

Large low-grade mineralised material stockpiles were created during previous operations. The stockpiles are located between the open pit and the tailings dam (see Figure 18-1). At the end of 2022, stockpiles I and J were estimated to contain 4.6 Mt and stockpile K was estimated at 1.1 Mt. The stockpiles will require trenching, drilling, and sampling to support any future Mineral Resource estimate of the potentially economic material within the piles.

18.11 CP Comments on "Item 18: Project Infrastructure"

All key mine site infrastructure for open pit operations is in place.

19.0 MARKET STUDIES AND CONTRACTS

19.1 Metal Prices

The commodity prices used in the financial analysis of the open pit base case are derived from the consensus median of leading banks and financial institutions as of January 2023, and are presented in Table 19-1. A portion of nickel and copper production is subject to hedging agreements. A total of 6,892 t of nickel and 1,200 t of copper have been hedged to the end of 2023. Otherwise, metal prices are subject to spot market conditions. Currency exchange rates are subject to spot market conditions. There are no metal streaming agreements in place.

Table 19-1: Commodity Price and Exchange Rate Forecasts
ACG Acquisition Company Limited – Santa Rita Mine

Item	2023	2024	2025	2026	2027	2028
Nickel (US$/lb)	9.87	9.46	9.61	9.13	8.46	8.46
Copper (US$/lb)	3.55	3.82	3.94	3.89	3.59	3.59
Cobalt (US$/lb)	25.58	27.70	27.37	26.43	23.53	23.53
Gold (US$/oz)	1,753	1,719	1,654	1,593	1,615	1,615
Platinum (US$/oz)	1,027	1,099	1,121	1,195	1,140	1,140
Palladium (US$/oz)	1,977	1,763	1,544	1,325	1,363	1,363
Exchange Rate US$:R$	5.39	5.44	5.66	5.55	5.55	5.55

19.2 Market Outlook and Concentrate Sales Terms

19.2.1 Market Outlook for Metals

19.2.1.1 Nickel

Nickel is utilised across a broad spectrum of end-use industries due to its physical, chemical, and mechanical characteristics. It is normally utilised in engineering, transport, and building and construction fields, and is also a crucial component of the most common batteries of electric vehicles.

Nickel prices are closely related to demand from stainless steel producers who account for about two-thirds of total demand. Currently, the primary factor driving price movements is related to infrastructure activity worldwide, with a particular emphasis on Asian nations. However, the predicted increase in demand for electric vehicles in the coming years is another significant driver of price changes.

A recovery in the stainless market fuelled by China, combined with ongoing strong growth in nickel use in batteries for electric vehicles, is expected to push the market back into supply deficit during 2027–2032, leading to steadily rising annual prices.

19.2.1.2 Copper

Copper is a 'through-the-cycle' commodity with applications across many industries such as: electrical, energy, communications, transport, infrastructure, and industrial equipment. Over the long term, an additional 6 Mt of copper is required by 2032 to meet the rising intensity of global use per capita and continued population growth to continue to support historical growth rates. A price of the magnitude US$3.50/lb Cu is required to incentivize the pipeline of lower quality projects to meet the projected demand deficit of refined copper.

19.2.1.3 Cobalt

Approximately 98% of global cobalt production is obtained as a by-product from the mining of nickel and copper ores. Cobalt has major applications as a battery chemical and is present in most of the battery types utilised on electric vehicles. The cobalt market is expected to be in a 32% deficit by 2030.

19.3 Concentrate Sales

Offtake contracts and terms are proprietary. There are several agreements in place between Atlantic Nickel and smelters/traders for export from Brazil. The CP has reviewed the contracts and has confirmed that the terms are appropriately included in the financial model.

19.4 Contracts

Atlantic Nickel has entered into agreements with various contractors for open pit mining at Santa Rita. The contracts include all open pit mining activities, such as drilling, blasting, loading and hauling of ore and waste rock. The contractors are:

- R&D Mineração E Construção Ltda. (R&D), for drilling, loading, hauling and support equipment such as dozers and graders.
- Fagundes Construção e Mineração S.A., for drilling, loading, hauling and support equipment such as dozers and graders.
- ENAEX Brasil through subsidiary IBQ – INDÚSTRIAS QUIMICAS S/A, for explosives.

R&D also has a one-year contract that ends in April 2023 to supply CAT 777 trucks and excavators to mine waste rock. This was implemented in order that the mine could catch up on its waste rock stripping requirements to achieve the LOM plan.

The CP has reviewed the mining contracts and has confirmed that the terms are appropriately included in the financial model. Atlantic Nickel is planning to transition from open pit contractor mining to Owner-operated mining starting in Q2 2023. Down payments for acquisition of mining equipment will take place during three periods, Q1 2023, Q2 2024, and Q4 2025.

Atlantic Nickel has also entered into electrical power agreements as follows:

- Power Purchase Agreement, take-or-pay with Tradener Ltda for approximately 50% of the yearly required power;
- Power Purchase Agreement, take-or-pay with Focus Energia for approximately 50% of the yearly required power.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

20.1 Baseline Studies

In Brazil, environmental impacts are assessed through Environmental Impact Assessment (EIA) studies. These documents are submitted to environmental agencies that grant licences and enforce EIA procedures. In Bahia, the main agency that controls the licences is INEMA, the state environmental agency. An EIA was completed in 2006 for the Santa Rita Mine. This is the main document with which the licences and mitigation measures are based. To support the development and approval of the 2006 EIA and State licensing permitting requirements, the EIA evaluated impacts on water quality, flora and fauna, air quality, soil, and the socio-economic impact on immediate communities. Based on these impacts, the EIA developed mitigation measures that were required to prevent and/or mitigate potential impacts.

The 2006 EIA was representative of conditions at the time. However, there have been changes to the environmental and social conditions with the operations re-start in 2019, which were addressed in an ESIA completed in early 2020. A list of surveys completed as of this CPR effective date is provided in Table 20-1.

Table 20-1: Completed Surveys
ACG Acquisition Company Limited – Santa Rita Mine

Environmental Study Completed	Resources Assessed	Date
2021 Geochemical Characterisation of Tailings[1]	Geology	2021
Dilution Study	Study of the impacts of discharging 2,000 m^3/h of effluent with 2,500 mg/L of sulphate into the Contas River	March 2021
Environmental Guarantee Technical Report	Water quality, flora, and fauna, waste management	Monthly and Quarterly Monitoring 2020
Environmental and Social Impact Assessment	Water quality, air, soil, flora, and fauna, social resources	April 1, 2020
Potential Environmental Impact Report	-	2020
Review of Site Waste and Water Management Practices	Waste Management	January 2021
Tailings Dam Stability	Tailings Dam	2022 (WSP)
Tailings Storage Facility Dam Safety and Design Review	Tailings Dam	2019 (WSP, formerly Wood E&I)
Waste Management and Disposal Inventories	Waste management	Annually

Notes:

1. Geochemical characterisation data of tailings and waste rock collected throughout the mine life will be used in the development of the closure plan updates and final detailed closure plan to ensure control and mitigation of potential acid mine drainage and or metals leaching.

20.1.1 Air Quality

Air quality issues at the mine are primarily related to dust and the burning of fossil fuels. There is no smelting or roasting of metals at the site. Air quality has been monitored since 2010 and results are reported to INEMA annually. Since operations resumed in 2019, Atlantic Nickel has developed a new baseline study to characterize air emissions associated with all equipment, machinery, extraction of ore processing, and vehicle traffic.

The current monitoring includes total suspended particulates (TSP) PM-10 and PM-2.5 (respirable particulate matter), nitrogen oxides (NOx), sulphur oxides (SOx), and CO. Monitoring equipment is located at four locations at or near the mine site and samples were collected during a 24-hour period every six months per under Ordinance 27.726/2023. In addition, dispersion modelling using AERMOD was completed. The conclusion of the report indicates that the air quality pollutants are within the legal standards for sensitive receptors.

20.1.2 Noise

Atlantic Nickel has a Noise and Vibration Monitoring Program with monitoring points throughout the mine site. This plan is intended to monitor noise and vibration impacts that occur from blasting activities, machines, and equipment (ERM, 2019). As reported in the 2022 Mine Closure Plan, noise mapping near the mine and the urban areas of Shearwater and Japomirim were within the normal range. The values identified were determined to be within the normal range of local background noise. Noise monitoring was resumed with the re-start of mining operations in 2019.

Noise monitoring has been conducted throughout 2022 to comply with National Council of Environment (Conselho Nacional do Meio Ambiente, or CONAMA) Resolution No. 1 and ABNT NBR 10151 technical standard. Results of monitoring have indicated noise levels are within acceptable levels when compared to Table 1 of ABNT NBR 10151 (SESI 2022a, SESI 2022b, SESI 2022c; SESI 2022d, SESI 2022e, SESI 2022f; SESI 2022g).

20.1.3 Surface Water

The mine has constructed drains to channel stormwater flow to the East Pond where the run-off is recirculated to the process plant or TSF. The water quality monitoring plan contemplates the collection of samples on a quarterly basis from 10 locations including waterways within the mine boundary and receiving water outside the mine boundary. Water quality information is provided in Section 20.1.5.

The water balance of the mine site includes the inputs and outputs of water from the infrastructures such as the open pit, WRSFs, TSF, processing plant, and adjacent areas. New water enters the system being pumped from the Contas River, in addition to the reuse of water from the TSF and pit, subtracting losses such as evaporation and infiltration. Sensitivity analysis concludes that under normal operating conditions, the recirculation rate is approximately 95%.

Relative to the water availability in the region, due to the high level of flow in the Contas River, factors such as hydric stress are not expected nor historically registered. The analysis also shows that there is insignificant impact on the water availability in the community as a result of the production process considering that the plant consumes around 0.26% of the minimum flow of the Contas River.

20.1.4 Groundwater

Groundwater monitoring data was collected on site during baseline studies for the 2006 EIA and during the halt in operations between 2016 and 2019, being conducted quarterly at 16 locations around the mine site. Groundwater monitoring data as recently as May 2019 indicated high levels of sulphate in the groundwater (ERM, 2019). The presence of sulphate is expected and naturally generated as the result of oxidation of sulphide mineralisation in the rock when exposed to weather conditions such as water, oxygen, and bacteria contained in the air.

A new mineralogical characterisation study of rocks was carried out between 2020 and 2021 with the objective of evaluating the potential for solubilisation/leaching of metals contained in the minerals present in the pit, dam, piles, and surrounding areas.

The study demonstrated that, based on 20-week static and kinetic testing, the Neutralisation Potential (NP) is four times higher than the Acidity Potential (AP), resulting in very low potential for metal leaching or acid drainage generation.

In total, more than 100 samples were taken for the purpose of characterising the rocks, concluding that the presence of neutralising potential exceeds the acidity potential during the 20 week static and kinetic testing (Hidrogeo 2020-2021, VOGBR 2008). It is noted that kinetic testing of core samples from the Orthopyronxenite lithology showed a downward trend in pH values over the 20 week test, although pH values continued to be in the 5.0 to 9.0 range (Hidrogeo, 2021).

Mitigation measures currently being conducted by the mine include recirculation of water to the extent possible and use of non-acid generating material for road construction and maintenance. Additional water quality information is provided in Section 20.1.5.

20.1.5 Water Quality

Surface and groundwater results from 2015–2019 data demonstrate that sulphate, nickel, and iron concentrations were above legal thresholds established by CONAMA (357/2005, 410/2009, 430/2011, 396/2008, 454/2012). Specifically, sulphate tests showed that surface water values were significantly above the Brazilian standards, with an average value at least three times above the standard (ERM, 2019). With the implementation of an action plan including sulphide material management and the construction of the water recirculation project in 2020, Atlantic Nickel has been able to reduce water quality constituents in the Peixe River to below the Brazilian standards. In addition to sulphate, reductions were observed in most constituents including nickel, iron, manganese, selenium, and vanadium.

The most recent surface water monitoring data in 2021 and 2022 show exceedance of iron and manganese in surface water, nevertheless, these elements were already present above the limit in monitoring carried out in the 2006 EIA, before the start of operations, being the natural background of the region. It is worth mentioning that the presence of iron and manganese were also observed upstream of the project.

20.1.6 Flora and Fauna

The mine is in the Atlantic Forest biome. Vegetation communities within the mine area, as classified by the Brazilian Institute of Geography and Statistics, include dense ombrophilous (rain-loving) forest, semi-deciduous forest, and semi-deciduous forest and vegetation with hydrologic influence (e.g., swamps and forested wetlands). However, much of forested areas around the mine and in the region have been cleared for agricultural uses. Surveys in relation to the 2006 EIA identified five endemic or restricted-range flora species (Caesalpinia); and one fauna species (Myrmotherula urosticta). In addition, one new flora species of the Kuhlmanniodendron genus that had previously not been identified is present in the area (ERM, 2019).

20.1.7 Waste (Solid Waste, Hazardous Waste)

In accordance with Brazil's National Policy on Waste Management, law No. 12,305/2010, a Solid Waste Management Plan was developed to provide guidance on the management of solid waste. In addition, the Chemical Management Report provides guidance for chemical management, including hazardous waste. Current waste disposal meets the requirements of the operating permit for waste handling.

20.2 Environmental Considerations/Monitoring Programs

The 2006 EIA is linked to numerous mitigation measures, consisting primarily of management plans that are required based on permits and licences. Management plans required per the EIA have been developed and implemented.

A list of the management plans is provided in Table 20-2.

Table 20-2: Management Plans
ACG Acquisition Company Limited – Santa Rita Mine

Plan Name	Status/ Date	Corresponding Licence
Acidic Mine Drainage and Control Program	2020	Requirement based on 2006 EIA. Monitoring Program for the Treatment Stations of Domestic Liquid and Industrial Effluents from Mina Santa Rita, 2018.
Archeological Rescue Plan	Complete, date of completion unknown	Interministerial Ordinance 419/201114, IPHAN
Degraded Area Recovery Plan	New requirement as of August 2019	Requirement based on August 2019 Operational Permit Renewal
Effluent Management Program	2018	Requirement based on 2006 EIA. Monitoring Program for the Treatment Stations of Domestic Liquid and Industrial Effluents from Mina Santa Rita, 2018.
Environmental Guarantee Technical Report (Monthly and Quarterly Monitoring Report)	February 2020	INEMA
Groundwater Level Monitoring Program	2020	Requirement based on 2006
Health Services Waste Management Plan	Developed	Required by Brazilian legislation
Hydrogeochemical Report	2006, 2015–2020	
Mine Closure Plan	Current plan 2022	
Noise and Vibration Monitoring Program	Monitoring plan in place	Noise and vibration monitoring was re-started in August 2019
Relatório de Atendimento de Condicionantes, 2018	2020	MM and requirement of Installation Licence 8697 and Operating Licence 11.491/2016
Relatório Revegetação, 2018	2020	Federal Law 12651/12. The 2019 report has been submitted to the agency
Rivering Flow Rate Monitoring Program	2020	The 2019 report has been submitted to the agency
Solid Waste Management Plan	No. 12,305/2010 12/2015	Revision 3.0

Plan Name	Status/ Date	Corresponding Licence
Tailings Dam Emergency Action Plan (PAEBM),	March 2021	ANM Ordinance No. 14066/2020
Waste Management and Disposal Inventories	2006–ongoing	Completed annually
Water Management Program	Implemented and on-going monitoring	Requirement based on 2006 EIA
Water Quality Monitoring Program	2020	Plans integrated into the environmental management system

20.3 Tailings Storage Facility

The initial TSF designs were completed by Golder Associates in and prior to 2007, and were advanced to a Pre-Feasibility Study (PFS) level. Initial designs by Golder involved a geomembrane-lined TSF with an embankment to be constructed of waste rock, a decant structure, and an underdrain system. After additional chemical characterisation, the tailings were subsequently classified as Class II B (non-toxic and inert waste, according to ABNT NBR 10004) to support the original design. ABNT NBR 10004 is the technical standard published by ABNT for Solid Waste Classification. Subsequent designs completed by VOGBR did not include a geomembrane liner and the TSF embankment was designed as an earthen and rockfill dam, consisting of upstream low-permeability zones with transition/filter zones and downstream rockfill zones.

VOGBR (2008; 2011) planned to construct the TSF in three major stages, referred to as the initial stage (with a starter dam crest elevation of 146.0 MASL), intermediate stage (with an intermediate dam crest elevation of 166.0 MASL), and a final stage. The final dam crest of the final stage was revised from elevation 188.0 MASL to elevation 198.0 MASL (VOGBR, 2011), which increased the ultimate tailings storage capacity to over 100 Mt. The TSF final stage design was completed to a conceptual level (VOGBR, 2011).

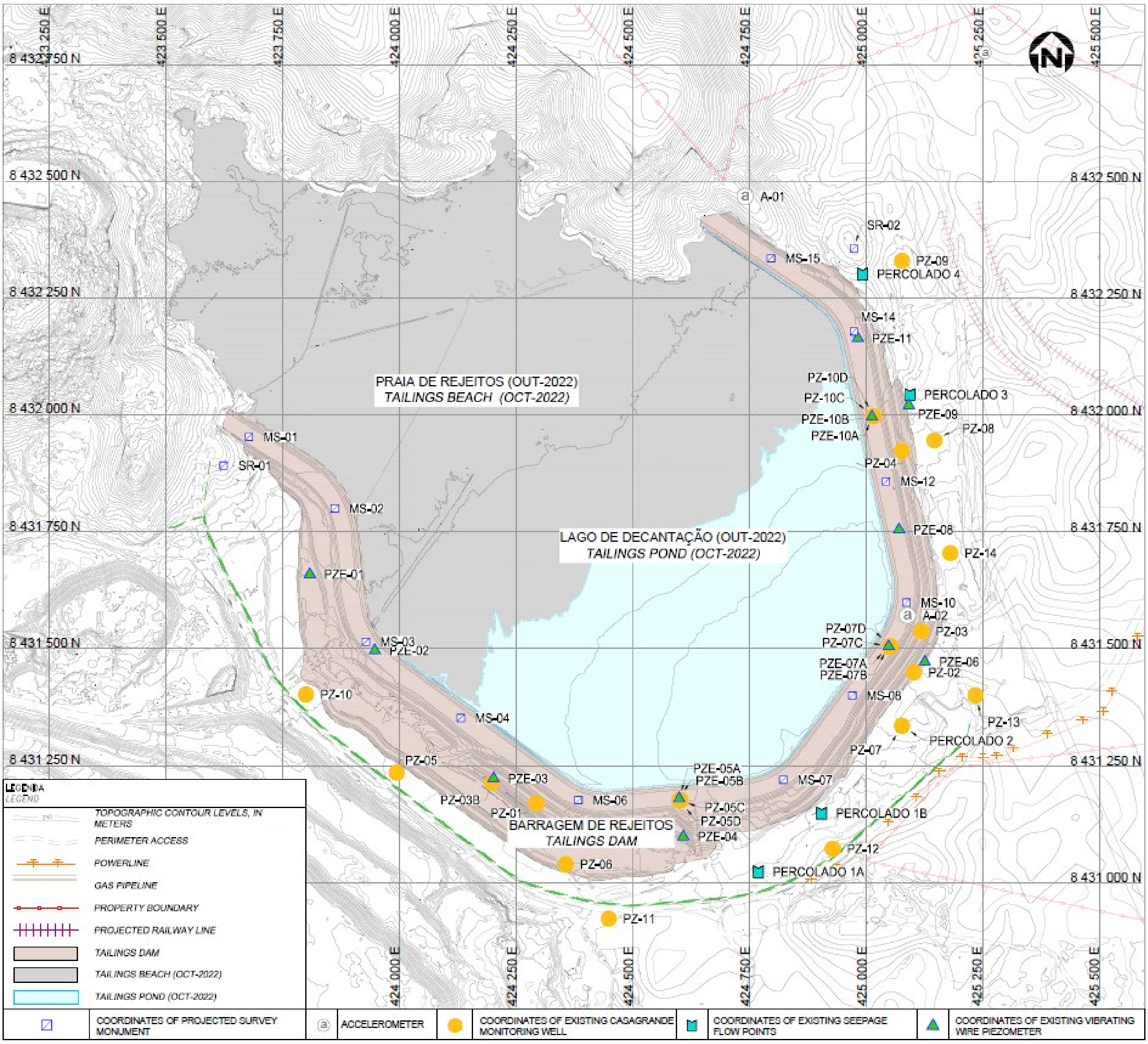
The initial TSF stage was constructed in 2008–2009, and tailings deposition commenced in November 2009. Construction of the intermediate stage started in April 2013, and was divided into six separate construction phases referred to as Phases 1 through 6. These phases were to provide incremental tailings storage capacities required for processing operations between 2013 and 2018 (VOGBR, 2013).

Coffey (2015) completed a detailed-level design for a TSF dam raise to elevation 154.0 MASL, which is referred to as Phase 3 construction, and this is the last design that was used for construction prior to the resumption of TSF operations in 2019. The Phase 3 construction was stopped in the first quarter of 2016, and tailings discharge to the impoundment ceased in April 2016. The operations were then placed on care and maintenance.

WSP (formerly Wood E&I) assumed the role of TSF designer in November 2019 and became the Engineer of Record in April 2021. Three subsequent TSF expansions, referred to as Phases I through III, have been constructed or are currently being developed. Among them, Phase I with the lowest dam crest elevation 160.1 MASL has been constructed; Phase II is divided into two interim stages, i.e., II-A and II-B, with the construction of Phase II-A recently completed to the lowest dam crest elevation 162.2 MASL, and the dam crest has reached lowest elevation 164.0 MASL, which represents the current dam configuration as of December 2022. Phase II-B (to crest elevation 168.0 MASL) and Phase III (to crest elevation 174.0 MASL) are currently being designed and constructed, with the majority of Phase II-B features completed.

The current TSF layout, adjacent infrastructure, and existing monitoring instruments are shown in Figure 20-1.

The following subsections provide a summary of the TSF and designs in general accordance with an as-built summary prepared by Atlantic Nickel (2017) for conditions prior to 2019, and recent design documents by WSP (2020a, 2020b, 2021a, 2021b, 2021c).



Source: WSP (formerly Wood E&I), 2023.

Note. Figure shown in relation to adjacent infrastructure and existing monitoring instrument locations as of December 2022.

Figure 20-1: Existing TSF Layout

20.3.1 Tailings and TSF Features – 2022

Features of the Phase II design include:

- TSF surface area: approximately 143.8 ha, based on an October 2022 survey by Atlantic Nickel;

- Existing stored tailings: approximately 52 Mt or 32 Mm^3, based on the tonnage number provided by Atlantic Nickel as of December 2022;
- Tailings specific gravity: 3.15; design tailings dry density: 1.6 t/m^3 (WSP, 2021c);
- Lowest tailings level: approximately 153.6 MASL, in accordance with a survey by Atlantic Nickel provided in October 2022;
- Supernatant pool level: approximately 157.4 MASL, in accordance with the November monthly monitoring report by WSP;
- Length of embankment: approximately 3.2 km, in accordance with a survey by Atlantic Nickel provided in October 2022;
- TSF dam crest (lowest): elevation 164.0 MASL, in accordance with a survey by Atlantic Nickel provided in October 2022;
- Maximum embankment downstream height: approximately 40 m, in accordance with a survey by Atlantic Nickel provided in October 2022;
- Ultimate tailings storage capacity upon construction of the final dam to crest elevation 180.0 MASL: approximately 88.6 Mt, according to the conceptual design by WSP (2021d). The remaining storage capacity of 36.6 Mt exceeds the required production of 33 Mt planned from the open pit operations.

20.3.2 TSF Design Criteria – Phase II

The TSF design criteria, which are in accordance with criteria for an Extreme Classification per Canadian Dam Association (CDA, 2019), include:

- Environmental design flood (EDF) to contain: a design event with a return period of 200 years, 24-hour precipitation = 187 mm, and design flood volume = 0.42 Mm^3;
- Inflow design flood (IDF) to manage (store and pass via spillway): probable maximum precipitation in 24 hours = 548.6 mm and design flood volume = 1.57 Mm^3;
- Emergency hydraulic freeboard: 1.0 m minimum, above IDF level;
- Spillway invert width: 15.0 m;
- Spillway design maximum outflow rate: approximately 9.3 m^3/s;
- Spillway invert elevation: 166.3 MASL;
- Earthquake design event: peak ground acceleration of a design earthquake event with a return period of about 10,000 years (1/10,000) or maximum credible earthquake (MCE) = 0.22 g;
- Slope stability design criteria:
    - Factor of safety (FOS) > 1.5 under long-term static condition;
    - FOS > 1.3 static condition – during construction;
    - FOS > 1.2 under rapid drawdown condition;
    - FOS > 1.1 pseudo-static condition;
    - FOS > 1.2 post-seismic condition.

The TSF embankment is constructed of zoned, locally sourced earth materials, which form the inner inclined low-permeability core layers, filter/transition layers, and downstream rockfill sections of ROM waste rock. The TSF embankment is raised in stages using a downstream raise methodology to achieve required storage capacity, along with freeboard of design storm events.

The TSF receives thickened tailings produced from the thickeners in the process plant area via an overland pipeline. Tailings are deposited in the impoundment flowing from the northwest, where they are discharged via a high-density polyethylene (HDPE) pipe, to the southeast, forming a supernatant pool against the southern and eastern legs of TSF embankment. A floating barge pump station, located at the southeast corner of the impoundment, returns supernatant reclaim water to the process plant. An overflow spillway is constructed west of the barge pump station through the southern leg of the TSF embankment. The supernatant pool is planned to be moved to the north of the impoundment, away from the highest segments of the TSF embankment, in the future.

According to Article 7 of Brazilian Federal Law No. 12,334, dams are classified by the inspection agents, based on category of risk, associated potential damage, and by their volume, as specified in the general criteria established by ANM Resolution 95 (ANM, 2022). The Santa Rita TSF dam is classified with "high" potential damage (among three categories of "high", "medium", and "low"), and "low" risk (among three categories of "high", "medium", and "low"), and with a recommended classification category of Class "A" to guide the operation management. Class A indicates a second highest rating "score" out of five tiers (AA, A, B, C, and D), indicating generally satisfactory operations practice.

The mine has dedicated staff managing the TSF and embankment. Ongoing operations, in relation to the TSF, have consisted of dam monitoring activities using an automated robotic total station, survey monuments, surveillance cameras, piezometers, seepage flow monitoring, visual inspections, and supernatant pool level measurements. An emergency action plan and an operation, maintenance, and surveillance manual were prepared and are used for guiding TSF operation and management, which include local community engagement for dam safety. The Santa Rita TSF has been inspected and assessed semi-annually by each of the mine tailings management team and an engineering consulting firm. Inspection frequencies are in full compliance with Brazilian regulations and CDA guidelines.

In 2019, WSP (formerly Wood E&I, 2019) conducted a third-party review of the TSF for dam safety and planned TSF expansion designs. The review provided recommendations to advance the TSF designs and supported the resumption of operations on site based on observations made during WSP's site visit and review of past studies and reports. No visible signs of dam instability were observed by WSP. The recommendations have been addressed by the work performed by WSP and the Atlantic Nickel team and incorporated into the current design and operation of the TSF. The latest two inspections performed by engineering consulting firms included GeoHydroTech Engenharia (2021) and WSP (2022), wherein the TSF dam was deemed stable. In addition, the dam has also been inspected annually by ANM.

Based on new geochemical characterisation data of the tailings, Atlantic Nickel reclassified the existing tailings as the Class II A waste (non-toxic and non-inert waste, according to ABNT NBR 10004) in 2021.

Although the original TSF and embankment were designed to meet Brazilian regulations only, the design criteria used in current TSF designs are in compliance with both Brazilian regulations and the CDA Technical Bulletin "Application of Dam Safety Guidelines to Mining Dams" (2019), which have been adopted as current international standards. The current TSF designs have considered the Santa Rita TSF dam with "Extreme" consequence of failure. Wood is implementing the TSF expansion designs following both Brazilian regulations and CDA guidelines. Where one standard or guideline is stricter than the other, it is the governing criterion. The Global Industry Standard on Tailings Management (GISTM, 2020) was recently published, which sets a precedent for the safe management of tailings facilities, towards the goal of zero harm. GISTM (2020) will also be considered to guide future TSF design and management.

20.4 Closure Plan

20.4.1 Closure Planning

Mine closure is regulated by Brazilian Mining Technical Standard 20 (NRM-20), approved by Legal Ordinance No. 237 issued in 2001 by the DNPM, linked to the ANM (Mirabella Mineracao, 2018).

Atlantic Nickel’s intent is to comply with the CDA/GISTM standards including mine closure in the future.

Atlantic Nickel developed a revised mine closure plan in 2022. This report provides basic guidelines for the mine closure and includes an analysis of the mine’s lifecycle development, current structures, description of the existing physical and biological environment, closure and reclamation methods, and a closure and reclamation cost estimate. The plan did not address underground mining as there was no formal study on underground mining available at the time.

Atlantic Nickel has planned and intends to develop, operate, and reclaim the operations consistent with industry standards and in accordance with national, state, and local laws and regulations. The physical and chemical stability of the operations area will be completed per a detailed closure plan that will be developed prior to closure. A conceptual closure plan is complete and includes a schedule indicating the time frames for the development of more detailed closure plans prior to the cessation of operations. Reclamation and closure will abide by Brazilian Law 6.938/81 and reclamation of the operations area will meet or exceed the requirements in Decree no. 97,632, 10.04.1989. Art. 19 of Law No. 7.805/89, which identifies the permit or licence holder responsible for damages to the environment (Mirabella Mineracao, 2018).

Decree No. 237, 18.10.2001 as amended by Decree No. 12, 22.02.2002 sets the regulatory Norms (MRLs) for mining, with No. 20 identifying the administrative and operational procedures for the cessation of mining operations, which includes the following requirements for closure plans:

- Report of work performed to date;
- Characterisation of the remaining Mineral Reserve;
- Plan for demobilisation;
- Topographic update;
- Area of disturbance including reclaimed areas;
- Monitoring Plan to include water resources, and slope stability;
- Pollution Control Plan for soil, air and water resources;
- Site security plan;
- Description of environmental impacts;
- Post-closure land use plan;
- Reclamation topography to show stability and erosion control;
- Report on the occupational health of workers.

Atlantic Nickel’s conceptual closure plan identifies the following per Ordinance 237 (October 18, 2001) and amended by Ordinance 12 (January 22, 2002):

- Report on the work status;
- Characterisation of remaining reserves;
- Plan to demobilize the facilities and equipment that compose the infrastructure of the mining enterprise and indicate their destination;
- Update of all topographical surveys of the mine;
- Mine plant with reclaimed mined areas, re claimed and to be reclaimed impacted areas, areas for disposal of organic and sterile soil, ores and tailings, disposal systems, access roads and other civil works;
- Follow slopes in up and monitoring programs related to disposal and containment systems; general; behaviour of the water table and water drainage;

- Plan for the control of pollution of soil, atmosphere and water resources, with characterisation of controlling parameters;
- Effluent release control plan with characterisation of controlling parameters;
- Measures to prevent access to the mine by strangers and set barriers to block access to dangerous areas;
- Definition of environmental impacts in the areas of influence of the enterprise, taking into account the physical, biotic and anthropic means;
- Aptitude and intention of future use of the area;
- Topographic and landscape design, taking into account stability, erosion control and drainage aspects; and
- Report on the occupational health conditions of workers during the lifetime of the mine;
- Physical and financial schedule of the proposed activities.

Atlantic Nickel has developed a concurrent reclamation plan for disturbed areas which includes traditional seeding, planting of seedlings, installation of artificial perches for birds, installation of shelters and artificial nests, and salvage of soil for reuse to retain the biotic and seed bank components of the soil. To aid in the revegetation success, Atlantic Nickel constructed and operates a plant nursery to develop seedlings for use during reclamation. As part of the nursery program, vegetation species identified as priorities for conservation are being propagated through the collection of seeds and seedlings for growing in the nursery. According to the closure plan, the mine operations have reforested 17.1 ha within the permit area and 92.0 ha within the legal reserve area.

Since the current closure plan is conceptual in nature due to the early phases of the mining operation, significant details regarding reclamation and closure techniques are not included. However, the plan does identify the risks associated with each facility, which will guide future detailed closure plans. The schedule for development and implementation is provided on the current conceptual closure plan and includes the following:

- Years 2008–2023: conceptual closure plan;
- Years 2023–2027: detailed closure plan;
- Years 2027–2030: transition from operations to closure;
- Years 2030–2040: post closure to include monitoring and maintenance;
- Year 2040: transfer custody of the area.

The following provides a list of the facilities with the largest disturbance area and includes the conceptual closure method for each:

- Open pit: the open pit will be left as is and is expected to fill with water from precipitation and groundwater inflow. The slopes, berms, and benches may be seeded or may be allowed to revegetate naturally. Water within the pit will be monitored following the cessation of mining.
- TSF: once processing has ceased, the TSF will be reclaimed. The structure will be drained, peripheral channels will be installed, and the TSF surface will be covered with growth media and revegetated with native species.
- WRSFs: will be graded to ensure the stability of slopes and maintain proper drainage, cover with growth media, and revegetated through seeding and planting of seedlings.
- Building area and support facility: will either be removed during closure or repurposed for post-closure use. Other areas such as roads, yards, etc., will be revegetated following loosing of the soil through ripping or other means.

Following final closure, a monitoring plan will be implemented to ensure proper physical and chemical stability is maintained following operations.

20.4.2 Closure Costs

Since the current closure plan is conceptual in nature, the reclamation cost estimate only provides a preliminary assessment of the potential cost for reclamation. The 2022 closure plan estimates a closure cost of approximately US$29.3 million. To assess the accuracy of this estimate, the Standardised Reclamation Cost Estimator (SRCE) was used to develop a reclamation cost estimate for the Santa Rita Mine based on the reclamation of the major facilities (WRSF, TSF, open pit, and buildings/roads). The SRCE is a spreadsheet-based estimator developed by the Nevada Department of Environmental Protection and the United States Bureau of Land Management to estimate third-party reclamation bonding costs for mining operations in Nevada. Since its inception, many other states have adopted the SRCE to develop reclamation bonding costs.

With the assumptions made in the SRCE, which included removal of all buildings (number and sizes estimated), and cover material on the WRSF and TSF, the SRCE model was used only as a high-level check of the costs presented in the closure plan. It should be noted that the labour, equipment, and material rates are based on US third-party rates which are expected to be higher than those in Brazil.

As the conceptual closure plan is revised to a detailed closure plan, the closure cost will also be more accurately developed.

20.5 Permitting

The environmental licensing process in Brazil has four stages (T de Mello and Malpass, 2015):

- Presentation of the Project
- Issuance of the preliminary licence
- Issuance of the installation licence
- Issuance of the operating licence

With the approval of these licences, additional management plans or permits are required. Administrative penalties for irregular installations or operations can include shutdowns, and/or fines ranging from R$500 to R$10 million. In addition, non-compliance with requirements and conditions identified in environmental licences can be subject to similar penalties (Gonçalves et al., 2012). A list of environmental permits is provided in Table 20-3.

Table 20-3: Permit List
ACG Acquisition Company Limited – Santa Rita Mine

Required Permit	Regulatory Ordinance, Licence, or Regulating Agency	Issued	Expiration	Notes
Effluent Discharge Permit	Portaria 26.534/2022, INEMA	7/22/2022	7/22/2026	For discharging up to 2,000 m^3/h of effluent generated by the mine
Environmental Authorisation for the extraction of clay	Portaria 22.304/2021, INEMA	3/02/2021	3/02/2023	Authorisation for the extraction of clay for tailings dam construction purposes; permit being renewed
Environmental Operating Permit	Portaria 27.726/2023	1/4/2023	1/4/2027	

Required Permit	Regulatory Ordinance, Licence, or Regulating Agency	Issued	Expiration	Notes
Environmental Operating Permit Renewal	Portaria 26.534/2022	7/22/2022	7/22/2026	Submitted 4/08/2013, not authorised until 02/2014
Mine dewatering permit	Portaria 11.469/2016, INEMA	3/16/2019	3/28/2024	For pumping water from the mine up to 1,540 m³/day
Mining Lease	-	8/17/2003	Amended 2004, 2005, 2007, and 2008	-
Mining Licence	390/2008, INEMA	1/02/2008	Unknown	Located on mining concession DNPM No. 871.369/89. Mining Licence is subject to the Mining Lease
Mining Permit 390/2008	DNPM process Nº 871.369/89	-	-	Industrial water consumption is provided by the Contas River, which has a water grant of 16.800 m³/day for 24 hrs/day issued by the environmental state agency
Mining Permit 390/2008	Nº 390/12/2007	-	12/31/2027	Mining Concession for nickel ore, in the Itagiba, municipality, state of Bahia
Operational permit for lateritic nickel extraction	Portaria 24.957/2022	1/6/2022	1/6/2026	The company applied for renewal 210 days prior to expiration following Brazilian Legislation. During the renewal process, the previous licence is valid.
Operational permit for sulphide nickel extraction	Portaria 27.726/2023	1/4/2023	1/4/2027	The company required to implement a recirculation system for the confluent waters in the East and South dikes and monitor related water quality.
Operating permit renewal	Ordinance Nº18.825/2019, INEMA	1/04/2023	1/04/2027	-
Permanent preservation area	Federal Law 12.651/12	-	-	A form of conservation of the natural ecosystem to be maintained in a Legal Reserve in native vegetation
Preliminary environmental permit	Nº 2006-001086/TEC/LL-0013, INEMA	12/23/2006	-	-

Required Permit	Regulatory Ordinance, Licence, or Regulating Agency	Issued	Expiration	Notes
Sanitary wastewater discharge authorisation	Ordinance Nº 26.534/2022	7/22/2022	7/22/2026	Authorize effluents discharge in the Peixe River (maximum flow rate of 48,000 m³/day, dilution flow rate of 6,000 m³/day, DBO concentration of 5.5 mg/L and 1 x 10³ UFC/100 mL) for thermotolerant coliforms.
Treatment plant	Procedure 2007_004376/TEC/LI-0027 (Portaria CRA 897/2007), INEMA	-	-	-
Wastewater discharge permit	Portaria 26.534/2022	7/22/2022	7/22/2026	Authorizes the release up to 2,000 m³/h of effluent generated by the mine.
Water abstraction permit (or water permit)	Portaria 24.957/2022	1/06/2022	1/06/2026	For water abstraction considering industrial supply purposes up to 700 m³/h from Contas River
Water abstraction permit for human consumption	Ordinance Nº 20.312/2020, INEMA	28/03/2020	28/03/2024	Water abstraction from the Contas River for human consumption purposes up to 720 m³/day, for 24 h/day.
Water permit for recirculation system	Environmental Agency of Bahia	12/2019	-	

Santa Rita has the required permits for open pit mining and processing operations.

20.6 Considerations of Social and Community Impacts

Atlantic Nickel updated the 2006 EIA with Santa Rita's Environmental and Social Impact Assessment (ESIA) in 2020. The updated ESIA did not encounter any major additional impact, above and beyond what had already been identified in the initial studies developed during the previous licensing processes. The gaps have been identified, however, as compared to the International Finance Corporation (IFC) Performance Standards. The findings have been thoroughly described within the Environmental and Social Action Plan (ESAP), and recommendations were fully implemented by the end of 2021.

To understand the needs of the stakeholders including the local communities, Atlantic Nickel created a stakeholder mapping and engagement plan. A survey was conducted as part of the plan to obtain information from interested parties who frequently interact with the mine. Based on the results of the survey, an action plan was developed that establishes frequent engagement with the stakeholders to ensure a bidirectional flow of communication and transparency. Atlantic Nickel registers and monitors interactions with the stakeholders to enhance the quality of the engagements.

Atlantic Nickel is part of the Comissão de Acompanhamento do Empreendimento (CAE). The CAE is an advisory committee of 14 members including local authorities and regional institution representatives and Atlantic Nickel representatives. The purpose of the CAE is to provide a formal setting to promote community interactions and encourage engagement by the community.

Atlantic Nickel has several social programs focusing on education and training, environmental stewardship, social entrepreneurship, and culture. These include:

- Cacao Project in partnership with Sofrê Institute, focusing on optimisation for cacao farmers.
- Social and Environmental Sustainability Plan. Includes contributions and donations to nursing homes and communities in need.
- Partnership with state, federal, and private technical schools and universities to focus on job training, expert exchange, technology development, publication exchange, research, and extension. The goal of these activities is to promote education and research in the mining and environmental fields and provide internships and training for students.
- PROMART – Projeto de Musicalização e Arte do Centro Batista Sete de Setembro de Ipiaú (CBS): This project has been active for 22 years and aims at providing children and teenagers from public schools in Ipiaú with educational support such as tutoring and extra-curricular activities such as music, sports, dancing, and computing lessons.

21.0 CAPITAL AND OPERATING COSTS

21.1 Capital Cost Estimates

21.1.1 Capital Cost Summary

Initial capital costs were incurred to rehabilitate and re-start the Santa Rita Mine with a process plant throughput of 6.5 Mt/a (17,800 t/d) in 2019. Atlantic Nickel declared commercial production on January 1, 2020 and the mine has been operating continuously since then. This CPR considers a mine plan with a start date of January 1, 2023. All capital costs in the LOM plan are considered sustaining capital.

The open pit mine has continued operations during the COVID-19 pandemic without major impact on production. Concentrate shipments have been dispatched according to contract. New health and safety protocols have been put in place to mitigate COVID-19 issues and to track follow-up actions.

The cost estimates are expressed in Q1 2023 US dollars. Unless otherwise indicated, all costs in this section of the CPR are expressed without allowance for escalation or interest rates. The currency exchange rates used in the cost estimate are based on forecast rates of R$5.39 per US$1.00 for 2023, and a long term rate of R$5.55 per US$1.00.

Sustaining capital costs over the open pit LOM are estimated at $245 million(Table 21-1). The sustaining capital cost estimate covers direct and indirect costs, Owner's costs, and 15% contingency on process plant, site refurbishment, and open pit mining equipment. Water treatment is based on actual quotes. The contingency on the tailings dam construction varies with each phase depending on the type of work. There is no contingency on drilling programs since the costs are well established.

Table 21-1: LOM Sustaining Capital Cost Estimate
ACG Acquisition Company Limited – Santa Rita Mine

Item	Sustaining Capital (US$M)
Mining equipment	65.8
Equipment salvage value	(20.3)
Process plant and site refurbishment	15.1
Water treatment pond	1.8
Tailings dam	76.7
Mineral Resource drilling	3.3
Closure cost	27.6
Capitalised deferred stripping	75.3
Total	**245.2**

21.1.2 Basis of Sustaining Cost Estimate

The accuracy of the sustaining capital cost estimate is supported by the design and engineering carried out by Atlantic Nickel and Appian Capital for the process plant and site refurbishment, and Mineral Resource drilling; WSP for the tailings dam; and Paques BV (Paques) for the water treatment plant and associated costs. Each consultant provided input to the capital cost estimate, appropriate to a PFS level.

Given the detailed design level and pricing basis, the overall estimated accuracy is expected to be ±15% of the final sustaining capital costs.

21.1.2.1 Mining Equipment

Atlantic Nickel plans to convert from contractor open pit mining to Owner operations starting in Q2 2023. Down payments for acquisition of mining equipment will take place during three periods, Q1 2023, Q2 2024, and Q4 2025. New mining equipment will be purchased with 30% down payment and 70% financing. The costs are based on quotations. A residual value of 15% to 40% depending on the type of equipment is expected as a salvage value at the end of the open pit life.

21.1.2.2 Process Plant and Site

The process plant and site costs were calculated by the processing team at Atlantic Nickel based on historical replacement periods for the processing plant equipment and associated infrastructure. The Atlantic Nickel team provided a breakdown of items composed of 48 work streams and a 15% contingency for the LOM based on actual quotes and previously achieved costs.

21.1.2.3 Water Treatment

Atlantic Nickel engaged Paques to evaluate if the sulphate-rich wastewater from the mine could be treated to remove the sulphates and at the same time precipitate the metals as metal sulphides. Paques concluded that the water can be treated successfully with SulfateQ technology. The estimated cost is based on their quotes inclusive of taxes.

21.1.2.4 Tailings Dam

The tailings dam design was completed by WSP for the open pit LOM. Based on the construction quantities required, Atlantic Nickel completed a cost estimate based on quotations for the work planned. The total cost is estimated at R$153 million. Differences in exchange rate account for the discrepancy between the 2022 estimate of $29.3 million noted in section 20.4.2 and the estimate of $27.6 million noted in Table 21-1. The costs in Table 21-1 are based on the exchange rates in Table 19-1.

21.1.2.5 Drilling

Actual unit costs from previous drilling were the basis for the estimation of the infill drill program at the open pit.

21.1.2.6 Closure

Arcadis completed an updated closure cost estimation comprehensive of additional studies, new Mineral Reserve estimate, mine, process plant, and tailings dam decommissioning together with a maintenance and monitoring plan (Arcadis, 2022). The total closure cost is estimated at R$153 million. Differences in exchange rate account for the discrepancy between the 2022 estimate of $29.3 million noted in section 20.4.2 and the estimate of $27.6 million noted in Table 21-1. The costs in Table 21-1 are based on the exchange rates in Table 19-1.

21.1.2.7 Capitalised Deferred Stripping

For each year in the mine plan, if the stripping ratio is greater than the LOM average stripping ratio, then the mining cost of the excess amount of waste rock is capitalised.

21.2 Operating Cost Estimates

21.2.1 Operating Cost Summary

The all-in sustaining operating cost (AISC) for the Santa Rita Mine is estimated to average $26.07/t processed over the open pit LOM. Table 21-2 summarizes the breakdown by activity.

Table 21-2: Base Case Operating Cost Summary
ACG Acquisition Company Limited – Santa Rita Mine

Item	Units	Unit Cost ($/t)	LOM Total ($M)
Open pit mining costs	US$/t mined	2.04	
Open pit mining costs	US$/t processed	7.55	262.9
Processing costs	US$/t processed	5.46	190.1
Site G&A	US$/t processed	1.94	67.7
Treatment, refining, penalties	US$/t processed	7.17	249.9
Freight costs	US$/t processed	2.50	87.2
By-product credits*	US$/t processed	(8.94)	(311.6)
C1 cost [1]	**US$/t processed**	**15.68**	**546.2**
Royalties	US$/t processed	3.77	131.4
Sustaining capital costs	US$/t processed	6.62	230.6
AISC [2]	**US$/t processed**	**26.07**	**908.2**

Notes: *Includes revenue from Cu, Co, Pd, Pt and Au.

1. C1 cost is cash operating costs less net by-product credits.
2. All-in sustaining cost (AISC) is C1 cost plus royalties and sustaining capital expenditures.

21.2.2 Basis of Estimate

21.2.2.1 Wages and Salaries

Salary and wage rates are based on current labour rates. The calculation of all-in labour cost included burdens to cover all statutory payments, company sponsored benefit plans and programs, and costs associated with vacation, insurance, retirement plan, sick leave, and absenteeism.

21.2.2.2 Work Schedule

The work schedule assumes production will operate 24 hr/day, seven days/week, 365 days/year.

21.2.2.3 Energy Costs

A diesel fuel price of R$6.50/L (US$1.21/L in Q1 2023) has been used for estimation of operating costs. Electrical power costs for Santa Rita were calculated to average R$247/MWh, (US$0.046/kWh in Q1 2023) over the LOM, inclusive of taxes.

21.2.2.4 Freight

Freight costs are based on executed contracts for port operations and land freight, and quotes for the other types of freight, in line with historical costs.

21.2.2.5 Tax Rebates

Atlantic Nickel accumulates credits for PIS (social integration program) and COFINS (social security financing contribution), both value-added federal taxes, and ICMS (value-added state taxes on sales and services) from the acquisition of services and goods within Brazil. As Atlantic Nickel is a 100% exporting company, it is allowed to recover a portion of the value-added taxes during production. The recovered taxes are shown as a tax rebate in the operating costs. The recovery rates are specified in a tax report by KPMG Assessores Ltda. (2020).

21.2.3 Mining

Atlantic Nickel has entered into agreements with two contractors for open pit mining at the Santa Rita Mine. The contracts include all open pit mining activities, such as drilling, blasting, loading and hauling of ore and waste rock. Mining costs for Q1 2023 are based on the executed contracts plus Owner's costs for technical staff and support. As of Q2 2023, mining equipment will start to be purchased and operated by Atlantic Nickel. New equipment will be phased in to replace contractor equipment, and some contractor equipment will be purchased by Atlantic Nickel. The operation will transition to Owner operated by the end of 2024. The unit mining operating cost over the LOM is estimated to average $2.04/t material mined and is presented in Table 21-3. The inclusion of tax rebates and allocating expenses to waste rock capitalised deferred waste stripping have reduced the unit mining cost.

Table 21-3: Base Case Unit Mining Operating Cost
ACG Acquisition Company Limited – Santa Rita Mine

Item	Unit Cost (US$/t mined)	LOM Total (US$M)
Ore drilling	0.15	19.0
Ore removal	0.15	19.6
Ore loading	0.12	15.0
Ore transport	0.23	30.1
Waste rock drilling	0.27	35.1
Waste rock removal	0.25	32.3
Waste rock loading	0.35	44.6
Waste rock transport	0.68	87.4
Re-handling	0.12	15.8
Owner's team	0.11	14.5
Pumping and dewatering	0.11	13.6
Other mining costs	0.43	55.8
Tax rebate	(0.35)	(44.8)
Capitalised expenses	(0.58)	(75.3)
Total	**2.04**	**262.9**

21.2.4 Processing

Process plant operating costs include the costs for operating and maintaining the processing facilities, from the primary crusher through to concentrate loadout, as well as process and reclaim water pumping, and operating the TSF. The processing costs account for the expenses associated with purchasing consumables, equipment maintenance, personnel, and electrical power consumption.

Consumable costs include items such as crusher liners, mill liners, grinding media, all chemical reagents, and an allocated cost for office/laboratory supplies.

Electrical power consumption was derived from the estimated electrical load of individual pieces of equipment on the process plant equipment list.

The average LOM unit processing cost is estimated at $5.46/t and is presented in Table 21-4.

Table 21-4: Base Case Unit Processing Operating Cost
ACG Acquisition Company Limited – Santa Rita Mine

Item	Unit Cost ($/t feed)	LOM Total ($M)
Labour	0.97	33.7
Inputs	1.96	68.1
Energy	1.28	44.5
Chemical laboratory	0.02	0.8
Operating consumables	0.02	0.5
Maintenance consumables	0.04	1.5
Services	0.27	9.4
Mechanical materials	0.48	16.8
Electrical materials	0.02	0.7
SAG mill liners	0.69	23.9
Tax rebate	(0.28)	(9.8)
Total Processing Costs	**5.46**	**190.1**

21.2.5 Site General and Administrative

The G&A operating costs are the expenses for cost centres that are not directly linked to the mining and process disciplines, and include labour and overhead costs.

The G&A unit operating cost is estimated to average $1.94/t over the LOM and is presented in Table 21-5.

Table 21-5: Base Case G&A LOM Cost Estimate
ACG Acquisition Company Limited – Santa Rita Mine

Item	Unit Cost ($/t feed)	*LOM Total ($M)*
Site G&A labour	0.75	26.0
Site G&A services	0.63	22.0
General expenses	0.58	20.3
Tax rebate	(0.01)	(0.5)
Total G&A Costs	**1.94**	**67.7**

21.3 Manpower

Table 21-6 presents a summary of open pit, process plant, and G&A manpower per annum. The mine plans to transition from contractor mining to Owner-operated mining starting in early 2023. A full transition is planned to be complete by the end of 2024.

Table 21-6: Base Case Manpower Summary
ACG Acquisition Company Limited – Santa Rita Mine

Item	With Mining Contractor January 1, 2023	Owner-Operated December 2023	Owner-Operated December 2024
Owner			
Mining	94	563	1,410
Processing	203	203	203
Admin	102	123	123
Sub-Total	**399**	**889**	**1,736**
Contractor			
Mining	1,607	902	55
Processing	85	85	85
Admin	919	710	710
Sub-Total	**2,611**	**1,697**	**850**
Total Mine			
Mining	1,701	1,465	1,465
Processing	288	288	288
Admin	1,021	833	833
Total	**3,010**	**2,586**	**2,586**

21.4 CP Comments on "Item 21: Capital and Operating Costs"

21.4.1 Mining Costs

The CP notes:

- Initial capital costs have been spent and are considered as sunk costs; all ongoing capital costs are sustaining capital costs.
- The open pit mine operating costs are based on the mine plan.
- Mining is planned to transition from open pit contractor to Owner operated starting in Q2 2023 and completed in Q4 2024. Down payments for acquisition of mining equipment will take place during three periods, Q1 2023, Q2 2024, and Q4 2025.

22.0 ECONOMIC ANALYSIS

22.1 Cautionary Statement

The results of the economic analyses discussed in this CPR section represent forward-looking information. The results depend on inputs that are subject to a number of known and unknown risks, uncertainties, and other factors that may cause actual results to differ materially from those presented here. Information that is forward-looking includes:

- Mineral Reserve estimates;
- Commodity prices and exchange rates;
- Mine production plan;
- Mining and process plant recovery rates;
- Mining dilution and mining recovery;
- Sustaining costs and operating costs;
- Closure costs and closure requirements;
- Environmental, permitting, and social risks.

Additional risks to the forward-looking information include:

- Changes to costs of production from what is assumed;
- Unrecognised environmental risks;
- Unanticipated reclamation expenses;
- Unexpected variations in quantity of mineralised material, grade, or recovery rates;
- Geotechnical or hydrogeological considerations during mining being different from what was assumed;
- Failure of mining methods to continue to operate as anticipated;
- Failure of process plant, equipment, or processes to operate as anticipated;
- Changes to assumptions as to the availability of electrical power and its rates used in the operating cost estimates and financial analysis;
- Ability to maintain the social licence to operate;
- Accidents, labour disputes, and other risks of the mining industry;
- Changes to interest rates;
- Changes to tax rates.

22.2 Methodology Used

A financial model was developed to estimate the Santa Rita Mine base case open pit LOM plan comprised of mining the Proven and Probable Mineral Reserve within the open pit. The LOM plan covers a period of six years beginning Q1 2023. Table 22-1 presents a summary of the LOM financial parameters and evaluation. The financial analysis was prepared on a real currency basis with all cash flows expressed in Q1 2023 US dollar terms.

22.3 Financial Model Parameters

A total of 207 Mlb of NiEq (using the metal prices in Table 22-1) are payable over the open pit LOM. NiEq is determined by dividing the revenue from payable Cu, Co, Au, Pt, and Pd by the price of Ni to calculate equivalent pounds of Ni, then adding the payable Ni pounds to sum to the total NiEq pounds. LOM production and payable NiEq metal are summarised in Figure 22-1.

Other economic factors include the following:

- Discount rate of 8%;
- Figures in Q1 2023 US dollars;
- All cash flows include 90% to 95% payments for concentrate during the period in which they are incurred, depending on the concentrate sales agreement. The remaining 5% to 10% of the metal is paid within 90 days of reaching the Brazilian port.

Net revenue is calculated on the following:

- Revenues are calculated on the sale of nickel concentrates based on metal prices from the consensus mean of leading banks and financial institutions as of Q1 2023, and forecast Brazilian to US dollar exchange rates;
- Treatment and refining charges for concentrates are based on contracted terms with several smelters/refineries and metal offtakers;
- There are four NSR royalties payable over the LOM:
    - The CFEM royalty at 2.00% on an NSR that does not allow the deductibility of freight costs;
    - The CBPM royalty at 2.51% on 60% of the value of nickel contained in concentrate and a royalty rate of 2.51% on 100% of the value of copper, cobalt, palladium, platinum, and gold contained in concentrate;
    - Land owner royalties at 1.00%;
    - The Appian Natural Resources Fund II royalty at 2.75%.

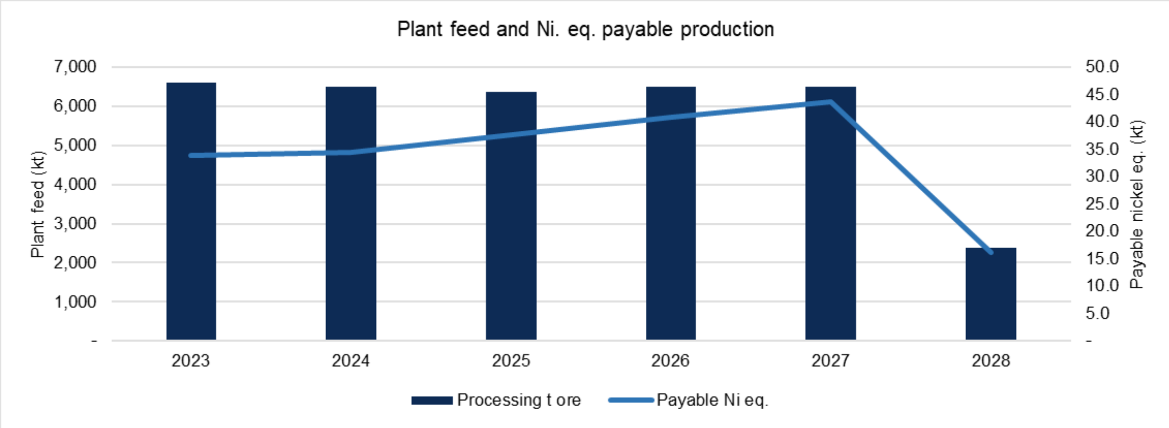
Table 22-1: Base Case LOM Cash Flow and Parameters
ACG Acquisition Company Limited – Santa Rita Mine

Item	Unit	Value
Commodity Prices and Exchange Rate 1		
2023–2028 nickel price	US$/lb	9.87–8.46
2023–2028 copper price	US$/lb	3.55–3.59
2023–2028 cobalt price	US$/lb	25.58–23.53
2023–2028 gold price	US$/oz	1,753–1,615
2023–2028 platinum price	US$/oz	1,027–1,140
2023–2028 palladium price	US$/oz	1,977–1,363
2023–2028 BRL:USD	R$:US$	5.39–5.55
LOM Mine Plan Summary		
Mine life (including stockpile processing)	Years	6
Mineral Reserve	kt	34,842
Grade NiS	%	0.31
Grade Cu	%	0.11
Grade Co	%	0.01
Grade Pd	g/t	0.03

Item	Unit	Value
Grade Pt	g/t	0.06
Grade Au	g/t	0.04
Processing rate	Mt/a	6.5
LOM Concentrate Production		
Concentrate (dry)	kt	656
Ni	%	13.50
Cu	%	4.39
Co	%	0.24
Pd	g/t	1.67
Pt	g/t	2.26
Au	g/t	1.03
LOM Revenue		
Net smelter return revenue	US$M	1,569
LOM Operating Cost		
Mining	US$/t processed	7.55
Processing	US$/t processed	5.46
Site G&A	US$/t processed	1.94
Treatment, refining, penalties	US$/t processed	7.17
Freight	US$/t processed	2.50
By-product credits	US$/t processed	(8.94)
C1 operating cost [2]	US$/lb Ni [3]	3.16
AISC cost [4]	US$/lb Ni	5.26
Operating costs net of adjustments	US$M	(858)
Royalties	US$M	(131)
LOM Cash Flow		
EBITDA cash	US$M	967
Cash Flow		
Taxes	US$M	(54)
Change in working capital	US$M	25
Sustaining capex	US$M	(245)
Unlevered Free Cash Flow	**US$M**	**694**
Post-Tax $NPV_{8\%}$	**US$M**	**546**

Notes: EBITDA = earnings before interest, taxes, depreciation and amortisation.

1. Metal prices and exchange rates after 2027 are long-term forecasts. Refer to Table 19-1 for values used for 2023–2028.
2. C1 cost = cash operating costs less net by-product credits.
3. Ni cost = (mining cost + processing cost + site G&A cost + treatment/refining cost + freight cost – by-product credits for Cu, Co, Pd, Pt, Au) / payable Ni.
4. All-in sustaining cost (AISC) = C1 cost plus royalties and sustaining capital expenditures.



Source: Atlantic Nickel, 2023.

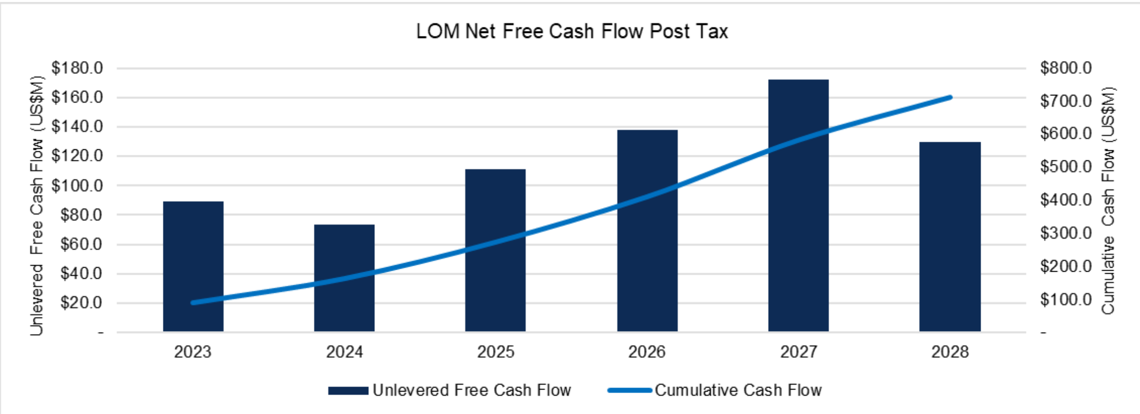
Figure 22-1: LOM Payable NiEq

All applicable Brazilian taxes are estimated in the financial model. PIS/COFINS credits have been applied to offset income taxes. The financial model also reflects that Atlantic Nickel recently obtained an extension on the Superintendency for the Development of the Northeast (Superintendência de Desenvolvimento do Nordeste, or SUDENE) tax incentive in 2020, which encourages economic development in Northeast Brazil. This incentive program provides for a 75% reduction in the base income tax rate, for a period of 10 years until 2030.

22.4 Economic Analysis

The Santa Rita operations are estimated to generate US$122 million in average unlevered free cash flow annually over the open pit LOM and has a post-tax NPV, using an 8% discount rate, of US$546 million. A measure of the internal rate of return (IRR) and number of payback years are not possible in this case since the initial capital costs have been expended and are considered sunk costs.

The financial results are presented in Figure 22-2 and a summary of the financial model is presented in Table 22-2. The open pit mine plan commences at the beginning of Q1 2023.



Source: Atlantic Nickel, 2023.

Figure 22-2: LOM Net Unlevered Free Cash Flow Post Tax

Table 22-2: Cash Flow Analysis
ACG Acquisition Company Limited – Santa Rita Mine

Item	Units	2023	2024	2025	2026	2027	2028	2029	Total
Ni price	US$/lb	9.87	9.46	9.61	9.13	8.46	8.46	—	9.17
Cu price	US$/lb	3.55	3.82	3.94	3.89	3.59	3.59	—	3.73
Co price	US$/lb	25.58	27.70	27.37	26.43	23.53	23.53	—	25.69
Au price	US$/oz	1,753	1,719	1,654	1,593	1,615	1,615	—	1,658
Pt price	US$/oz	1,027	1,099	1,121	1,195	1,140	1,140	—	1,120
Pd price	US$/oz	1,977	1,763	1,544	1,325	1,363	1,363	—	1,556
BRL:USD exchange rate	R$:US$	5.39	5.44	5.66	5.55	5.55	5.55	—	5.52
Mining ore	kt	6,602	5,660	7,349	7,023	7,340	—	—	33,973
Mining waste rock	kt	27,518	25,625	22,438	14,660	4,493	—	—	94,734
Strip ratio	W:O	4.17	4.53	3.05	2.09	0.61	—	—	2.79
Processing ore	kt	6,600	6,500	6,367	6,500	6,500	2,376	—	34,842
Ni grade	%	0.27	0.28	0.30	0.32	0.34	0.32	—	0.31
Cu grade	%	0.10	0.10	0.11	0.11	0.13	0.12	—	0.11
Co grade	%	0.01	0.02	0.01	0.01	0.01	0.01	—	0.01
Au grade	g/t	0.04	0.04	0.04	0.04	0.04	0.04	—	0.04
Pt grade	g/t	0.06	0.06	0.06	0.06	0.06	0.06	—	0.06
Pd grade	g/t	0.03	0.03	0.03	0.03	0.03	0.03	—	0.03
Concentrate (dmt)	kt	109	110	118	130	141	48	—	656
Concentrate Ni grade	%	13.50	13.50	13.50	13.50	13.50	13.50	—	13.50

Item	Units	2023	2024	2025	2026	2027	2028	2029	Total
Concentrate Cu grade	%	4.51	4.45	4.37	4.28	4.36	4.40	—	4.39
Concentrate Co grade	%	0.22	0.25	0.25	0.25	0.25	0.25	—	0.24
Concentrate Au grade	g/t	1.03	1.03	1.03	1.03	1.03	1.03	—	1.03
Concentrate Pt grade	g/t	2.26	2.26	2.26	2.26	2.26	2.26	—	2.26
Concentrate Pd grade	g/t	1.67	1.67	1.67	1.67	1.67	1.67	—	1.67
Payable Ni	Mlb	28.7	28.7	31.5	34.1	36.3	13.3	—	172.7
Payable Cu	Mlb	8.2	8.2	8.8	9.3	10.1	3.8	—	48.4
Payable Co	Mlb	0.2	0.2	0.3	0.3	0.3	0.1	—	1.4
Payable Au	koz	2.2	2.3	2.6	2.8	3.0	1.1	—	14.0
Payable Pt	koz	5.2	5.3	5.8	6.2	6.6	2.5	—	31.7
Payable Pd	koz	3.8	3.9	4.3	4.6	4.9	1.9	—	23.4
Payable NiEq	Mlb	33.8	34.5	37.7	40.9	43.7	16.1	—	206.7
Ni revenue	US$M	284.1	271.7	301.7	310.6	306.6	119.4	—	1,594.1
Cu revenue	US$M	29.2	31.2	34.3	35.8	36.4	14.4	—	181.2
Co revenue	US$M	4.6	6.6	7.3	7.8	7.4	2.4	—	36.1
PGM revenue	US$M	16.4	16.6	17.2	17.8	18.8	7.4	—	94.3
Hedging gain	US$M	50.8	—	—	—	—	—	—	50.8
Total Revenue	**US$M**	**385.1**	**326.0**	**360.5**	**372.0**	**369.2**	**143.6**	**—**	**1,956.5**
Net Smelter Return	**US$M**	**314.0**	**270.3**	**302.6**	**313.2**	**309.2**	**110.2**	**—**	**1,619.3**
Less: mining costs	US$M	(67.4)	(46.6)	(52.7)	(53.3)	(38.1)	(4.7)	—	(262.9)
Less: processing costs	US$M	(36.6)	(35.0)	(34.5)	(34.7)	(34.9)	(14.4)	—	(190.1)

Item	Units	2023	2024	2025	2026	2027	2028	2029	Total
Less: general and administrative	US$M	(12.5)	(12.1)	(12.5)	(11.3)	(11.3)	(10.7)	—	(67.7)
Less: royalties	US$M	(22.3)	(22.5)	(25.2)	(26.1)	(25.9)	(9.4)	—	(131.4)
EBITDA	**US$M**	**175.2**	**153.9**	**177.8**	**187.7**	**198.9**	**73.6**	**—**	**967.2**
EBITDA margin	%	*46*	*47*	*49*	*50*	*54*	*51*	—	49
C1 cost	US$/lb Ni	4.79	3.32	3.13	2.84	2.25	2.73	—	3.16
C1 cost	US$M	137.4	95.2	98.7	96.8	81.7	36.4	—	546.2
Less: cash taxes	US$M	(16.7)	(12.9)	(10.0)	(7.4)	(5.7)	(0.9)	—	(53.6)
Less: change in working capital	US$M	(1.5)	9.5	(12.7)	(2.3)	(11.6)	44.5	(0.5)	25.2
Less: sustaining capital expenditures	US$M	(67.4)	(77.1)	(44.2)	(40.2)	(9.6)	12.5	(19.1)	(245.2)
AISC	US$/lb Ni	7.84	6.69	5.27	4.71	3.22	3.55	—	5.26
AISC	US$M	225.0	192.1	166.1	160.7	116.9	47.4	—	908.2
Unlevered Free Cash Flow	**US$M**	**89.5**	**73.5**	**110.9**	**137.8**	**172.0**	**129.6**	**(19.7)**	**693.7**
Cumulative cash flow	US$M	89.5	163.0	273.9	411.7	583.7	713.4	693.7	
NPV @ 8% discount rate	**US$M**								**546.1**

Notes:

1. Totals may not sum due to rounding.
2. C1 cost = cash operating costs less net by-product credits.
3. All-in sustaining cost (AISC) = C1 cost plus royalties and sustaining capital expenditures.

22.5 Sensitivity Analysis

The cash flow and $NPV_{8\%}$ sensitivity to variations in nickel price are summarised in Table 22-3.

Table 22-3: Base Case Cash Flow at Various Nickel Prices
ACG Acquisition Company Limited – Santa Rita Mine

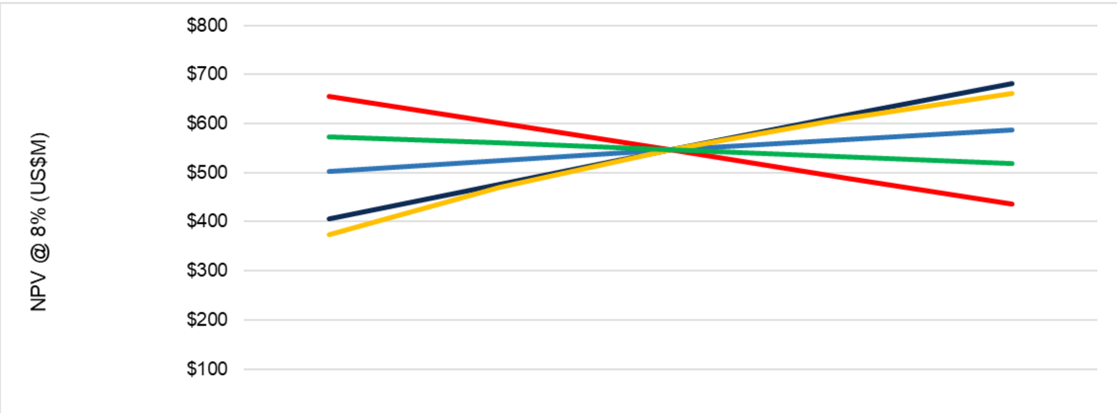
Sensitivity (%)	-20	-10	0	+10	+20
Operating Cash Flow Pre-Tax ($ M)					
Annual	140	155	**172**	187	203
LOM cumulative	782	874	**967**	1,058	1,148
Net Unlevered Free Cash Flow ($ M)					
Annual	86	102	**118**	133	148
LOM cumulative	508	601	**694**	784	874
NPV Results ($M)					
Post-tax $NPV_{8\%}$	407	476	**546**	614	682

Note: Base Case is bolded.

Base case nickel prices in the financial model range from US$8.46/lb to US$9.87/lb depending on the year, and all of these prices were changed according to the sensitivity percentage.

Figure 22-3 presents an NPV sensitivity analysis on nickel price, by-product prices, exchange rate, operating costs, and sustaining capital costs.

The operations are most sensitive to changes in the nickel price, less sensitive to changes in foreign exchange rate fluctuations and operating costs, and least sensitive to commodity price changes for the by-product elements and variations to the sustaining capital costs.



	(20%)	(10%)	-	10%	20%
Nickel price	$407	$476	$546	$614	$682
By-products prices	$503	$525	$546	$567	$588
FX	$375	$470	$546	$608	$660
Opex	$656	$601	$546	$491	$437
Capex	$574	$560	$546	$532	$518

Source: Atlantic Nickel, 2023.

Figure 22-3: Base Case NPV Sensitivity Analysis

22.6 CP Comments on “Item 22: Economic Analysis”

Financial analysis on the Santa Rita Mine demonstrates positive economics and project viability. The Santa Rita Mine is most sensitive to the nickel price, less sensitive to changes in foreign exchange rate fluctuations and operating costs, and least sensitive to commodity price changes for the by-product elements and variations to the sustaining capital costs.

23.0 ADJACENT PROPERTIES

There are no adjacent properties to report in this section.

24.0 OTHER RELEVANT DATA AND INFORMATION

24.1 Preliminary Economic Assessment

24.1.1 Introduction

The 2023 PEA that follows is an alternative development option completed at the conceptual level based on Mineral Resources that are considered amenable to underground mining methods.

The 2023 PEA mine plan is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the 2023 PEA based on these Mineral Resources will be realised. Inferred Mineral Resources comprise 55% of the 2023 PEA mine plan.

The information presented in Sections 1 to 14 of the CPR also pertains to the 2023 PEA, as do Section 23 and Sections 25 to 27, and therefore is not repeated here. Information relating to Sections 15 to 22 content for the 2023 PEA is provided in the following subsections. Years presented in the 2023 PEA are for illustrative purposes only.

24.1.2 Mineral Reserve Estimates

This section is not relevant to the 2023 PEA, as the 2023 PEA mine plan is based on Mineral Resources only.

24.1.3 Mining Methods

24.1.3.1 Introduction

The Mineral Resource considered amenable to underground mining methods includes both Indicated Mineral Resources and Inferred Mineral Resources.

The Santa Rita deposit is currently being mined by conventional open pit methods, and production is scheduled from 2023 to 2028. The open pit will be mined to a maximum depth of 320 m (164 m RL). Underground development would commence before the open pit is depleted so that there would not be a significant gap in feed to the process plant.

The Santa Rita mineralisation extending below the open pit comprises a large tabular-to-massive deposit, striking north–south for over 800 m, dipping 50° to 55° to the east, extending to a known depth of approximately 1,100 m, and varying in thickness from 50 m to 150 m. The mineralisation shows a trend for increasing grade and thickness with depth.

An SLC mining method was selected for the underground portion of the Santa Rita deposit based on the amenable geometry of the deposit and the productivity and cost advantages of SLC enabling greater exploitation of the Mineral Resource at a greater margin than more selective methods. The relatively wide deposit determined that a transverse drill drive orientation should be used.

The Santa Rita SLC geometry and location below a mined open pit are similar to the Ernest Henry SLC which is successfully operated by Ernest Henry Mining (a subsidiary of Glencore) in Queensland, Australia.

The SLC mining method employs longhole drilling and blasting techniques to extract mineralisation sequentially from surface to the bottom of the deposit. The method does not require backfill and therefore relies on the overlying waste rock to cave and fill the mined void. Caving of the overlying waste rock results in surface subsidence directly above and in the immediate vicinity of the underground deposit.

SLC mining typically comprises multiple mining levels spaced at regular vertical intervals, generally at 25 m spacing. Each level is made up of parallel and evenly-spaced drill drives from which production drilling and blasting occur. Once blasted, the mineralisation is loaded from the drill drives using load-haul-dump (LHD) machines, and loaded into trucks for haulage to the surface during the initial ramp-up phase, and later to ore-passes feeding an underground crushing station. After crushing, the mineralisation can be either hoisted to surface in a shaft or conveyed to the surface via an inclined tunnel. For the Santa Rita underground mine design, a conveyor was selected.

The SLC method enables a fast production ramp-up because it employs a top-down mining sequence that enables production to commence soon after the top of the underground deposit has been accessed. The method also enables high production rates since the mining cycle is simplified by the standardisation of development and production activities, and backfilling is eliminated. These characteristics typically act to lower operating costs and reduce the ramp-up period for SLC compared to other mining methods.

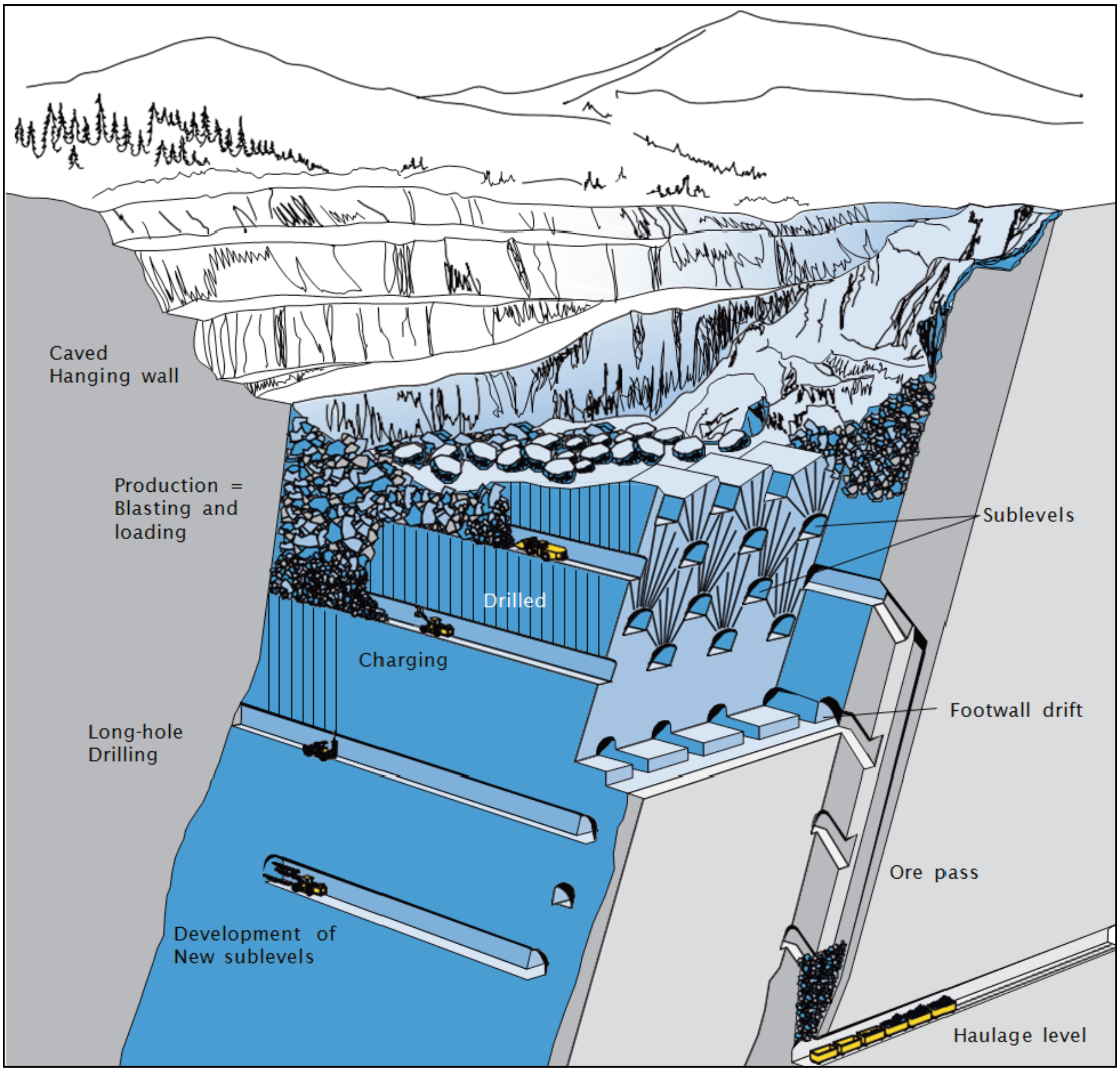
An underground mining operation at the Santa Rita deposit would be developed, operated, and supported by the remaining resources and infrastructure associated with current mining of the open pit.

24.1.3.2 Underground Mining Method

A schematic to illustrate the SLC mining method is provided in Figure 24-1.

Longhole open stoping methods were excluded from this study because the higher operating cost considerably reduces the Mineral Resource available for economic extraction and reduces the operating margin. However, opportunity may exist for selective longhole open stoping mining to occur adjacent to the SLC during the ramp-up phase and aid the creation of water surge voids for the SLC.

Block caving was not considered because the dip of the deposit is generally not considered favourable for this mining method and would result in excessive dilution (based on a typical block cave layout using a single extraction level). However, further investigation into inclined caving layouts is warranted given the additional productivity and operating cost benefits compared to SLC. Inclined caving uses multiple, smaller, extraction levels that align with the footwall to reduce dilution compared to block caving, and does not require the extensive development and longhole drill and blast of SLC.



Source: Epiroc (2007).

Figure 24-1: Sub-level Caving Schematic

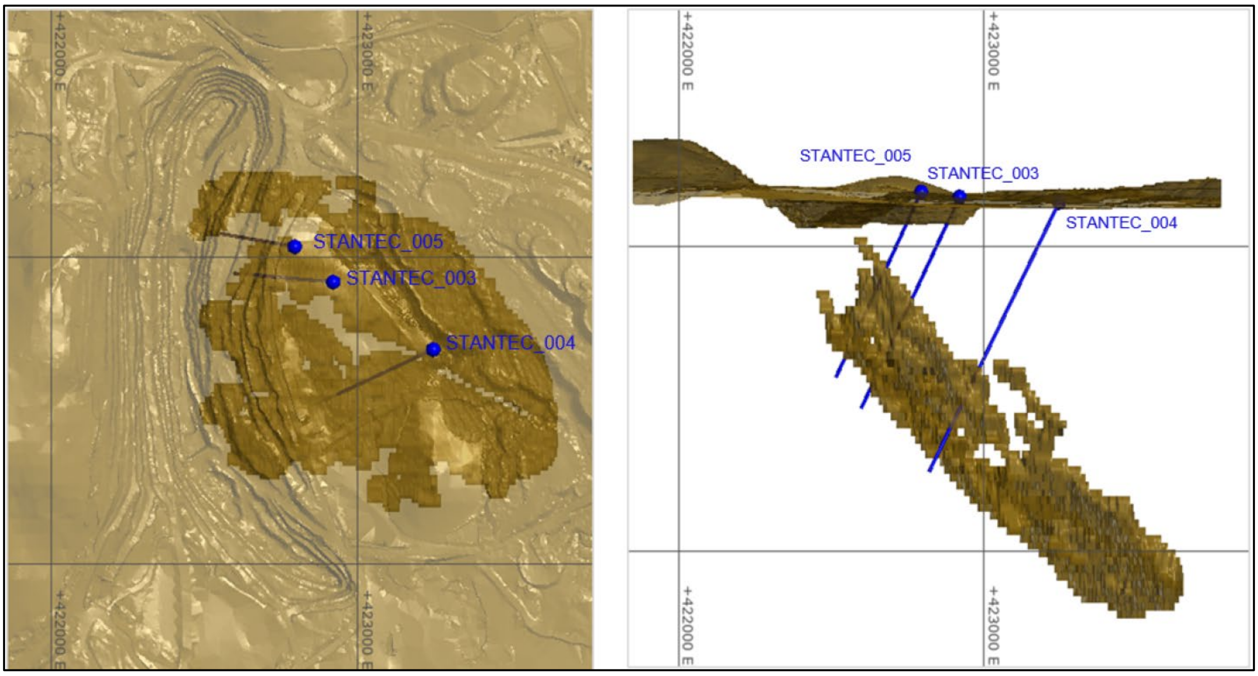
24.1.3.3 Geotechnical

The following geotechnical investigations were completed for the 2023 PEA:

- Stantec, Scoping Level Sublevel Caving Geotechnical Studies for the Santa Rita Project, Brazil (Stantec, 2020);
- Stantec, Prefeasibility Level Sublevel Caving Geotechnical Studies for the Santa Rita Project, Brazil (Stantec, 2022);
- Power Geotechnical, Santa Rita SLC Scoping Modelling (Power Geotechnical Ltd, 2021).

Stantec reviewed existing geotechnical data and oversaw a site investigation comprising three geotechnical drill holes specifically for assessing underground conditions, and provided recommendations based on SLC mining method. The locations of the three holes are shown in Figure 24-2.

Power Geotechnical conducted SLC cave draw and dilution modelling, scheduling, and caveability assessment based on the Stantec findings.



Source: Stantec (2020).

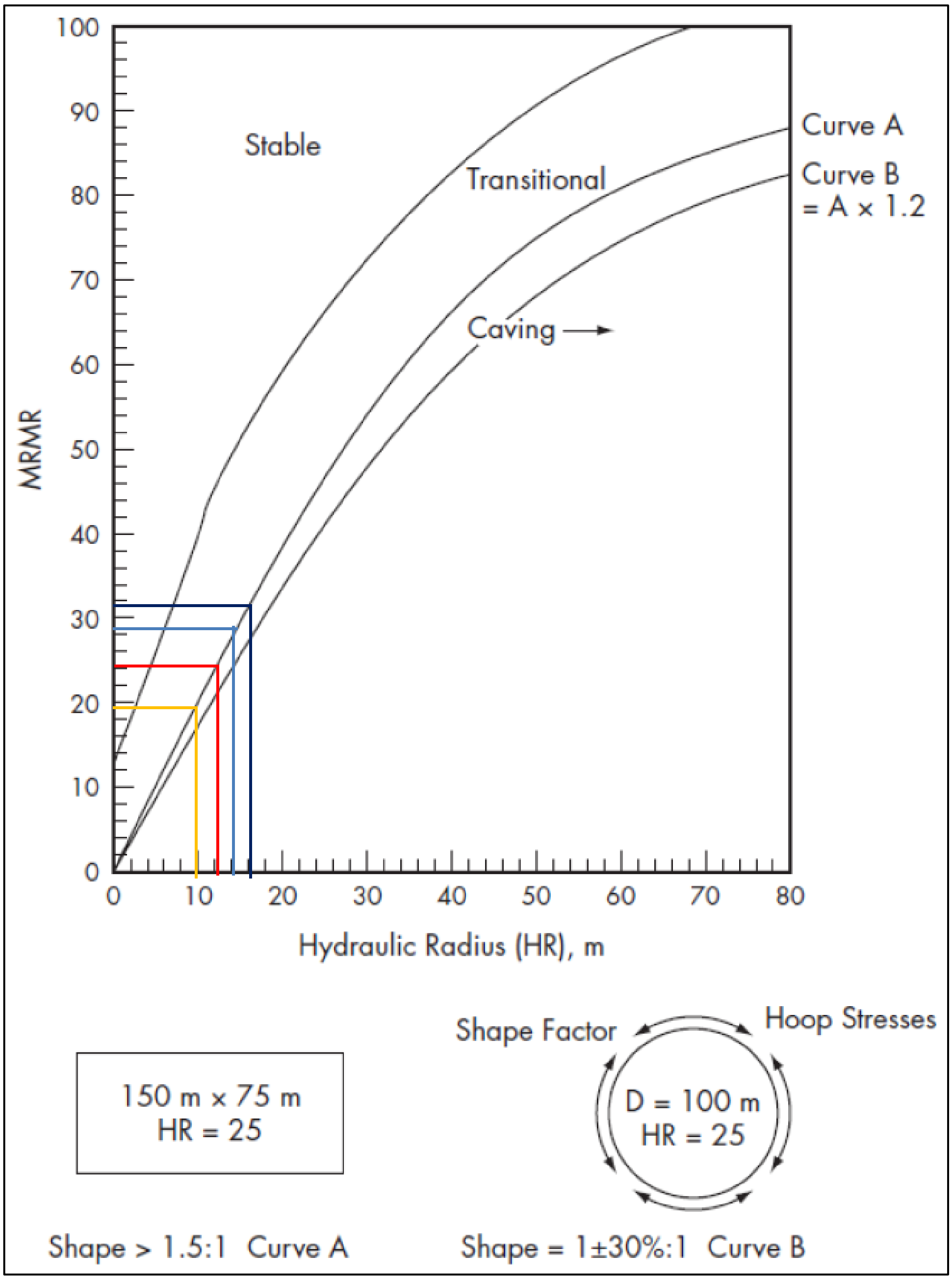
Figure 24-2: Location of Underground Geotechnical Drill Holes

24.1.3.3.1 Caveability Assessment

This section comprises excerpts from the Stantec Scoping Study geotechnical report (Stantec, 2020).

The caveability of the hanging wall rock above the sub-level caving operation is crucial to the success of the SLC mining method. Mine-scale structures and the general geotechnical conditions of the rock mass influence the hanging wall caveability.

Caveability assessment was undertaken using Laubscher's empirical stability chart which is based on empirical data from caving and stable situations for varying hydraulic radii and mining rock mass rating (MRMR) values (Figure 24-3).



Source: Stantec (2020).

Figure 24-3: Laubscher Caveability Chart

Table 24-1 shows the resulting hydraulic radii required for caving based on the adjusted MRMR for each geotechnical drill hole assuming a polygonal caving front (Curve A). From the caveability chart shown in Figure 24-4 the critical hydraulic radius to initiate caving for the Santa Rita hanging wall rock mass for Stantec 003 and Stantec 005 is between 10 to 12, which is equivalent to a zone approximately 40 m wide by 40 m long. It is estimated that this will be achieved with the opening of three adjacent production drifts. The critical hydraulic radius for Stantec 004 is between 14 to 18, which is equivalent to a minimum zone of approximately 60 m wide by 60 m long, up to a maximum zone of 60 m wide by 90 m long.

Table 24-1: Adjusted MRMR and HR for Each Drill Hole in the Hanging Wall Zone
ACG Acquisition Company Limited – Santa Rita Mine

Item			Percentage (%)	
Weathering			94	
Orientation of structure			75	
Induced stresses			80	
Blasting			80	
Case	**MRMR**		**HR**	
	max	**min**	**max**	**min**
Stantec 003	25.7	19.2	12	10
Stantec 004	32.3	29.1	18	14
Stantec 005	25.2	19.3	12	10

These results indicate that caving can occur with hydraulic radii appropriate for sub-level caving based on the design SLC footprints.

To maintain an understanding of how the cave is progressing, cave monitoring throughout the life of the operations is important. A cave monitoring system should consist of several complementary measurement techniques to allow for the cross-referencing of results. Microseismic systems placed outside the expected cave column give an indication of the seismogenic zone, which exists just above the cave back and can be used not only until the cave breaks through to the surface but also as it relaxes over the LOM. Open holes into the cave back area can be used until the cave reaches a predefined distance from the surface where it is no longer safe for people to travel above the cave back. The open holes can be plumbed for depth using weighted wire rope and, in some cases, also provide access for borehole cameras. As the cave approaches the surface, the open holes can be used to place extensometers and time-domain reflectometers, which allow for remote monitoring of the failure of the cap rock.

24.1.3.3.2 Summary of Prefeasibility Caveability Assessment – Stantec

For purposes of disclosure, a brief update of underground geotechnical investigation progress is provided here.

In April 2022, Stantec completed the Prefeasibility Level Sublevel Caving Geotechnical Studies for the Santa Rita Project, Brazil (Stantec, 2022). The latest caveability assessment determined no discernible change in the hydraulic radii required for caving compared to its 2020 study. Stantec concluded, "analysis results show that initial caving could occur with a hydraulic radii (HR) of between 11.8 to 13.6 m. This will be reached within six slots developed in neighbouring production drifts. Once the caving has begun levels below will have sufficient HR to continue cave propagation."

Three-dimensional numerical modelling also determined that the major LOM development and underground infrastructure excavation designs (namely crushers and conveyors) used in the 2023 PEA are sufficiently outside of the influence of abutment stress redistribution.

Given the absence of material changes in the PFS geotechnical study findings, the 2023 PEA mine plan design remains valid.

24.1.3.3.3 Caveability Assessment – Power Geotechnical

This section comprises excerpts from the Power Geotechnical report (Power Geotechnical Ltd, 2020).

The approach taken in generation of the footprints for this study was to attempt to connect the upper production levels to the overlying pit. Assuming that these upper levels were blasted through to the open pit when caving is initiated, the air blast risk would be generally manageable. Where step-outs are assumed at depth, production controls have been implemented in the schedule. With increasing depth of production, hanging wall caving would be expected, but probably would lag the active production levels, as the hanging wall would be buttressed by inflow of diluted rock from above.

The strike length of the underground deposit is in the vicinity of 800 m and the lateral extent perpendicular to strike is of similar extent (an eventual hydraulic radius of approximately 160). Taking these factors into account, it is likely that the caveability risk could be successfully managed at this mine.

The work completed indicates that SLC is a viable option. The geometry of the deposit is similar to existing operations which have been brought to production successfully. Further work to generate a range of tonnes and grade options is recommended and could be completed at further study levels.

Power Geotechnical updated the SLC modelling in 2021 in response to the updated Mineral Resource estimate. This update did not include any new assessment of caveability. The following excerpt is from the latest Power Geotechnical report (Power Geotechnical Ltd, 2021).

"…the footprints have changed somewhat for the upper levels of the mine due to changes in the block model. Efforts have been made to ensure that rings have fired rock above them, or stepout production controls were incorporated where stepouts occur. However, connection of the cave to the surface and continuity of this connection to all lower levels should be assessed further, along with caveability of some of the smaller mineralized lenses which do not initially connect to the surface".

24.1.3.4 Subset of the Mineral Resource Estimate Amenable to Underground Mining Methods Considered in the 2023 PEA Mine Plan

The portion of the Mineral Resource that was considered for the 2023 PEA mine plan (Table 24-2) was determined using flow modelling and level footprints determined by Power Geotechnical based on the March 2021 underground Mineral Resource model provided by MTS.

Table 24-2: Mineral Resource Considered in the 2023 PEA Plan
ACG Acquisition Company Limited – Santa Rita Mine

Classification	Tonnes (kt)	Grade						Contained Metal					
		NiS (%)	Cu (%)	Co (%)	Pd (g/t)	Pt (g/t)	Au (g/t)	Ni (kt)	Cu (kt)	Co (kt)	Pd (koz)	Pt (koz)	Au (koz)
Indicated	64,346	0.57	0.19	0.02	0.04	0.09	0.06	364	121	10	73	187	126
Inferred	77,396	0.55	0.18	0.02	0.05	0.10	0.06	428	135	12	117	249	152

Note: Numbers have been rounded and totals may be affected by small rounding errors.

An NSR approach was used for economic evaluation of the potential viability of the Mineral Resources. Nickel and copper are the predominant payable metals, with cobalt and precious metals contributing approximately 6% of the revenue.

For the purposes of determining the material potentially amenable to underground mining, a simplified calculation of the NSR values in the block model used only nickel and copper. The value derived from the other remaining payable elements (Co, Pd, Pt, Au) is approximately equal to, and therefore cancels out, the NSR and gross smelter return (GSR) royalties of 3.0% and 1.51%, respectively. An accurate and final determination of revenue and downstream costs (including royalties) was performed in the economic model using the estimated process plant feed grades for all payable metals.

The NSR value for the block model was calculated using the parameters provided in Table 24-3, based on current concentrate offtake agreements for the open pit operation. The NSR value in US$/t was applied to the block model using the following formula:

NSR = NiS% x 73.832 + Cu% x 31.482

Table 24-3: NSR Grade Input Parameters
ACG Acquisition Company Limited – Santa Rita Mine

Assumptions	Unit	Ni	Cu
Metal price	$/lb	6.50	3.00
Concentrate type	type	Single concentrate Ni and Cu	Single concentrate Ni and Cu
Recovery	%	83%	70%
Concentrate grades	%	13.85%	4.17%
Payability	%	91%	80%
Penalties (MgO)	$/t conc	14.0	—
Concentrate moisture	%	8%	—
Transport cost	$/t conc	87.44	—
Smelting cost	$/t conc	210	—
Refining cost	$/lb	0.92	0.45
NSR coefficient	$ per grade %	73.832	31.482

24.1.3.5 Cut-off Value

An approximate breakeven NSR cut-off of US$30/t NSR was estimated as the minimum cut-off likely to be applicable based on current site processing and G&A costs, and an estimated SLC mine operating cost, as provided in Table 24-4.

Table 24-4: Underground Breakeven Cut-off Value
ACG Acquisition Company Limited – Santa Rita Mine

Underground mining cost	21.09
Open pit cut-off value *	8.91
Total NSR Cut-Off Value	*30.00*

Note: * = Consists of US$5.17/t processing, US$1.71/t royalties, US$1.41/t site G&A and US$0.62/t corporate G&A.

A range of cut-off values were investigated from US$30 to US$45/t using a spreadsheet model. The spreadsheet model used Datamine's MRO inventories generated at various cut-offs and estimated capital costs, operating costs, production rate, overhead costs, and a simple project schedule for each scenario. NPVs, IRRs, and margins were compared on an EBITDA basis for nickel prices varying from US$6.00/lb to US$7.50/lb.

A final cut-off value of US$35/t for production was selected because it was shown to generate near-maximum NPVs across varying nickel prices.

24.1.3.6 Mining Recovery and Dilution

SLC is a multilevel recovery system where mineralisation recovered at an individual drawpoint may have originated from up to six levels (approximately 150 m) above. Flow modelling software is therefore required to accurately estimate the recovery and dilution. Current flow modelling systems successfully generate accurate estimates of dilution and recovery and are an invaluable tool for optimising modern SLC mines.

The moderately dipping geometry of the Santa Rita deposit means that, compared to a steeply dipping deposit, a larger proportion of production blast rings will interact with overlying waste, thereby increasing the potential for dilution and the need for controlled draw management to balance recovery and dilution. Industry expertise was sought from Power Geotechnical Ltd to conduct SLC flow modelling in order to obtain a more reliable estimate of the mineralisation that was potentially amenable to underground mining.

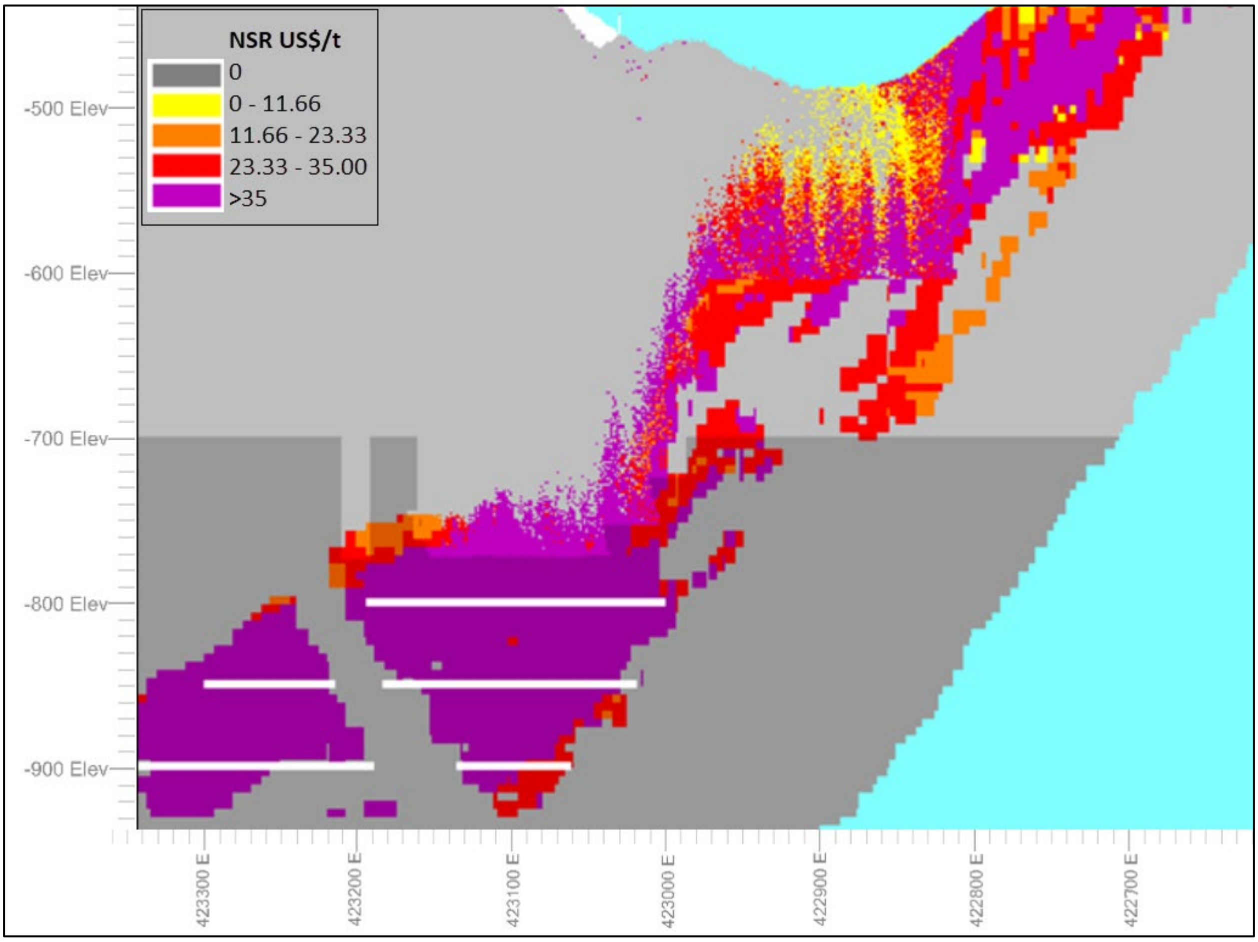
In general, dilution and recovery are dependent on geometry, rock types, geotechnical conditions, drill and blast performance, and draw control management (which can be tonnage or grade based). Contemporary practice uses low draw percentages (around 40% of blasted tonnes) in the initial levels of an SLC to ensure no air gaps are formed during the initial cave propagation and to mitigate entrainment of the overlying waste. Cave voids provide potential for air blasts which can have catastrophic consequences in caving mines as they did at the Northparkes mine, near Parkes in central New South Wales, in 1999. Sudden collapse of cave voids can trigger air blasts and mud rushes.

This low draw practice against overlying waste helps to develop what is often referred to as an 'mineralisation blanket' between the blasted rings and the overlying caved waste, which assists in controlling dilution. The draw percentage is progressively increased with each level in a vertical column of blasted mineralised rings, and overdrawing can be applied to the lowest drawpoint level of a blasted mineralised column to maximize recovery.

24.1.3.7 SLC Modelling

This section comprises excerpts from the Santa Rita SLC Scoping Modelling Update report (Power Geotechnical Ltd, 2021).

The flow modelling methodology used in generation of the work described here was Power Geotechnical's proprietary flow modelling software PGCA. PGCA is a model that is generally described as stochastic cellular automata. Cellular automata are a discrete-time dynamical system of interacting model cells. In PGCA, the cells are discrete blocks representing broken rock (Figure 24-4).



Source: Power Geotechnical Ltd (2020).

Note. Top of block model not shown. Looking southeast

Figure 24-4: Section Through PGCA Model of the Lower Half of the Deposit

In PGCA the cells are defined by material states. These states are void, static solids, or movable rock (and when required, different classes of movable rock, e.g., fines, rock type A, rock type B, etc.). The rules defining movement of individual blocks can be driven by several variables, some of which are user defined, and include:

- Relative particle location
- Material properties
- Caving behaviour
- Blasting behaviour
- Fragmentation

Although block movement can be controlled using many different factors in PGCA, in general free flow situations only material properties and particle location are mandatory. Up to 32 grade or material fields can be tracked by the model, such as:

- Grades for economic evaluation
- Resource codes for estimation of resource risk
- Material properties for fines migration or fault-based behaviour
- Particle velocities for linking with cave propagation codes

Model calibration against reconciled production sources has been shown to be very good at several different operational mines. Generally, it falls within 5%, and as close as 1% in some cases.

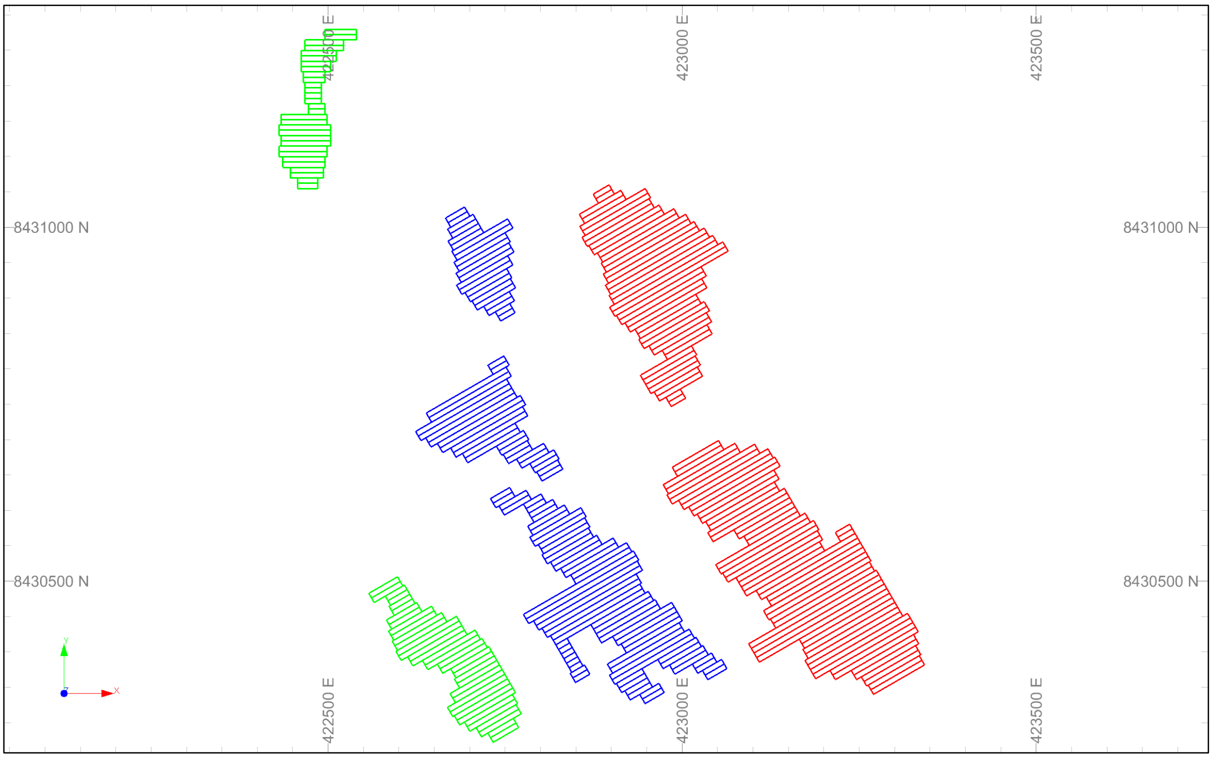
SLC level footprints were generated using the following process:

- Oversize footprints were generated beyond the limits of the deposit for five vertical columns extending the full depth of the footprint. Production cross cuts were designed to run at 60° in the main deposit due to the strike of the deposit in this area. Some of the mineralisation at the northern end of the mine above 525 level was given cross cuts oriented at 90° to better suit the strike of the deposit.
- Initial footprints were generated on each level using the results of the initial modelling runs based on a cut-off grade of $35/t NSR with the aim of generating a head grade of $45/t NSR.
- Initial footprints were assessed relative to one another and rationalised based on vertical and lateral continuity of the deposit.
- Step-outs were assessed, so that zones of the deposit extending under un-caved ground had fixed tonnages on their first three levels of 40%, 60% and 90% of average in-situ ring tonnage to allow caving to progress and inhibit air-blast potential. Shut-off models were run in three stages (surface to 450 level, 450 level to 700 level, and 700 level to 1050 level).
- Final footprints were generated from the results of these staged models.

Indicative examples of production levels on -200 m RL, -500 m RL, and -800 m RL can be seen in Figure 24-5. Individual lenses were followed through to the cave break-through on the surface, or to previously caved areas above. At more detailed study levels, these footprints may need to be modified based on slot and perimeter drive design, and further rationalising of shut-off and cut-off grades. Slots were not included in the design and scheduling process described in this subsection.

Based on the final layout, models were run to generate the final mineralised shapes that would be the basis of the production plan. The final models used 6.25 mW x 5.0 mH production drives. Production tonnages for individual rings were not smoothed but were capped at 6,000 t (approximately 200% draw). Minimum draw for all rings was 1,200 t, equivalent to 40% draw.

The SLC modelling resulted in an overall SLC draw factor of 75% of the blasted tonnes and 6% grade dilution. Development in mineralisation is estimated to total 18 Mt over the underground mine life.



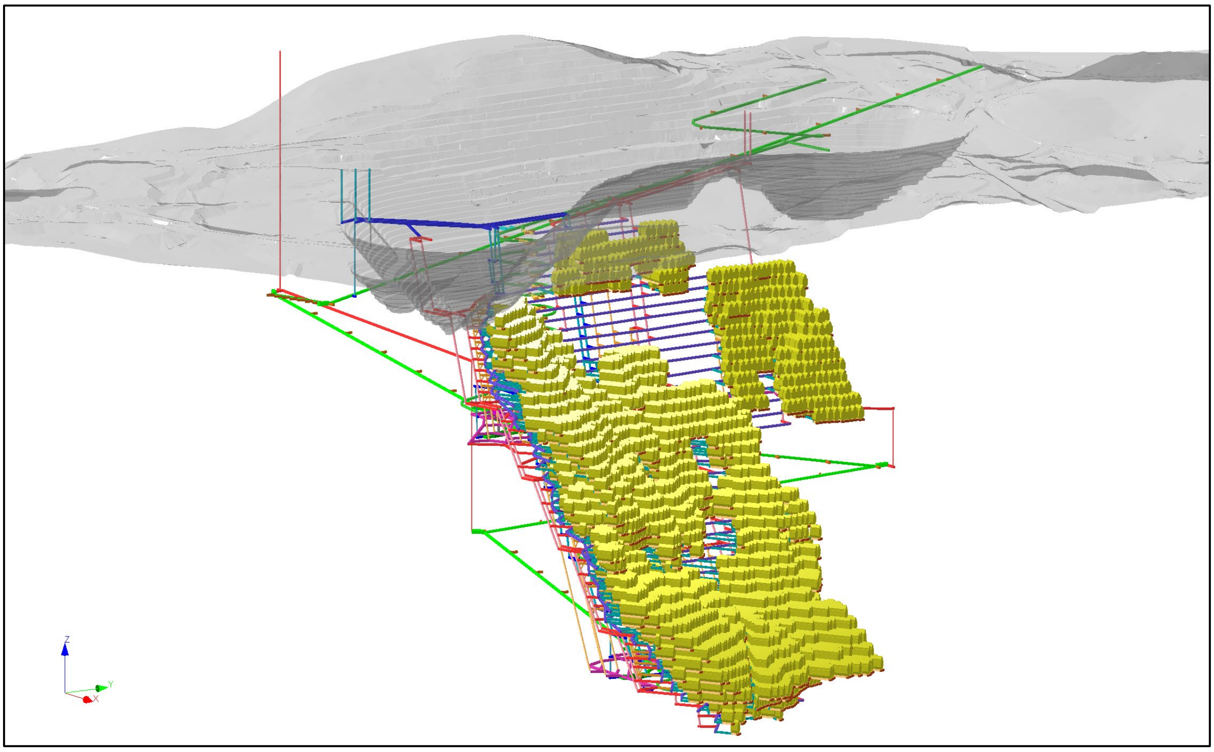
Source: Atlantic Nickel, 2021.

Note. Green is -200 m RL, blue is -500 m RL, red is -800 m RL

Figure 24-5: Example of Footprints on Levels -200m RL, -500m RL, and -800m RL

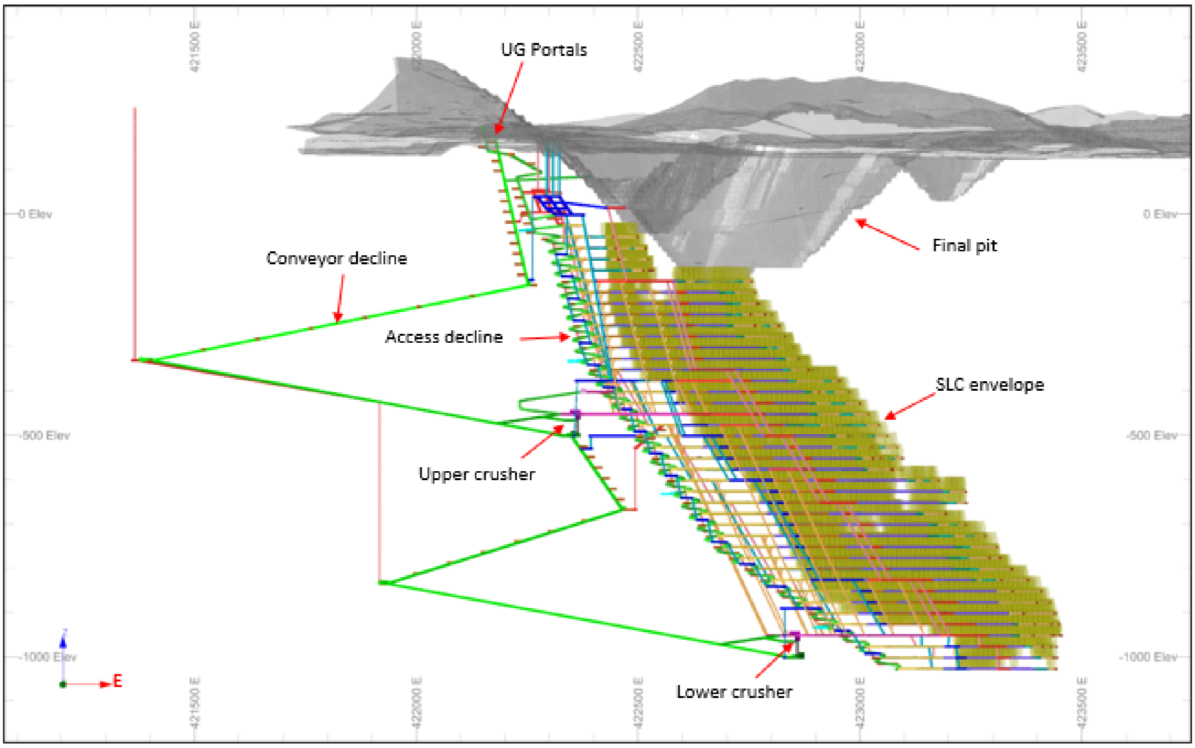
24.1.3.8 Underground Mine Design

The mine design was based on decline access from surface with a separate conveyor decline developed in parallel to accommodate a conveyor handling system for mill feed. Truck haulage was selected for handling all waste material to simplify the materials handling infrastructure and given the relatively small waste movement required. Truck haulage was not a viable option for mill feed handling at the peak production rate. Mill feed will be trucked to the surface during the ramp-up phase prior to commissioning of the crusher and conveyor system. Total trucking capacity was limited to 3 Mt/a during the underground ramp-up phase while haul distances will still be short. Figure 24-6 to Figure 24-9 provide four different views of the planned underground design for Santa Rita.



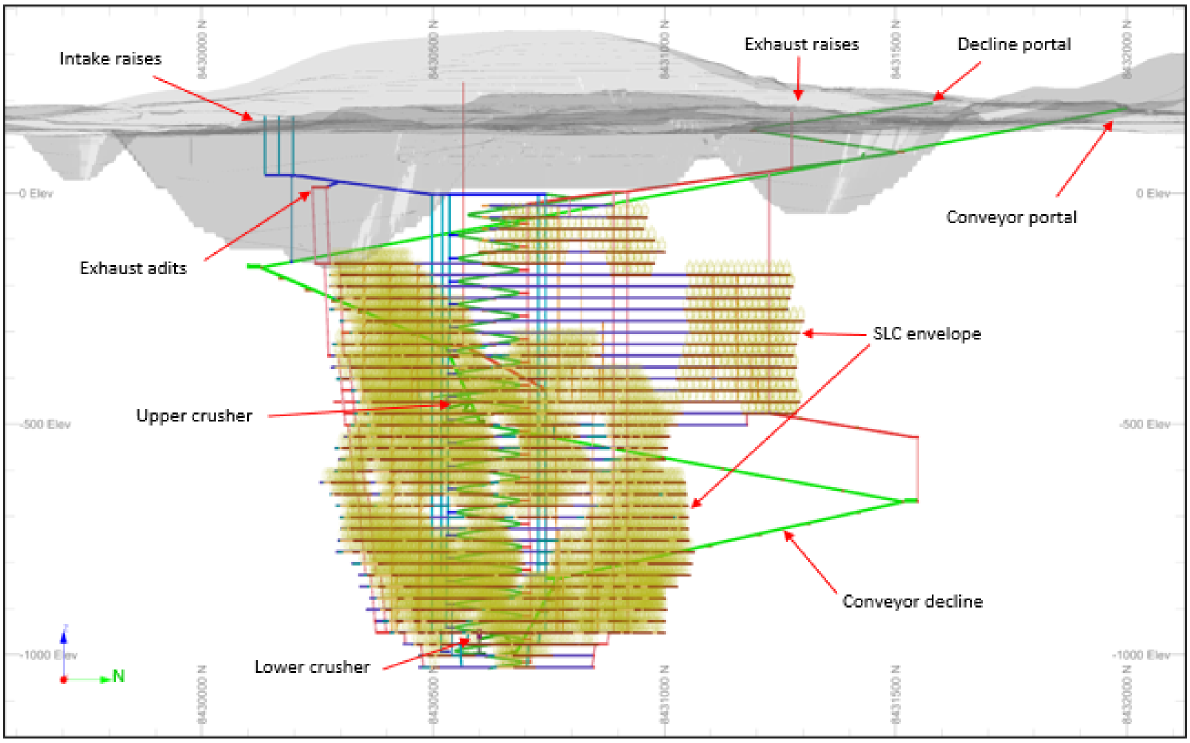
Source: Atlantic Nickel (2021).

Figure 24-6: 3-D Schematic Showing the SLC Envelope and Some of the Infrastructure Proposed to be Located in the Footwall



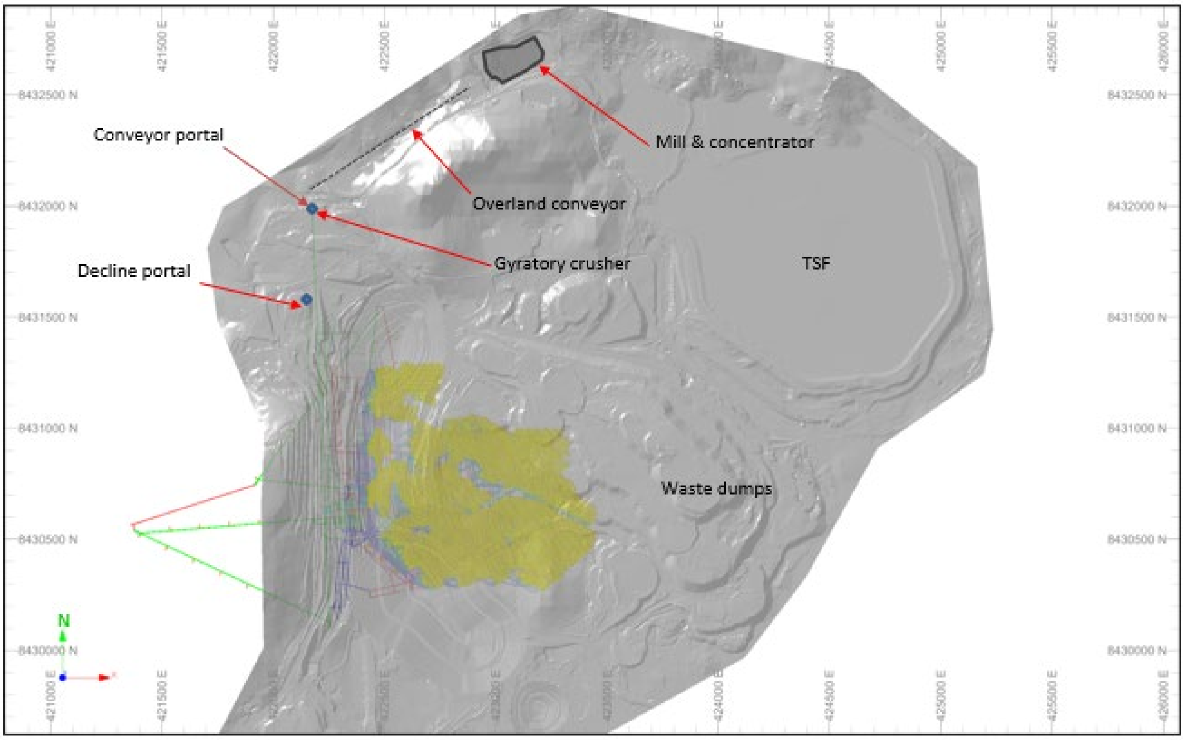
Source: Atlantic Nickel (2021).

Figure 24-7: SLC Mine Design Cross-Section, Looking North



Source: Atlantic Nickel (2021).

Figure 24-8: SLC Mine Design Longitudinal Section Projection, Looking West



Source: Atlantic Nickel (2021).

Figure 24-9: SLC Mine Design Plan View

Conveyors were selected over shaft hoisting for the following reasons:

- A conveyor system is better able to follow the dip of the deposit and will not require the anticipated lateral transfer development associated with accessing the bottom of a vertical shaft.
- The conveyor decline can be driven concurrently with the access decline using the same equipment and personnel, whereas a shaft would require specialised resources.
- The conveyor decline will increase the trucking capacity of the mine by providing a second haulage route until the conveyor is installed, and prolonged trucking during ramp-up enables infrastructure installation to be delayed.
- There appears to be a general preference within the mining industry to install conveyor systems in lieu of shafts, some examples include Carrapateena SLC, Ridgeway SLC, New Afton block cave, and Timok SLC.
- Conveyors were anticipated to have a lower capital cost than shafts in this application. Shaft installations typically cost in excess of US$100,000 per vertical metre (all-inclusive capital cost) whereas a 1 in 5.5 gradient conveyor is estimated to cost approximately US$60,000 per vertical metre.

A detailed material handling trade-off study is recommended in subsequent studies to determine the most beneficial material handling system. This trade-off study should include the Rail-Veyor system because it potentially has capital cost benefits arising from its progressive installation, and the elimination of underground crushers.

The SLC layout details are provided in Table 24-5 and are similar to those used at SLC operations in Australia as shown in Table 24-6. These designs have been shown to improve recovery and reduce dilution by encouraging overlapping draw cones. Subsequent studies may seek to optimize the layout using flow modelling software.

Table 24-5: SLC Production Level Layout
ACG Acquisition Company Limited – Santa Rita Mine

Item	Criteria (m)
Sub-level interval	25 (floor to floor)
Drill drive interval	15 (centreline)
Drill drive width	6.25
Drill drive height	5.0

Table 24-6: SLC Layout Comparison
ACG Acquisition Company Limited – Santa Rita Mine

Operation	Drill Drive Spacing (centreline) (m)	Level Spacing (floor to floor) (m)
Ravenswood	13	25
Ernest Henry	15	25
Mt Lyell 1995	15	20
Mt Lyell 2001	14	25
Ridgeway	14	25

Note: Data from AusIMM (2013)

24.1.3.8.1 Lateral Development

The SLC design comprises the following lateral development components:

- Conveyor decline for conveying mill feed
- Access decline adjacent to the deposit for level access
- 40 production levels, spaced at 25 m vertically
- First (or top) production level at -50 m RL (immediately beneath the open pit and approximately 250 m below the natural surface)
- Last (or bottom) production level at -1025 m RL (approximately 1,225 m below the natural surface)
- Upper crusher access level (Crusher 1) located at -450 m RL
- Lower crusher access level (Crusher 2) located at -950 m RL
- Main workshop, refuelling bay, wash bay located at -400 m RL level

The opportunity to reduce development by replacing some footwall drives with additional secondary access declines (particularly in the upper north SLC block) was excluded in favour of retaining the extended footwall drive for improved ore-pass access and resource drilling options.

The mine design was based on the lateral development dimensions provided inTable 24-7.

Table 24-7: Development Dimensions and Gradients
ACG Acquisition Company Limited – Santa Rita Mine

Profile	Development	Dimensions	Profile	Gradient *
A	Access decline	5.5 m wide, 5.8 m high	Semi-arched	1:70
A	Footwall drive, accesses	5.5 m wide, 5.8 m high	Semi-arched	1:50
B	Conveyor decline	5.5 m wide, 6.0 m high	Semi-arched	1:5.5
B	Stockpile	5.5 m wide, 6.0 m high, 20 m long	Semi-arched	1:20
C	Ventilation drive, sump	5.5 m wide, 5.5 m high	Semi-arched	1:50
D	Drawpoint	5.0 m wide, 4.2 m high	Rectangular	1:50
D	Slot drive	5.0 m wide, 4.2 m high	Rectangular	1:50
E	Drill drive	6.25 m wide, 5.0 m high	Rectangular	1:50
F	Crusher chamber	10.5 m wide, 12 m high, 24 m long	Rectangular	Flat
G	Loading chamber	10 m wide, 10 m high, 29 m long	Rectangular	Flat
H	Conveyor chamber	13 m wide, 15 m high, 18 m long	Rectangular	Flat

Note: * Gradient for construction: level development designed with no gradient.

24.1.3.8.2 Decline Development

The access decline adjacent to the deposit is the primary access to the mine for equipment and personnel. The access decline was design at a gradient of 1:7 and a minimum radius of curvature of 27.5 m. Rehandling bays (or stockpiles) were nominally spaced at 125 m to 150 m apart. Separate intake and exhaust raises were designed to follow the spiral decline in 50 m vertical increments to ensure adequate ventilation while advancing the decline and establishing the levels. Both intake and exhaust raises were designed as 5.0 m diameter raisebores.

The conveyor decline was designed at a gradient of 1:5.5 with legs in multiples of 1,000 m. The standardisation of conveyor length reduces the number of different spares required and simplifies maintenance. The steep gradient reduces the total development and conveyor installation cost without impacting productivity. The first crusher from -450 m RL requires 4,000 m of conveyors over three legs (two legs of 1,000 m and one leg of 2,000 m length).

The second crusher from -950 m RL required an additional 3,000 m of conveyors over three legs. Further information on the conveyor system is provided in Section 24.1.3.9.

24.1.3.8.3 Level Development

The SLC design was based on 25 m level intervals. For the purpose of simplification all levels were designed at zero gradient. In practice all level development will be designed at a nominal gradient of 1:50 or thereabout so that the entire level drains via gravity to sump(s) located on each level.

Footwall drives were designed parallel to the SLC for entire strike length on each level with a nominal stand-off distance of 30 m from the SLC. Footwall drive dimensions of 5.5 m wide by 5.8 m high ensure truck passage under auxiliary ventilation conditions (e.g., with vent duct installed).

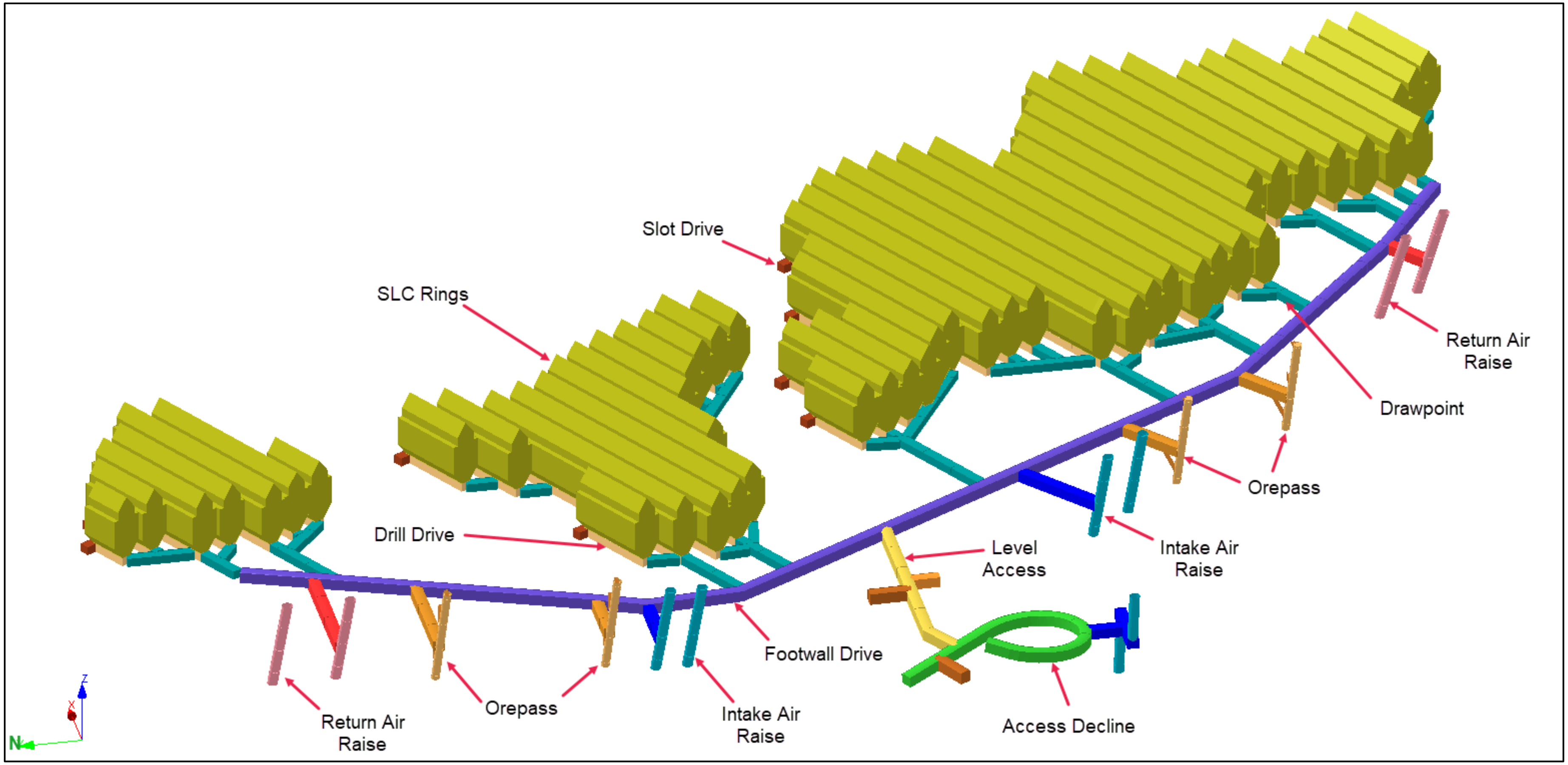
Footwall drives will be developed to the return air connections to establish primary airflow along the footwall drive prior to commencing drawpoint and drill drive development. Sumps, stockpiles, ore-pass accesses, and vent connections will be developed concurrently with the footwall drive, as will the initial stub drives for each drawpoint.

Ore-pass designs consist of an ore-pass access drive and a finger raise. Ore-pass finger raises are designed at 2.0 m by 2.0 m in cross section and will be developed as longhole raises at approximately 60°. Each finger raise will be fitted with a grizzly.

A typical production level layout is shown in Figure 24-10 and Figure 24-11.

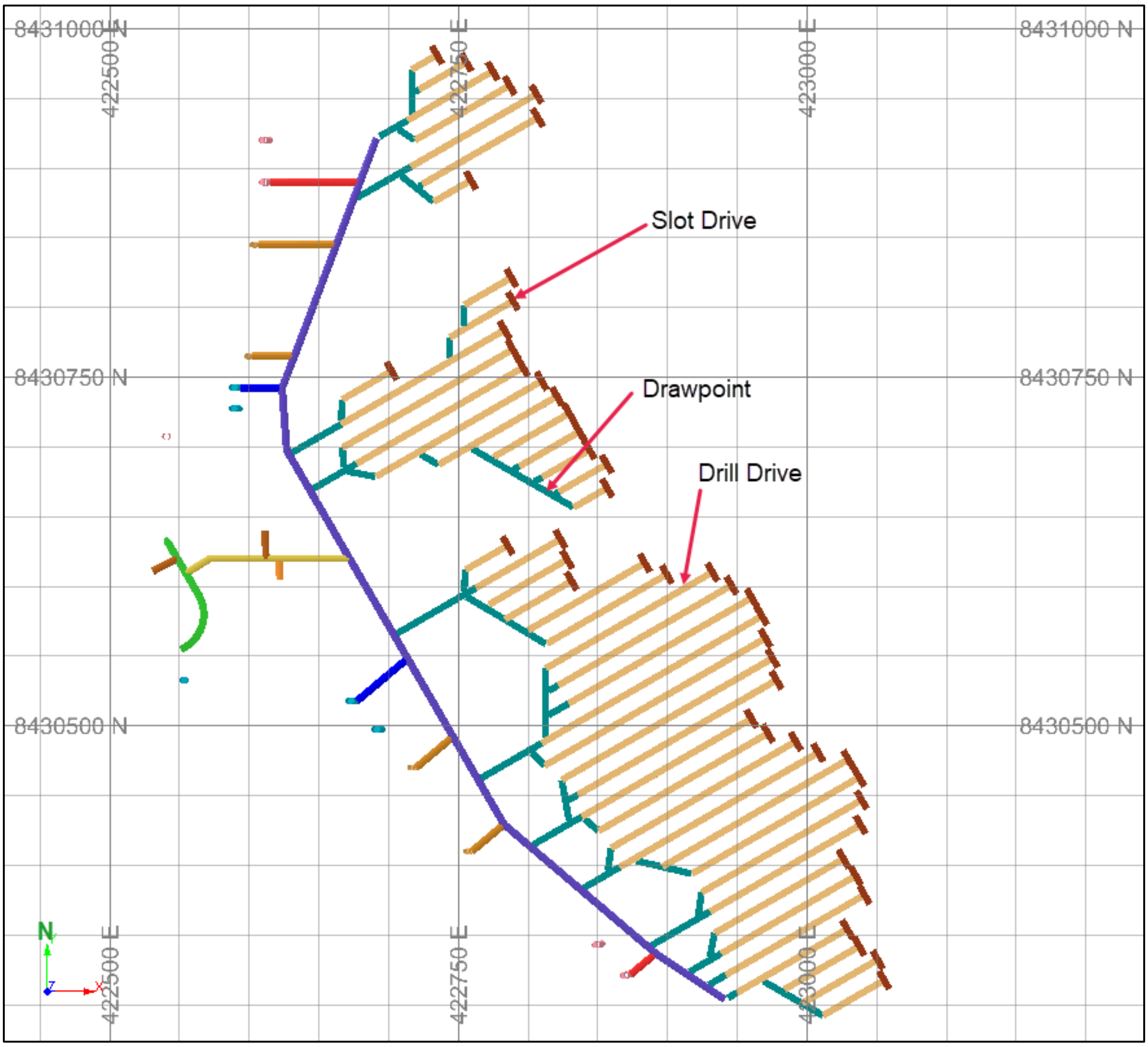
24.1.3.8.4 Crusher Level

The layouts for the upper crusher (-450 m RL) and the lower crusher (-950 m RL) are shown in Figure 24-12 and Figure 24-13, respectively.



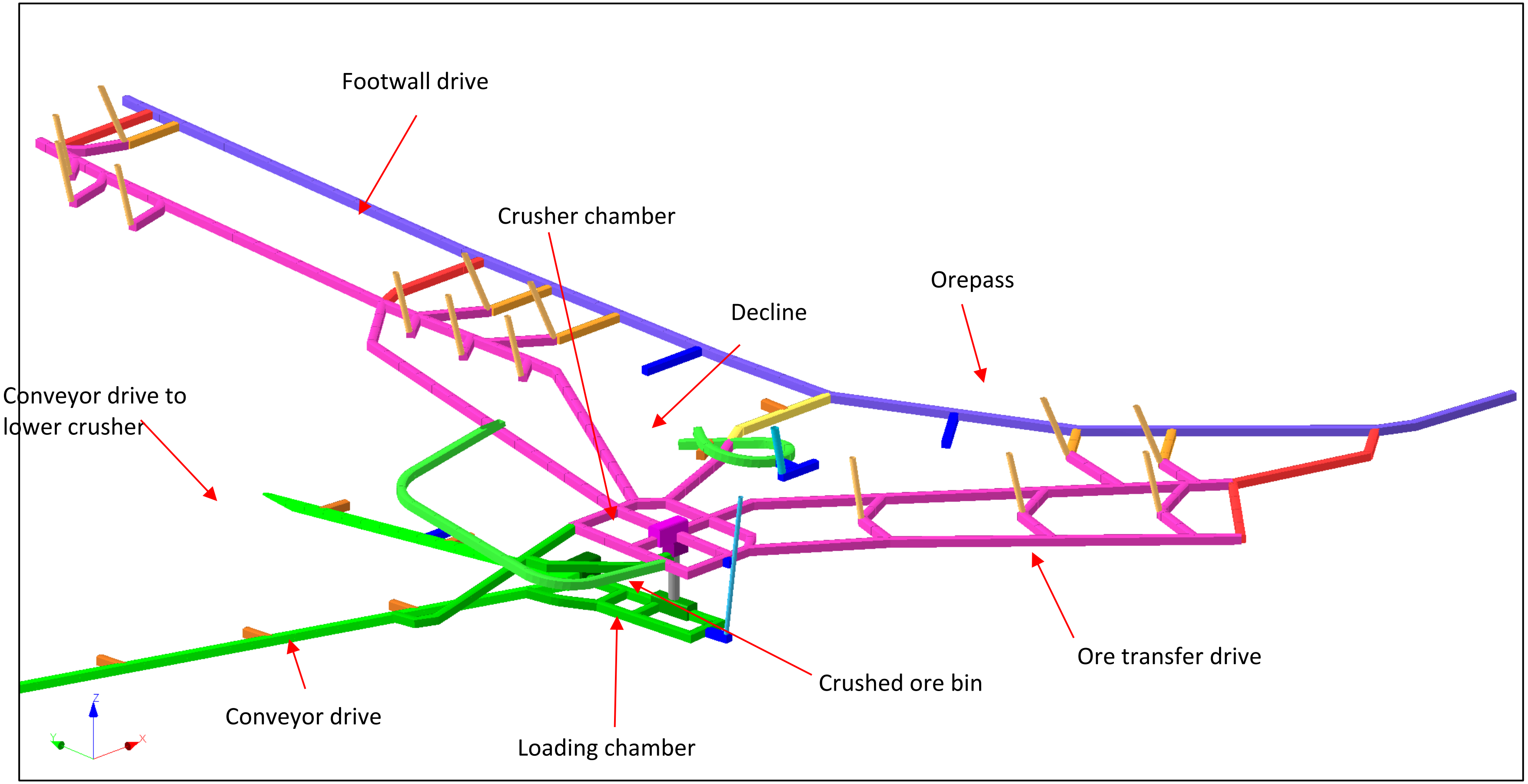
Source: Atlantic Nickel, 2021.

Figure 24-10: Typical SLC Level Layout, Isometric View, Looking South-West



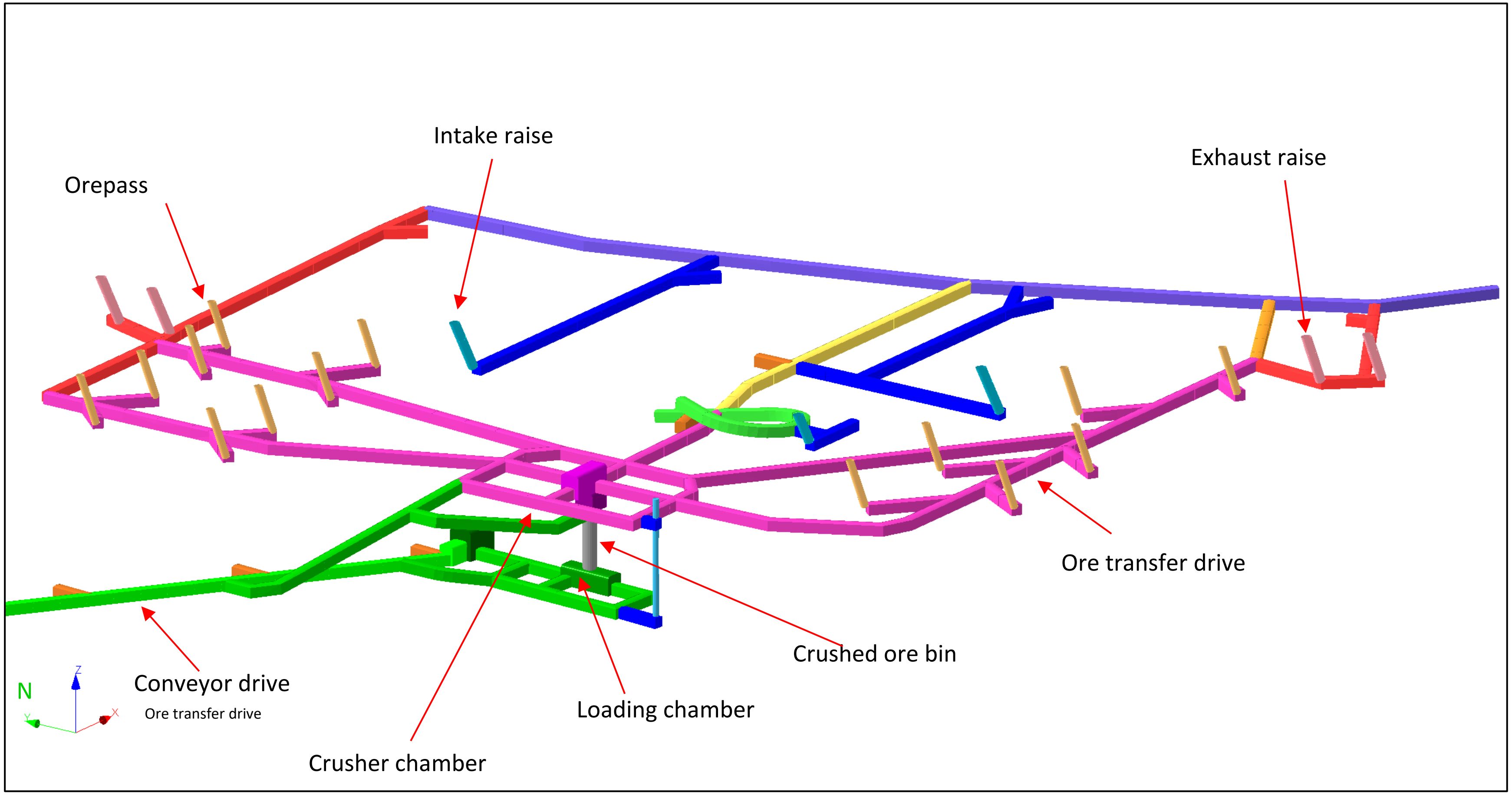
Source: Atlantic Nickel, 2021.

Figure 24-11: Typical SLC Level Layout, Plan View



Source: Atlantic Nickel, 2021.

Figure 24-12: Upper Crusher Layout, -450 m RL



Source: Atlantic Nickel, 2021.

Figure 24-13: Lower Crusher Layout, -950 m RL

Each crusher installation consists of a crusher tip level and a conveyor loading level. The installations associated with each level include the following:

- Crusher tip level:
  - Crusher chamber equipped with overhead crane
  - Crusher tip point
  - Gyratory crusher
  - Crushed mill feed bin 7.0 m diameter (nominal storage capacity 2,500 t)
  - Transfer drives for transferring mill feed from ore-passes to the crusher with LHD
- Conveyor loading level:
  - Loading chamber with chute and feeder at base of the crushed mill feed bin
  - Short transfer conveyor to main conveyor
  - Conveyor drive chamber housing the conveyor drive unit
  - Magnets and storage for tramp material removed from mill feed

The crusher levels incorporate transfer drives to transfer mill feed from the orepasses to the crusher tip using large capacity (21 t) LHDs. Up to three automated 21 t LHDs will operate concurrently to feed the crusher.

Additional development, not shown in the design, was included in the cost model to facilitate concurrent operation of three automated LHDs on individual routes.

Optimisation of the ore-pass arrangement has the potential to minimize the transfer workload and reduce the number of LHDs required.

Given the long lead time until commencement of SLC production, future developments in automation may permit multiple LHDs to interact safely on shared drives.

24.1.3.8.5 Vertical Development

The design comprises the following vertical development components:

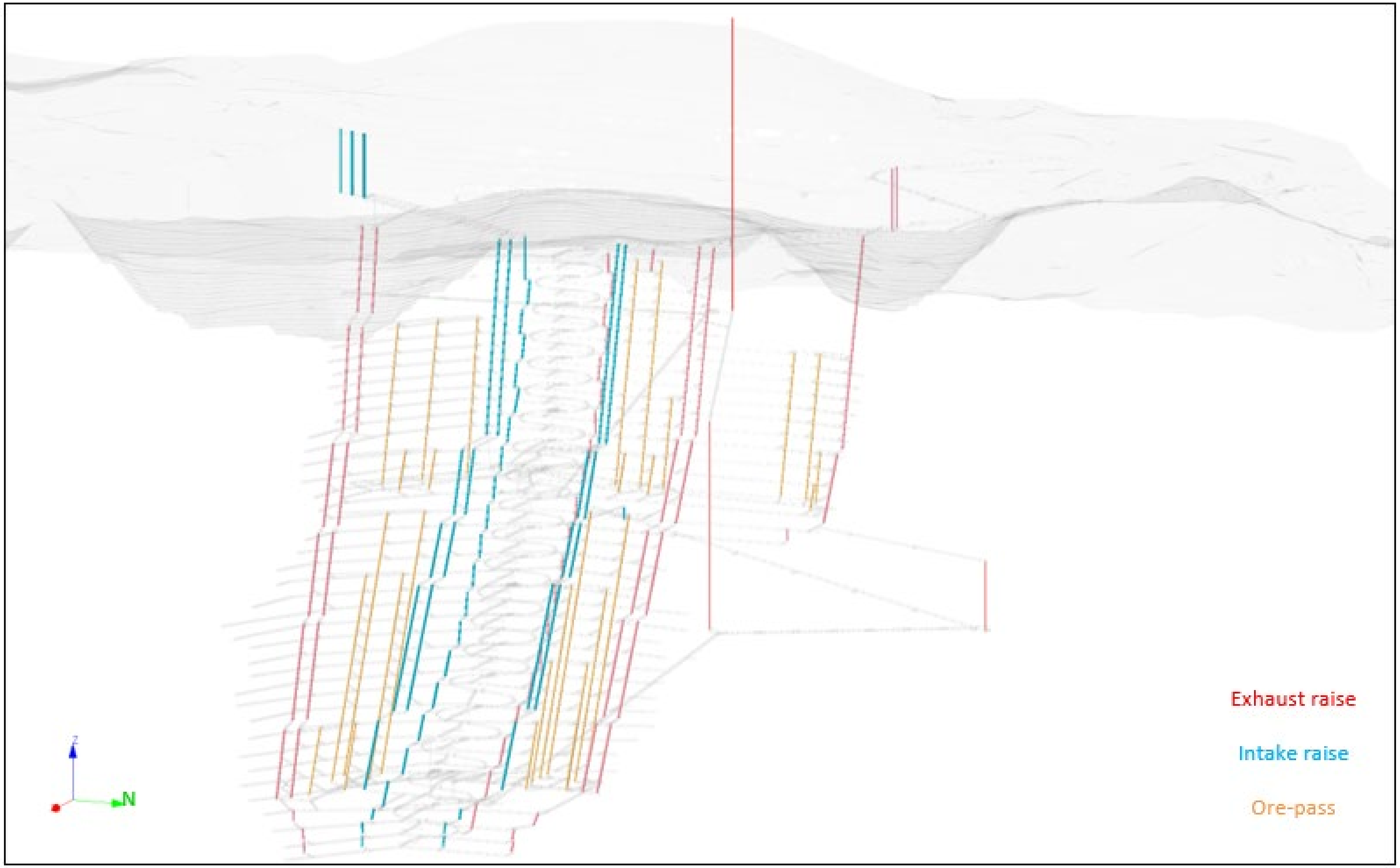
- Primary exhaust raises (return air raises, or RARs)
- Primary intake raises (fresh air raises, or FARs)
- Decline ventilation system raises
- Ore-passes
- Ore-pass finger raises
- Crushed mill feed bins
- Egress raises (escapeways)

Most raises will be developed using a raisebore machine at 4.0 m and 5.0 m diameters. Slot raises are assumed to be longhole uphole raises. Ore-passes were designed at 4.0 m diameter to minimize the likelihood of blockages.

The design dimensions and gradients for vertical development are provided in Table 24-8. All raises are shown in Figure 24-14 and raises with surface expressions within the vicinity of the final open pit are detailed in Figure 24-15.

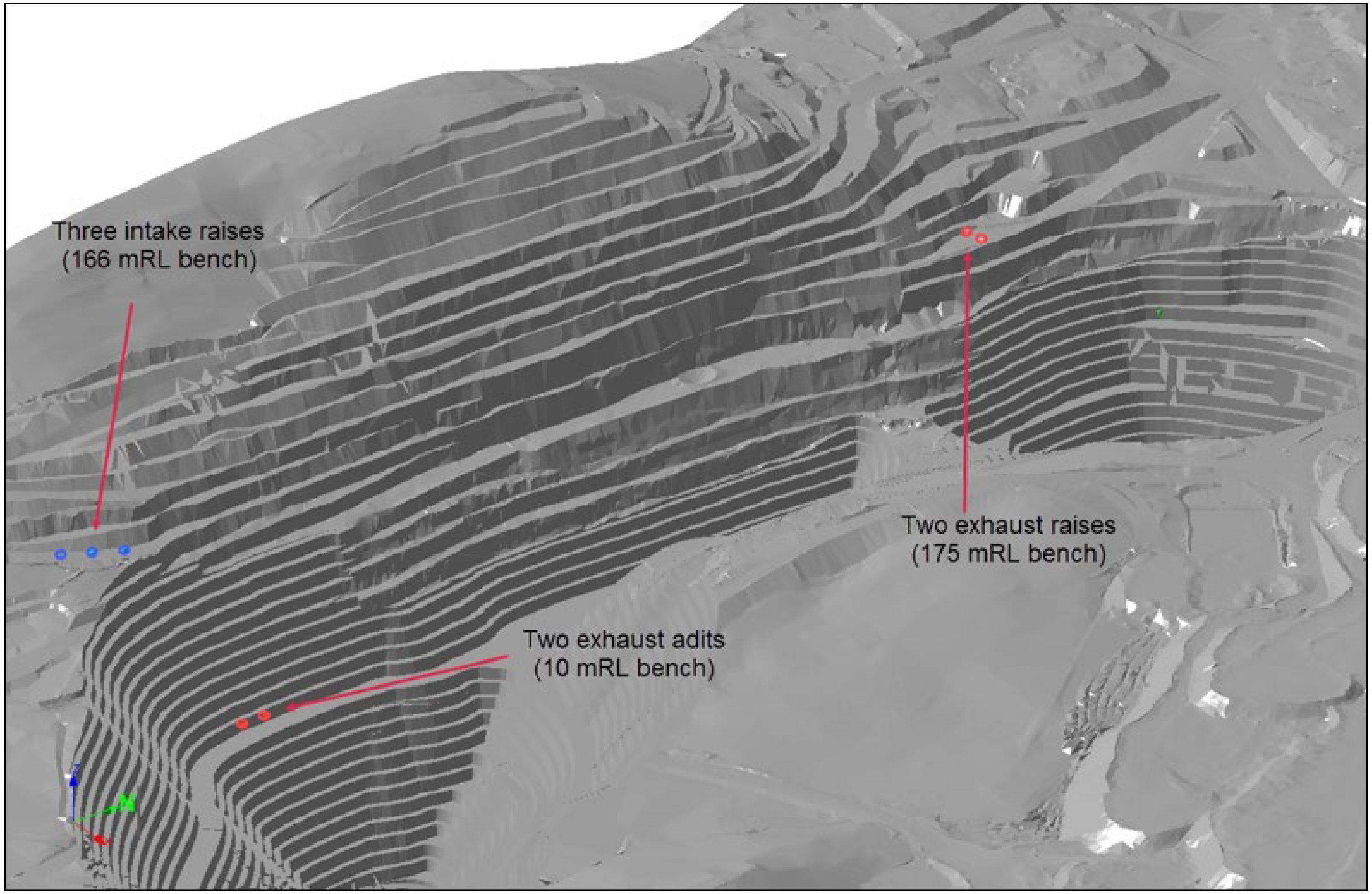
Table 24-8: Vertical Development Dimensions and Gradients
ACG Acquisition Company Limited – Santa Rita Mine

Development	Dimensions	Profile	Gradients
Ventilation raises	5.0 m diameter	Circular	60° to vertical
Ventilation raise – conveyor drive	3.0 m diameter	Circular	Vertical
Ore-pass	4.0 m diameter	Circular	60°
Ore-pass finger raise	2 m x 2 m longhole raise	Square	60°
Slot raise	5 m x 5 m longhole raise	Square	Vertical



Source: Atlantic Nickel, 2021.

Figure 24-14: Vertical Development Design, Looking South-West



Source: Atlantic Nickel, 2021.

Figure 24-15: Vertical Development Items with a Surface Expression in Vicinity of the Open Pit

24.1.3.8.6 Development Stand-off Distances and Exclusion Zones

The permanent access development and underground infrastructure were designed in the footwall of the deposit and will not be impacted by the caving subsidence zones due to their stand-off distance from the cave.

Table 24-9 shows the minimum design stand-off distance for key infrastructure and development from the SLC.

Table 24-9: SLC Stand-off Distance and Exclusion Zone Criteria for Lateral Development
ACG Acquisition Company Limited – Santa Rita Mine

Key Infrastructure	Stand-off Distance from SLC (m)
Conveyor decline	150
Spiral decline adjacent to deposit	100
Footwall drive	25
Underground crushers	150
Pump stations	50
Workshop	150
Fuel bay	150
Primary vent raises	50
Ore-passes (including finger raises)	50
Crushed mill feed bins	120

24.1.3.8.7 SLC Production

The SLC production cycle was based on the following:

- Develop the footwall drive and establish primary vent connections, ore-passes and services.
- Develop transverse drawpoints from the footwall drive to the SLC footprint.
- Develop transverse drill drives from the drawpoints across the full width of the SLC footprint.
- Develop slot drives at the end of each drill drive, perpendicular to the drill drive orientation.
- Drill and blast the slot, mucking the swell.
- Drill production blast rings on a campaign basis with multiple rings drilled ahead of the drawpoint.
- Blast production rings one at a time, mucking blasted material as determined by the SLC draw plan using predetermined tonnages for each production ring.

Figure 24-16 provides a cross-section (perpendicular to the drill drives) showing the SLC rings and drill drive layout.

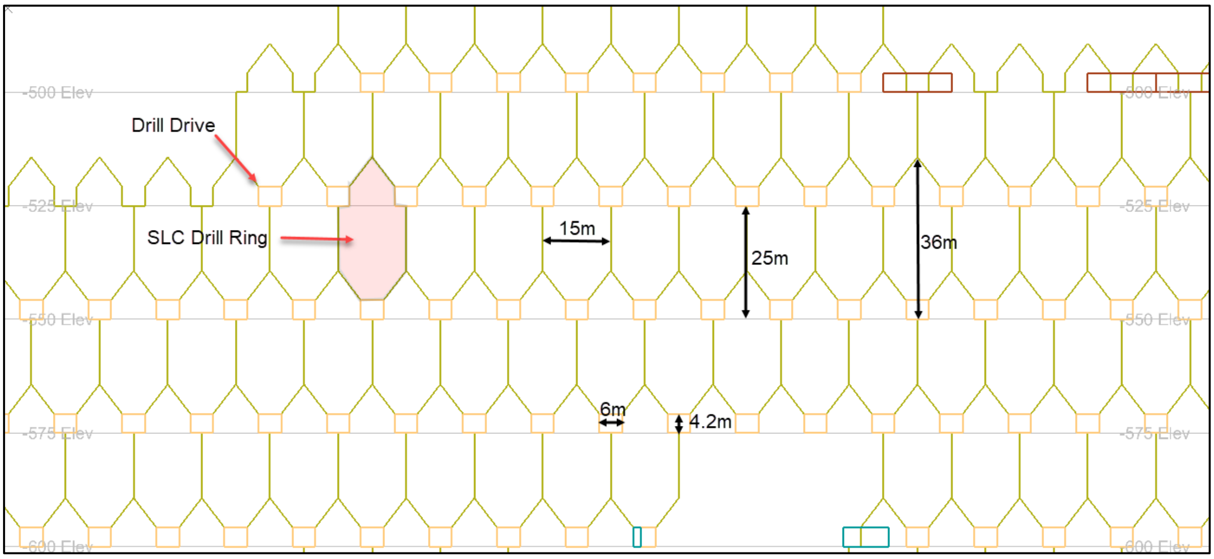
The SLC ring drilling design is shown in Figure 24-17. The nine-hole per ring drilling pattern is similar to that employed at Ernest Henry SLC. The ring drilling design parameters that were used are provided in Table 24-10.

SLC production drilling requirements were estimated based on the following assumptions:

- 14.6 in-situ tonnes per drill metre for SLC ring drilling

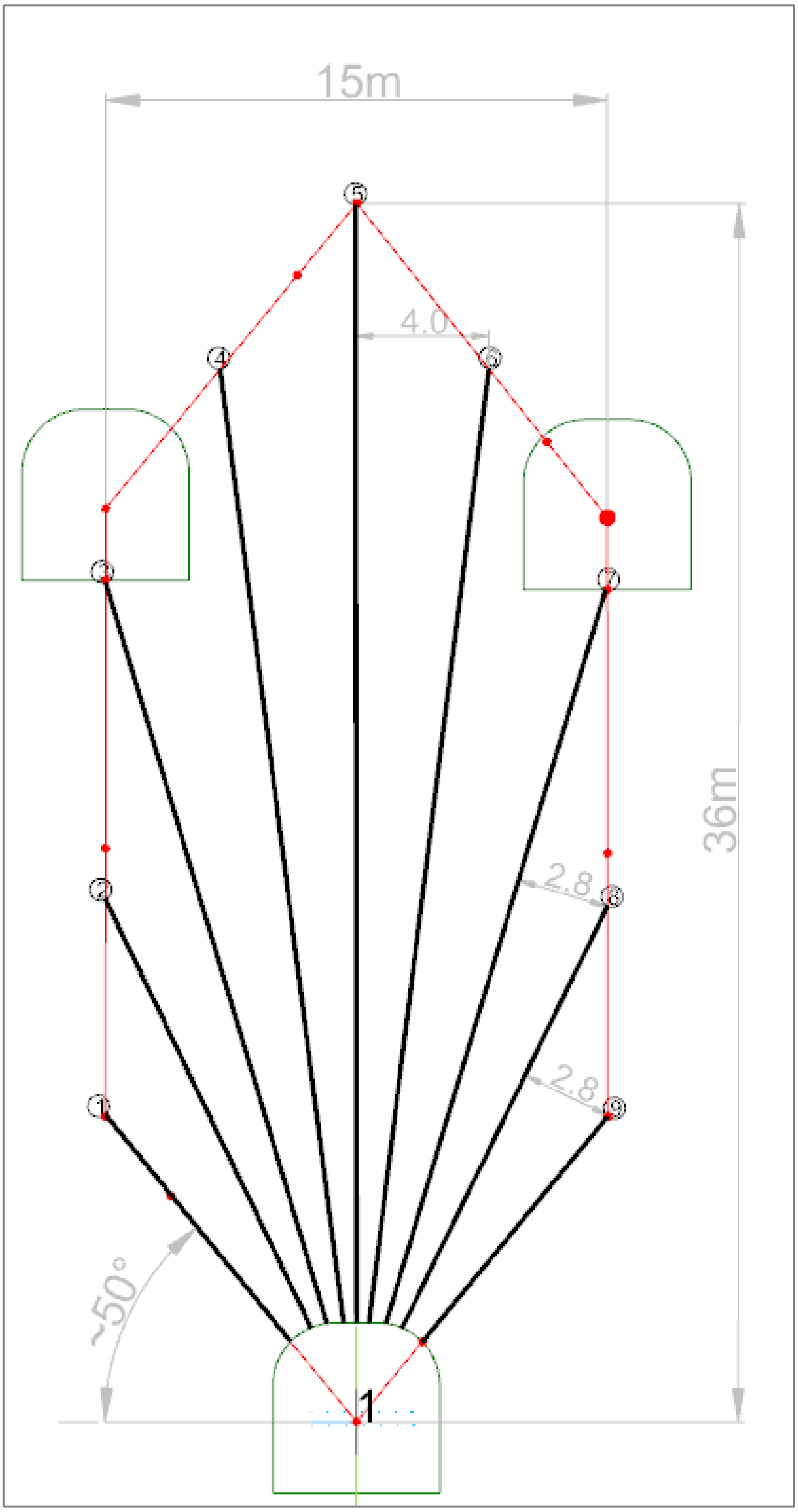
- One 5 m by 5 m slot raise for every four drill drives
- 5% drilling allowance for miscellaneous drilling and additional hole density in slots

As shown in Figure 24-11, many slot drives align on the hanging wall which allows multiple slot drives to be connected together and serviced by a single slot raise, as is common in operating SLC mines. On average it was assumed that one slot raise would be required for every 60 m of slot drive, which is one slot raise for every four drill drives. It is recommended that subsequent designs determine the slot requirement more accurately once Mineral Resource definition permits better determination of the hanging wall slot drive locations.



Source: Atlantic Nickel, 2021.

Figure 24-16: SLC Drill Drives and Production Rings, Vertical Section Looking West



Source: Atlantic Nickel, 2021.

Figure 24-17: SLC Longhole Drill and Blast Ring Layout

Table 24-10: Drill and Blast Design Criteria For SLC Production Rings
ACG Acquisition Company Limited – Santa Rita Mine

Item	Unit	Design Criteria
Bulk explosive	type	Emulsion
Bulk explosive density	t/m^3	1.1
Drill hole diameter	mm	102
Ring dump angle	degrees from horizontal	80
Detonators per hole (electronic)	no. per hole	2
Powder factor	kg/t	0.5
Holes per ring	no.	9
Total drill length (inclined length) per ring	m	185
Ring burden (horizontal distance)	m	2.6
Volume fired per ring	m^3	910
Tonnes fired per ring	t	2,975
Re-drills	%	10
Total drilling length including re-drill allowance	m	204
Drilling factor	Blasted t per drill metre	14.6
Drilling factor @ 75% total draw	Drawn t per drill metre	10.95

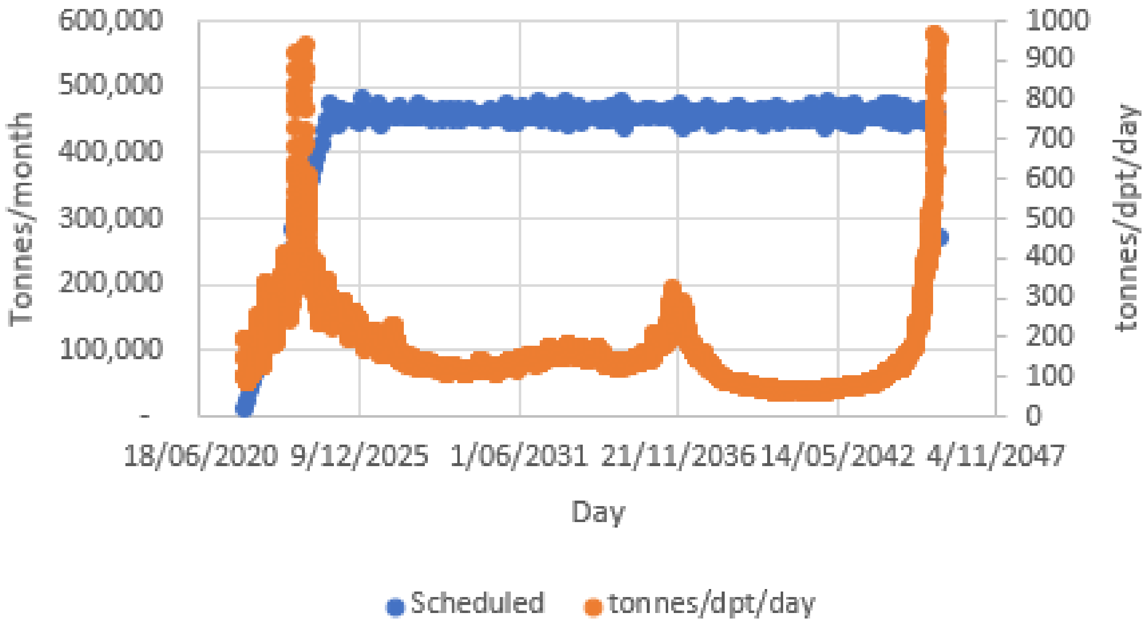
24.1.3.8.8 Mine Production Rate

The final SLC production and mineralised development was scheduled in Datamine 5D Planner and EPS by ACG. Draw tonnages from Power Geotechnical's SLC production modelling were consolidated into activities comprising five rings. These activities were scheduled in EPS using a minimum SLC level lag of 25 m (45°) and a daily drawpoint productivity of 200 tonnes per day per drawpoint.

SLC production scheduling by Power Geotechnical Ltd. (2021) confirmed the production rate.

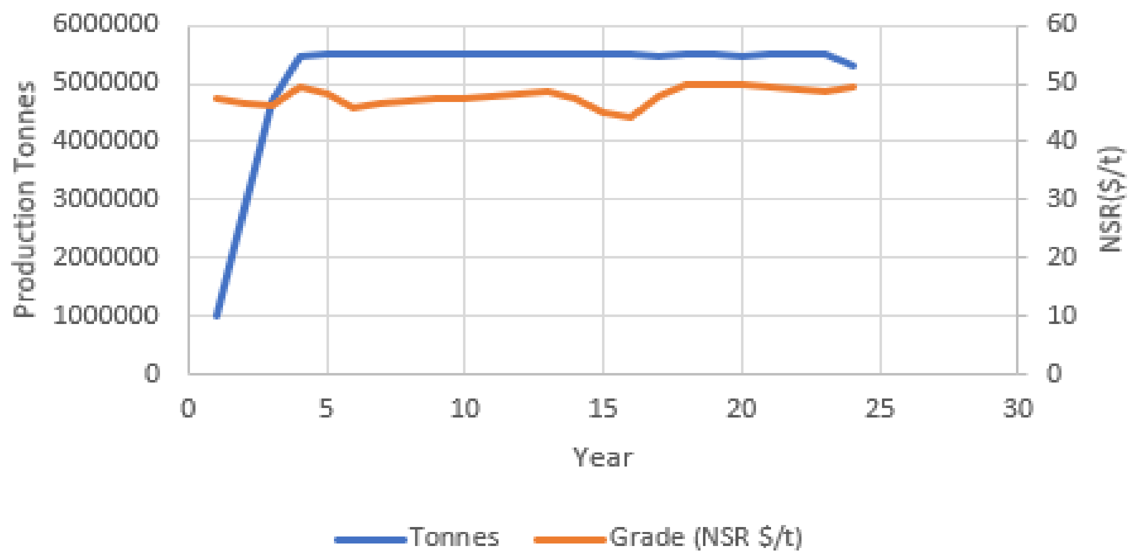
The proposed underground operations were scheduled at an initial target production rate of 5.5 Mt/a (excluding mineralised development material) and assuming a ramp-up of four years total. The ramp-up period was based on data from other SLC operations' start-up periods. Scheduling was completed to a conceptual level.

Figure 24-18 shows the production schedule and tonnes per drawpoint per day (tonnes/dpt/day) calculation across a daily scale as scheduled by Power Geotechnical. Apart from a brief peak during the ramp up period (which would be smoothed with more detailed scheduling) tonnes/drawpoint/day is generally below 200, which indicates a sustainable production schedule. The peak at the end of the schedule indicates that few drawpoints are available and that a ramp down would be occurring. This would be shown in a more detailed schedule completed at the next study level. Figure 24-19 shows the production schedule tonnes and grade profile.



Source: Power Geotechnical Ltd. (2021)

Figure 24-18: Schedule Showing Monthly Production Rate and Tonnes per Drawpoint per Day



Source: Power Geotechnical Ltd. (2021)

Figure 24-19: Production Schedule Showing Tonnes and Grade Profile

In order to commence underground production earlier, and delay completion of the crushers for the benefit of cash flow, the final production schedule has a flatter, more conservative ramp-up profile than the Power Geotechnical schedule shown.

24.1.3.9 Materials Handling

To handle a final production rate of 6.2 Mt/a, the mine design was based on a conveyor system with underground crushers. It is recommended that future studies review the material handling in greater detail to verify the selection of conveyors. Subsequent material handling review should consider Rail-Veyor as a material handling option as well as revisiting shaft and shaft-hybrid options.

Underground crusher and conveyor designs were based on recent installations at New Afton (block cave at 6 Mt/a) and Carrapateena (SLC at 4.2 Mt/a). The conveyor specifications were based on:

- All conveyor legs an identical 1,000 m in length, or multiples thereof
- Conveyor installation angle of 10.3° (1 in 5.5 gradient)
- Conveyor capacity of 1,000 t/h
- Installed power of 900 kW per conveyor
- Estimated belt width 1.06 m
- Estimated P_{80} particle size of 76 mm
- Conveyors suspended from the back of the conveyor drive to permit vehicular access underneath

The underground conveyor was designed to intercept the existing tunnel at the bottom of the current surface crusher discharge bin. The underground conveyor will discharge mill feed directly onto the current overland conveyor which carries crushed mill feed to the process plant feed stockpile.

Underground gyratory crusher locations were selected at -450 m RL and -950 m RL for the following reasons:

Upper crusher location at -450 m RL will permit high utilisation of the first crusher (approximately 50 Mt of mill feed) and keep the pre-production period to under four years.

Lower crusher location at -950 m RL (the bottom of the mineable inventory) will minimize the total crusher installation capital costs by limiting underground crusher installations to two.

As the deposit is further defined through drilling, crusher locations and the materials handling system in general will need to be reviewed.

The mine plan includes three levels below the lower crusher which requires approximately 3 Mt of mineralised material to be hauled by truck to the crusher tip at -950 m RL.

Details of the materials handling system are provided in Table 24-11.

Table 24-11: Materials Handling System Summary
ACG Acquisition Company Limited – Santa Rita Mine

Phase	Item	Location	Length (m)	Lift (m)	Description	Capacity (t/h)
1	Conveyor leg 1	182 m RL to -163 m RL	1,900	345	2 x 900 kW	1,000
1	Conveyor leg 2	-163 m RL to -334 m RL	950	171	900 kW	1,000
1	Conveyor leg 3	-334 m RL to -504 m RL	950	171	900 kW	1,000
1	Crusher 1	-450 m RL	—	—	Gyratory crusher	1,300
2	Conveyor leg 4	-504 m RL to -671 m RL	934	167	900 kW	1,000
2	Conveyor leg 5	-671 m RL to -837 m RL	933	167	900 kW	1,000
2	Conveyor leg 6	-837 m RL to -1,004 m RL	930	167	900 kW	1,000
2	Crusher 2	-950 m RL	—	—	Gyratory crusher	1,300

24.1.3.10 Ground Support Methods

Ground support requirements were based on an assessment by Stantec (Stantec, 2020), and from methods in use at other SLC operations. The following section includes excerpts from the Stantec assessment.

All permanent access headings will be supported with resin grouted rockbolts and 50 mm fibrecrete. Temporary headings will be supported with yielding resin grouted rockbolts (such as DSI Yield-Lok or Minova Unipass) and mesh screen as a minimum. A yielding ground support installation, such as Versabolts and fibrecrete, is likely to be required in some of the drill drives to cope with rock strain from mining induced stress redistribution. An allowance to also spray approximately 70% of all temporary headings with 50 mm thick fibrecrete was included in the mine plan and cost estimate.

Bolts will be installed in all waste development using mechanised rock bolters.

Cablebolting will be installed in all intersections and large spans of various crusher, conveyor and pump chambers using fully mechanised cable bolters capable of inserting and grouting cables.

Permanent openings are those located in the footwall zone and used over the entire mine life, while temporary openings are those located in the mineralised zone over a limited lifespan of several years. The recommended bolt length for spans between 4.5 m and 5.5 m is 2.0 m for the mineralised zone and 2.2 m for the footwall zone. Resin grouted bolts of 2.4 m total length were selected for the mine plan.

24.1.3.11 Mining Equipment

The mine plan is based on the equipment types specified in Table 24-12.

SLC is a highly productive mining method amenable to a high level of automation. Automation was assumed for longhole drilling, SLC production mucking, and transfer of mill feed from orepasses to the crusher. While the cost estimates include provision for purchase of automated equipment, the number of personnel allowed for was based on non-automated operator manning levels for conservatism, i.e., one person per machine.

Table 24-12: Major Mobile Equipment and Function
ACG Acquisition Company Limited – Santa Rita Mine

Function	Equipment Specification
Development drilling	Twin boom jumbo
Longhole drilling	Automated production longhole drill
Waste haulage	Diesel haul truck, 63 t capacity
Development mucking	LHD, 17 t capacity
SLC production mucking	Automated LHD, 17 t capacity
Transfer from ore-passes to crusher	Automated LHD, 21 t capacity
Explosive charging	Dedicated charging units
Ground support installation	Bolters Cablebolters Robotic shotcrete sprayers

Automated equipment enables increased equipment utilisation (particularly at shift change-over and firing times), improved operator safety and comfort (remotely located), lower operating costs (less wear and damage), and increased overall productivity (faster trams and multiple machines controlled by a single operator).

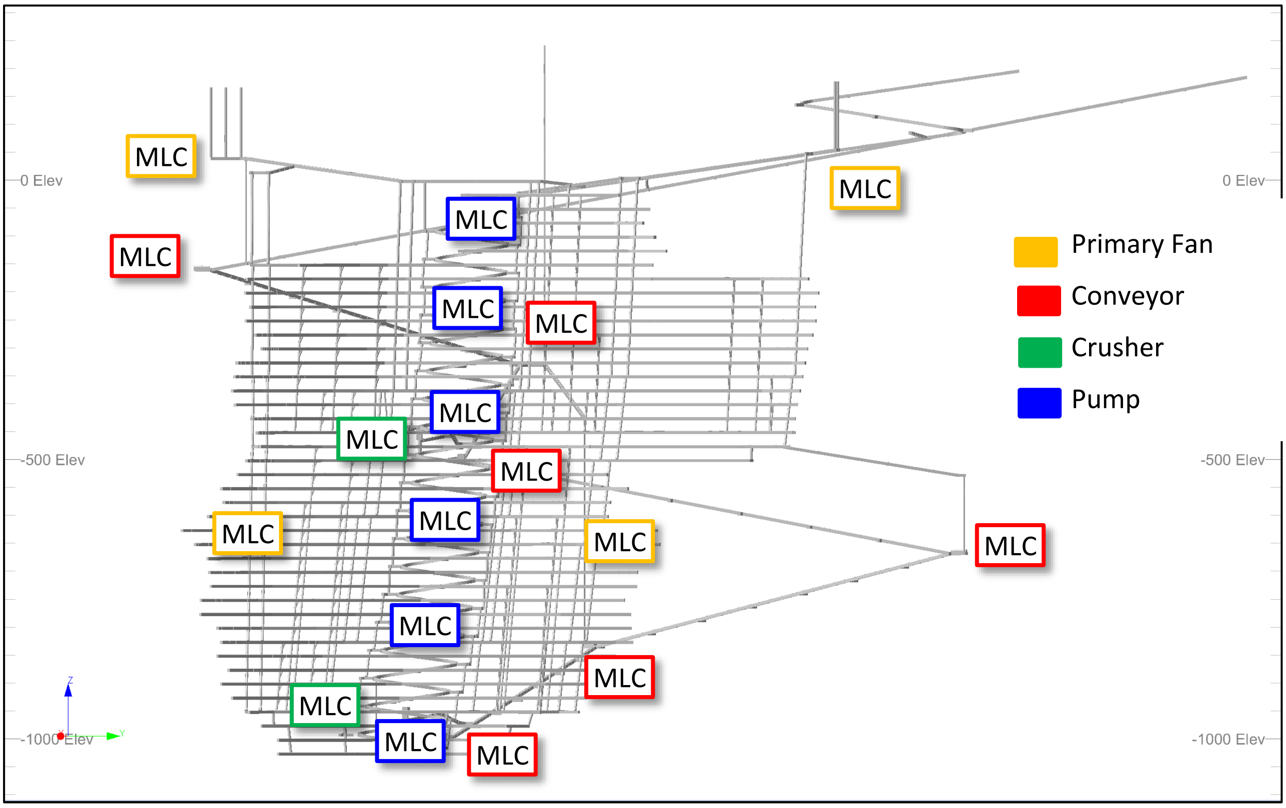
24.1.3.12 Power Reticulation

High voltage power will be reticulated through the underground mine at 13.8 kV via vertical service holes drilled between levels. Mine load centres (MLCs), nominally 2 kVA, will reduce the voltage to 600 V for mine plant and equipment. Each MLC for development and/or production will nominally serve one to two levels, depending on the demand, to power: secondary fans; longhole drills; development drill jumbos; miscellaneous submersible pumps, and lighting. MLCs will be installed and/or relocated as required to support development and production operations. Distribution boxes fed from the MLCs will extend 600 V power to one or more pieces of equipment as required.

Appropriately sized MLCs will also be required for permanent infrastructure such as primary fans, pumps, crushers and conveyors. The locations of these MLCs are shown in Figure 24-20.

Figure 24-21 shows the power demand schedule and the estimated peak power demand driven by times of higher equipment utilisation. The primary drivers of power consumption are crushers, conveyors, ventilation fans and pumps. Mobile drilling equipment comprises a very small proportion of overall power requirement. Of the primary drivers, most have a consistent demand profile, however pumping power demand is estimated to increase by up to three times during periods of high rainfall.

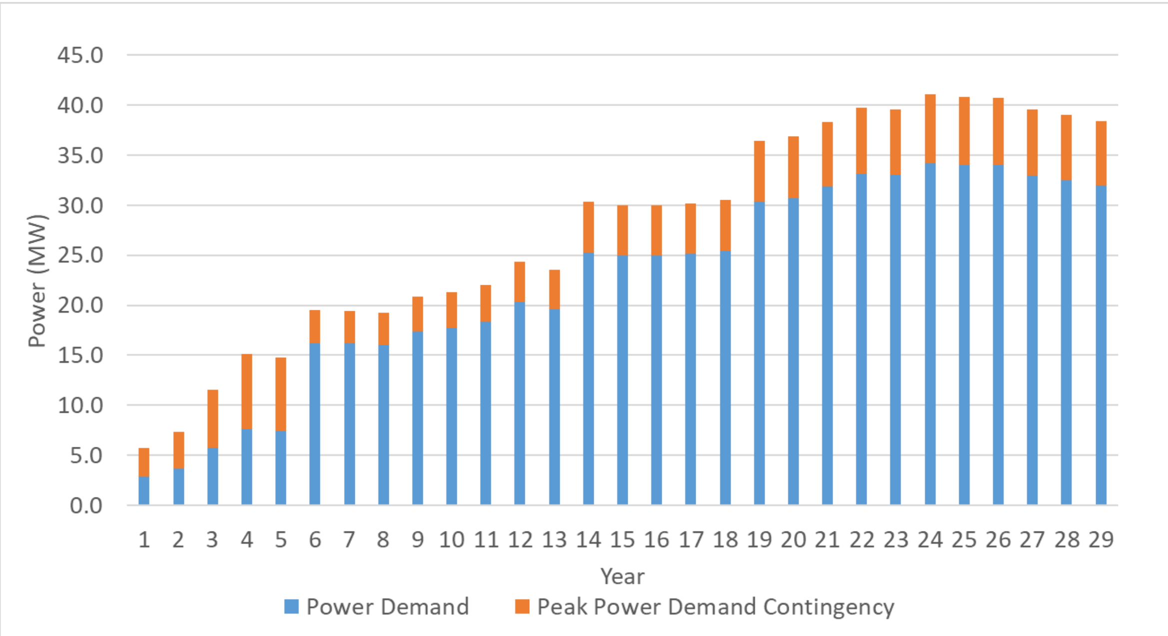
It is important to note that the power demand shown has the potential to reduce significantly based on likely dispensation from current ventilation regulations. The following section on ventilation shows that the primary airflow based on diesel equipment requirements is approximately 950 m^3/s, while the airflow calculated according to Brazilian regulations based on mined tonnage requires approximately 1,600 m^3/s. The latter airflow requires a threefold increase in installed primary fan power from approximately 6 MW to approximately 20 MW.



Source: Atlantic Nickel, 2021.

Note. On-level MLCs for Operating Levels Not Shown

Figure 24-20: Permanent MLCs Required for Mine Infrastructure



Source: Atlantic Nickel, 2021.

Figure 24-21: Power Demand Schedule

24.1.3.13 Mine Ventilation

The ventilation system was based on a pull (or exhaust) system. The primary components include exhaust raises and intake raises, with the access decline and conveyor decline acting as supplementary intakes. Primary airflow will be established in the footwall drives on each level, drawing air from the primary intakes at the centre of the level and exhausting air at the exhaust raises at the strike extremities of each level.

Secondary ventilation will use 110 kW axial flow fans located in the footwall drive primary airflow to force air into drawpoints and drill drives via flexible 1.2 m diameter ventilation duct. Each secondary fan will service several drill drives by directing flow to the active work heading and shutting off flow to inactive headings. Future studies will investigate the use of smaller fans on each heading integrated into the mine automation network to create an on-demand ventilation system with reduced operating costs.

The conveyor drives will be connected directly to the primary exhaust raises to ensure that in the unlikely event of a conveyor fire, smoke does not enter the main mine workings and can be removed as directly as possible from the mine.

Brazilian Mining Regulatory Norms require underground ventilating airflow to be the maximum as determined by the following:

- Airflow calculated by formula based on diesel equipment power (and to lesser extent personnel numbers);
- Airflow calculated by formula based on quantity of explosives used;
- Airflow calculated by formula based on monthly tonnage disassembled. Note that the Brazilian Mining Regulatory Norms do not define tonnage disassembled; however, it was assumed to mean total tonnage of mineralised material and waste blasted.

As a result, this study is based on a primary ventilating airflow of 1,600 m^3/s as determined by the tonnage based airflow requirement. The diesel based airflow requirement was calculated to be approximately 950 m^3/s and the explosive based requirement was only relevant for the purpose of calculating re-entry times to work areas after blasting.

The tonnage driven airflow requirement does not take into account the efficient and highly productive nature of SLC, and the fact that the material handling system is predominantly non-diesel based. Further, in most mining jurisdictions globally there is no tonnage driven airflow requirement. Discussions with external Brazilian ventilation engineers suggests it is not common for the tonnage based requirement to dictate airflows, with the diesel based requirement being the determinant.

While this study is based on the higher tonnage driven airflow of 1,600 m^3/s, the diesel driven requirements are also presented in this section to highlight the potential opportunity subject to review by Brazilian regulators.

P&E conducted ventilation modelling on the mine design based on required airflows of 1,600 m^3/s, 950 m^3/s and 650 m^3/s for future reductions (P&E, 2020). Ventsim modelling by P&E determined that the mine design would benefit from duplication of the intake raises to reduce fan power requirements and the extra development was included in the final mine design. The model was revised in 2021 to accommodate additional resources included in the mine plan. The fan requirements (numbers and locations thereof) remain unchanged from the 2020 P&E work. The final Ventsim model is shown in Figure 24-22.

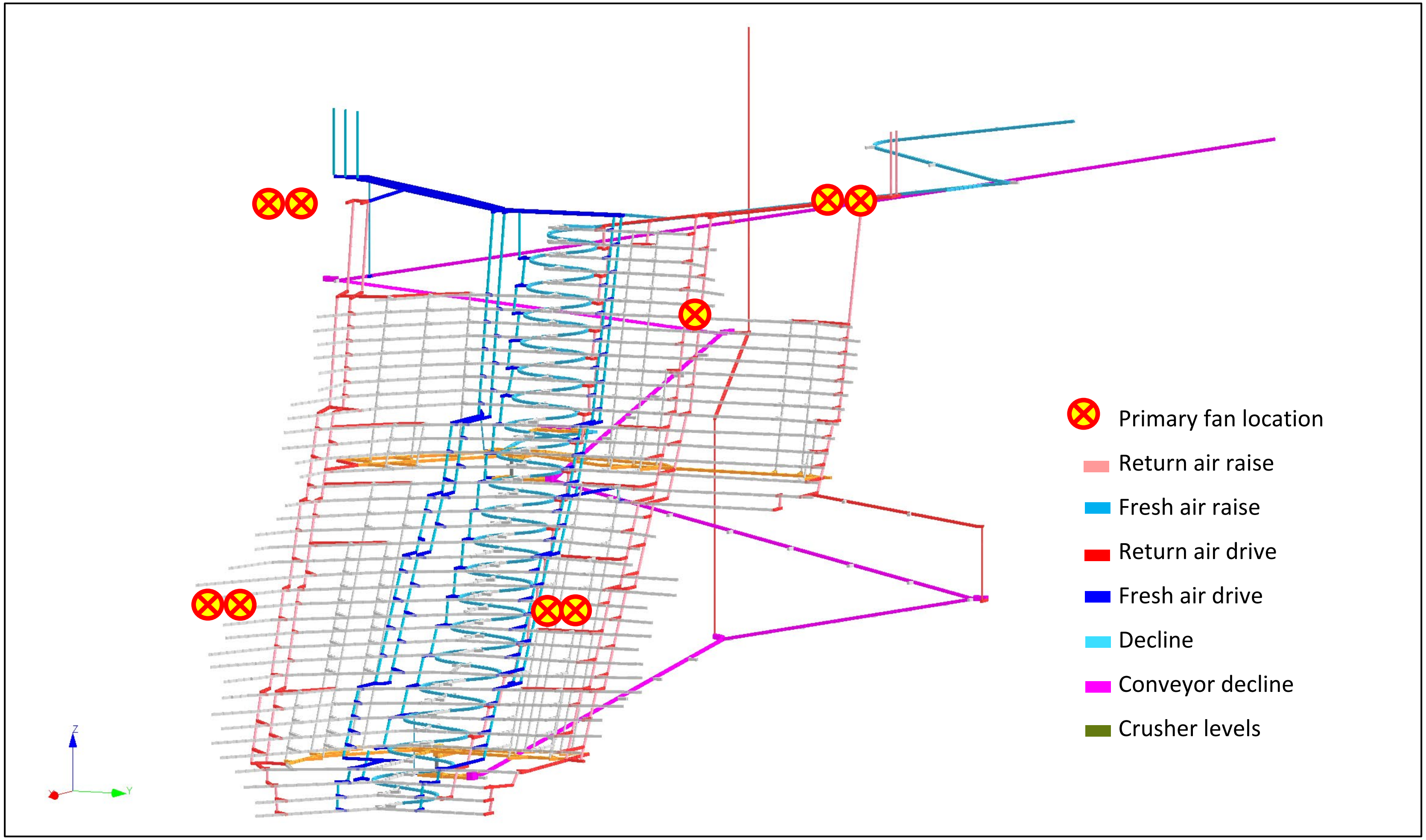
It is important to note that while the study is based on an airflow of 1,600 m^3/s the mine design and Ventsim modelling was not optimised for 1,600 m^3/s because of the high expectation for dispensation.

Primary vent fan requirements were determined for three main stages of the mine life:

- Early stage production at depth of approximately 300-400 mbs, upper crusher operating;
- Mid stage production at depth of approximately 700-900 mbs, lower crusher operating;
- Late stage production at depth of 1,000-1,150 mbs, lower crusher operating.

The fan requirements for the various stages are shown in Table 24-13 for 1,600 m^3/s. For comparison, Table 24-14 provides the fan requirements for a 950 m^3/s scenario.

All primary vent fans are expected to be installed underground.



Source: Atlantic Nickel, 2021.

Figure 24-22: Primary Ventilation Layout

Table 24-13: Primary Vent Fan Requirements for 1,600 m^3/s, Tonnage Based Airflow
ACG Acquisition Company Limited – Santa Rita Mine

Type	Item	1,600 CMS Flow Model								
		Operating Pressure (Pa)			Operating Flow (CMS)			Operating Power (kW)		
		Stage 1	Stage 2	Stage 3	Stage 1	Stage 2	Stage 3	Stage 1	Stage 2	Stage 3
Primary Vent System Fan Installs	Conveyor RAR Top	1,791	2,073	2,141	87	80	77	202	201	213
	Crusher 1 FAR Top	875	908	1,037	58	58	54	67	66	74
	Crusher 2 FAR Top	—	2,537	2,206	—	91	103	—	278	288
	RAR 1 Top	3,911	2,751	2,681	380	396	401	2,012	1,595	1,589
	RAR 1 Upper Booster	—	2,781	2,666	—	394	402	—	1,598	1,588
	RAR 1 Lower Booster	—	—	3,186	—	—	363	—	—	1,618
	RAR 2 Top	3,904	2,751	2,672	380	396	402	2,013	1,595	1,588
	RAR 2 Upper Booster	—	2,757	2,715	—	395	399	—	1,596	1,592
	RAR 2 Lower Booster	—	—	3,237	—	—	359	—	—	1,619
	RAR 3 Top	3,671	2,731	2,500	405	397	406	2,035	1,594	1,583
	RAR 3 Upper Booster	—	2,805	2,568	—	392	410	—	1,599	1,578
	RAR 3 Lower Booster	—	—	3,205	—	—	299	—	—	1,297
	RAR 4 Top	3,621	2,726	2,495	406	397	409	2,035	1,593	1,579
	RAR 4 Upper Booster	—	2,757	2,516	—	395	410	—	1,596	1,577
	RAR 4 Lower Booster	—	—	3,175	—	—	307	—	—	1,274

Table 24-14: Primary Vent Fan Requirements for 950 m^3/s, Diesel Based Airflow
ACG Acquisition Company Limited – Santa Rita Mine

Type	Item	950 CMS Flow Model								
		Operating Pressure (Pa)			Operating Flow (CMS)			Operating Power (kW)		
		Stage 1	Stage 2	Stage 3	Stage 1	Stage 2	Stage 3	Stage 1	Stage 2	Stage 3
Primary Vent System Fan Installs	Conveyor RAR Top	760	812	831	62	59	58	59	63	63
	Crusher 1 FAR Top	654	699	1,089	63	62	53	54	57	75
	Crusher 2 FAR Top	—	2,573	2,376	—	90	97	—	293	292
	RAR 1 Top	2,163	1,942	1,891	203	231	245	565	613	636
	RAR 1 Lower Booster	—	—	1,767	—	—	248	—	—	612
	RAR 2 Top	2,163	1,942	1,888	203	231	246	565	613	636
	RAR 2 Lower Booster	—	—	1,851	—	—	240	—	—	612
	RAR 3 Top	2,094	2,195	1,835	241	228	242	679	673	614
	RAR 3 Lower Booster	—	—	2,069	—	—	216	—	—	610
	RAR 4 Top	2,111	2,210	1,853	239	226	240	680	674	614
	RAR 4 Lower Booster	—	—	2,112	—	—	210	—	—	608
	FAR 1 Bottom (Auxiliary)	-	25	—	—	5	—	—	1	—
	FAR 2 Bottom (Auxiliary)	-	25	—	—	5	—	—	1	—

24.1.3.14 Refuges and Secondary Egress

Brazilian Mining Regulatory Norms require that every underground mine has at least two accesses and that each level of an underground mine in operation must have two distinct exits.

The mine design incorporates the following refuge and secondary egress facilities:

- Emergency exit ladderway installed in small diameter raise between each mine level;
- Ability to access the conveyor decline from the access decline at various points;
- Portable self-contained refuge chambers utilised prior to permanent refuge chambers being established;
- Permanent refuge chambers will be self-contained and equipped as a fresh air base for mine rescue operations, including airlock doors and communications systems;
- Allocation of self-rescuers to personnel to ensure safe passage to refuge chambers in case of smoke or gas.

24.1.3.15 Mine Dewatering

A hydrogeological prefeasibility study for the underground SLC was completed in September 2022 by FloSolutions (FloSolutions, 2022). The results of this study were subsequently used to update this section of the technical report. In general, the results of the recent study were not significantly different from the assumptions used previously for estimating mine dewatering.

A generic pumping system comprising pump stations in stages (in series) was devised for this study in the absence of sufficient data for specific station design.

Rainfall captured in the overlying pit and within surface subsidence zones connected to the cave will be the main driver of underground pumping duty.

Detailed studies will be required to determine a suitable pump system for the mine, taking into consideration the following water sources:

- Open pit rainfall catchment linking directly to underground SLC;
- SLC subsidence zone rainfall catchment;
- Surface topography directing water into the open pit and subsidence zones;
- SLC subsidence zone intersecting groundwater conduits.

Rainfall in the region is considerable and measures that can reduce the effective rainfall catchment area and prevent rainfall ingress to the cave will significantly reduce underground pumping requirements. An average annual rainfall of 768 mm in a dry year and 1,432 mm in a wet year was taken from Wood (2020), with the maximum rainfall in a 24-hour period as presented in Table 24-15.

Table 24-15: Maximum Rainfall Over 24-Hour Period
ACG Acquisition Company Limited – Santa Rita Mine

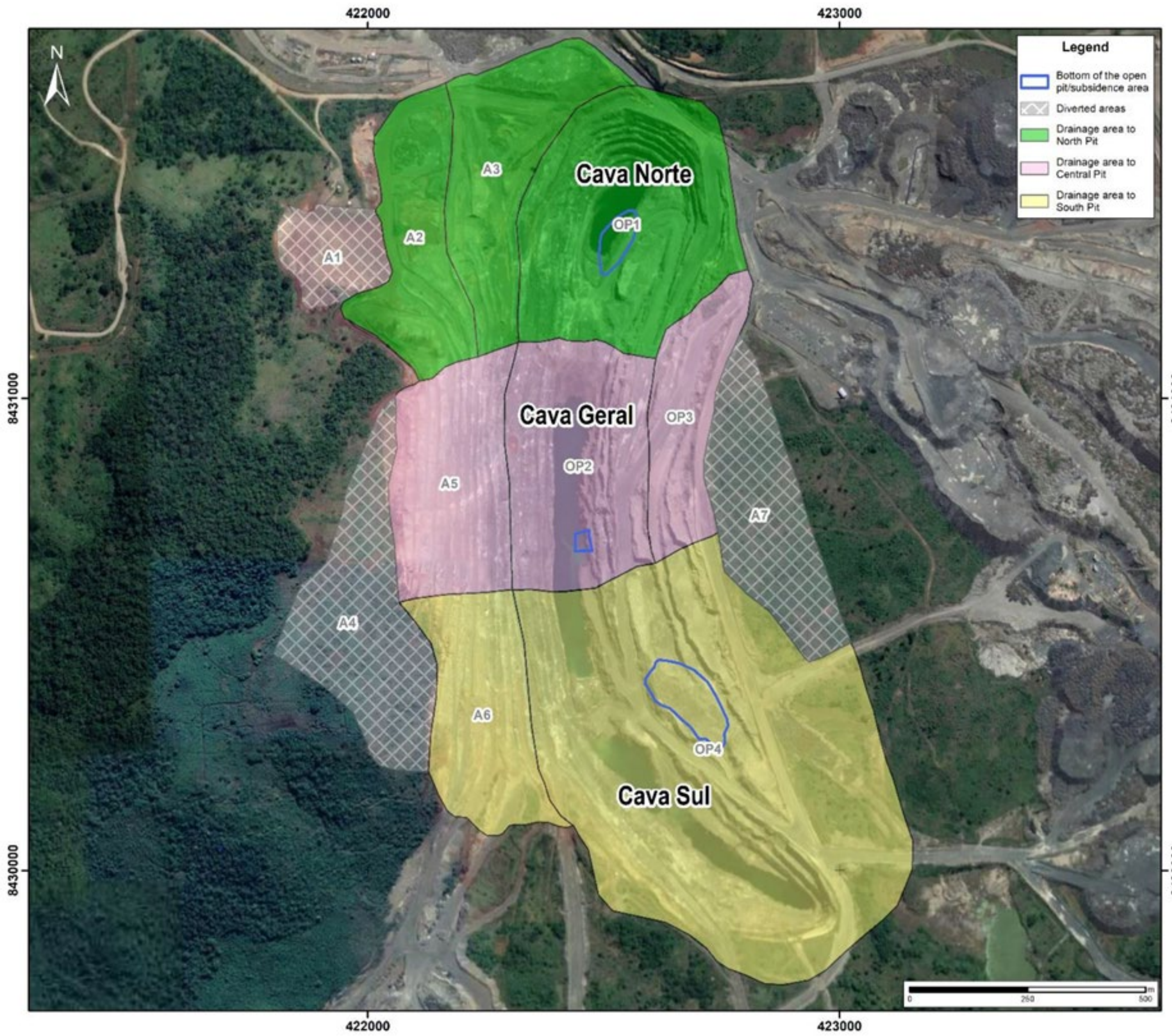
Return Period (yr)	Maximum Rainfall (mm)	Factor	Corrected Maximum Rainfall (mm)
10,000	245	1.13	276
1,000	198	1.13	224
500	184	1.13	208

Return Period (yr)	Maximum Rainfall (mm)	Factor	Corrected Maximum Rainfall (mm)
200	166	1.13	187
100	152	1.13	171
50	138	1.13	156
25	123	1.13	140
10	104	1.13	118
5	89	1.13	101
2	66	1.13	75

The underground dewatering requirements were based on the following assumptions:

- Groundwater inflow into footwall development workings increasing from 10 L/s initially, to a maximum of 40 L/s over the mine life (FloSolutions, 2022).
- Groundwater inflow into the SLC production zone increasing from 10 L/s initially, to a maximum of 80 L/s over the mine life (FloSolutions, 2022).
- Pre-SLC rainfall captured in the open pit is pumped out with in-pit pumps.
- SLC will break through to the open pit shortly after production commences.
- The rainfall catchment area for underground inflows remains constant over time based on initial surface subsidence modelling (FloSolutions, 2022).
- Maximum monthly rainfall in a wet year of 512 mm plus 25% overcapacity will be used for instantaneous pumping capacity calculations.
- Average annual rainfall of 1,083 mm will be used for pump utilisation calculations.
- Water surge storage stopes will be required to handle inflows that exceed the installed pumping capacity, based on a 100-year return, 24-hour rainfall of 171 mm.
- Water surge storage stopes will be located at or near the crusher levels on -450 m RL level and -950 m RL level.

The rainfall catchment areas are shown in Figure 24-23 and are the primary drivers of the mine dewatering requirements. The catchment areas were based on initial subsidence modelling by Stantec (Stantec, 2022).



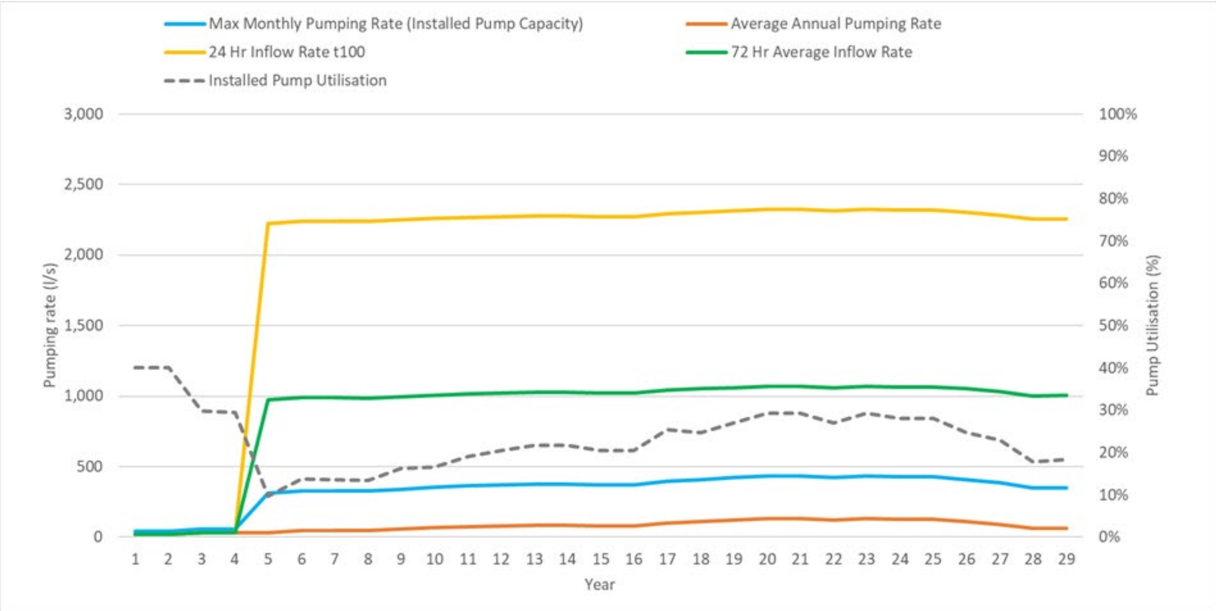
Source: FloSolutions, 2022.

Figure 24-23: Delineated Surface Water Catchments

The rainfall catchment area contributions are as follows:

- Cava Norte 31% of catchment area;
- Cava Geral 25% of catchment area;
- Cava Sul 44% of catchment area.

The 24-hour, 100-year return rainfall event was estimated to generate underground inflows rates 20 times greater than the average annual pumping rate and seven times greater than the average monthly pumping rate for the wettest month (installed pump capacity), refer to Figure 24-24. Other underground operations in high rainfall areas, such as the Ernest Henry SLC and the Argyle block cave, have shown that it is more cost effective to excavate underground water surge storage stopes than to install and operate significantly oversized pumping capacity. Flooding of the workings is not a viable option for Santa Rita SLC because of the significant investment that will be made in the underground materials handling infrastructure and the significant lost production that would result.



Source: Atlantic Nickel, 2023.

Figure 24-24: Required Pumping Rates for Various Rainfall Schemes

Underground water surge storage stopes were assumed to be 25 m x 25 m x 60 m high (37,500 m^3) and excavated with pillars of similar dimensions. During the upper crusher operating period (Years 6 to 14 of the underground mine plan) a water surge storage capacity of 165,000 m^3 was designed. The capacity was doubled to a combined total of 330,000 m^3 during the lower crusher operating period (after Year 14).

Within the underground workings water will typically drain via gravity or be pumped to sumps on each level. Water collected in sumps will cascade down through the level sumps to settling sumps adjacent to permanent pump station installations. Permanent pump stations will be spaced approximately 200 m vertically and will be installed sequentially as mining progresses deeper. Water will be pumped to the surface in series through each pump station. Pumping below the lowest pump station will be performed by a skid mounted pump with a tank.

The underground dewatering system details are provided in Table 24-16. All pumps were assumed to be 150 kW operating at a nominal 50 L/s at 200 m lift. The pump estimates in this study serve only to estimate capital and operating costs for the estimated pumping duties based on generic pumps.

Optimisation of the pumping system is required in subsequent studies, particularly given the depths, varying water inflows, and various pump types that are available.

Table 24-16: Underground Dewatering System Details
ACG Acquisition Company Limited – Santa Rita Mine

Pump Station	Elevation (m RL)	Pump Lift (m)	Crusher 1 (upper)	Crusher 2 (lower)
Pumping capacity installed			380 L/s	440 L/s
Surge storage stopes capacity -450 m RL			165,000 m^3	
Surge storage stopes capacity -950 m RL				165,000 m^3
Pumps – station 1	0	200	8	9
Pumps – station 2	-200	400	8	9
Pumps – station 3	-400	600	8	9
Pumps – station 4	-600	800	8	9
Pumps – station 5	-800	1,000		9
Pumps – station 6	-1,000	1,200		9
Total pumps installed			32	54

FloSolutions' PFS suggests that the three pit zones, or areas, could exhibit varying transmission rates for the captured rainfall because of the potential for varied caving in the pit floors. Table 24-17 provides an indication of the reduced inflow rates that may eventuate should transmission of rainwater to underground extend beyond the instantaneous rate assumed here for pumping calculations – this information has not been incorporated into this PEA but will be considered further in a future study.

Table 24-17: 24-Hour Storm Inflow Rates for Varying Inflow Durations
ACG Acquisition Company Limited – Santa Rita Mine

Return Period	Cava Norte			Cava Geral			Cava Sul			Total		
	Inflow Duration (days)			Inflow Duration (days)			Inflow Duration (days)			Inflow Duration (days)		
	1	3	7	1	3	7	1	3	7	1	3	7
5	404	135	58	314	105	45	574	191	82	1292	431	185
10	492	164	70	380	127	54	694	231	99	1566	522	224
25	604	201	86	464	155	66	850	283	121	1918	639	274
50	689	230	98	527	176	75	964	321	138	2179	726	311
100	772	257	110	589	196	84	1079	360	154	2440	813	349

Source: FloSolutions, 2022.

Subsequent studies will need further work to determine the following:

- Develop additional detail for pit perimeter diversions and capture to mitigate rainfall entering the underground workings;

- Underground water routing designs to optimise underground storage arrangements;
- Underground dewatering infrastructure details;
- Underground storage void design;
- Update of inflow estimates to incorporate new hydrogeological investigations;
- Surface water mine water storage and treatment requirements.

24.1.3.16 Mine Design Physicals

The mine design physicals provided in the following tables are based on the three-dimensional mine design. The following items were added to the final schedule and cost estimate but do not have designs:

- Water storage stopes (excavated primarily for surge rainfall storage) underground, 165,000 m^3 of capacity on -450 m RL and an additional 165,000 m^3 of capacity on -950 m RL;
- Additional transfer drives from ore-passes to crusher to permit additional loaders to operate simultaneously, approximately 1,200 m;
- Emergency egress raise, 1.5 m diameter, installed between each level;
- Substation cut-outs, 30 m per level;
- Miscellaneous cut-outs, 30 m per level.

Waste development mined over the underground mine plan life is estimated at 14 Mt.

A summary of lateral and vertical development is provided in Table 24-18 and Table 24-19 respectively.

A summary of other significant production activities is provided in Table 24-20.

Table 24-18: Lateral Development Summary (designed items only)
ACG Acquisition Company Limited – Santa Rita Mine

Description	Quantity (m)
Access	15,723
Conveyor drive	6,612
Decline	9,496
Drawpoint	58,694
Drill drive	147,134
Footwall drive	33,669
Ore-pass drive	6,535
Slot drive	27,750
Stockpile (remuck bays)	2,820
Vent drive	19,473
Waste Drive	2,460
Chambers (equivalent metres of access size development)	1,474
Total Lateral Development	**331,841**

Table 24-19: Vertical Development Summary (designed items only)
ACG Acquisition Company Limited – Santa Rita Mine

Description	Quantity (m)
Egress raise, 1.5 m diameter	1,025
Finger raise, 2 m x 2 m	2,315
Ore-pass 4.0 m	7,641
Slot raise, 5 m x 5 m	9,250
Vent raise 3.0 m	1,517
Vent raise 5.0 m	11,321
Total Vertical Development	**33,070**

Table 24-20: Production Activities Summary
ACG Acquisition Company Limited – Santa Rita Mine

Description	Quantity
Stripping (slashing) volume	386,400 m^3
Truck haulage	102,900 kt.km
Production drilling	12,300 km
Cablebolting	1,050 km
Miscellaneous shotcreting of operating development	131,400 m^3
Service hole drilling	21 km

24.1.3.17 Mine Scheduling Parameters and Assumptions

The mine development schedule was generated from the mine design using Datamine 5D Planner and Earthworks Production Scheduler (EPS). SLC production tonnage was determined by Power Geotechnical as part of the cave draw modelling as discussed in Section 24.1.3.8.8 (Mine Production Rate) and scheduled using Datamine 5D Planner and EPS.

24.1.3.17.1 Mine Operating Roster

The underground mine will operate continuously 7 days per week, 24 hours a day, using an 8-hour shift roster and a total of four crews. The average weekly hours worked per worker is 42.

24.1.3.17.2 Scheduling Productivities

The activity productivities used for development scheduling are provided in Table 24-21. These rates are applicable to each individual activity in the schedule and not intended as mine aggregated rates.

Table 24-21: Mining Activity Productivity Rates
ACG Acquisition Company Limited – Santa Rita Mine

EPS Activity	Productivity	Comment
Development – decline, conveyor drives	120 m/mth	—
Development – footwall drive, drawpoints, vent drives	60 m/mth	—

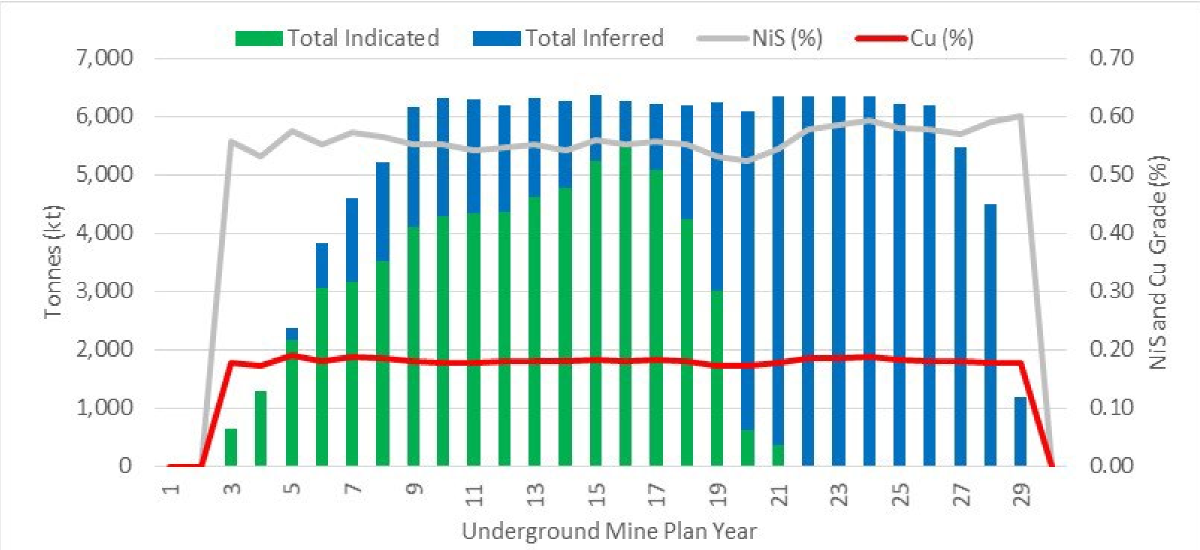
EPS Activity	Productivity	Comment
Development – slot drive, drill drive, level accesses	40 m/mth	—
Raisebores	120 m/mth	180 m/mth for long 3.0 m raisebores
Longhole raises	120 m/mth	—
SLC draw	200 t/day/drawpoint	400 t/day/drawpoint on bottom three levels to minimise production schedule tail-off

24.1.3.17.3 Mining Schedule

The production profiles for mill feed tonnes and grade are provided in Figure 24-25.

The following can be observed:

- Ramp up to full production rate of 6.2 Mt/a over the first six years of underground production (nine years including the pre-production period).
- Grade profile is relatively consistent.
- Grade profile is slightly higher during ramp-up due to higher proportion of mill feed originating from development operations (less dilution).
- Grade profile increases at the end of the mine plan due to increasing grades at depth.
- Contained Ni production of approximately 33 kt/a.
- Contained Cu production of approximately 11 kt/a.

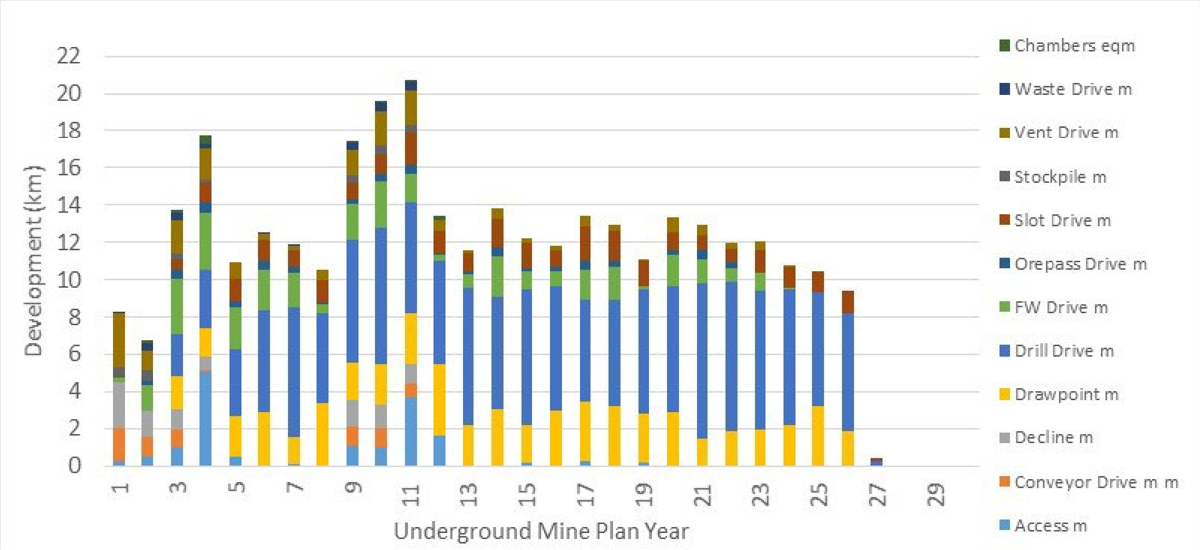


Source: Atlantic Nickel, 2021.

Figure 24-25: Mineral Resource Production and Grade Profile

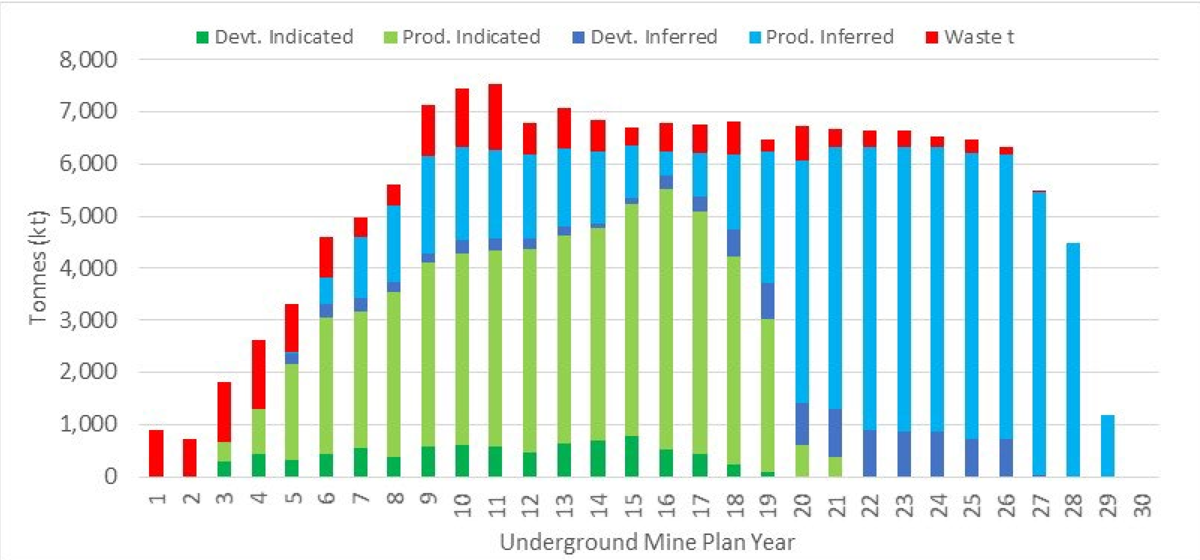
Lateral development is relatively consistent over time, at approximately 12 km per year, excepting the period from years 9 to 11 in the underground mine plan. During this period mine development and infrastructure is extended to the bottom of the mine at -950 m RL to establish the lower crusher (Figure 24-26).

Lateral development is composed of approximately 50% mineralised development and 50% waste rock development. The total material mined by year is shown in Figure 24-27.



Source: Atlantic Nickel, 2021.

Figure 24-26: Lateral Development Profile



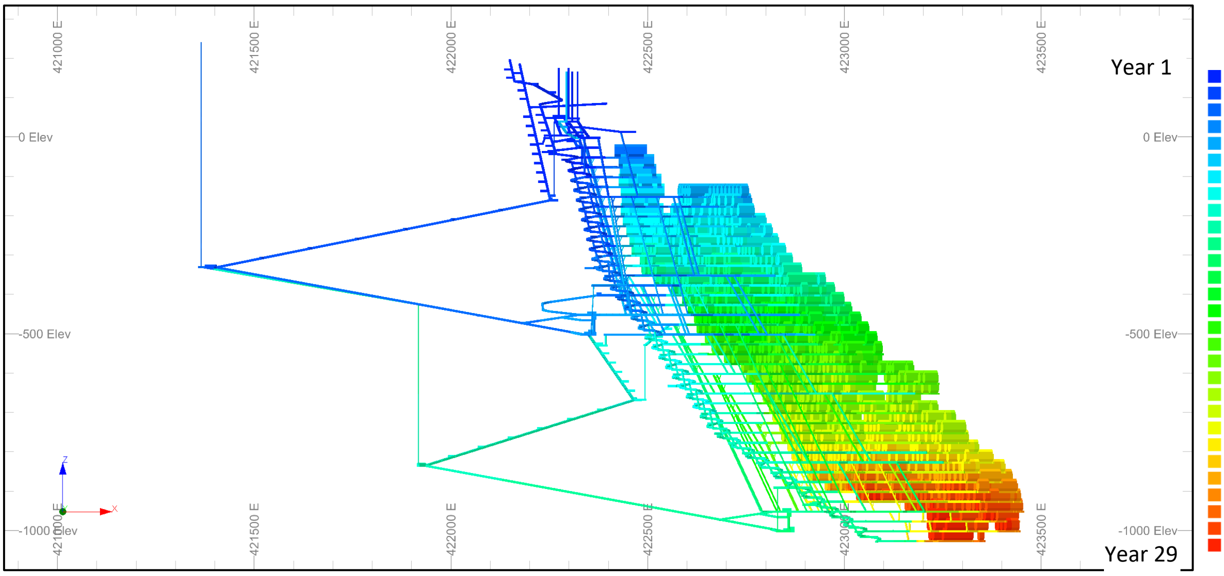
Source: Atlantic Nickel, 2021.

Figure 24-27: Material Mined Profile

Mill feed from development is consistent over time at 700 kt/a. The underground materials handling system (crusher and conveyors) is assumed to be operational by the sixth year of underground production to coincide with Mineral Resource production in excess of 2.5 Mt/a.

Truck haulage is utilised for the first five years of the underground mine plan while total material movements are less than 3 Mt/a (assisted by relatively short haulage distances from the upper levels and twin access routes).

The mine design was coloured coded according to the underground mine plan schedule in Figure 24-28.



Source: Atlantic Nickel, 2021.

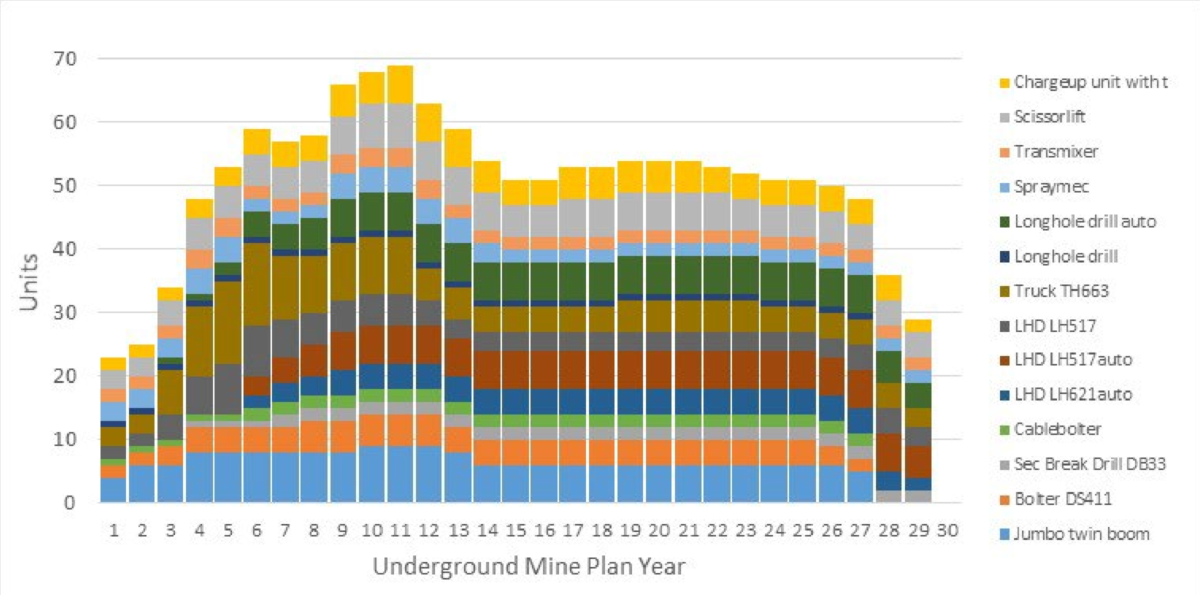
Figure 24-28: Colour-Coded Mine Schedule, Looking North

24.1.3.17.4 Mining Fleet Requirements

A modern diesel mining fleet was selected and sized appropriately for the mine, consisting primarily of 63 t trucks, 17 t and 21 t automated LHDs, automated longhole drills, programmable development jumbos, ground support bolters, bolters, secondary breaking drill rigs, and shotcreting units. A high level of automation was assumed to improve productivity, reduce costs and increase quality.

Adoption of battery powered equipment is increasing as the technology and capacity of such equipment improves. Electric-powered equipment options will be considered in the future with the potential benefits of reducing mine air ventilation requirements and increased productivity.

The mining fleet is provided in Figure 24-29. Note that the equipment numbers have been smoothed and within some time periods the equipment numbers shown over-represent the numbers required to perform the actual workload. In particular, the truck fleet required reduces significantly after underground mine plan year five, however the fleet size persists until the trucks are retired at end of life.

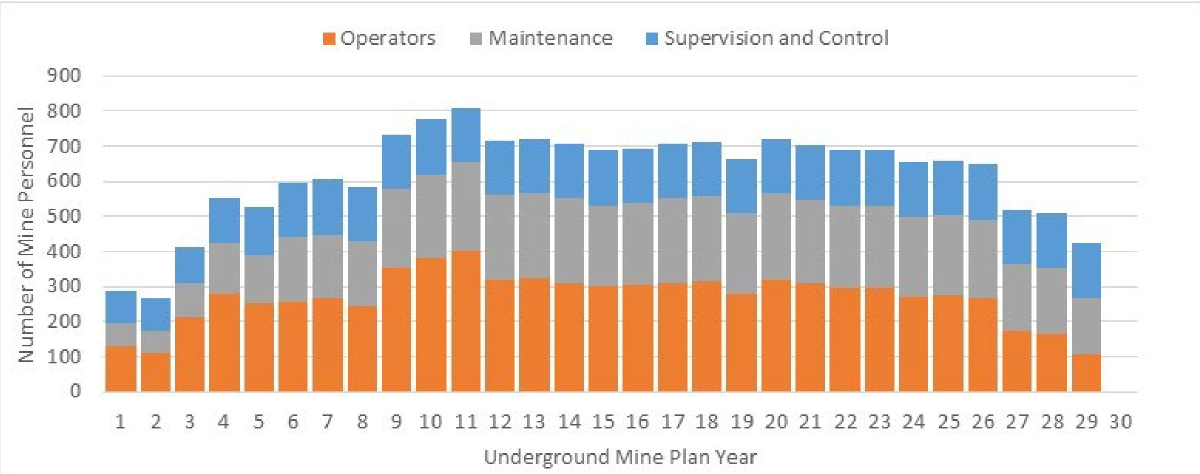


Source: Atlantic Nickel, 2021.

Figure 24-29: Mining Fleet Profile

24.1.3.17.5 Mining Personnel Requirements

Mining personnel requirements are provided in Figure 24-30. A breakdown of the supervisory and control personnel (fixed personnel) is provided in Table 24-22. These personnel numbers do not include consultants or personnel involved with large infrastructure installations such as the crushers, conveyors and pumping systems.



Source: Atlantic Nickel, 2021.

Figure 24-30: Mining Personnel Profile

Table 24-22: Mining Supervision Personnel Requirements
ACG Acquisition Company Limited – Santa Rita Mine

Supervision Personnel	Number
Manager	1
Superintendent	2

Supervision Personnel	Number
Senior Engineer	2
Engineer	4
Junior Engineer	4
Senior Geologist	2
Geologist	6
Junior Geologist	6
Senior Geotech Engineer	1
Geotech Engineer	2
Safety Officer	2
Training Officer	3
Administrative Assistant	6
General Labourer – UG	40
General Labourer – Surface	40
UG Foreman	2
UG Shift Boss	8
Maintenance Foreman	2
Maintenance Shift Boss	8
Mech/Elec Foreman	2
Mech/Elec Shift Boss	8
Mechanical Engineer	2
Electrical Engineer	4
Mine Surveyor	8
Total	*165*

24.1.3.18 Underground Mine Plan

A production schedule for the underground mine is presented in Table 24-23.

Table 24-23: 2023 PEA Underground Mine Production Schedule
ACG Acquisition Company Limited – Santa Rita Mine

Mine Plan	Unit	Pre-Production Years -2 to 0	Years 1 to 5	Years 6 to 10	Years 11 to 15	Years 16 to 20	Years 21 to 25	Years 26 to 27	Total
Underground waste rock	kt	4,066	3,486	4,329	2,297	1,802	411	0	16,391
Underground process plant feed	kt	491	16,173	30,986	31,295	31,301	29,192	2,304	141,742
NiS grade	%	0.56	0.56	0.55	0.55	0.55	0.58	0.59	0.56
Cu grade	%	0.18	0.19	0.18	0.18	0.18	0.18	0.18	0.18

Mine Plan	Unit	Pre-Production Years -2 to 0	Years 1 to 5	Years 6 to 10	Years 11 to 15	Years 16 to 20	Years 21 to 25	Years 26 to 27	Total
Co grade	%	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Au grade	g/t	0.07	0.06	0.06	0.06	0.06	0.06	0.09	0.06
Pt grade	g/t	0.11	0.09	0.10	0.10	0.09	0.10	0.14	0.10
Pd grade	g/t	0.05	0.04	0.04	0.04	0.04	0.04	0.07	0.04

24.1.4 Project Infrastructure

Santa Rita has all necessary infrastructure in place to support an open pit mining and mineral processing operation. The existing on-site infrastructure to support the mining and processing sites includes the following:

The existing on-site infrastructure to support the mining and processing sites includes the following:

- Site roads
- TSF
- Open pit mine
- Waste rock storage facilities (East and South)
- Ore stockpiles
- Process plant/concentrator
- Conveyor system
- Powerlines
- Water pipelines
- Site buildings, including:
  - Administration offices
  - Gatehouse (including truck scale)
  - Bus station
  - Maintenance buildings (electro/mechanical and mobile equipment)
  - Warehouse
  - Washroom and change rooms
  - Kitchen and canteen
  - Healthcare and firefighting department
  - Assay laboratory
  - Metallurgical laboratory
- Consumables storage
- Security and fencing
- Explosives magazines
- Parking area
- Water and mine site sewage treatment facilities
- Data and communications infrastructure

Future underground mining operations will largely utilize the existing surface facilities. The current workshop, canteen, explosives magazine, warehousing, fuel storage and office facilities will generally be more than sufficient for supporting the underground operation. The underground is expected to function with fewer people than the open pit.

New surface infrastructure associated with the underground will include the following:

- A box cut and portal located to the west of the north end of the open pit;
- A conveyor portal connecting to the bottom of the existing crusher installation;
- A temporary construction portal in the west wall at the north end of the open pit on the 82 m RL bench;
- Multiple ventilation raise surface collars on the western side of the open pit;
- Ventilation adits on the west wall at the south end of the open pit on the 10 m RL bench;
- Dewatering pond for storing, settling and recycling water from underground;
- Electrical reticulation to the portals, adits and services;
- Shotcrete batch plant.

24.1.5 Recovery Methods

24.1.5.1 Introduction

Information in this subsection is obtained from RPA (2015), operating results from 2012 to 2016 and January 2020 to December 2022, information gathered by the CP during a site visit on July 23 and 24, 2019, a testwork reports issued by SGS Geosol in November 2021, and direct communication with Santa Rita staff.

The Santa Rita process plant was commissioned in October 2009, commenced production of nickel concentrate in November 2009 and entered into commercial production in January 2010 (RPA, 2015).

From the start of production in 2009 to the end of Q1 2016 when the plant was shut down, the process plant treated a total of 34.1 Mt at average feed grades of 0.48% Ni (total), 0.11% Cu, and 0.02% Co. The plant was re-started in October 2019 and process plant production from January 2020 to December 2022 totalled 12.0 Mt at average feed grades of 0.30% NiS, 0.10% Cu, and 0.01% Co.

24.1.5.2 Process Plant

The Santa Rita process plant consists of crushing, grinding, flotation, thickening, and filtration unit operations to produce a saleable nickel concentrate. Flotation tailings are pumped to a tailings storage facility. Figure 24-31 shows the current flowsheet.

Payable metals such as platinum, palladium and gold are also contained in the concentrate with nickel, copper and cobalt. The majority of revenue is generated by nickel.

The initial nameplate capacity was 4.6 Mt/a; this was expanded to 6.5 Mt/a in 2012 with the addition of a desliming circuit, pebble crushing, a second ball mill and a pressure filter.

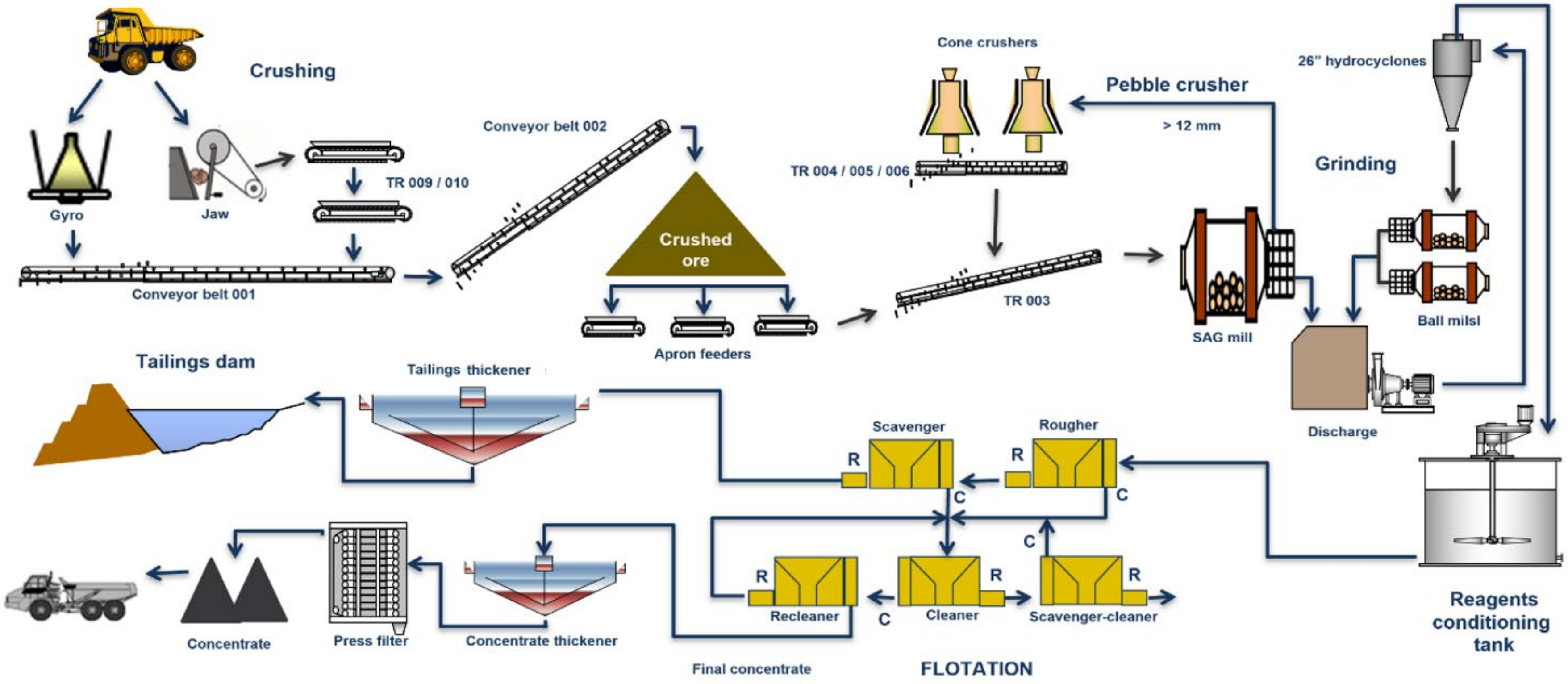
From July 2012 to the end of March 2016, Santa Rita produced 386,947 t of concentrate with a total metal content of approximately 18% and an average nickel content of approximately 14.3%; containing 55,263 t of nickel, 15,221 t of copper, and 986 t of cobalt in concentrate.

Over the period January 2020 to December 2022, the plant produced 290,821 t of concentrate containing 39,488 t of nickel at 13.6% total nickel, 4.4% copper, 0.25% cobalt and payable gold, platinum, and palladium.

Since the start-up of the process plant in October 2019, the desliming circuit has not been operated. Plant technical staff conducted statistical studies of process plant data and bench scale flotation tests to compare results with and without desliming. These both demonstrate that desliming makes no difference to nickel recovery. Testwork conducted by SGS Geosol in 2020 confirmed this conclusion.

The underground mill feed is planned to be treated in the existing Santa Rita process plant, which will require only minor modifications. The annual feed rate will be 6.25 Mt/a for the first five years after the mining ramp-up. The projected average NiS feed grade is 0.56% NiS compared to an average of 0.29% for the open pit mill feed. Flotation testwork has shown that the NiS recovery will be higher than that obtained for open pit mill feed.

The underground mill feed will be crushed underground and transported to surface by a conveyor that will discharge onto the existing coarse ore stockpile feed conveyor.



Source: Atlantic Nickel, 2021.

Figure 24-31: Process Flowsheet

24.1.5.3 Process Description

24.1.5.3.1 Crushing and Grinding

Blended open pit mill feed from the stockpile area is fed to primary crushing. The primary gyratory crusher (a Metso 50/65 MK II gyratory crusher) crushes from a nominal F_{80} size of 800 mm to a P_{80} size of 140 mm to 150 mm at a rate of approximately 1,500 t/h. The second primary crusher (a Metso C-160 jaw crusher) is located close to the primary gyratory crusher and has a nominal throughput rate of 750 t/h and produces a crushed product with a nominal P_{80} size of 152 mm.

The primary crushed material will be conveyed to an open stockpile with a total capacity of 67,000 t (live capacity 15,000 t, 19 hours; 84 hours total capacity). Three feeders will extract the mill feed from beneath the stockpile at a controlled rate of around 900 t/h for feed to the SAG mill.

The SAG mill is a 30 ft diameter by 16.4 ft long Outotec mill with an 8 MW motor. The design target transfer size (T_{80}) is 4 mm at a nominal throughput of 832 t/h.

Two Metso HP400 pebble crushers operate in closed circuit with the SAG mill to crush oversize from the SAG mill (material in the size range -70 mm to +12 mm).

Material <12 mm flows to a common pump box shared by the SAG mill and ball mill circuits. Material from this pump box is pumped to a single cluster of ten 26 inch diameter cyclones, allowing the two 20 ft diameter x 28.5 ft long 5.8 MW Outotec ball mills to operate in closed circuit to produce a nominal flotation feed product with a P_{80} of approximately 125 µm.

For underground mill feed, the flowsheet for this area will be the same as the current flowsheet. The process plant operates at around 90% availability; hence, the required hourly throughput will be approximately 797 t/h compared to 842 t/h for open pit mill feed. Laboratory testing carried out by SGS Geosol has shown that the underground material has slightly lower crushing and SAG milling indices than the open pit ore and the Bond ball mill work index is a little higher than the hardest open pit mill feed. JKTech used its JKSimMet software to model the circuit with underground feed and concluded that a treatment rate of 955 t/h could be achieved at maximum SAG mill motor power. The required rate of 797 t/h will be achievable at a normal SAG power draw of 90%. The SAG mill will not be a bottleneck because it currently operates at up to 900 t/h with the harder open pit ore. The ball mills currently operate at about 72% of full motor power; hence, there is additional capacity available to produce the required flotation feed F_{80} size of 125 µm from the underground material.

24.1.5.3.2 Deslime Circuit

This circuit is not currently in operation but could be used if slimes problems are encountered in the future. The circuit comprises two clusters of ten 20 inch diameter cyclones, two clusters of twenty 10 inch diameter cyclones and twelve clusters containing 256 x 4 inch diameter cyclones. The target P_{80} for the 4 inch diameter cyclone overflow is 10 µm, but is normally closer to 20 µm. The slimes are pumped to the tailings dam.

The desliming circuit will not be required for underground mill feed.

24.1.5.3.3 Conditioning Circuit and Reagents

The conditioning circuit has three conditioning tanks. The primary conditioner is used to condition the ball mill cyclone overflow with activator (copper sulphate and citric acid); the two other tanks are used to condition the rougher flotation feed to each bank of rougher cells with collector and frother.

Between 300 g/t and 500 g/t of 50% sodium silicate solution is added as a dispersant/pH modifier to the ball mill cyclone underflow. Between 60 g/t and 100 g/t of activator is added to the primary conditioner tank. Sodium ethyl xanthate mixed 4:1 with sodium di-alkyl di-thiophosphate is used as the collector added to the feed to the secondary conditioner tanks.

24.1.5.3.4 Flotation

The rougher/scavenger flotation circuit consists of two rows of six 160 m^3 Outotec tank cells. The scavenger circuit concentrate can be directed back to the rougher feed or to the cleaner circuit feed; the scavenger circuit tailings report to the tailings thickener. The rougher concentrate, along with the re-cleaner tailings and cleaner scavenger concentrate, report to the cleaner circuit, which consists of six 70 m^3 cleaner cells and three 70 m^3 cleaner-scavenger cells. The cleaner-scavenger tailings are returned to the rougher feed. Cleaner concentrate reports to four 30 m^3 re-cleaner cells.

For underground mill feed, changes will be required to launders, piping, pumps and samplers to deal with the increased quantity of concentrate produced compared to open pit mill feed treatment. The circuit residence times are sufficient.

24.1.5.3.5 Thickening and Filtration

The final concentrate is thickened in a 15 m diameter concentrate thickener to a density of approximately 65% w/w solids, from where it is pumped to storage tanks ready for filtration. The concentrate is filtered using a Larox pressure filter. For underground mill feed no changes will be required to the circuit or the existing thickener. The current reported settling rate is 0.25 t/m^2/h which equates to a capacity of 44 t/h. The calculated average production rate will be approximately 27 t/h. The capacity of the existing Larox filter is 33 t/h. A second filter is available if required.

Following filtration, the final concentrate is trucked to the port of Ilhéus where it is loaded onto ships for transport to market.

The final tailings are thickened in a 35 m diameter thickener to a density of 55% to 60% w/w solids and are then pumped to the TSF for final deposition. Thickener overflow water is recirculated for use within the process plant. Reclaim water from the TSF is also recirculated for use within the process plant. No changes will be required to the existing circuit or the thickener for the underground mill feed. The tailings flow with underground material will be lower than with open pit mill feed.

24.1.5.4 Associated Facilities

Process-associated facilities comprise a metallurgical testing laboratory for grinding and flotation testwork, a 400 kg/h pilot plant for full circuit testing and a well-equipped assay laboratory.

24.1.5.5 Consumables and Reagents

The process plant requires approximately 1,600 m^3/h of water this is derived from three sources with the capacities shown below:

- The Contas River can provide up to 700 m^3/hr (normally 500 m^3/hr);
- Water return from the TSF at 400–500 m^3/hr;
- Tailings thickener overflow at 800–900 m^3/hr.

For the underground mill feed the process plant water sources will be the same as for the open pit operation and consumption will be similar or slightly lower than in the current plant.

Power is taken from the national grid; the process plant power requirement is 21.1 MW. Tailings spigotting at the TSF is under evaluation to start mid-2023. This would require an extra 0.7 MW. For underground mill feed the plant power demand could increase by up to 2 MW to 23.8 MW due to the higher consumption in ball milling.

The consumption of grinding balls and reagents is shown in Table 24-24. For underground mill feed, the ball mill liner and ball consumption could increase by between 5% and 10%. The collector consumption will increase only marginally.

Table 24-24: Grinding Media and Reagent Consumption
ACG Acquisition Company Limited – Santa Rita Mine

Item	Consumption (g/t plant feed)
Grinding	
5-inch balls	210
2.5-inch balls	250
CMC depressant	10
Flotation	
Copper sulphate	50
Sodium ethyl xanthate	60
Sodium di-alkyl di-thiophosphate	60
Sodium silicate	750
Citric acid	50
Thickening	
Flocculant	16

24.1.5.6 CP's Comments on Underground Material Recovery Methods

The existing process plant has the capacity to treat open pit mill feed at 6.5 Mt/a and underground mill feed at 6.25 Mt/a as required by the mine plan.

Changes for mill feed from underground may be required in the grinding circuit and could include the following recommendation by JKTech:

- Decrease SAG mill total volumetric load to 25% and increase the ball load to decrease fines generation and decrease the load on the SAG; review the SAG grate design to increase the pebble port size to further decrease fines generation.

The CP agrees with these recommendations, as they should ensure that the SAG motor power does not become a restriction, passing a coarser product to the ball mills that have sufficient spare power to accommodate this.

24.1.6 Market Studies and Contracts

24.1.6.1 Metal Prices

The commodity prices used in the financial analysis of the underground base case are based on the consensus median of leading banks and financial institutions as of January 2023, and are presented in Table 24-25. Both the metal prices and currency exchange rate are subject to spot market conditions. There are no metal streaming agreements in place, and hedge contracts are scheduled to be completed in Q1 2024 so will not affect financial analysis of the underground.

Table 24-25: Real Metal Prices and Exchange Rate Assumptions
ACG Acquisition Company Limited – Santa Rita Mine

Item	For Underground Years
Nickel (US$/lb)	8.46
Copper (US$/lb)	3.59
Cobalt (US$/lb)	23.53
Gold (US$/oz)	1,615
Platinum (US$/oz)	1,140
Palladium (US$/oz)	1,363
Exchange Rate US$:R$	5.55

24.1.6.2 Market Outlook and Concentrate Sales Terms

24.1.6.2.1 Market Outlook for Metals

Nickel

Nickel is utilised across a broad spectrum of end-use industries due to its physical and mechanical characteristics. It is normally utilised in engineering, transport, and building and construction fields, and is also a crucial component of the most common batteries of electric vehicles.

Nickel prices are closely related to demand from stainless steel producers who account for about two-thirds of total demand. Currently, the primary factor driving price movements is related to infrastructure activity worldwide, with a particular emphasis on Asian nations. However, the predicted increase in demand for electric vehicles in the upcoming years is another significant driver of price changes.

A recovery in the stainless market fuelled by China, combined with ongoing strong growth in nickel use in batteries for electric vehicles, is expected to push the market back into supply deficit during 2027–2032, leading to steadily rising annual prices.

Copper

Copper is a 'through-the-cycle' commodity with applications across many industries such as: electrical, energy, communications, transport, infrastructure and industrial equipment. Over the long term, an additional 6 Mt of copper by 2032 is required to meet the rising intensity of global use per capita and continued population growth to continue to support historical growth rates. A price of the magnitude US$3.50/lb Cu is required to incentivize the pipeline of lower quality projects to meet the projected demand deficit of refined copper.

Cobalt

98% of global cobalt production is obtained as a by-product from the mining of nickel and copper ores. Cobalt has major applications as a battery chemical and is present in most of the battery types utilised on electric vehicles. The cobalt market is expected to be in a 32% deficit by 2030.

Concentrate Sales

Offtake contracts and terms are proprietary. There are several agreements in place between Atlantic Nickel and smelters/traders for export from Brazil. The CP has reviewed the contracts and has confirmed that the terms are appropriately included in the financial model.

24.1.6.3 Contracts

There are no contracts in place related to underground mining.

24.1.7 Environmental Studies, Permitting, and Social or Community Impact

24.1.7.1 Introduction

Atlantic Nickel is evaluating the potential to conduct underground mining following completion of the open pit operations. Once Mineral Resources have been extracted from the open pit, Atlantic Nickel would transition to underground mining using existing facilities to the extent possible. With the development of the underground Mineral Resource, the existing TSF would not have sufficient capacity for the additional process tailings. Thus, a new TSF would be required for the underground operations.

24.1.7.2 Tailings Storage Facility

The current mine plan calls for raising the existing TSF to contain the 33 Mt of tailings to be produced from mining the open pit, without encroaching on the existing gas pipeline right-of-way located to the east of the TSF. With the addition of underground mining, a new TSF would be required at some point of the operation in order to store the additional 140 Mt of tailings to be produced from the underground mine over a period of 28 years.

RoséGeo Consulting Ltd (RoséGeo) in partnership with WSP completed a scoping-level study to identify and evaluate, at a conceptual level, options for tailings storage in support of the 2021 PEA for the planned underground mining project. The scoping-level TSF study (RoséGeo-Wood, 2020; amended in 2021) was performed in consideration of relevant Brazilian and International standards/guidelines, including but not limited to:

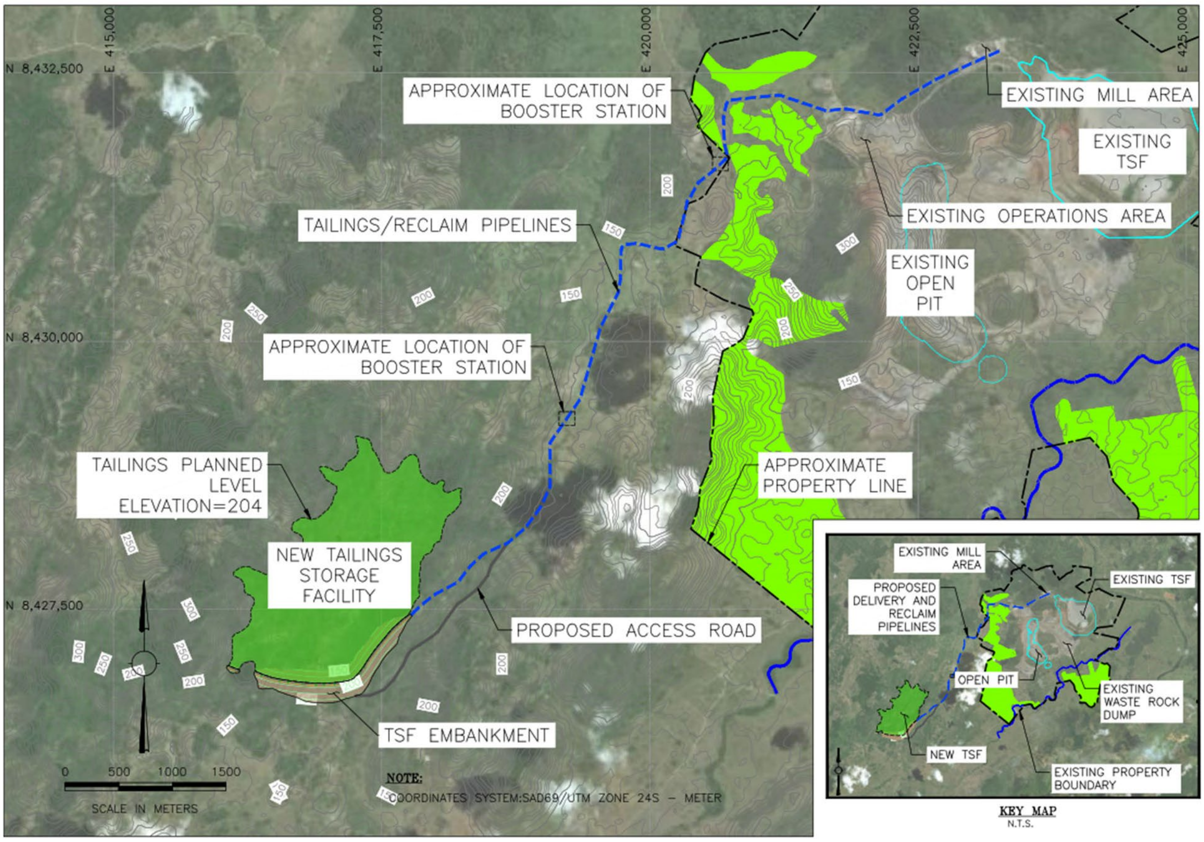
- Agência Nacional de Mineração, 2019. “Resolução ANM nº 04”;
- Departamento Nacional de Produção Mineral (DNPM), May 2017. Portaria Nº70.389;
- Associação Brasileira de Normas Técnicas, NBR 13028/2017. “Mineração — Elaboração e apresentação de projeto de barragens para disposição de rejeitos, contenção de sedimentos e reservação de água — Requisitos”;
- Canadian Dam Association, 2014, “Technical Bulletin: Application of Dam Safety Guidelines to Mining Dams”;
- CNRH, 2012. “Resolução nº 143/2012”. Seção 1 do D.O.U de 4 de setembro de 2012.

The scoping study evaluated four alternatives and evaluated two different placement methods considering aspects such as storage requirements, climatic environment, site experience with associated tailings disposal, geotechnical risks, property boundary and land use constraints, construction/operating costs and methods, location relative to existing infrastructure and nearby residential areas, potential environmental impacts, and closure. Both filtered (‘dry-stack’) tailings disposal and conventional (slurry) tailings disposal were considered. The scoping study was amended in 2021 (RoséGeo-Wood, 2021) and an addendum was issued to evaluate an additional alternative site located to the west of the mine site that was selected as the preferred alternative. The new base case TSF is outside of the existing mine property boundaries and located approximately 6 km to 9 km southwest of the existing open pit and plant areas. It is assumed that Atlantic Nickel will acquire lands associated with the future TSF footprint and required infrastructure including, access roads and pipelines prior to construction of the new TSF. Early discussions with landowners have been initiated and will be advanced as a priority. Figure 24-32 shows a layout of the conventional TSF identified as the preferred option. The above-mentioned scoping and sizing studies associated with the new TSF have been summarised in WSP (2021e).

The conceptual design of the new TSF assumes that the tailings will be classified as Class II B (non-toxic and inert waste, according to ABNT NBR 10004) given the similarity in the deposit. An unlined basin has therefore been considered for tailings storage. The new TSF is planned to be developed as a cross-valley surface impoundment confined by two embankments along the southern side of the facility. The planned TSF embankments will be constructed as earthen and rockfill dams with the upstream faces to be lined with an HDPE geomembrane liner, along with underlying protective bedding, filter and transition layers. The dam configuration is currently planned to have an ultimate length of approximately 2 km and will feature a 20 m wide crest, an upstream side-slope of 2H:1V, and a downstream overall side-slope of 2.25H:1V. TSF construction will begin with an initial starter dam and will be expanded every three years using a downstream raise method until reaching the ultimate maximum dam height of 70 m.

Thickened tailings would be pumped from the existing process plant and discharged from the embankments. Tailings would be deposited from header lines forming a beach along the dam crest and supernatant pool(s) against the existing hillside and away from the main embankments. The TSF is planned to incorporate a stormwater management system, a decant and reclaim water system that returns reclaim water toward the process plant, a seepage collection system that returns foundation seepage (if occurring) and run-off from the downstream slope back to the impoundment, and a geotechnical monitoring and instrumentation program.

The scoping study for the new TSF was completed in support of planning for future tailings placement and siting, as well as for identifying general features that could be used for further assessments and indicative costs for the 2021 PEA study. A PFS level design of the new TSF is currently ongoing including geotechnical field work and tailings characterisation that was completed in 2022.



Source: Rosé and Wood, 2021.

Note. Elevation shown in metres above sea level.

Figure 24-32: Conceptual Layout of New Conventional TSF

Several opportunities have been identified for project optimisation which may include:

- Relocating the existing pipelines to allow for further raises of the existing TSF to contain additional tailings, thus reducing the required size and delaying the starter dam construction of the new TSF.
- Using depleted open pits for storage of tailings.
- Evaluating other sites with relatively shorter pumping or hauling distances from the process plant, WRSFs, and other borrow sources.

In parallel with the TSF base case, an alternative scenario is being developed with similar capacity located only three kilometres from the beneficiation plant and within the current mining property boundary. The base case TSF project optimisation opportunities, along with other TSF design activities, will be further evaluated as the underground mine project is advanced to future stages.

24.1.7.3 Permitting

Since underground operations would use existing surface infrastructure, with the exception of a new TSF, INEMA defined a permitting process in a single phase, called “Alteration Licence”. This process would likely include presenting compliance data from the ongoing monitoring programs for the existing operations and collecting additional baseline data for the area proposed for the new TSF. In addition to regranting of the operating licence from INEMA, other permits required for operations would need to be renewed or extended for the life of the underground.

The baseline data collected in the area of the new TSF and TSF corridor would be used to develop an EIA associated with the new underground operation and new TSF. The EIA would address proposed changes to the operations, existing environmental and social conditions, expected impacts to the environment and socioeconomic conditions, and proposed mitigation measures to address the expected impacts.

In addition to the environmental permitting, Atlantic Nickel would be required to comply with current laws and regulations associated with dam safety. New regulations were passed due to recent dam failures in Brazil. As a result of these significant dam failures, there is also widespread public concern regarding new and expanded tailings storage facilities. Compliance with existing permits, development of a TSF design to meet current and proposed new dam safety laws and regulations, and a strong public outreach program will reduce and mitigate the risks associated with development of a new TSF.

24.1.7.4 Social

Atlantic Nickel implemented numerous social programs during the open pit operations. With the addition of the underground operations, Atlantic Nickel would continue these social programs and would extend these programs to areas that would be impacted by the new TSF and new TSF transportation corridor. These programs would be extended to the projected life of the mine based on the underground operations.

24.1.7.5 Closure

The reclamation and closure of the facilities associated with the underground would be the same procedure as currently planned for the open pit facilities. The new TSF would be closed in a similar fashion as the current TSF.

24.1.8 Capital and Operating Costs

24.1.8.1 Capital Costs

Initial capital costs for the 2023 PEA are estimated at US$417 million. Capital costs incurred during the production period are considered sustaining capital costs. Total sustaining costs have been estimated at US$1,086 million before tax credits and at US$1,038 million after tax credits. All capital costs are presented in Table 24-26.

Table 24-26: 2023 PEA Capital Cost Estimates
ACG Acquisition Company Limited – Santa Rita Mine

Item	Initial Capital	Sustaining Capital (US$ M)
Process plant and site refurbishment	7.3	42.6
Tailings dam	3.2	399.1
Drilling and technical studies	13.1	48.5
Underground development	209.3	325.0
Underground infrastructure	127.6	181.5
Underground equipment	58.6	78.4
Closure cost	0.0	11.3

Item	Initial Capital	Sustaining Capital (US$ M)
Sub-total	419.2	1,086.3
Tax rebate	(2.6)	(47.9)
Total	**416.6**	**1,038.4**

The cost estimates are expressed in Q1 2023 US dollars. Unless otherwise indicated, all costs in this section of the CPR are expressed without allowance for escalation or interest rates. The currency exchange rate of US$:R$5.55 used in the estimate is based on bank consensus long term rates.

All 2023 PEA cost estimates were done from first principles. Underground initial and sustaining capital cost estimates include a 20% contingency.

Underground mining equipment costs were based on a lease rate for all major mining equipment such as trucks, jumbo and production drills, LHDs, dewatering pumps and secondary vent fans, and therefore large lump sum mobile equipment purchases are absent from the cash flow.

The lease rate calculation assumed the following:

- A lease rate of 8%
- An upfront lease payment of 15%
- Lease period of five years with a residual value of zero
- Lease calculated assuming monthly re-payments

Cost inputs for major operating cost contributors were based on existing site data provided by ACG and quotations as follows:

- Underground mining fleet: Sandvik (Atlas Copco and Caterpillar also quoted)
- Explosives: Enaex Britanite
- Concrete/Fibrecrete: ACG
- Diesel: ACG
- Power: ACG
- Ground support: DSI Underground
- Personnel: ACG

Significant underground infrastructure costs for items such as primary ventilation fans, pump stations, raisebores, underground crushers, underground conveyors, and electrical substations were estimated using quotes, budget prices, and database information for similar equipment.

Underground initial capitalised development costs were based on approximately 24,200 m of lateral development and 4,020 m of vertical development.

Underground capital infrastructure costs include mining fleet and ancillary equipment for support infrastructure and upfront equipment lease payments.

The underground mining capital costs include allowance for the following:

- Site mobilisation
- Primary ventilation fans and refrigeration including installation and power connection
- Permanent electrical substations including installation underground, HV dropper line from surface and distribution boards
- Initial purchases of mobile equipment power boxes

- Main underground dewatering pumps and rising main
- Secondary pumps
- Refuge chambers and fit-out
- Underground workshop fit-out
- Training equipment, production recording and monitoring system and maintenance system
- Safety and monitoring equipment, including geotechnical monitoring systems
- Self-rescuers, cap-lamps and cap-lamp charging rack
- Underground data and communication equipment and setup
- Mines rescue facilities
- Surface and underground workshop equipping
- Office equipment (computers and furniture) for management, supervisors and technical personnel

The underground mining sustaining capital costs exclude the following:

- All surface infrastructure (other than for the ventilation and refrigeration equipment)
- Purchase of pit dewatering pumps (assumed to be carried over from the open pit)

24.1.8.2 Operating Costs

LOM operating cost estimates are presented in Table 24-27. The average LOM AISC for underground mining is estimated at US$31.50/t processed.

Table 24-27: 2023 PEA Operating Cost Summary
ACG Acquisition Company Limited – Santa Rita Mine

Item	Unit Cost (US$/t processed)	Underground Total (US$M)
Mining costs	12.91	1,830.3
Processing costs	5.43	769.4
Site G&A	1.59	225.3
Treatment, refining, penalties	7.40	1,049.3
Freight costs	4.40	623.4
By-product credits *	(13.87)	(1,966.6)
C1 cost [1]	**17.86**	**2,531.1**
Royalties	6.40	906.9
Sustaining capital costs after tax credits	7.24	1,026.9
All-in sustaining cost [2]	**31.50**	**4,464.9**

Notes: * Includes revenue from Cu, Co, Pd, Pt and Au.

1. C1 cost = cash operating costs less net by-product credits.
2. All-in sustaining cost (AISC) = C1 cost plus royalties and sustaining capital expenditures.

24.1.8.2.1 Underground Mining Cost Estimate

The first principles cost estimate includes labour, materials, parts, consumables, contracts and equipment lease costs build-ups for the following mining activities and functions:

- Mineralised development: includes drilling, blasting and ground support;
- SLC production: includes production drilling, blasting and ground support;
- Materials handling: includes loading, conveying and truck haulage to surface ROM pad;
- Mine services: includes road maintenance, dewatering, water supply, power reticulation, ventilation, compressed air, ancillary equipment, control and communications, minor civil construction, development services, production services, and other mine services;
- Supervision and grade control: includes mine department personnel and grade control drilling;
- Dayworks miscellaneous: work such as barricade construction, ladderway installations, service hole drilling etc.

The cost estimates for the activities and functions above were applied to the schedule and mining physicals over the underground production mine life to determine an average estimated operating cost of US$12.91/t mined.

The underground mining operating costs include allowance for the following:

- Medical assistance, meals, food voucher and travel allowance for all personnel;
- Computer and software costs;
- All labour burdens such as bonus, danger and unhealthy work allowances, overtime, taxes, worker insurance, accrued annual leave, absences, training, personal protective equipment, and small tools;
- Materials required to perform the works, including diesel, propane, electrical power, and explosives.

The underground mining operating costs exclude insurances such as property and equipment, liability, freight, pollution and environmental liability etc. (other than workers compensation which is included in the labour costs).

24.1.8.2.2 Process Costs

Process plant operating costs include the costs for operating and maintaining the processing facilities, from the primary crusher through to concentrate loadout, as well as process and reclaim water pumping, and operating the tailings storage facility. The processing costs account for the expenses associated with purchasing consumables, equipment maintenance, personnel, and power consumption.

Consumable costs include items such as crusher liners, mill liners, grinding media, all chemical reagents, and an allocated cost for office/laboratory supplies.

The average LOM unit processing cost is estimated at US$5.43/t. The operating cost is estimated to increase during underground mining, compared to open pit mining, due an increase in power demand (up to 2 MW) and increased mill ball and mill liner consumption (up to 15%).

24.1.8.2.3 G&A Operating Costs

The G&A operating costs are the expenses for cost centres that are not directly linked to the mining and process disciplines, and include labour and overhead costs.

The G&A unit operating cost is estimated to average US$1.59/t over the LOM.

24.1.9 Economic Analysis

24.1.9.1 Cautionary Statement

The results of the economic analyses discussed in this section represent forward-looking information. The results depend on inputs that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here. Information that is forward-looking includes:

- Mineral Resource estimates and the subset of the Mineral Resource estimate included in the 2023 PEA mine plan;
- Assumed commodity prices and exchange rates;
- The proposed mine production plan and mining method;
- Projected mining and process recovery rates;
- Assumptions as to mining dilution and mining recovery;
- Sustaining costs and proposed operating costs;
- Assumptions as to closure costs and closure requirements;
- Assumptions as to environmental, permitting and social risks.

Additional risks to the forward-looking information include:

- Changes to costs of production from what is assumed;
- Unrecognised environmental risks;
- Unanticipated reclamation expenses;
- Unexpected variations in quantity of mineralised material, grade or recovery rates;
- Geotechnical or hydrogeological considerations during mining being different from what was assumed;
- Failure of mining methods to operate as anticipated;
- Failure of process plant, equipment or processes to operate as anticipated;
- Changes to assumptions as to the availability of electrical power, and its rates used in the operating cost estimates and financial analysis;
- Ability to maintain the social licence to operate;
- Accidents, labour disputes and other risks of the mining industry;
- Changes to interest rates;
- Changes to tax rates.

The mine plan is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the 2023 PEA based on these Mineral Resources will be realised. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

24.1.9.2 Summary

A financial model was developed to estimate the Santa Rita Mine underground mine development case LOM plan. The LOM plan covers a period of 30 years, including two years of pre-production and 28 years of production mining. Table 24-28 presents a summary of the LOM financial parameters and valuation. All costs are in Q1 2023 US dollars, and inflation has not been considered in the cash flow analysis.

Table 24-28: Underground LOM Cash Flow and Parameters
ACG Acquisition Company Limited – Santa Rita Mine

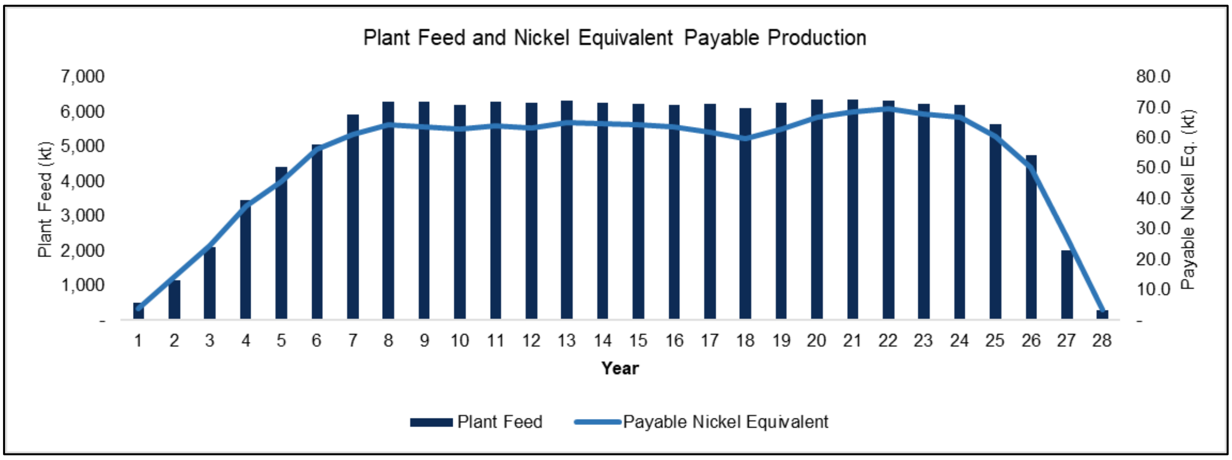
Item	Unit	Value
Commodity Prices and Exchange Rate		
Nickel price	US$/lb	8.46
Copper price	US$/lb	3.59
Cobalt price	US$/lb	23.53
Palladium price	US$/oz	1,363
Platinum price	US$/oz	1,140
Gold price	US$/oz	1,615
BRL:USD	R$:US$	5.55
LOM Mine Plan Summary		
Mine production life	Years	28
Measured and Indicated Mineral Resource mined	kt	64,346
Inferred Mineral Resource mined	kt	77,396
Grade NiS: MI, I	%	0.57, 0.55
Grade Cu: MI, I	%	0.19, 0.18
Grade Co: MI, I	%	0.02, 0.02
Grade Pd: MI, I	g/t	0.04, 0.05
Grade Pt: MI, I	g/t	0.09, 0.10
Grade Au: MI, I	g/t	0.06, 0.06
Processing Rate	Mt/a	6.2
LOM Concentrate Production		
Concentrate (dry)	kt	4,888
Ni	%	13.85
Cu	%	3.94
Co	%	0.25
Pd	g/t	1.67
Pt	g/t	2.26
Au	g/t	1.03
LOM Revenue		
Net smelter return revenue	US$M	10,871
LOM Operating Cost		
Mining	$/t processed	12.91
Processing	$/t processed	5.43
Site G&A	$/t processed	1.59
Treatment, refining, penalties	$/t processed	7.40
Freight	$/t processed	4.40
By-product credits	$/t processed	(13.87)
C1 operating cost [1]	US$/lb Ni [2]	2.02
AISC cost [3]	US$/lb Ni	3.57

Item	Unit	Value
Operating costs	US$M	(4,498)
Royalties	US$M	(907)
LOM Cash Flow		
EBITDA cash	US$M	7,139
Cash Flow		
Taxes	US$M	(1,685)
Capital expenditures	US$M	(1,505)
Unlevered Free Cash Flow	US$M	3,938
Post-Tax $NPV_{8\%}$	US$M	942
Post-tax internal rate of return	%	25
Payback period	Years	3.4

Notes.

1. EBITDA = earnings before interest, taxes, depreciation and amortisation.
2. MI = Measured and Indicated, I = Inferred.
3. C1 cost = cash operating costs less net by-product credits.
4. Ni cost = (mining cost + processing cost + site G&A cost + treatment/refining cost + freight cost – by-product credits for Cu, Co, Pd, Pt, Au) / Payable Ni
5. All-in sustaining cost (AISC) = C1 cost plus royalties and sustaining capital expenditures.

A total of 1,392 Mlb of NiEq are payable over the LOM. NiEq is determined by dividing the revenue from payable Cu, Co, Au, Pt, and Pd by the price of Ni to calculate equivalent pounds of Ni, then adding the payable Ni pounds to sum to the total NiEq pounds. Process plant feed and payable NiEq metal are summarised in Figure 24-33.



Source: Atlantic Nickel, 2023.

Figure 24-33: LOM Payable NiEq

24.1.9.3 Financial Model Parameters

Other economic factors include the following:

- Figures in Q1 2023 US dollars;
- All cash flows include 90% to 95% payments for concentrate during the period in which they are incurred, depending on the concentrate sales agreement. The remaining 5% to 10% of the metal is paid within 90 days of reaching the Brazilian port.

Net revenue is calculated on the following:

- Revenues are calculated on the sale of nickel concentrates based on long term metal prices from the consensus mean of leading banks and financial institutions as of January 2023, and a long term forecast Brazilian to US dollar exchange rate;
- Treatment and refining charges for concentrates are based on contracted terms with several smelters/refineries and metal offtakers;
- There are four NSR royalties payable over the LOM:
  - The CFEM royalty at 2.00% on an NSR that does not allow the deductibility of freight costs;
  - The CBPM royalty at 2.51% on 60% of the value of nickel contained in concentrate and a royalty rate of 2.51% on 100% of the value of copper, cobalt, palladium, platinum and gold contained in concentrate;
  - Land owner royalties at 1.00%;
  - The Appian Natural Resources Fund II royalty at 2.75%.

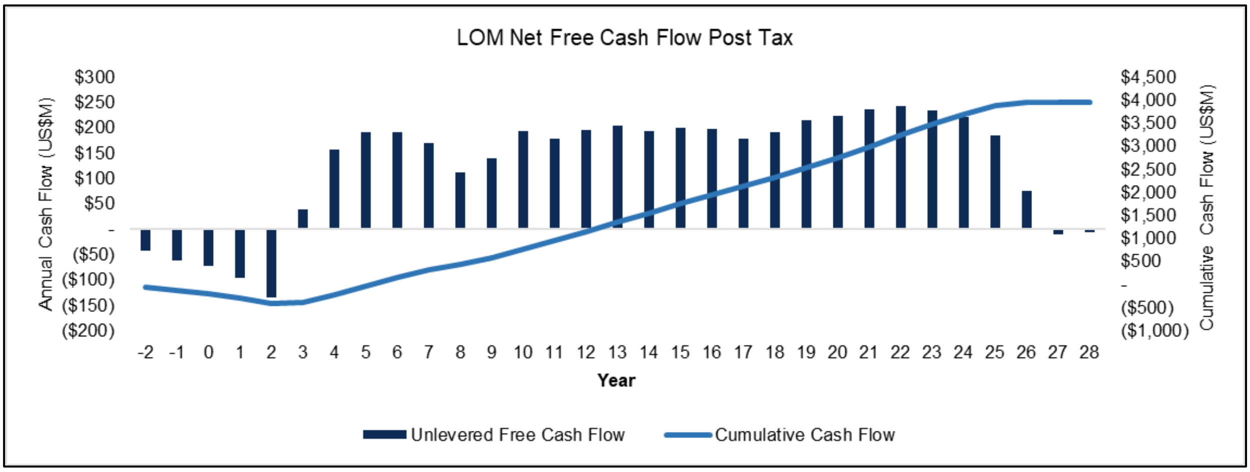
All applicable Brazilian taxes are estimated in the financial model. PIS/COFINS credits have been applied to offset income taxes. The financial model also reflects that Atlantic Nickel recently obtained an extension on the SUDENE tax incentive in 2020, which encourages economic development in Northeast Brazil. This incentive program provides for a 75% reduction in the base income tax rate, for a period of 10 years until 2030.

24.1.9.4 Economic Analysis

The 2023 PEA is estimated to generate US$180 million in average unlevered free cash flow annually over the LOM and has a post-tax NPV, using an 8% discount rate, of US$942 million.

The post-tax IRR is estimated at 25% and the payback is estimated at 3.4 years.

The financial results are presented in Figure 24-34 and a summary of the financial model is presented in Table 24-29 to Table 24-31. Key metrics by five-year periods from production year four onwards are presented in Table 24-32.



Source: Atlantic Nickel, 2023.

Figure 24-34: LOM Net Unlevered Free Cash Flow Post Tax

Table 24-29: Cash Flow Analysis (Years -2 to 8)
ACG Acquisition Company Limited – Santa Rita Mine

Item	Units	-2	-1	0	1	2	3	4	5	6	7	8
Ni price	US$/lb	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46
Cu price	US$/lb	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59
Co price	US$/lb	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53
Au price	US$/oz	1,615	1,615	1,615	1,615	1,615	1,615	1,615	1,615	1,615	1,615	1,615
Pt price	US$/oz	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140
Pd price	US$/oz	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363
BRD:USD exchange rate	R$:US$	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55
Mining underground mill feed	kt	—	—	491	1,143	2,112	3,465	4,401	5,053	5,912	6,278	6,290
Mining waste rock	kt	1,602	2,464	941	790	373	398	984	1,121	1,252	581	777
Processing feed	kt	—	—	491	1,143	2,112	3,465	4,401	5,053	5,912	6,278	6,290
Ni grade	%	—	—	0.56	0.53	0.57	0.55	0.57	0.57	0.56	0.55	0.54
Cu grade	%	—	—	0.18	0.17	0.19	0.18	0.19	0.19	0.18	0.18	0.18
Co grade	%	—	—	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Au grade	g/t	—	—	0.07	0.07	0.06	0.07	0.06	0.06	0.07	0.06	0.06
Pt grade	g/t	—	—	0.10	0.10	0.09	0.10	0.09	0.09	0.10	0.10	0.09
Pd grade	g/t	—	—	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Concentrate (dmt)	kt	—	—	17	38	74	118	154	176	202	214	211
Concentrate nickel grade	%	—	—	13.85	13.85	13.85	13.85	13.85	13.85	13.85	13.85	13.85
Concentrate copper grade	%	—	—	3.90	3.96	4.03	4.02	4.02	4.00	3.97	3.95	3.99
Concentrate cobalt grade	%	—	—	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Payable Ni	Mlb	—	—	3.1	12.0	20.7	31.5	38.3	47.3	51.6	54.2	53.5
Payable Cu	Mlb	—	—	0.8	3.0	5.4	7.9	9.5	11.7	12.6	13.2	13.1
Payable Co	Mlb	—	—	0.0	0.1	0.1	0.3	0.3	0.4	0.4	0.5	0.5
Payable Au	koz	—	—	0.2	0.9	1.6	2.5	3.1	3.8	4.2	4.4	4.3
Payable Pt	koz	—	—	0.6	2.2	3.8	5.7	6.8	8.2	8.8	9.2	9.1

Item	Units	-2	-1	0	1	2	3	4	5	6	7	8
Payable Pd	koz	—	—	0.4	1.6	2.8	4.2	5.0	6.0	6.5	6.8	6.7
Payable NiEq	Mlb	—	—	3.6	14.3	24.6	37.6	45.5	56.3	61.2	64.3	63.5
Ni revenue	US$M	—	—	25.8	99.4	172.1	268.2	321.4	396.8	434.8	457.8	452.7
Cu revenue	US$M	—	—	2.7	10.6	18.9	28.7	34.0	41.7	45.3	47.2	47.2
Co revenue	US$M	—	—	0.5	1.9	3.3	6.2	7.7	9.5	10.5	11.2	11.0
PGM revenue	US$M	—	—	1.6	6.0	10.5	16.3	19.3	23.4	25.4	26.6	26.4
Total Revenue	US$M	—	—	30.6	117.8	204.8	319.4	382.4	471.4	515.9	542.8	537.3
Net Smelter Return	US$M	—	—	23.1	88.8	156.2	262.9	322.9	404.6	448.7	476.6	470.5
Less: mining costs	US$M	(4.9)	(7.1)	(15.1)	(28.4)	(40.9)	(53.8)	(63.2)	(66.6)	(68.0)	(68.5)	(68.5)
Less: processing costs	US$M	—	—	(6.9)	(11.7)	(17.1)	(22.1)	(26.1)	(28.5)	(31.1)	(32.3)	(32.3)
Less: general and administrative	US$M	—	—	—	(2.7)	(10.7)	(10.7)	(10.2)	(10.2)	(10.2)	(9.7)	(9.7)
Less: royalties	US$M	—	—	(2.0)	(7.6)	(13.2)	(22.0)	(27.0)	(33.8)	(37.5)	(39.7)	(39.3)
EBITDA	US$M	(4.9)	(7.1)	(0.9)	38.5	74.3	154.3	196.4	265.5	301.9	326.4	320.8
EBITDA margin	%	—	—	(3)	33	36	48	51	56	59	60	60
C1 cost	US$/lb Ni	—	—	8.12	4.42	4.09	2.92	2.56	2.06	1.85	1.69	1.73
C1 cost	US$M	4.9	7.1	24.8	53.3	84.6	91.9	98.0	97.5	95.4	91.7	92.7
Less: cash taxes	US$M	(0.2)	(0.3)	(1.4)	(2.9)	(4.1)	(6.1)	(7.7)	(38.3)	(60.4)	(87.4)	(88.0)
Less: change in working capital	US$M	(16.8)	(0.0)	6.7	9.8	(0.3)	(20.7)	(4.7)	(1.8)	(2.8)	0.7	6.1
Less: capital expenditures	US$M	(52.0)	(53.2)	(72.7)	(136.8)	(207.4)	(91.4)	(29.0)	(33.4)	(49.7)	(70.2)	(126.6)
AISC	US$/lb Ni	—	—	11.39	8.15	8.46	5.40	4.00	3.43	3.51	3.70	4.79
AISC	US$M	—	—	34.8	98.2	174.7	170.4	153.0	162.4	181.2	200.7	256.5
Unlevered Free Cash Flow	US$M	(73.9)	(60.6)	(68.4)	(91.3)	(137.5)	36.1	155.0	192.0	189.0	169.5	112.3
Cumulative cash flow	US$M	(73.9)	(134.4)	(202.9)	(294.2)	(431.7)	(395.6)	(240.5)	(48.5)	140.6	310.1	422.4

Note: C1 cost = cash operating costs less net by-product credits. All-in sustaining cost (AISC) = C1 cost plus royalties and sustaining capital expenditures

Table 24-30: Cash Flow Analysis (Years 9 to 18)
ACG Acquisition Company Limited – Santa Rita Mine

Item	Units	9	10	11	12	13	14	15	16	17	18
Ni price	US$/lb	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46
Cu price	US$/lb	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59
Co price	US$/lb	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53
Au price	US$/oz	1,615	1,615	1,615	1,615	1,615	1,615	1,615	1,615	1,615	1,615
Pt price	US$/oz	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140
Pd price	US$/oz	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363
BRL:USD exchange rate	R$:US$	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55
Mining underground mill feed	kt	6,213	6,294	6,272	6,328	6,277	6,222	6,196	6,226	6,119	6,269
Mining waste rock	kt	597	345	546	537	629	240	650	354	304	310
Processing feed	kt	6,213	6,294	6,272	6,328	6,277	6,222	6,196	6,226	6,119	6,269
Ni grade	%	0.55	0.55	0.54	0.55	0.55	0.56	0.55	0.54	0.53	0.54
Cu grade	%	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.17	0.17	0.18
Co grade	%	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Au grade	g/t	0.06	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Pt grade	g/t	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.10	0.09	0.09
Pd grade	g/t	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Concentrate (dmt)	kt	202	206	204	209	208	206	204	199	192	202
Concentrate nickel grade	%	13.85	13.85	13.85	13.85	13.85	13.85	13.85	13.85	13.85	13.85
Concentrate copper grade	%	4.02	4.02	4.05	4.02	3.99	4.00	3.99	3.98	4.00	3.97
Concentrate cobalt grade	%	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Payable Ni	Mlb	52.9	54.0	53.3	54.7	54.4	54.1	53.5	52.2	50.3	53.1
Payable Cu	Mlb	13.1	13.3	13.3	13.5	13.4	13.3	13.2	12.8	12.4	13.0
Payable Co	Mlb	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5
Payable Au	koz	4.3	4.4	4.3	4.5	4.4	4.4	4.3	4.2	4.1	4.3
Payable Pt	koz	9.0	9.1	9.0	9.2	9.2	9.1	9.1	8.9	8.6	9.1

Item	Units	9	10	11	12	13	14	15	16	17	18
Payable Pd	koz	6.6	6.7	6.7	6.8	6.8	6.8	6.7	6.6	6.3	6.7
Payable NiEq	Mlb	62.9	64.1	63.4	65.0	64.6	64.2	63.5	62.0	59.7	63.0
Ni revenue	US$M	447.7	456.2	451.0	462.3	460.4	457.2	452.6	442.0	425.5	448.2
Cu revenue	US$M	47.1	47.9	47.7	48.5	48.0	47.7	47.2	45.9	44.5	46.6
Co revenue	US$M	10.9	11.1	10.9	11.3	11.2	11.1	11.0	10.8	10.4	10.8
PGM revenue	US$M	26.1	26.6	26.3	26.9	26.8	26.6	26.4	25.9	24.9	26.2
Total Revenue	US$M	531.7	541.7	536.0	549.0	546.4	542.7	537.1	524.6	505.4	531.8
Net Smelter Return	US$M	466.0	475.7	469.4	482.6	478.8	476.0	470.7	459.1	441.6	462.0
Less: mining costs	US$M	(69.9)	(73.9)	(75.7)	(74.0)	(73.8)	(75.9)	(76.2)	(77.9)	(77.7)	(78.7)
Less: processing costs	US$M	(32.1)	(32.3)	(32.2)	(32.4)	(32.3)	(32.1)	(32.0)	(32.1)	(31.8)	(32.2)
Less: general and administrative	US$M	(9.7)	(9.2)	(9.2)	(9.2)	(8.8)	(8.8)	(8.8)	(8.3)	(8.3)	(8.3)
Less: Royalties	US$M	(38.9)	(39.7)	(39.2)	(40.3)	(39.9)	(39.7)	(39.3)	(38.3)	(36.8)	(38.6)
EBITDA	US$M	315.5	320.5	313.1	326.7	324.0	319.5	314.4	302.5	286.9	304.2
EBITDA margin	%	59	59	58	60	59	59	59	58	57	57
C1 cost	US$/lb Ni	1.76	1.78	1.85	1.74	1.77	1.81	1.85	1.94	2.02	1.98
C1 cost	US$M	93.3	96.0	98.8	95.3	96.4	98.0	98.8	101.2	101.8	105.4
Less: cash taxes	US$M	(88.3)	(89.6)	(84.7)	(89.2)	(87.8)	(84.3)	(82.7)	(78.0)	(70.4)	(75.8)
Less: change in working capital	US$M	(6.4)	(3.3)	3.7	(3.8)	1.0	1.1	(1.3)	0.8	2.4	(2.9)
Less: capital expenditures	US$M	(81.0)	(33.8)	(52.7)	(37.8)	(33.1)	(41.5)	(29.9)	(26.1)	(39.9)	(33.5)
AISC	US$/lb Ni	4.00	3.12	3.54	3.14	3.09	3.27	3.12	3.15	3.51	3.32
AISC	US$M	211.7	168.5	188.5	172.0	168.2	177.0	166.7	164.6	176.4	176.2
Unlevered Free Cash Flow	US$M	139.7	193.9	179.4	195.9	204.2	194.8	200.7	199.3	178.9	192.0
Cumulative cash flow	US$M	562.1	756.0	935.4	1,131.3	1,335.4	1,530.2	1,730.8	1,930.2	2,109.1	2,301.1

Note: C1 cost = operating costs less net by-product credits. All-in sustaining cost (AISC) = C1 plus royalties and sustaining capital expenditures

Table 24-31: Cash Flow Analysis (Years 19 to 27 and total)
ACG Acquisition Company Limited – Santa Rita Mine

Item	Units	19	20	21	22	23	24	25	26	27	Total
Ni price	US$/lb	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46
Cu price	US$/lb	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59
Co price	US$/lb	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53
Au price	US$/oz	1,615	1,615	1,615	1,615	1,615	1,615	1,615	1,615	1,615	1,615
Pt price	US$/oz	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140
Pd price	US$/oz	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363
BRL:USD exchange rate	R$:US$	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55
Mining underground mill feed	kt	6,342	6,345	6,337	6,240	6,212	5,659	4,744	2,009	295	141,742
Mining waste rock	kt	184	257	150	4	—	—	—	—	—	16,391
Processing feed	kt	6,342	6,345	6,337	6,240	6,212	5,659	4,744	2,009	295	141,742
Ni grade	%	0.57	0.58	0.59	0.58	0.58	0.57	0.58	0.59	0.60	0.56
Cu grade	%	0.18	0.19	0.19	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Co grade	%	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Au grade	g/t	0.06	0.06	0.06	0.06	0.06	0.06	0.08	0.09	0.09	0.06
Pt grade	g/t	0.09	0.09	0.09	0.09	0.10	0.10	0.12	0.14	0.14	0.10
Pd grade	g/t	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.07	0.07	0.04
Concentrate (dmt)	kt	223	229	232	225	222	200	172	74	11	4,888
Concentrate nickel grade	%	13.85	13.85	13.85	13.85	13.85	13.85	13.85	13.85	13.85	13.85
Concentrate copper grade	%	3.92	3.88	3.86	3.84	3.82	3.82	3.71	3.63	3.59	3.94
Concentrate cobalt grade	%	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Payable Ni	Mlb	56.3	57.9	58.8	57.2	56.4	51.0	42.5	22.9	3.0	1,250.9
Payable Cu	Mlb	13.6	13.8	13.9	13.5	13.2	12.0	9.8	5.4	0.7	304.4
Payable Co	Mlb	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.2	0.0	10.8
Payable Au	koz	4.6	4.7	4.8	4.6	4.6	4.1	3.4	1.8	0.2	101.3
Payable Pt	koz	9.5	9.8	9.9	9.7	9.5	8.7	7.5	4.2	0.6	213.9

Item	Units	19	20	21	22	23	24	25	26	27	Total
Payable Pd	koz	7.0	7.2	7.3	7.2	7.0	6.5	5.5	3.1	0.4	158.0
Payable NiEq	Mlb	66.7	68.6	69.6	67.7	66.7	60.4	50.3	27.1	3.6	1,483.9
Ni revenue	US$M	475.5	489.5	496.8	484.4	476.8	433.0	362.7	197.9	28.3	10,577.0
Cu revenue	US$M	48.6	49.5	50.0	48.6	47.5	43.3	35.4	19.6	2.8	1,092.7
Co revenue	US$M	11.6	11.9	12.1	11.8	11.6	10.5	8.7	3.9	0.5	254.0
PGM revenue	US$M	27.7	28.5	28.9	28.2	27.8	25.4	21.6	12.0	1.7	619.9
Total Revenue	US$M	563.5	579.4	587.8	572.9	563.6	512.2	428.4	233.3	33.3	12,543.5
Net Smelter Return	US$M	495.9	509.4	517.0	502.3	494.7	445.7	364.4	179.8	25.4	10,870.8
Less: mining costs	US$M	(78.2)	(79.8)	(80.9)	(80.0)	(78.8)	(66.9)	(60.7)	(47.2)	(19.4)	1,830.3
Less: processing costs	US$M	(32.5)	(32.5)	(32.4)	(32.1)	(32.1)	(30.4)	(27.5)	(16.9)	(3.4)	769.4
Less: general and administrative	US$M	(7.9)	(7.9)	(7.9)	(7.5)	(7.5)	(7.5)	(7.2)	(7.2)	(1.8)	225.3
Less: royalties	US$M	(41.3)	(42.5)	(43.1)	(41.7)	(41.1)	(37.1)	(30.3)	(15.1)	(2.1)	906.9
EBITDA	US$M	336.0	346.8	352.6	340.9	335.2	303.8	238.7	93.4	(1.3)	7,138.9
EBITDA margin	%	60	60	60	60	59	59	56	40	0	57
C1 cost	US$/lb Ni	1.74	1.73	1.72	1.78	1.78	1.80	2.20	3.90	7.60	2.02
C1 cost	US$M	98.2	100.2	101.1	101.8	100.5	92.1	93.7	89.4	23.1	2,531.1
Less: cash taxes	US$M	(85.5)	(85.8)	(86.8)	(82.5)	(76.8)	(68.1)	(50.6)	(19.6)	(1.8)	(1,685.3)
Less: change in working capital	US$M	(1.0)	0.2	(1.4)	0.1	1.2	1.1	4.9	14.6	2.0	(0.0)
Less: capital expenditures	US$M	(33.8)	(37.5)	(26.7)	(15.9)	(24.5)	(13.4)	(6.6)	(3.4)	(12.3)	(1,505.5)
AISC	US$/lb Ni	3.06	3.07	2.88	2.77	2.91	2.77	3.06	4.69	8.49	3.57
AISC	US$M	172.2	177.8	169.4	158.5	164.0	141.4	130.0	107.5	25.8	4,464.9
Unlevered Free Cash Flow	US$M	215.8	223.7	237.7	242.6	235.0	223.5	186.5	85.1	(13.4)	3,937.6
Cumulative cash flow	US$M	2,516.9	2,740.6	2,978.2	3,220.9	3,455.9	3,679.4	3,865.9	3,951.0	3,937.6	
	IRR	**25%**		**NPV8%**	**942**						

Note: C1 cost = cash operating costs less net by-product credits. All-in sustaining cost (AISC) = C1 cost plus royalties and sustaining capital expenditures

Table 24-32: Key Metrics by Five-Year Periods
ACG Acquisition Company Limited – Santa Rita Mine

Key Metric	Unit	Production Year					
		4–8	9–13	14–18	19–23	24–27	LOM
Processing feed	Mt	*27,933*	*31,384*	*31,032*	*31,476*	*12,707*	**141,742**
C1 cost	US$/lb Ni	1.98	1.78	1.92	1.75	3.10	**2.02**
AISC	US$/lb Ni	3.89	3.38	*3.27*	2.94	3.80	**3.57**
EBITDA	US$M	*1,411*	*1,600*	*1,528*	*1,711*	*635*	**7,139**
EBITDA margin	%	57	59	58	60	33	**57**
Unlevered Free Cash Flow	US$M	818	913	966	1,155	482	**3,938**

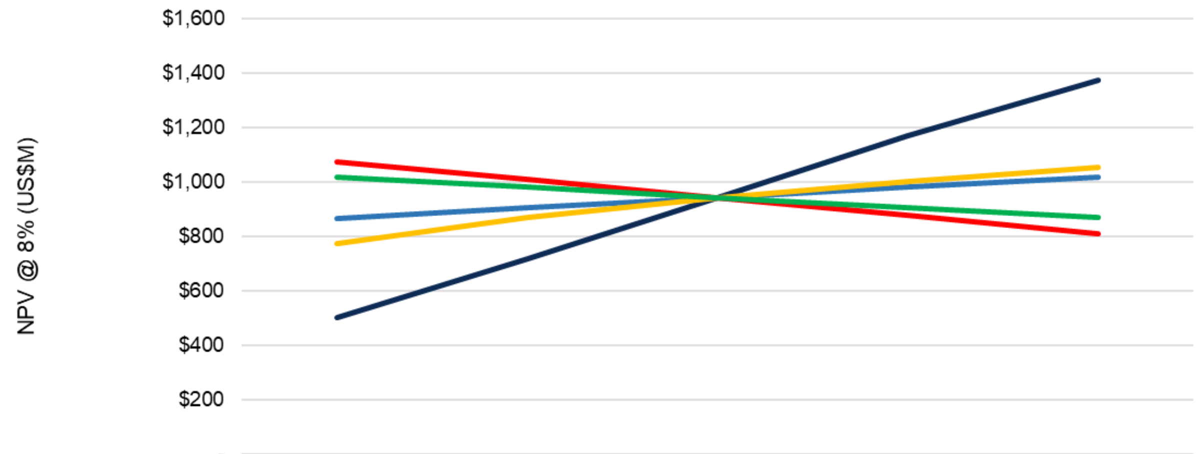
24.1.9.5 Sensitivity Analysis

The cash flow and $NPV_{8\%}$ sensitivity to various nickel prices are summarised in Table 24-33.

Figure 24-35 presents an NPV sensitivity analysis on nickel price, by-product prices, exchange rate, operating costs and capital expenditures. The Project as envisaged in the 2023 PEA is most sensitive to changes in the nickel price, less sensitive to changes in operating costs and capital expenditures and foreign exchange rate fluctuations, and least sensitive to commodity price changes for the by-product elements.

Table 24-33: Underground Cash Flow Sensitivity at Various Nickel Prices
ACG Acquisition Company Limited – Santa Rita Mine

Sensitivity (%)	-20	-10	0	+10	+20
Operating Cash Flow *Pre-Tax* ($M)					
Annual	213	254	297	340	380
LOM cumulative	5,081	6,088	7,139	8,193	9,153
Net Unlevered Free Cash Flow ($M)					
Annual	125	152	180	209	235
LOM cumulative	2,560	3,232	3,938	4,645	5,289
NPV Results ($M)					
Post-tax NPV8%	501	717	942	1,168	1,375



	(20%)	(10%)	-	10%	20%
Nickel price	$501	$717	$942	$1,168	$1,375
By-product prices	$865	$904	$942	$980	$1,017
FX	$775	$868	$942	$1,003	$1,053
Opex	$1,074	$1,008	$942	$876	$810
Capex	$1,017	$980	$942	$905	$867

Source: Atlantic Nickel, 2023.

Figure 24-35: 2023 PEA Sensitivity Analysis

25.0 INTERPRETATION AND CONCLUSIONS

Under the assumptions described in this CPR, the LOM plan is achievable, and the economic analysis supports declaration of Mineral Reserves.

Under the 2023 PEA assumptions presented in this CPR, the portion of the Mineral Resource subset within the 2023 PEA mine plan returns positive economics.

25.1 Geology and Mineral Resources

- As of December 31, 2022, inclusive of Mineral Reserves, Measured Mineral Resources for open pit operations are estimated to total 7,914 kt at 0.38% NiS, 0.13% Cu, 0.02% Co, 0.03 g/t Pd, 0.07 g/t Pt, and 0.04 g/t Au and Indicated Mineral Resources are estimated to total 142,202 kt at 0.48% NiS, 0.16% Cu, 0.01% Co, 0.04 g/t Pd, 0.09 g/t Pt, and 0.06 g/t Au. In addition, Inferred Mineral Resources are estimated to total 130,898 kt at 0.54% NiS, 0.17% Cu, 0.01% Co, 0.05 g/t Pd, 0.10 g/t Pt, and 0.06 g/t Au.
- The Mineral Resource estimates reported in this CPR follow the CIM (2014) definitions.
- Santa Rita is a magmatic nickel-copper sulphide deposit and it is very well understood by Atlantic Nickel staff.
- The hanging wall mineralisation limits are well defined and the limits considered for NiS (%) is reasonable for the deposit type and mineralisation style. The footwall mineralisation limits are more variable.
- The geological setting, surface samples, and geological mapping of the Santa Rita area present good exploration potential, as a number of targets have already been identified near the mining operation. Three prospects warrant drill testing, Peri-Peri, Santa Maria, and Aiquara, and the Ibicuí prospect should be subject to an exploration review. Grassroots exploration activities should continue on the exploration permits.
- Protocols for drilling, sample preparation and analysis, verification, and security meet industry standard practices and are appropriate for the purposes of a Mineral Resource estimate.
- The QA/QC program as designed and implemented by Atlantic Nickel is adequate, with no significant bias, to support the resource database. The resource database was verified by GeoEstima and is suitable for Mineral Resource estimation.
- The lithological models are reasonably constructed using available geological information and are appropriate for Mineral Resource estimation.
- The assumptions, parameters, and methodology used for the Santa Rita Mineral Resource estimate are appropriate for the style of mineralisation and proposed mining methods.
- The database made available by Atlantic Nickel confirms the exploration potential identified for the Palestina target and additional drilling during 2021 and 2022 demonstrates the continuity of mineralisation and shows an opportunity to convert this exploration target into Mineral Resources in the future.

25.2 Mineral Reserve Estimates

The Mineral Reserve estimation for the Project incorporates industry-accepted practices and is reported using the 2014 CIM definitions.

Measured and Indicated Mineral Resources were converted to Mineral Reserves. Inferred Mineral Resources were considered as waste.

The Mineral Reserve estimates are based on detailed pit limit designs, which were validated by a LOM mine plan.

The estimate of Mineral Reserves may be materially affected by metal prices, US$/R$ exchange rate, environmental, permitting, legal, title, taxation, socio-political, marketing, infrastructure development, or other relevant issues.

Mineralised material stockpiles exist at the mine site. Two large stockpiles in particular have been surveyed and estimated to contain approximately 5.7 Mt of material. Atlantic Nickel plans to drill and sample the material to allow a Mineral Resource estimate to be completed.

25.3 Mine Plan

Mining operations are conducted year-round.

The mine is a conventional open pit operation using conventional equipment. The pit has six of the original 10 phases remaining to be mined. A small satellite open pit located to the southeast of the main pit will also be mined.

The production plan targets ore to the process plant at 6.5 Mt/a and a total production rate of 30 Mt/a (combined ore and waste). Mining operations use standard open pit methods with drilling and blasting, loading and hauling. Bench heights are 6 m in ore and 12 m in waste. Mining is contracted to a consortium of mining contractors until Q2 2023 at which time the mine will transition to Owner operated. The transition will be completed by the end of 2024.

Four ore types and stockpiles of material are used. They are defined based on NSR cut-off value, lithology type (based on MgO grade) and head grade ranges (high-grade and low-grade based on NiS%). Ore types include lithologies based on MgO% (peridotite >29% MgO and pyroxenite <29% MgO). The high-grade versus low-grade boundary for NiS% is approximately 0.35% NiS. The open pit remaining mine life is approximately six years, ending in 2028.

25.4 Mineral Processing

The dominant sulphide minerals in the Santa Rita deposit are pentlandite, pyrrhotite, pyrite, chalcopyrite, and violarite. The major gangue materials were identified as olivine, orthopyroxene, serpentine and chrome spinel. The recoverable nickel (sulphide) was found to be predominantly in pentlandite, violarite, and pyrite. Copper is primarily associated with chalcopyrite. Iron is most abundant in pyrite (approximately 47%), less abundant in pentlandite, chalcopyrite, and chrome spinel.

Based on the deportment of nickel and magnesia, Mirabela Brazil, a previous owner, subdivided the orebody into three domains, orthopyroxenite (P domain), olivine orthopyroxenite (O domain), and harzburgite (H domain). Between 0.24% Ni and 0.30% Ni is associated with olivine, between 0.05% and 0.1% Ni with orthopyroxene, and approximately 0.09% Ni with chrome spinels. The majority of the iron occurs in olivine (11% to 12%), serpentine (5% to 9%), and orthopyroxene (8%).

In the P and O domains, most of the nickel is hosted in sulphides and, therefore, is recoverable. In the H domain, nickel is divided more evenly between sulphides and gangue minerals. Consequently, the P and O domains have a higher proportion of recoverable nickel and the H domain has a lower proportion of recoverable nickel.

Atlantic Nickel staff collected plant data over the period January 2021 to December 2021 and from September 2022 to December 2022 with the objective of determining a robust formula to predict NiS recovery. A strong relationship was found between the enrichment ratio (%NiS in concentrate/%NiS in feed) versus the % mass pull to the concentrate. At a fixed concentrate grade, the recovery can be calculated. The new model is suitable for calculating the LOM open pit ore recovery.

The process plant performance data from January 2020 to December 2022 indicate NiS recovery of 79.3%; the average concentrate grade was steady at approximately 13.5% NiT and NiS recoveries in 2022 averaged 80.1%.

Comminution testwork was carried out on composites of the three main open pit lithologies and on variability samples. The pyroxenite material in the north of the pit is the hardest material and harzburgite is the softest. Tests following the SMC protocols and the Bond suite gave the same conclusion. JKTech used a plant survey and these results to model plant performance. The base case calculated a throughput of 855 t/h versus the LOM production requirement of up to 842 t/h at 89.5% availability. The average throughput from December 2021 to December 2022 was 839 t/h considering 89.5% plant availability.

Rougher-scavenger flotation testing was carried out on the three main open pit lithology composites, 51 variability samples, and a blend of the variability samples. The lithology testing confirmed that pyroxenite and orthopyroxenite perform better than harzburgite. The variability samples showed large variations in recovery and concentrate grade. LCTs carried out on the variability sample blend gave NiS recoveries between 76% and 82% at concentrate grades between 9.9% NiS and 14.8% NiS. The CP is of the opinion that sufficient comminution and flotation variability testing has been carried out to predict plant performance in line with the parameters used in the project financial model.

Mineralogical examinations showed that for a sample ground to 125 µm, the mean size of the particles was 48 µm for pentlandite and 30 µm for chalcopyrite. Finer grinding would lead to slime losses. The majority of losses to tailings occurs in complex particles with fine metal sulphides occluded in gangue minerals.

The upper and lower composite underground material and the underground variability samples showed similar particle size data to the open pit ore. The pentlandite content was approximately 60% higher.

The comminution data for the underground upper and lower composites showed that they were softer for crushing and SAG milling than the open pit ore but harder for ball milling. The tests carried out on the LOM period composites confirmed these results. JKTech calculated a throughput of 955 t/h for the upper and lower composites. The required throughput is 797 t/h for the first five years of underground operation at 89.5% availability to attain a production level of 6.25 Mt/a. The CP considers that the plant is capable of this throughput; however, it is recommended that the JKTech report be updated with the comminution data from the variability and LOM period composites testing.

Rougher-scavenger flotation testing on the upper and lower underground composites showed similar results to the previous Atlantic Nickel tests on open pit ore but with higher recovery and lower rougher concentrate grade. The tests on the underground variability samples also showed generally higher recoveries but at similar rougher concentrate grades.

LCTs on the underground upper and lower composites gave similar results to the open pit blend material. However, the LCTs on the underground LOM period composites gave better results with NiS recoveries in the range 85% to 91% at concentrate grades between 13.3% and 14.9% NiS. Atlantic Nickel staff plotted the enrichment ratio (%NiS in concentrate/%NiS in feed) versus the % mass pull to the concentrate for the open pit and underground LCTs. The R^2 correlation coefficient for the resulting curve is 0.9804. The CP considers this model is suitable for calculating the LOM underground material recovery.

The only deleterious element in the concentrate that could lead to downstream treatment penalties is MgO; this is controlled by efficient cleaner flotation and has not been an issue to date.

The process plant re-started in October 2019 and from January 2020 to December 2022 treated 17.06 Mt of ore, producing 290,821 t of nickel concentrate containing 39,488 t of nickel. The average overall nickel recovery was 58% and the average nickel sulphide recovery was 79%. The plant is currently operating at its design capacity of 6.5 Mt/a.

The NiS recovery has improved since January 2020, especially during 2022. The average recovery increased from 80.2% in Q1 2022 to 81.3% from June to December 2022. The improvement is due to the following:

- Improvements in control algorithms for the SAG and ball mills
- Adjustment in the cyclone operating pressure
- Reducing fines generated in grinding
- Change in the classification solids percent parameters
- Better knowledge of the flotation kinetics per stage
- Improvements in flotation control
- Use of a different collector resulting in better recovery
- Training of process, operation and maintenance teams
- Operational stability leading to increased equipment availability

The expected performance for 2023 takes these improvements into account.

25.5 Infrastructure

The Santa Rita Mine has all necessary infrastructure in place to support a large open pit mining and mineral processing operation. Infrastructure includes a gatehouse, administration offices, kitchen/canteens, maintenance buildings, warehouse, washroom and change rooms, health and fire-fighting facilities, process plant, conveyors, and concentrator, laboratories, pipelines, and powerlines.

There is no accommodations camp on site. Personnel reside in nearby communities and commute to the site.

Electricity supply is generated by a hydroelectric power plant that is located approximately 20 km from the mine.

There are two existing WRSFs, located to the east and south of the open pit. The East WRSF is the primary waste rock storage area and the South WRSF is a secondary storage area.

Ore stockpiles and ore bins at the ROM pad are mainly used for short-term operational ore control and emergency ore handling purposes and are not intended to provide longer-term storage capacity.

25.6 Markets and Contracts

There are several agreements in place between Atlantic Nickel and smelters/traders for export from Brazil. Offtake contracts and terms are proprietary.

The commodity prices used in the financial analysis of the open pit base case are derived from the consensus median of leading banks and financial institutions as January 2023. The forecasts used vary for the period 2023–2026, reverting to long-term pricing in 2027. The long-term prices include US$8.46/b Ni, US$3.59/lb Cu, US$23.53/lb Co, US$1,615/oz Au, US$1,140/oz Pt, and US$1,363 Pd. The Brazilian reais to US$ exchange rate is forecast at 5.55.

A portion of nickel and copper production is subject to hedging agreements. 6,892 t of nickel and 1,200 t of copper have been hedged up to the end of 2023. Otherwise, metal prices are subject to spot market conditions. Currency exchange rates are subject to spot market conditions. There are no metal streaming agreements in place.

Atlantic Nickel has entered into agreements with various contractors for open pit mining and is planning to transition from open pit contractor mining to Owner-operated mining starting in Q2 2023. Atlantic Nickel has also entered into electrical power agreements.

25.7 Environment

25.7.1 Environmental Studies

An EIA was completed in 2006. To support the development and approval of the 2006 EIA and State licensing permitting requirements, the EIA evaluated impacts on water quality, flora and fauna, air quality, soil, and the socio-economic impact on immediate communities. The 2006 EIA is linked to numerous mitigation measures, consisting primarily of management plans that are required based on permits and licences. Mitigation measures have been undertaken with the re-start of operations including implementation of the water management system mitigation, which has significantly reduced sulphate and other constituents in the discharge water.

25.7.2 Tailings Storage Facility

The existing Santa Rita TSF consists of an unlined basin with a zoned earthen and rockfill perimeter embankment enclosing three sides of the impoundment. The TSF embankment is planned to be constructed in three major stages (initial, intermediate, and final stages), with a downstream raise methodology. The existing TSF is permitted to be constructed to a dam crest elevation 198.0 MASL higher than the currently planned st final dam crest elevation 180.0 MASL that is required to contain the tailings produced from the LOM of the open pit operations.

Under Brazilian laws and regulations, the Santa Rita TSF is classified with “high” potential damage (among three categories of “high”, “medium”, and “low”), and “low” risk (among three categories of “high”, “medium”, and “low”), and with a recommended classification category of Class “A” to guide the operation management. Class A indicates a second highest rating “score” out of five tiers (AA, A, B, C, and D), indicating generally satisfactory operations practice. The new TSF phases have been designed to also satisfy the CDA Dam Safety Guidelines (2019) for an “Extreme” Consequence Classification facility.

The TSF has been well managed by the mine using an operation, maintenance, and surveillance manual and an emergency action plan has been prepared in line with recent Brazilian regulations. The dam has been inspected and assessed semi-annually by the mine tailings management team and an engineering consulting firm each year, with the recent two inspections completed by GeoHydroTech Enginharia (2021) and WSP (2022); no significant concerns have been raised and the safety factors were found to be in compliance with design criteria for both Brazilian regulations and CDA guidelines. In addition, the dam has been inspected annually by the ANM.

25.7.3 Closure

Atlantic Nickel developed a mine closure plan, with the last plan updated in 2022. Since the current closure plan is conceptual in nature, the reclamation cost estimate only provides a preliminary assessment of the potential cost for reclamation.

As the conceptual closure plan is revised to a detailed closure plan, the closure cost will also be more accurately developed.

25.7.4 Permitting

Santa Rita has the required permits for open pit mining and processing operations.

25.7.5 Social

Atlantic Nickel completed an updated ESIA in 2020.

Atlantic Nickel continuously registers and monitors interactions with stakeholders to enhance the quality of the engagements.

Atlantic Nickel has several social programs focusing on education and training, environmental stewardship, social entrepreneurship, and culture.

25.8 Capital Cost Estimates

This CPR considers a mine plan with a start date of Q1 2023. All capital costs incurred in the mine plan are considered sustaining capital.

Sustaining capital costs over the open pit LOM are estimated at $245 million. The sustaining capital cost estimate covers direct and indirect costs, Owner's costs, and 15% contingency on process plant, site refurbishment, and mining equipment. Water treatment is based on actual quotes. The contingency on the tailings dam construction varies with each phase depending on the type of work. There is no contingency on drilling programs since the costs are well established.

25.9 Operating Cost Estimates

The all-in sustaining cost for the Santa Rita Mine is estimated to average $26.07/t processed over the open pit LOM.

25.10 Economic Analysis

A financial model was developed to estimate the Santa Rita Mine base case open pit LOM plan comprised of mining the Proven and Probable Mineral Reserve within the open pit. The LOM plan covers a period of six years beginning Q1 2023. The financial analysis was prepared on a real currency basis with all cash flows expressed in Q1 2023 US dollar terms.

The operations are estimated to generate US$122 million in average unlevered free cash flow annually over the open pit LOM at a post-tax NPV, using an 8% discount rate, of US$546 million. A measure of the IRR and payback years are not applicable in this case since the initial capital costs have been expended.

The operations are most sensitive to changes in the nickel price, less sensitive to changes in operating costs and foreign exchange rate fluctuations, and least sensitive to commodity price changes for the by-product elements and variations to the sustaining capital costs.

25.11 2023 Preliminary Economic Assessment

25.11.1 Mine Plan

The 2023 PEA is an alternative development option done at the conceptual level based on Mineral Resources, which assesses the potential for underground operations beneath the Santa Rita open pit.

The mine plan is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the PEA based on these Mineral Resources will be realised. Inferred Mineral Resources comprise 55% of the mine plan.

The 2023 PEA mine plan envisages SLC at a throughput rate of approximately 6.2 Mt/a. The LOM plan covers a period of 30 years including pre-production.

25.11.2 Tailings Storage Facility

The current mine plan calls for raising the existing TSF to contain the 33 Mt of tailings to be produced from mining the open pit, without encroaching on the existing gas pipeline right-of-way located to the east of the TSF. A new TSF would be required to store the additional 140 Mt of tailings to be produced from the underground mine over a period of 28 years. A new conventional TSF located to the southwest of the mine site was selected as the preferred alternative. The new TSF would be outside of the existing mine property boundaries and located approximately six to nine kilometres southwest of the existing open pit and plant areas. It is assumed that Atlantic Nickel will acquire lands associated with the future TSF footprint and access roads prior to construction. The new TSF construction will begin with an initial starter dam and will be expanded every three years using a downstream raise method. The PFS design is currently ongoing. As a backup plan, several alternative tailings management strategies and facilities have been assessed at a scoping level including options located within the mine boundary.

25.11.3 Economic Outcome

Initial capital costs for the 2023 PEA are estimated at US$417 million. Total sustaining costs during the production period have been estimated at US$1,086 million before tax credits and at US$1,038 million after tax credits.

The average LOM all-in sustaining cost for underground mining is estimated at US$31.50/t processed.

Under the assumptions in this CPR, the 2023 PEA mine plan shows positive project economics over the LOM. The 2023 PEA is estimated to generate US$180 million in average unlevered free cash flow annually over the LOM and has a post-tax NPV, using an 8% discount rate, of US$942 million. The post-tax IRR is estimated at 25% and payback is estimated at 3.4 years.

The Project as envisaged in the 2023 PEA is most sensitive to changes in the nickel price, less sensitive to changes in operating costs and capital expenditures and foreign exchange rate fluctuations, and least sensitive to commodity price changes for the by-product elements.

25.12 Risks and Opportunities

25.12.1 Risks

The major Project risks at the current stage of operations are summarised in Table 25-1. In addition to these risks, Covid-19 may impact mine and plant operations.

A formal risk assessment workshop has not been carried out for the 2023 PEA. Overall project risks are perceived by the CPs as moderate, with the highest risks related to increasing the TSF storage capacity (including the establishment of a new tailings storage site) and potentially converting the Inferred Mineral Resources to Indicated Mineral Resources with further drilling.

Table 25-1: Risks
ACG Acquisition Company Limited – Santa Rita Mine

Area	Risk	Comment/Mitigation Plan
Geology and Mineral Resources	Tonnage and grade variation – new diamond drill data	Update the mineralised wireframes with the new drill hole information, to obtain a more precise tonnage and grade according to the new drill hole campaign
	Geological faults – underground	Incorporate the post-mineralised faults in the geological model, aiming to increase the confidence level of the underground Resource shapes

Area	Risk	Comment/Mitigation Plan
Mining Operations	Mine performance below expectations (grade, tonnage)	Short-term production planning at eight week intervals; production plan; consideration of alternate accesses; pumping requirements
	Poor blast performance	Detailed firing plan
	Pit slope instability due to dip of mineralization and low rock mass attributes	Maintain thorough ongoing monitoring program of geotechnical inspections; water level, vibration, and mass movement monitoring
	Meet plant throughput	Short-term production planning at eight week intervals; alternate faces available for mining operations
Mineral Processing	Inability to meet nickel recovery and concentrate grade targets	Maintain program of continuous improvements in process control and operational practices
TSF	Difficulty acquiring land for the new TSF site and right of way.	Early discussions with landowners have been initiated and will be advanced as a priority. Moreover, as backup plans, several alternative tailings management strategies and facilities have been assessed at a scoping level including options located within the mining boundary
	Compliance with new regulations and industry standards, including GISTM	Early planning in future designs; currently working toward compliance with GISTM
Environmental	Not meeting water quality discharge requirements	Monitoring; ensuring that no sulphide waste is used for any construction activity; lithological characterisation studies
Permitting	Inability to renew licences	Monitoring; ensuring compliance with licence terms

25.12.2 Opportunities

Opportunities identified by the CPs in their various areas of expertise are summarised in Table 25-2.

Table 25-2: Opportunities
ACG Acquisition Company Limited – Santa Rita Mine

Area	Opportunity	Note
Geology and exploration	Potential to increase resource base	Current advanced exploration at the Palestina Project has the potential to define a resource. There is excellent potential to increase the underground resource at Santa Rita, by drill testing extensions of the mineralisation at depth.
Mining	Mineralised stockpiles (open pit)	Historical mineralised material stockpiles exist at the mine site. Two large stockpiles have been surveyed and are estimated to contain approximately 5.7 Mt of material. The stockpiles require drilling and sampling to allow a Mineral Resource Estimate to be completed.
	Cut-off grade (underground)	The 2023 PEA assumes a higher cut-off grade than the break-even grade. There is potential to both lower the cut-off to allow more material to be mined, and to optimize the cut-off over time.
	Ventilation (underground)	There may be an opportunity to reduce ventilation costs if checks with the applicable regulatory agency allow ventilation criteria to be modified from that assumed in the 2023 PEA mine plan.
	Automation (underground)	An investigation should be conducted into the feasibility of automating much of the underground equipment to provide potential capital and operation cost savings, and reduce safety risks associated with human-operated equipment.
	Mining method (underground)	A mass mining method such as an incline cave should be evaluated to determine if operating cost savings can be achieved by reducing operating development, and production drill and blast costs.
Mineral Processing	Improve nickel sulphide concentrate grade	Investigate open circuit scavenger cleaning to reduce the circulating load in flotation; this may require more cleaner scavenger flotation residence time.
	Improve SAG mill performance to increase throughput and produce less ultra fine particles	Implement JKTech recommendations once the current in-house optimisations have been completed.
	Upgrade the existing low grade stockpiles using ore sorting	Carry out ore sorting testwork on low grade material at a laboratory with the requisite experience and testing equipment.
TSF	Capacity (open pit)	The existing TSF capacity is limited to that for the open pit due to the presence of a gas pipeline located downstream of the toe. If the gas pipeline route can be moved, the facility can be expanded to hold approximately 50 Mt. Depending on the costs to move the pipeline, this could represent a significant savings in capital and operating costs and a delay in the shift to the new TSF required for the 2023 PEA scenario

26.0 RECOMMENDATIONS

26.1 Geology and Mineral Resources

GeoEstima has the following recommendations for Geology and Mineral Resources:

- Prepare a Mineral Resource estimate for the Palestina target considering all the information available and conduct an economic study for possible extraction either through open pit or underground mining.
- Update the Mineral Resource estimate at Santa Rita with the ongoing drilling information added since 2021, as well as the updated metal prices and costs. The new drilling may better define the mineralisation extents, mainly in the deeper portion of the deposit, and it will upgrade the Mineral Resource classification in some areas.
- Review the NSR parameters to include the PGMs (Pd and Pt), as well as the cut-off value for open pit and underground shapes, aiming to update the reasonable prospects for RPEEE criteria.
- Integrate the post-mineralisation faults into the geological model, improving the shape modelling of mineralised zones. This activity will mainly impact the modelling of the deeper zone of the deposit.
- Carry out a comparison between the blast hole and drilling data.
- Improve the reconciliation with analysis and comments about the blast hole model versus the long-term resource model inside the depleted volume.

26.2 Mining

A number of initiatives are recommended in support of the 2023 PEA findings.

- A review of the proposed NSR cut-off value used in the 2023 PEA should be undertaken, to assess whether it can be lowered, and to assess the potential to optimize the cut-off over time.
- An investigation as to optimisation of the mine layout for automated equipment should be conducted.
- A mass mining method such as an incline cave should be evaluated to determine if operating cost savings can be achieved by reducing operating development, and production drill and blast costs.
- These work programs are estimated at US$230,000.

26.3 Mineral Processing

JKTech carried out a comminution survey in February 2021 and made several recommendations for potential improvements based on the results of this work. The key recommendations were to:

- Decrease the SAG mill total volumetric load to 25% and increase the ball load to decrease fines generation and decrease the load on the SAG mill.
- Review the SAG mill grate design to increase the pebble port size to further decrease fines generation. This change could be made during a scheduled liner change with minimal additional expenditure.
- Upgrade the cyclone feed pumping capacity to allow a target of 55% solids; then, increase water addition to achieve this density (and improve cyclone efficiency).

The CP agrees with recommendations 1 and 2 as they will avoid the SAG mill becoming a throughput restriction. The CP also agrees with recommendation 3 because higher cyclone efficiency will assist in minimising slimes production and nickel losses. The site stated that the amount of water added in the grinding circuit has been increased without the need to re-power the cyclone feed pumps and that an ongoing study has shown that good classification efficiency is being achieved.

The plant technical staff have stated that a new load and impact meter has been purchased and they are now in a position to carry out the load test in 2023 in a safe manner (avoiding breakage of mill liners).

The grate slot width has not yet been increased as the current focus is to increase the grate life. The current opening is 70 mm and the pebble port size is 90 mm (the maximum size feed for the pebble crushers). There is a concern that increasing the slot width would reduce the grate life.

The JKTech February 2021 report should be updated with the comminution results from testwork carried out in 2022 on underground variability samples and LOM period composites.

The CP recommended in 2021 that consideration be given to operating the cleaner-scavenger circuit in open circuit instead of returning the cleaner-scavenger tailings to the rougher feed. The LCTs carried out at SGS in 2021 showed that reducing the recycle prevented the build-up of gangue minerals in the concentrate. This phenomenon has not been reported in the plant; however, it may be possible to improve the concentrate grade with minimal loss of recovery. Additional cleaner-scavenger capacity may be required to maintain the recovery. This could be tested directly on the scavenger circuit feed and tailings in the on-site pilot plant. This test has not yet been performed nor has a test to increase the scavenger cleaning capacity. The plant staff report that efforts are being made first to reduce the fines generation in the grinding circuit.

26.4 Tailing Storage Facility

A new tailings storage facility to support the underground expansion project is currently being designed to the PFS level. Besides the new TSF, the design should include appurtenance facilities consisting of a tailings delivery system, decant pumping and reclaim water return system, access roads, and power supply. The required budget to complete the remaining PFS design related to the TSF appurtenances is estimated to be US$200,000.

26.5 Environment

The current mine closure plan provides little detail for addressing potential groundwater contamination from seepage from the tailings storage facility and waste rock storage facility. The latest tailings and waste rock geochemical data collected in 2021 and prior should be used to identify potential issues during closure and post-closure of the TSF and WRSF, and to develop appropriate mitigation measures as needed to address potential contamination from these facilities.

26.6 Preliminary Economic Assessment

A two-phase work program is proposed. The first work phase includes grassroots geochemical exploration, greenfields exploration, step-out and infill drilling, metallurgical testwork on material from exploration prospects, mining initiatives on aspects of the 2023 PEA, and improvements to the process design. This work phase is estimated at about US$7.6 million. The second work phase is dependent on the results of the first work phase. Work recommended includes follow-up of any geochemical anomalies generated in Phase 1, incorporation of infill and step-out drilling results into an updated Mineral Resource estimate and revised 2023 PEA, and incorporation of the metallurgical testwork results for Palestina into a Mineral Resource estimate that can be used as the basis for a PEA on the underground potential of the Palestina area. This work phase is estimated at US$0.8 million.

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28.0 DATE AND SIGNATURE PAGE

This report titled "Competent Person's Report on the Santa Rita Mine, Bahia State, Brazil" with an effective date of December 31, 2022, was prepared and signed by the following authors:

(Signed & Sealed) ***David J.F. Smith***

Dated at Toronto, ON June 12, 2023	David J.F. Smith, CEng, FIMMM Global Technical Director – Mining and Mining Advisory Group SLR Consulting (Canada) Ltd.

(Signed & Sealed) ***Orlando Rojas***

Dated at Santiago, Chile June 12, 2023	Orlando Rojas, AIG Principal Consultant, GeoEstima SpA

(Signed & Sealed) ***Andrew Bradfield***

Dated at Brampton, ON June 12, 2023	Andrew Bradfield, P.Eng., Chief Operating Officer P&E Mining Consultants Inc.

(Signed & Sealed) ***D. Gregory Robinson***

Dated at Brampton, ON June 12, 2023	D. Gregory Robinson, P.Eng., Lead Mining Engineer P&E Mining Consultants Inc.

(Signed & Sealed) ***Anthony Maycock***

Dated at Santiago, Chile June 12, 2023	Anthony Maycock, P.Eng., Principal MM Consultores Limitada

(Signed & Sealed) ***Haiming (Peter) Yuan***

Dated at Reno, NV, USA
June 12, 2023

Haiming (Peter) Yuan, Ph.D., P.E.,
Lead Mining Engineer
Senior Associate Engineer
WSP USA Environment & Infrastructure Inc.

29.0 CERTIFICATE OF COMPETENT PERSON

29.1 David J.F. Smith

I, David J.F. Smith, CEng, FIMMM, as an author of this report entitled "Competent Person's Report on the Santa Rita Mine, Bahia State, Brazil" with an effective date of December 31, 2022 (the CPR), prepared for ACG Acquisition Company Limited, do hereby certify that:

1. I am Global Technical Director – Mining, Mining Advisory with SLR Consulting (Canada) Ltd of 55 University Avenue, Suite 501, Toronto, Ontario, M5J 2H7, Canada.
2. I am a graduate of the University of Newcastle upon Tyne, United Kingdom with a BSc (Eng) in Mining Engineering.
3. I am registered as a Chartered Engineer in the UK with the Engineering Council and am a Fellow of Institute of Materials, Minerals and Mining (Membership #43860). I have worked as a mining engineer for over 40 years since my graduation. My relevant experience for the purpose of the CPR is:
    - Review and report as a mining consultant involved in numerous consulting and engineering assignments including; project technical evaluations, technical report preparation for project financing and fund-raisings, IPOs, merger and acquisitions, due diligence reviews and engineering studies from scoping to basic engineering
    - Numerous consulting assignments on gold and base metal mine development projects and operating mines
    - Senior positions with a leading international mining and tunnelling contractor, managing international mine and tunnel construction projects as well as developing a successful engineering consulting business.
    - Former Board director for an international mining consulting firm, responsible for leading the UK technical staff, and ensuring the technical quality of the firm's consulting assignments across the consulting division.
4. I have read the definition of "Competent Person" set out in the Financial Conduct Authority (FCA) Primary Market Technical Note 619.1 (FCA Technical Note) and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be a Competent Person for the purposes of the FCA Technical Note.
5. I have not visited the Santa Rita Mine.
6. I am responsible for overall preparation of the CPR, including Sections 2, 3, and 23.
7. I am independent of ACG Acquisition Company Limited.
8. I have had no prior involvement with the property that is the subject of the CPR.
9. I have read CIM (2014) definitions and the FCA Technical Note, and the CPR has been prepared in compliance with these guidelines.
10. At the effective date of the CPR, to the best of my knowledge, information, and belief, the sections of the CPR for which I am responsible contain all scientific and technical information that is required to be disclosed to make the CPR not misleading.

Dated this 12th day of June, 2023

(Signed & Sealed) *David J.F. Smith*

David J.F. Smith, CEng, FIMMM

29.2 Orlando Rojas

I, Orlando Rojas, AIG, as an author of this report entitled "Competent Person's Report on the Santa Rita Mine, Bahia State, Brazil" with an effective date of December 31, 2022 (the CPR), prepared for ACG Acquisition Company Limited, do hereby certify that:

1. I am a Director and Principal Consultant with GeoEstima SpA, of Floor 19, Edificio Parque Oriente, 5320 Alonso de Cordova, Las Condes Santiago, Chile.
2. I graduated from Universidad de Chile, Chile, in 1993 with a BSc (Science) in Geologist and from Ecole des Mines de Paris in 2001 with a Specialist in Geostatistics diploma (CFSG).
3. I am registered as a Geologist in Australia and Chile in the Australian Institute of Geoscientists Membership #5543 and Comision Minera Chile #285. I have worked as a geologist consultant for a total of over 30 years since my graduation. My relevant experience for the purpose of the CPR is:
    - Numerous consulting assignments related to mineral resources evaluation and geometallurgy on base metal and gold exploration projects, mine development projects, and operating mines.
    - Senior position in large mining company and executive positions in a mining corporation
    - Experience in mineral resource evaluation in similar mineral deposits to Santa Rita.
4. I have read the definition of "Competent Person" set out in the Financial Conduct Authority (FCA) Primary Market Technical Note 619.1 (FCA Technical Note) and certify that by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfill the requirements to be a Competent Person for the purposes of the FCA Technical Note.
5. I visited the Santa Rita Mine on November 17 and 18, 2022.
6. I am responsible for Sections 1.1.1.1, 1.1.2.1, 1.3.1 to 1.3.6, 4.1 to 4.8, 4.12, 5 to 12, 14, 25.1, 26.1, and related disclosure (pertaining to Geology and Mineral Resources) in Sections 1.4, 25.12, and 27 of the CPR.
7. I am independent of ACG Acquisition Company Limited.
8. I have had no prior involvement with the property that is the subject of the CPR.
9. I have read CIM (2014) definitions and the FCA Technical Note, and the CPR has been prepared in compliance with these guidelines.
10. At the effective date of the CPR, to the best of my knowledge, information, and belief, Sections 1.1.1.1, 1.1.2.1, 1.3.1 to 1.3.6, 4.1 to 4.8, 4.12, 5 to 12, 14, 25.1, 26.1, and related disclosure (pertaining to Geology and Mineral Resources) in Sections 1.4, 25.12, and 27 of the CPR for which I am responsible contain all scientific and technical information that is required to be disclosed to make the CPR not misleading.

Dated this 12th day of June, 2023

(Signed & Sealed) ***Orlando Rojas***

Orlando Rojas, AIG

29.3 Andrew Bradfield

I, Andrew Bradfield, P.Eng., as an author of this report entitled "Competent Person's Report on the Santa Rita Mine, Bahia State, Brazil" with an effective date of December 31, 2022 (the CPR), prepared for ACG Acquisition Company Limited, do hereby certify that:

1. I am the Chief Operating Officer of P&E Mining Consultants Inc., of Suite 304, 201 County Court Blvd, Brampton, Ontario, Canada, L6W4L2.
2. I am a graduate of Queen's University, Kingston, Ontario, Canada, with an honours B.Sc. degree in Mining Engineering in 1982.
3. I have practiced my profession continuously since 1982. I am a Professional Engineer of Ontario (License No.4894507). I am also a member of the National CIM. My relevant experience for the purpose of the CPR is:
   - 13 years as the COO or VP Operations of junior mining companies, primarily gold, also base metals and diamonds, open pit and underground operations.
   - 15 years as a GM or COO of several consulting companies. Numerous technical reports and various assignments, scoping to feasibility study, due diligence and royalty reviews, mergers and acquisitions.
   - 7 years as a mining engineer at a senior level for various consulting companies.
   - 6 years as a mining engineer at open pit and underground mining operations
4. I have read the definition of "Competent Person" set out in the Financial Conduct Authority (FCA) Primary Market Technical Note 619.1 (FCA Technical Note) and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be a Competent Person for the purposes of the FCA Technical Note.
5. I visited the Santa Rita Mine on February 14, 2023.
6. I am responsible for Sections 1.1.1.2, 1.1.1.4, 1.1.1.6 (except TSF), 1.1.2.2, 1.1.2.5, 1.2, 1.3.7, 1.3.8, 1.3.11, 1.3.12, 1.3.14, 1.3.15 (except 13.15.4), 15, 16, 18, 19, 21, 22, 24.1.1, 24.1.2, 24.1.4, 24.1.6, 24.1.9, 25.2, 25.3, 25.5, 25.6, 25.8 to 25.10, 25.11.3, 26.2, 26.6, and related disclosure (pertaining to Mining, Mineral Reserves, and 2023 PEA) in Sections 1.4, 25.12, and 27 of the CPR.
7. I am independent of ACG Acquisition Company Limited.
8. I have had prior involvement with the property that is the subject of the CPR since 2019 including acting as a QP on two internal Technical Reports.
9. I have read CIM (2014) definitions and the FCA Technical Note, and the CPR has been prepared in compliance with these guidelines.
10. At the effective date of the CPR, to the best of my knowledge, information, and belief, Sections 1.1.1.2, 1.1.1.4, 1.1.1.6 (except TSF), 1.1.2.2, 1.1.2.5, 1.2, 1.3.7, 1.3.8, 1.3.11, 1.3.12, 1.3.14, 1.3.15 (except 13.15.4), 15, 16, 18, 19, 21, 22, 24.1.1, 24.1.2, 24.1.4, 24.1.6, 24.1.9, 25.2, 25.3, 25.5, 25.6, 25.8 to 25.10, 25.11.3, 26.2, 26.6, and related disclosure (pertaining to Mining, Mineral Reserves, and 2023 PEA) in Sections 1.4, 25.12, and 27 of the CPR for which I am responsible contain all scientific and technical information that is required to be disclosed to make the CPR not misleading.

Dated this 12th day of June, 2023

(Signed & Sealed) ***Andrew Bradfield***

Andrew Bradfield, P.Eng.

29.4 D. Gregory (Greg) Robinson

I, D. Gregory (Greg) Robinson, P.Eng., as an author of this report entitled "Competent Person's Report on the Santa Rita Mine, Bahia State, Brazil" with an effective date of December 31, 2022 (the CPR), prepared for ACG Acquisition Company Limited, do hereby certify that:

1. I am Lead Mining Engineer with P&E Mining Consultants Inc., of Suite 304, 201 County Court Blvd, Brampton, Ontario, Canada.
2. I am a graduate of Dalhousie University of Halifax, Nova Scotia, Canada, in 2008, with a Bachelor's Degree in Mineral Resource Engineering (Mining), and a graduate of Cornell University in Ithaca, New York, USA in 2018 with a Masters of Business Administration.
3. I am registered as a Professional Engineer in the Province of Ontario, Canada (Reg.# 100216726). I have worked as a mining engineer/ for a total of 15 years since my graduation. My relevant experience for the purpose of the CPR is:
   - 5 years in engineering and operations at two different underground sub-level caving operations with production rates in excess of 6,000tpd, in roles including ventilation, drill and blast, short term planning, operations supervision, and technical leadership.
   - 6 years as a mining engineering consultant, including the design and costing of underground operations in North and South America for projects at all stages of development, in both greenfields and brownfields projects.
   - Technical leadership positions at operating mines and as an engineering consultant.
   - Competent/Qualified Person on numerous issued technical reports.
4. I have read the definition of "Competent Person" set out in the Financial Conduct Authority (FCA) Primary Market Technical Note 619.1 (FCA Technical Note) and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be a Competent Person for the purposes of the FCA Technical Note.
5. I visited the Santa Rita Mine on January 18, 2019.
6. I am responsible for Sections 1.3.15.2, 24.1.3, 24.1.8 and 25.11.1 of the CPR.
7. I am independent of ACG Acquisition Company Limited.
8. I have had previous involvement with the property that is the subject of the CPR from 2019-present, including site visits, generation of ventilation models, and PEA-level reviews of designs and costs.
9. I have read CIM (2014) definitions and the FCA Technical Note, and the CPR has been prepared in compliance with these guidelines.
10. At the effective date of the CPR, to the best of my knowledge, information, and belief, Sections 1.3.15.2, 24.1.3, 24.1.8 and 25.11.1 of the CPR for which I am responsible contain all scientific and technical information that is required to be disclosed to make the CPR not misleading.

Dated this 12th day of June, 2023

(Signed & Sealed) ***D. Gregory Robinson***

D. Gregory (Greg) Robinson, P.Eng.

29.3 Anthony Maycock

I, Anthony Maycock, P.Eng., as an author of this report entitled "Competent Person's Report on the Santa Rita Mine, Bahia State, Brazil" with an effective date of December 31, 2022 (the CPR), prepared for ACG Acquisition Company Limited, do hereby certify that:

1. I am Principal of MM Consultores SpA, of Monjitas 550, Oficina 19, Santiago, Chile.
2. I am a graduate of the University of London (Royal School of Mines), London in 1969 with a BSc Degree in Mineral Technology. I am registered as a Professional Engineer in the Province of British Columbia, Canada (Reg.#13275). I have worked as metallurgist and Senior Consultant for a total of 53 years since my graduation. My relevant experience for the purpose of the CPR is:
   - Plant Manager and metallurgist in copper concentrators in Zambia
   - General Manager and Senior Metallurgist for two international engineering companies in the mining industry
   - Project Manager and Senior Metallurgist on many copper, gold, and base metals projects
   - Author of the metallurgical sections for several Canadian NI 43-101 reports
3. I have read the definition of "Competent Person" set out in the Financial Conduct Authority (FCA) Primary Market Technical Note 619.1 (FCA Technical Note) and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be a Competent Person for the purposes of the FCA Technical Note.
4. I visited the Santa Rita Mine on July 22 to 24, 2019.
5. I am responsible for Sections 1.1.3, 1.1.2.3, 1.3.9, 1.3.10, 13, 17, 24.1.5, 25.4, 26.3, and related disclosure (Mineral Processing) in Sections 1.4, 25.12, and 27 of the CPR.
6. I am independent of ACG Acquisition Company Limited.
7. I have provided independent metallurgical consulting services to Santa Rita before and after the re-start of the plant.
8. I have read CIM (2014) definitions and the FCA Technical Note, and the CPR has been prepared in compliance with these guidelines.
9. At the effective date of the CPR, to the best of my knowledge, information, and belief, Sections 1.1.3, 1.1.2.3, 1.3.9, 1.3.10, 13, 17, 24.1.5, 25.4, 26.3, and related disclosure (Mineral Processing) in Sections 1.4, 25.12, and 27 of the CPR for which I am responsible contain all scientific and technical information that is required to be disclosed to make the CPR not misleading.

Dated this 12th day of June, 2023

(Signed & Sealed) *Anthony Maycock*

Anthony Maycock, P.Eng.

29.4 Haiming (Peter) Yuan

I, Dr. Haiming (Peter) Yuan, P.E., as an author of this report entitled "Competent Person's Report on the Santa Rita Mine, Bahia State, Brazil" with an effective date of December 31, 2022 (the CPR), prepared for ACG Acquisition Company Limited, do hereby certify that:

1. I am Senior Associate Engineer of WSP USA Environment & Infrastructure Inc., of 9460 Double R Blvd, Suite 201, Reno, Nevada, USA 89521.
2. I am a graduate of Clemson University (Clemson, South Carolina, USA) in 2003 with a PhD in Geotechnical Engineering.
3. I am registered as a Professional Engineer in the State of Nevada, USA (Reg.# 19348, Civil). I have worked as an engineer consultant for a total of 19 years since my graduation. My relevant experience for the purpose of the CPR is:
   - Engineering services for tailings storage facilities (TSF).
   - Support on environment/permit/social related services pertaining to mining infrastructure facilities.
4. I have read the definition of "Competent Person" set out in the Financial Conduct Authority (FCA) Primary Market Technical Note 619.1 (FCA Technical Note) and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be a Competent Person for the purposes of the FCA Technical Note.
5. I visited the Santa Rita Mine on October 25 to 28, 2021.
6. I am responsible for Sections 1.1.1.5, 1.1.1.6 (TSF), 1.1.2.4, 1.3.13, 1.3.15.4, 4.9, 4.10, 4.11, 20, 24.1.7, 25.7, 25.11.2, 26.4, 26.5, and related disclosure (pertaining to Environment and TSF) in Sections 1.4, 25.12, and 27 of the CPR.
7. I am independent of ACG Acquisition Company Limited.
8. I have been involved in design and construction of the existing TSF and studies of the new TSF at the property that is the subject of the CPR.
9. I have read CIM (2014) definitions and the FCA Technical Note, and the CPR has been prepared in compliance with these guidelines.
10. At the effective date of the CPR, to the best of my knowledge, information, and belief, Sections 1.1.1.5, 1.1.1.6 (TSF), 1.1.2.4, 1.3.13, 1.3.15.4, 4.9, 4.10, 4.11, 20, 24.1.7, 25.7, 25.11.2, 26.4, 26.5, and related disclosure (pertaining to Environment and TSF) in Sections 1.4, 25.12, and 27 of the CPR for which I am responsible contain all scientific and technical information that is required to be disclosed to make the CPR not misleading.

Dated this 12th day of June, 2023

(Signed & Sealed) *Haiming (Peter) Yuan*

Dr. Haiming (Peter) Yuan, P.E.

30.0 APPENDIX 1 - FCA PRIMARY MARKET TECHNICAL NOTE 619.1 APPENDIX II MINING COMPETENT PERSON'S REPORT – RECOMMENDED CONTENT

Competent persons should provide competent person's reports structured in accordance with either the model content recommended under the code, statute or regulation the company is reporting under or, where there no such model content is set out in the code, the competent person should address the information set out in this appendix. Where it would be appropriate to adapt these contents for the circumstances of the issuer, we ask the competent person to draw this to the attention of, and discuss with, the FCA before the report is finalised.

(i) Legal and Geological Overview – a description of:

(1) the nature and extent of the company's rights of exploration and extraction and a description of the properties to which the rights attach, with details of the duration and other principal terms and conditions of these rights including environmental obligations, and any necessary licences and consents including planning permission;

(2) any other material terms and conditions of exploration and extraction including host government rights and arrangements with partner companies;

(ii) Geological Overview – a description of the geological characteristics of the properties, the type of deposit, its physical characteristics, style of mineralisation, including a discussion of any material geotechnical, hydrogeological/hydrological and geotechnical engineering issues;

(iii) Resources and reserves

(1) a table providing data on (to the extent applicable): exploration results inclusive of commentary on the quantity and quality of this, inferred, indicated/measured resources, and proved/probable reserves and a statement regarding the internationally recognised reporting standard used;

(2) a description of the process followed by the competent person in arriving at the published statements and a statement indicating whether the competent person has audited and reproduced the statements, what additional modifications have been included, or whether the authors have reverted to a fundamental re-calculation;

(3) a statement as to whether mineral resources are reported inclusive or exclusive of reserves;

(4) supporting assumptions used in ensuring that mineral resource statements are deemed to be 'potentially economically mineable';

(5) supporting assumptions including commodity prices, operating cost assumptions and other modifying factors used to derive reserve statements;

(6) reconciliations between the proposed and last historic statement;

(7) a statement of when and for how long a competent person last visited the properties (or a statement that no visit has been made if that is the case);

(8) for proved and probable reserves (if any) a discussion of the assumed:

(a) mining method, metallurgical processes and production forecast;

(b) markets for the company's production and commodity price forecasts;

(c) mine life;

(d) capital and operating cost estimates;

(iv) Valuation of reserves – taking consideration of internationally recognised valuation codes a valuation of reserves comprising:

(1) an estimate of net present value (or a valuation arrived at on an alternative basis, with an explanation of the basis and of the reasons for adopting it) of reserves;

(2) the principal assumptions on which the valuation of proved and probable reserves is based including those relating to discount factors, commodity prices, exchange rates, realised prices, local fiscal terms and other key economic parameters;

(3) information to demonstrate the sensitivity to changes in the principal assumptions; (or a statement that the valuation of reserves is omitted).

(v) Environmental, Social and Facilities – an assessment of

(1) environmental closure liabilities inclusive of biophysical and social aspects, including (if appropriate) specific assumptions regarding sale of equipment and/or recovery of commodities on closure, separately identified;

(2) environmental permits and their status including where areas of material non-compliance occur;

(3) commentary on facilities which are of material significance;

(vi) Historic Production/Expenditures – an appropriate selection of historic production statistics and operating expenditures over a minimum of a three year period;

(vii) Infrastructure – a discussion of location and accessibility of the properties, availability of power, water, tailings storage facilities, human resources, occupational health and safety;

(viii) Maps etc. – maps, plans and diagrams showing material details featured in the text; and

(ix) Special factors – if applicable a statement setting out any additional information required for a proper appraisal of any special factors affecting the exploration or extraction businesses of the company (for example in the polar regions where seasonality is a special factor).

31.0 APPENDIX 2 - VALUATION OF SANTA RITA PROPERTY

This valuation prepared by SLR follows the CIMVAL Standards and Guidelines for Valuation of Mineral Properties dated November 29, 2019 (2019 CIMVAL Code) for a Short Form Valuation Report. It relies on information in the body of this CPR and a site visit has been undertaken. The basis of value used is Market Value which means the highest price, expressed in terms of money or money's worth, obtainable in an open and unrestricted market between knowledgeable, informed and prudent parties, acting at arm's length, neither party being under any compulsion to transact, as at a given point in time (CIMVAL 2019 Definitions). The effective valuation date is December 31, 2022.

31.1 Valuation Approaches and Methods – Santa Rita

The objective of this Valuation Section is to estimate a range of Market Values for the Santa Rita Property (Santa Rita or the Property). Most of the value lies in the Mineral Reserves and Mineral Resources of the Santa Rita Mine, but some value accrues to the exploration ground held outside the mine area. There are two main categories of mineral properties, which require different approaches to valuation. These are exploration properties and development properties. This subdivision is based on technical information rather than on the type of mineral tenure.

Development properties are those on which an economically viable mineral deposit has been demonstrated to exist. Such properties are at a sufficiently advanced stage that adequate reliable information exists to value the property by Discounted Cash Flow (DCF) Analysis, with a reasonable degree of confidence. The value of a development property is the net present value (NPV) of a stream of estimated cash flows, discounted at an appropriate rate to reflect the risk of the mining project. Development properties include producing mines as well as properties on which development of an economically viable operation is planned.

Exploration properties are those on which an economically viable mineral deposit has not yet been demonstrated to exist. The real value of an exploration property lies in the potential for the existence and discovery of an economically viable deposit. Only a small number of exploration properties will ultimately become properties with operating mines, however, they have value until such time as exploration work has been sufficient and justified to test the potential. In the mineral industry, exploration properties are optioned, joint ventured, bought, sold, and traded on the basis of perceived exploration potential. The probability of a mineral exploration property becoming a mine is extremely low.

Typically, classifying mineral properties as exploration and development properties is relatively straightforward. There are some properties, however, which lie in a grey area between the two groups. These marginal properties contain well defined Mineral Resources, which could become economically viable at higher commodity prices or lower production costs but have marginal economics at the prices at the time of valuation.

31.1.1 General Considerations

Primary considerations in the valuation of mineral exploration properties include geological setting and potential, in addition to location with respect to established infrastructure, most notably permitted processing plants, and permitted tailings areas. Standalone, isolated projects in non-producing jurisdictions will likely face prolonged scrutiny and extensive pre-production periods. Exploration properties in established mining areas and within known productive geological environments often have a premium value due to the higher perceived potential for discovery of a mineral deposit and because of developed infrastructure. Alternatively, mineral properties remote from areas of infrastructure but within a good geological environment often have lower values. Political stability and the rule of law in a jurisdiction directly impact property values.

The three main approaches to the valuation of mineral properties are Market, Income, and Cost approaches. Different valuation approaches and methods are appropriate for mineral properties at different stages of exploration and development. The 2019 CIMVAL Code summarizes industry practice for appropriate valuation approaches for projects at different stages (Table 31-1).

Table 31-1: Valuation Approaches for Different Types of Mineral Properties[1]
ACG Acquisition Company Limited – Santa Rita Mine

Valuation Approach	Exploration Properties	Mineral Resource Properties	Development Properties	Production Properties
Income	No	In some cases	Yes	Yes
Market	Yes	Yes	Yes	Yes
Cost	Yes	In some cases	No	No

For the purposes of this valuation, SLR divided the Property into two portions: a Mine Portion which hosts the Mineral Resources and Mineral Reserves and site infrastructure on two Mining Concessions (2,000 ha), and an Exploration Portion which has exploration potential for Ni-Cu-Co-Pt-Pd-Au mineralisation similar to that at the Santa Rita Mine (37,286 ha). Of this exploration land, 2,000 ha is under Application for Mining Concession and contains the Palestina Exploration Target, expressed as a range of tonnes and grade.

For the Mine Portion, SLR relied on DCF Analysis (an Income Approach) as the primary method for valuation of the Mineral Reserves and Mineral Resources. Comparable Transactions Analysis (a Market Approach) was also used as a second method for the Mineral Resources inclusive of the Mineral Reserves. Metal Transaction Ratio (MTR) was used as a metric for the Comparable Transactions Analysis: the method is described below and can be used effectively for comparison of polymetallic properties.

For the Exploration Portion, SLR used Comparable Transactions Analysis using unit value per hectare ($/ha) as a comparison metric. The MTR method was also used for the Palestina Exploration Target.

Various mineral property valuation approaches and methods are described in Roscoe (2007 and 2012).

The following sections summarize the methods used.

31.1.2 Discounted Cash Flow Analysis

DCF Analysis is used for the valuation of advanced projects with Mineral Resources and/or Mineral Reserves, development projects, and operating mines, where sufficient reliable information exists to value the property by DCF Analysis with a reasonable degree of confidence. DCF Analysis is used to determine the NPV of a stream of estimated future cash flows from an operation, based on reasonable estimates of input parameters, which include workable mine plans and production rates, Mineral Resources and/or Mineral Reserves, process recovery, commodity price projections or sales contracts, initial and ongoing capital costs, operating costs, environmental and reclamation costs, royalties, taxes, status of permitting, and an appropriate discount rate.

[1] CIMVAL Code, 2019 (Table 1)

31.1.3 Comparable Transactions Analysis

Comparable Transactions Analysis uses the transaction price of a comparable mineral property to establish a value for the subject property. The method is described in Roscoe (2007).

A challenge posed by using the Comparable Transactions Method in the mining industry is that there are no true comparable transactions, unlike in real estate or oil and gas, each mineral property is unique with regard to key factors such as geology, mineralisation, costs, exploration stage, location, and infrastructure. In addition, there are relatively few transactions for mineral properties compared to the frequency of real estate transactions in general. When mineral property transactions do occur, they rarely involve strictly cash, leaving the valuator the task of converting blocks of shares, royalties, or option terms into monetary equivalents. Nonetheless, transaction prices of similar properties can indicate a range of values for a particular mineral property.

Exploration property transactions also give an indication of how active the market may be at any given time. As in the case for most valuations of real estate properties, the reliability of the valuation depends on an active market in comparable properties. Mineral properties differ from real estate properties in several ways. There are no true comparable transactions in the valuation of mineral properties, since each property is considered unique, as noted above. Mineral properties, which are at different stages of exploration or development, and have different geological and related attributes, including perceived exploration potential, may have considerably different values. This is due to the potential for cash flow from an identified mineral deposit, or the potential for discovery of a deposit. Another reason for the large differences in mineral property values, often an order of magnitude or more, is the small volume of mineral property transactions compared to the real estate market.

As with real estate properties, the location of a mineral property may also have a significant impact on its value. Exploration properties in established mining areas often have a premium value because of the higher perceived potential for discovery of a mineral deposit, and because of developed infrastructure. On the other hand, mineral properties remote from areas of infrastructure often have lower values.

For non-resource properties, SLR identifies market transactions on exploration properties comparable to the subject properties and analyses them in terms of total property value and $/ha. An appropriate range of $/ha values is determined and applied to the subject property.

For properties with Mineral Resources, SLR identifies market transactions on properties with Mineral Resources that are similar to the subject properties and analyses them in terms of total property value and value per unit metal contained in the Mineral Resources. For Mineral Resources with more than one metal, SLR uses MTR as a comparison metric, as described below. An appropriate range of values is then determined and applied to the subject property.

31.1.4 Option Agreement Terms Analysis

The Option Agreement Terms Analysis Method was utilised to value many of the properties used as market comparable transactions at the exploration stage without mineral resources.

Most market transactions on non-producing mineral exploration properties are not straightforward cash or share deals, but rather are typically option, earn-in, or JV agreements whereby one party obtains the right to earn an interest in the property from another party by fulfilling certain commitments over a period of time. The terms of the option or earn-in agreement must be analysed to estimate the value of the property being transacted.

In a typical option agreement, a schedule of firm and optional commitments must be fulfilled to earn an interest in the property. Commitments may include payment of cash, issuance of shares by the earn-in party, expenditures on mineral exploration, and royalties on production. In general, the commitments are firm in the first year and optional in subsequent years. Option Agreement Terms Analysis considers the firm commitments to contribute 100% to the value of the property. The optional commitments are assigned a subjective probability based on a prediction of the earn-in party fulfilling each of the annual commitments in the subsequent years of the agreement. The optional commitments multiplied by the probability factor for each year are considered to be the contribution to value. The transaction value is the sum of the firm commitment values and the probability-weighted optional commitment values. If the transaction is for a partial interest in the property, the value is adjusted to a 100% interest in the property.

31.1.5 Metal Transaction Ratio Analysis

For market transactions on Mineral Resource properties with a single metal, a value per unit metal can be calculated from the value of the transaction and the ounces or pounds of metal in the Mineral Resource estimate. The value per unit metal can also be expressed as a percentage of the metal price at the time of the transaction. For properties with more than one metal reported in the Mineral Resources, such as the Santa Rita Property, an MTR can be calculated which is analogous to the value per unit metal as a percentage of metal price (Roscoe, 2012). The total in situ dollar content of the metals contained in the Mineral Resource is calculated for the property using metal prices as of the date of the transaction. The MTR is the ratio of the transaction value to the in-situ dollar metal content of the Mineral Resources transacted, expressed as a percentage. An appropriate range of MTR values to apply to the Mineral Resources of the subject property is derived from the MTRs of the comparable transactions.

31.2 Valuation of the Santa Rita Property

As noted previously, SLR divided the Property into a Mine Portion and an Exploration Portion for valuation purposes. SLR valued the Mine Portion using DCF Analysis as the primary valuation method for the Mineral Reserves in the open pit operation and the Mineral Resources in the underground operation. As an additional method, SLR used Comparable Transactions Analysis (MTR method) for the Mine Portion. Results of the two methods were compared and weighted to derive a range of Market Values for the Mine Portion.

SLR valued the Palestina Exploration Target using the MTR method. The other exploration properties of the Exploration Portion were valued using Comparable Transactions Analysis on base metal exploration properties without Mineral Resources based on $/ha values. SLR was unable to identify any nickel-dominant exploration properties without Mineral Resources that transacted in South America in recent years. SLR therefore used, as a proxy, copper-dominant exploration properties, which were abundant in North and South America.

31.2.1 Income Approach – DCF Analysis

For the purposes of this valuation, SLR relied on the DCF models in the Santa Rita CPR: Economic Analysis chapter for the open pit operation and the Preliminary Economic Assessment (PEA) section of the Other Relevant Data and Information chapter for a potential future underground mine. A description of the key criteria and assumptions used to create the DCF models is provided in various sections of the Santa Rita CPR, including physical, revenue, costs, and economic metrics. The NPVs for the Santa Rita open pit operations and underground PEA are listed in Table 31-2. An 8% discount rate was used for the Santa Rita Open Pit since it is an operating mine with an operating history and reliable cash flow projections. A discount rate of 12.5% was used for the Santa Rita Underground since it is at the PEA level of economic evaluation, is not yet operating, and a substantial portion of Inferred Resources are in the DCF model. The total NPV for the Santa Rita Mine Portion is US$980 million.

Table 31-2: Net Present Value of Santa Rita Mine
ACG Acquisition Company Limited – Santa Rita Mine

Operation	Discount Rate	NPV (US$M)
Open Pit	8% after-tax	546
Underground	12.5% after-tax	434
Total		**980**

31.2.2 Market Approach – Mineral Resources Inclusive of Mineral Reserves

SLR compiled data on mineral properties similar to the Santa Rita Mine Portion of the Property on which transactions have taken place within a reasonable time period of the valuation date using the following criteria:

- Transactions on properties with sulphide Ni-Cu-Co PGM deposits hosted by mafic/ultramafic intrusive rocks; laterite deposits were not included.
- Transactions with dates from 2018 to 2022 for the December 31, 2022 Valuation Date.
- Comparable transactions were sought for producing and non-producing properties with Mineral Resources and/or Mineral Reserves.
- No suitable properties were identified in Latin America so the search was extended to North America, northern Europe, and Australia.
- Transactions selected were all arm's length, to the best of SLR's knowledge.

The terms of each transaction, as disclosed in press releases and other publicly available company information, were analysed to derive a value for each transacted property. If the deal was for less than a 100% interest, the value was adjusted to a 100% interest. If shares were used as firm commitments, SLR used the closing share price on the date of the announcement of the transaction.

Mineral Resources and other details of 20 transacted Ni-Cu-Co-PGM properties are listed in Table 31-3 as of the date of the announcement of the transaction. All categories of Mineral Resources for each property were totalled and the in situ dollar content of the contained metals was calculated using metal prices at the date of the announcement of the transaction. MTR, expressed as a percentage, was derived for each transacted property by dividing the property value by the in situ dollar content.

The MTR values were further analysed to derive a range to apply to the total in situ dollar content of the Santa Rita Mineral Resources. Considerations in choosing an appropriate range of MTR values to apply to the subject property included:

- Examining mean and median values as well as the overall range of values.
- Considering the variability of values as measured by the coefficient of variation (CV), which is the standard deviation divided by the average.
- Eliminating outliers at the high and/or low end of the value range.
- Considering which properties are more similar to the subject property.
- Rounding derived values appropriately.

In Table 31-3, SLR notes the following in its analysis of MTR values:

- MTR values range from 0.02% to 2.25%, with average and median values of 0.63% and 0.36%, respectively, and a CV of 114%.

- Excluding the four lowest MTR values, which appear to be outliers, the average and median values are 0.78% and 0.43%, respectively, with a CV of 94%.
- The MTR values can be considered in three groups of highest, middle, and lowest values, as follows.
  - The seven highest MTR values have average and median values of 1.43% and 1.38%, respectively, with a CV of 46%.
  - The next five highest MTRs have average and median values of 0.37% and 0.38%, respectively, and the CV is 15%.
  - The lowest group of four MTRs, excluding the four low outliers, have average and median values of 0.14% and 0.13%, respectively, and a CV of 19%.

SLR considers that the highest group of MTR values is most representative of the Santa Rita Mineral Resources because of their economic grades and the fact that they have been placed into production. Considering the average and median values of this group and its overall range, SLR recommends that an MTR range of 0.9% to 1.8% be used for valuation of non-producing properties.

Table 31-3: Comparable Transactions Analysis -Non-Producing Copper Dominant Properties with Resources in South America
AGC Acquisition Company Limited – Santa Rita Mine

Property	Location	Transaction Date	Equity Earned	Buyer	Seller	Deal Value 100% Basis (US$)	TOTAL RESERVES & RESOURCES Tonnes	Ni (%)	Cu (%)	Co (%)	Pt (g/t)	Pd (g/t)	Total In Situ $ Content (US$)	MTR
Grasset	Canada	13-Jul-22	100%	Archer Exploration	Wallbridge Mining	42,150,229	5,729,000	1.192	0.13	0.030	0.258	0.625	1,872,229,590	2.25%
Tamarack	USA	7-Nov-18	33%	Talon Metals	Rio Tinto Group	44,856,459	8,021,000	1.690	0.950	0.050	0.350	0.220	1,872,229,590	2.25%
Shakespeare	Canada	31-Jan-22	12.5%	Mitsui & Co.	Magna Mining	62,958,416	22,700,000	0.335	0.365	0.020	0.300	0.325	3,698,807,859	1.70%
Nepean	Australia	11-Nov-20	100%	Auroch Minerals	Undisclosed	2,915,944	591,300	2.200					211,065,875	1.38%
Lanfranchi	Australia	13-Sep-18	100%	Black Mountain Metals	Panoramic Resources	10,798,055	5,655,000	1.688					1,196,328,500	0.90%
Rana	Norway	17-Feb-21	10%	Global Energy Metals	Investor Group	6,231,069	9,150,000	0.360	0.090	0.010			730,810,150	0.85%
Long Complex	Australia	23-May-19	100%	Mincor Resources	Independence Group	2,428,416	750,000	4.225					368,652,000	0.66%
Lainejaur	Sweden	18-Mar-21	100%	Bayrock Cobalt	Carnaby Resources	1,169,229	460,000	2.200	0.700	0.150	0.200	0.680	271,679,859	0.43%
Marathon 2	Canada	8-Dec-21	16.5%	Generation Mining	Sibanye Stillwater	71,977,195	278,723,000		0.206		0.168	0.516	16,931,805,931	0.43%
Texmont	Canada	19-Dec-22	100%	Canada Nickel Co.	Undisclosed	2,989,550	3,190,000	0.920					785,117,000	0.38%
Thunder Bay North	Canada	10-Jan-20	100%	Clean Air Metals	Panoramic Resources	6,388,516	10354000	0.188	0.279	0.014	1.133	1.066	1,938,066,518	0.33%
Saints & Leinster	Australia	28-May-19	100%	Auroch Minerals	Minotaur Exploration	1,212,473	1,650,000	1.780	0.236	0.06			399,639,700	0.30%
Minago	Canada	22-Jan-21	100%	Silver Elephant Mining	Victory Nickel	11,721,795	68,699,000	0.520					6,509,711,143	0.18%
Marathon 1	Canada	17-Apr-19	80%	Generation Mining	Sibanye Gold	9,844,734	151,700,000		0.218		0.200	0.600	6,684,388,592	0.15%
Horden Lake	Canada	13-Sep-22	100%	Rafaella Resources	Gestion Ora-Mirage	3,051,106	16,550,000	0.230	0.875			0.150	2,499,366,753	0.12%
Gochager Lake	Canada	19-Sep-22	100%	Fathom Nickel	Undisclosed	389,795	1,770,000	0.735					319,473,560	0.12%
West Graham	Canada	31-Mar-21	30%	SPC Nickel	Landore Resources	666,860	10,550,000	0.440	0.310	0.010			1,080,121,700	0.06%
Turnagain	Canada	15-Aug-22	15%	Mitsubishi	Giga Metals Corp	41,318,046	2,215,420,000	0.219		0.013			119,899,428,344	0.03%
Dumont	Canada	22-Jul-20	28%	Waterton Global Resources	Karora Resources	19,539,811	2,165,400,000	0.260		0.011	0.008	0.180	84,564,387,062	0.02%
Thierry	Canada	18-Aug-20	100%	Braveheart Resources	Cadillac Ventures	1,275,994	77,341,000	0.122	0.761		0.053	0.152	6,702,027,860	0.02%
				All transactions	Average	17,194,185	252,720,165	1.072	0.427	0.037	0.297	0.451	12,926,766,879	0.63%
					Median	6,309,792	9,752,000	0.628	0.294	0.017	0.200	0.420	1,872,229,590	0.36%
					Std Dev	22,451,905	666,188,356	1.069	0.306	0.044	0.332	0.300	31,320,585,172	0.72%
					CV	131%	264%	100%	72%	118%	112%	66%	242%	114%
				Without 4 lowest MTR	Average	17,567,686	36,605,769	1.305	0.405	0.048	0.373	0.523	2,893,085,789	0.78%
					Median	6,309,792	6,875,000	1.056	0.258	0.030	0.258	0.558	1,534,279,045	0.43%
					Std Dev	23,750,701	75,324,033	1.109	0.316	0.049	0.341	0.294	4,270,961,260	0.73%
					CV	135%	206%	85%	78%	102%	92%	56%	148%	94%
				Highest to 7th highest MTRs	Average	24,619,798	7,513,757	1.670	0.384	0.028	0.303	0.390	1,421,446,223	1.43%
					Median	10,798,055	5,729,000	1.688	0.248	0.025	0.300	0.325	1,196,328,500	1.38%
					Std Dev	24,763,511	7,459,510	1.325	0.397	0.017	0.046	0.210	1,203,733,065	0.66%
					CV	101%	99%	79%	103%	62%	15%	54%	85%	46%
				8th to 12th highest MTRs	Average	16,747,393	58,875,400	1.272	0.355	0.075	0.500	0.754	4,065,261,802	0.37%
					Median	2,989,550	3,190,000	1.350	0.258	0.060	0.200	0.680	785,117,000	0.38%
					Std Dev	30,947,248	122,958,593	0.898	0.232	0.069	0.548	0.282	7,222,539,666	0.06%
					CV	185%	209%	71%	65%	93%	110%	37%	178%	15%
				13th to 16th highest MTRs	Average	6,251,857	59,679,750	0.495	0.547		0.200	0.375	4,003,235,012	0.14%
					Median	6,447,920	42,624,500	0.520	0.547		0.200	0.375	4,504,538,948	0.13%
					Std Dev	5,398,690	67,731,794	0.253	0.465			0.318	3,125,312,000	0.03%
					CV	86%	113%	51%	85%			85%	78%	19%

Recommended Range of MTR Values
Highest MTR Grouping **0.9% to 1.8%**

It is SLR's experience that producing properties have higher MTR values than non-producing properties, and that it would be appropriate to apply a premium to the MTR range of 0.9% to 1.8% derived from non-producing properties. Such a premium would be applicable to the Mineral Resources at the producing Santa Rita open pit operation but not to the Mineral Resources of the future underground mine envisaged in a PEA. Since SLR was unable to identify any suitable producing nickel-dominant property transactions, we used copper-dominant comparable transactions as a proxy to derive a premium to apply to the non-producing MTR range.

SLR compiled data on transactions on copper-dominant properties in North and South America from 2018 to 2022, both producing and non-producing. MTR values for each property were derived for each transacted property and further analysed to derive recommended ranges of MTR values.

Table 31-4 lists details for 35 transactions on non-producing copper-dominant properties. None of the MTR values appear to be outliers and, as for the nickel-dominant transactions, high, medium, and low groups of MTR values were considered, as summarised below:

- MTR values range from 0.02% to 2.90%, with mean and median values of 0.76% and 0.39%, respectively, and a CV of 115%.
- The MTR values were considered in three groups of highest, middle, and lowest values, as follows.
  - The 14 highest MTR values have mean and median values of 1.62% and 1.70%, respectively, with a CV of 48%.
  - The next 12 highest MTRs have mean and median values of 0.29% and 0.26%, respectively, and the CV is 46%.
  - The lowest group of nine MTRs have mean and median values of 0.04% and 0.03%, respectively, and a CV of 58%.

SLR considers that the highest group of MTR values for copper-dominant transactions is very similar to the nickel-dominant group of highest MTRs discussed above and that it is appropriate to use them as a proxy for nickel-dominant MTR values. Considering the average and median values and its overall range, SLR recommends an MTR range of 1.0% to 2.0% for the copper-dominant MTR range.

Table 31-4: Comparable Transactions Analysis -Non-Producing Copper Dominant Properties with Resources in South America
AGC Acquisition Company Limited – Santa Rita Mine

Property	Location	Transaction Date	Equity Earned	Buyer	Seller	Deal Value 100% Basis (US$)	TOTAL RESERVES & RESOURCES Tonnes	Cu (%)	Mo (%)	Au (g/t)	Ag (g/t)	CuEq Grade (%)	Total In Situ $ Content (US$)	MTR
Rosemont	USA	13-Mar-19	7.95%	Hudbay Minerals	Investor Group	943,396,226	1,135,700,000	0.366	0.011		3.499	0.438	32,482,614,645	2.90%
Stardust (Corporate)	Canada	20-Dec-18	13.8%	Teck Resoiurces	Sun Metals Corp.	13,754,960	2,970,000	1.270		1.680	32.59	2.795	496,258,322	2.77%
Oracle Ridge	USA	30-Apr-21	20%	Eagle Mountain Mining	Vincere Resource Holdings	48,807,360	12,200,000	1.508		0.186	16.268	1.751	2,123,941,274	2.30%
Mina Justa	Peru	23-Apr-18	40%	Inversiones Alxar	Minsur	500,000,000	431,900,000	0.748				0.748	22,584,930,564	2.21%
Quellaveco	Peru	14-Jun-18	21.9%	Mitsibishi Corp.	AngloAmerican plc	2,283,105,023	2,960,100,000	0.460	0.015			0.514	108,666,637,632	2.10%
New York Canyon 2	USA	11-Feb-20	75%	Kennecott Exploration	Emgold Mining	7,634,266	17,370,000	0.410				0.410	404,976,202	1.89%
Rosita	Nicaragua	30-Jul-18	75%	Century Mining	Investor Group	11,333,333	11,853,000	0.483		0.478	8.095	0.867	613,793,722	1.85%
Berta	Chile	19-Feb-19	100%	Santiago Metals	Coro Mining Corp.	8,500,000	29,995,000	0.291				0.289	550,024,800	1.55%
Tatogga (corporate)	Canada	10-Mar-21	85.1%	Newmont Mining	GT Gold Corp.	364,405,163	841,000,000	0.258		0.330	0.711	0.469	35,266,998,411	1.03%
MARA Project	Argentina	23-Sep-22	18.75%	Glencore International	Newmont Corporation	666,133,333	2,107,000,000	0.370		0.150	2.280	0.499	78,985,713,852	0.84%
Black Pine	USA	1-Nov-21	100%	Koba Resources	Jervois Global	1,403,061	800,000	1.823		0.413		2.091	167,202,686	0.84%
Michiquillay	Peru	21-Feb-18	100%	Southern Copper Corp.	Undisclosed	400,000,000	1,150,000,000	0.630				0.630	50,951,723,130	0.79%
Minto	Canada	3-Jun-19	100%	Pembridge Resources	Capstone Mining	20,000,000	23,500,000	1.400		0.540	4.800	1.859	2,557,436,172	0.78%
Chita Valley	Argentina	4-Nov-19	49.91%	South 32 Limited	Minsud Resources	10,666,219	41,610,572	0.430	0.017	0.700	2.170	0.559	1,364,848,046	0.78%
Galore Creek/Copper Canyon	Canada	26-Jul-18	50%	Newmont Mining	Novagold Resources	288,991,284	1,161,300,000	0.475		0.284	4.913	0.699	50,871,390,719	0.57%
Stardust, Lorraine, Okeover 2 (corpora	Canada	30-Nov-20	100%	Northwest Copper	Sun Metals	18,467,064	125,012,000	0.381	0.006	0.095	0.774	0.475	4,558,712,363	0.41%
Stardust, Lorraine, Okeover 1 (corpora	Canada	4-Feb-19	100%	Sun Metals	Lorraine Copper	11,981,659	107,038,580	0.364	0.007	0.078	0.904	0.456	2,963,228,035	0.40%
North Rok	Canada	29-Mar-22	100%	Newmont Mining	QuestEx	21,584,459	142,300,000	0.220		0.260		0.374	5,512,384,706	0.39%
Gaspe	Canada	28-Mar-22	100%	Osisko Metals	Glencore	46,997,364	456,000,000	0.310				0.310	14,471,588,000	0.32%
Carmacks 2 (70%) (corporate)	Canada	31-Aug-20	70%	Granite Creek Copper	Copper North Mining	6,233,210	33,095,000	0.784		0.266	3.009	1.072	2,386,439,883	0.26%
Jasperoide (Corporate)	Peru	26-Aug-19	100%	Carube Copper Corp.	Latin America Res. Group	2,741,170	12,187,270	1.320		0.320		1.601	1,095,439,250	0.25%
Kwanika 2021	Canada	28-Dec-21	31%	NorthWest Copper	POSCO	27,695,246	347,300,000	0.266		0.213	0.874	0.401	13,345,359,811	0.21%
Jasperoid	Peru	15-Jul-21	49%	C3 Metals	Hochschild Mining	3,500,462	12,187,270	1.320		0.320		1.522	1,725,698,000	0.20%
Lorraine	Canada	29-Oct-20	51%	Sun Metals	Teck Resources	2,435,802	35,242,000	0.479		0.197		0.656	1,548,085,900	0.16%
New York Canyon 1	USA	28-May-19	100%	Emgold Mining	Searchlight Resources	599,650	17,370,000	0.410				0.410	423,812,304	0.14%
Carmacks 1 (30%) (corporate)	Canada	21-Nov-19	30%	Granite Creek Copper	Undisclosed	2,645,593	33,095,000	0.784		0.266	3.009	1.028	1,977,569,816	0.13%
Okeover	Canada	14-Jan-22	100%	Alpha Copper Corp.	Northwest Copper Corp.	2,541,869	86,800,000	0.310	0.009			0.356	3,056,113,753	0.08%
Berg	Canada	15-Dec-20	70%	Surge Copper Corp.	Centerra Gold	9,746,895	410,650,000	0.307	0.033		3.096	0.427	13,582,025,814	0.07%
Ann Mason (corporate)	USA	31-Oct-18	86.1%	Hudbay Minerals	Mason Resources	18,794,704	2,033,000,000	0.311	0.006	0.029	0.657	0.361	44,271,300,642	0.04%
Axe	Canada	19-Apr-21	100%	Kodiak Copper Corp.	Orogen Royalties	1,061,570	71,100,000	0.380				0.379	2,540,167,000	0.04%
Copper Creek (corporate)	USA	25-Jun-18	100%	Copperbank Resources	Redhawk Resources	3,103,017	186,980,754	0.770				0.768	10,132,313,434	0.03%
Rosita	Nicaragua	28-Jun-21	17.5%	Mark X Ventures	King Global Ventures	232,793	11,853,195	0.486		0.477	8.087	0.847	942,447,156	0.02%
Escalones	Chile	4-Dec-18	100%	Wealth Copper	TriMetals Mining	4,386,454	760,228,000	0.332	0.007	0.045	0.788	0.396	18,572,886,362	0.02%
Big Onion	Canada	7-Dec-21	100%	Gama Exploration	Blue Lagoon Resources	754,938	126,000,000	0.267	0.009			0.305	3,702,975,759	0.02%
Mocoa	Colombia	9-May-18	100%	Libero Copper	B2Gold	4,096,327	636,000,000	0.328	0.036			0.466	20,332,276,164	0.02%
				All transactions	Average	164,506,585	444,878,218	0.602	0.014	0.349	5.363	0.778	15,863,694,695	0.76%
					Median	10,666,219	107,038,580	0.410	0.009	0.266	3.009	0.499	3,056,113,753	0.39%
					Std Dev	428,172,157	704,204,717	0.422	0.011	0.349	7.825	0.596	24,701,646,527	0.87%
					CV	260%	158%	70%	76%	100%	146%	77%	156%	115%
				Highest to 14th highest MTR	Average	377,081,353	626,142,755	0.746	0.014	0.560	8.802	0.994	24,086,935,676	1.62%
					Median	34,403,680	35,802,786	0.472	0.015	0.446	4.150	0.595	2,340,688,723	1.70%
					Std Dev	626,453,445	929,134,896	0.523	0.003	0.487	10.812	0.788	34,355,298,633	0.78%
					CV	166%	148%	70%	20%	87%	123%	79%	143%	48%
				15th to 26th highest MTR	Average	36,156,080	206,843,927	0.593	0.007	0.230	2.247	0.750	8,406,642,399	0.29%
					Median	9,107,435	71,140,290	0.442	0.007	0.263	1.957	0.566	2,674,833,959	0.26%
					Std Dev	80,806,722	332,363,976	0.383	0.001	0.085	1.681	0.452	14,153,937,112	0.13%
					CV	223%	161%	65%	11%	37%	75%	60%	168%	46%
				27th to 35th highest MTR	Average	4,968,730	480,290,217	0.388	0.017	0.184	3.157	0.478	13,014,722,898	0.04%
					Median	3,103,017	186,980,754	0.328	0.009	0.045	1.942	0.396	10,132,313,434	0.03%
					Std Dev	5,915,130	639,494,386	0.156	0.014	0.254	3.472	0.193	13,744,918,287	0.02%
					CV	119%	133%	40%	85%	138%	110%	40%	106%	58%

Recommended Range of MTR Values

Highest MTR Grouping **1.0% to 2.0%**

Table 30-5 lists details for four transactions on producing copper-dominant properties. Comments on the MTR values are:

- MTR values range from 1.80% to 4.62%, with mean and median values of 2.99% and 2.78%, respectively, and a CV of 39%.
- There do not appear to be any outlier MTR values.

Considering the average and median values and its overall range, SLR recommends an MTR range of 2.0% to 4.0% be used for the copper-dominant MTR range.

Table 31-5: Comparable Transactions Analysis - Producing Copper Properties in South America
AGC Acquisition Company Limited – Santa Rita Mine

Property	Location	Transaction Date	Equity Earned	Buyer	Seller	Deal Value 100% Basis (US$)	TOTAL RESERVES & RESOURCES					CuEq Grade (%)	Total In Situ $ Content (US$)	MTR
							Tonnes	Cu Grade (%)	Mo Grade (%)	Au Grade (g/t)	Ag Grade (g/t)			
Sierra Gorda	Chile	14-Oct-21	45%	South 32 Limited	Sumitomo	3,444,444,444	1,786,374,000	0.397	0.019	0.057		0.428	$74,583,027,392	4.62%
Quebrada Blanca	Chile	4-Dec-18	30%	Sumitomo	Teck Resources	4,000,000,000	4,740,340,000	0.399	0.017			0.479	$141,052,496,920	2.84%
Chapada	Brazil	15-Apr-19	100%	Lundin Mining	Yamana Gold	816,326,531	1,403,607,000	0.213		0.192		0.332	$30,034,578,496	2.72%
Red Chris	Canada	3-Oct-19	70%	Newcrest Mining	Imperial Metals	1,148,571,429	1,821,800,000	0.320		0.340	1.090	0.622	$63,893,440,876	1.80%
				All transactions	Average	2,352,335,601	2,438,030,250	0.332	0.018	0.196	1.090	0.465	77,390,885,921	2.99%
					Median	2,296,507,937	1,804,087,000	0.359	0.018	0.192	1.090	0.453	69,238,234,134	2.78%
					Std Dev	1,603,732,287	1,546,507,596	0.088	0.001	0.142		0.121	46,495,468,095	1.18%
					CV	68%	63%	0.264	0.079	0.721		0.260	60%	39%

Recommended Range of MTR Values **2.0% to 4.0%**

For the copper-dominant transactions used as a proxy for nickel-dominant transactions, the recommended MTR range of 2.0% to 4.0% for the producing properties is a factor of two higher than the recommended MTR range of 1.0% to 2.0% for the non-producing properties. Applying this factor to the recommended MTR range of 0.9% to 1.8% for the non-producing nickel-dominant transactions results in a recommended MTR range of 1.8% to 3.6% for producing nickel-dominant properties such as the Santa Rita open pit.

Table 31-6 shows the derivation of the in situ dollar content of the Santa Rita Mineral Resources, which totals US$5,152 million for open pit resources and US$45,298 million for the underground resources. Table 31-6 also includes the derivation of the in situ dollar content of the Palestina Exploration Target which totals US$1,113 million. The target is expressed as a range of tonnage and grade of which the mid-point is used.

Table 31-6: In situ Dollar Content of the Santa Rita Mineral Resources
ACG Acquisition Company Limited – Santa Rita Mine

Area	Metal	Grade	Contained Metal	Unit Price (US$) [1]	In Situ $ Content
Santa Rita Open Pit - all Mineral Resources Inclusive of Mineral Reserves	Ni (%, tonnes)	0.33	141,267	29,886	4,221,898,585
	Cu (%, tonnes)	0.12	51,299	8,365	429,100,445
	Co (%, tonnes)	0.01	4,229	51,514	217,838,434
	Pd (g/t, oz)	0.03	43,781	1,788	78,280,582
	Pt (g/t, oz)	0.06	90,442	1,065	96,320,459
	Au (g/t, oz)	0.04	59,703	1,816	108,399,596
Total					**5,151,838,100**
Santa Rita Underground - all Mineral Resources Inclusive of Mineral Reserves	Ni (%, tonnes)	0.60	1,270,524	29,886	37,970,889,342
	Cu (%, tonnes)	0.17	411,956	8,365	3,445,916,458
	Co (%, tonnes)	0.01	30,893	51,514	1,591,438,139
	Pd (g/t, oz)	0.05	346,438	1,788	619,430,474
	Pt (g/t, oz)	0.10	757,763	1,065	807,018,044
	Au (g/t, oz)	0.06	475,915	1,816	864,089,844
Total					**45,298,782,302**
Palestina - Mid-point of Exploration Target Range of Tonnes and Grade	Ni (%, tonnes)	0.260	32,500	29,886	971,295,000
	Cu (%, tonnes)	0.066	8,250	8,365	69,009,270
	Co (%, tonnes)	0.0113	1,413	51,514	72,763,525

Area	Metal	Grade	Contained Metal	Unit Price (US$) [1]	In Situ $ Content
Total					1,113,067,795

Notes:

1. Metal prices as per the Valuation Date.

Table 31-7 shows the application of the recommended MTR ranges to the Santa Rita in situ dollar content, 1.8% to 3.6% for open pit (producing) and 0.9% to 1.8% for underground (non-producing). The total value range for open pit and underground is US$500 million to US$1,001 million. Table 31-7 also shows the application of an MTR range for non-producing properties to the Palestina Exploration Target. A range of 0.45% to 0.9% has been used, which is 50% of the recommended range for resources, because the target is not currently a Mineral Resource.

Table 31-7: Santa Rita Valuation by Comparable Transactions Analysis
ACG Acquisition Company Limited – Santa Rita Mine

Item	In Situ $ Content	Range of MTR Values		Range of Values (US$M)	
		Low End	High End	Low End	High End
Santa Rita Open Pit Resources	5,151,838,100	1.80%	3.60%	93	185
Santa Rita Underground Resources	45,298,782,302	0.90%	1.80%	408	815
Santa Rita Mine Total				**500**	**1,001**
Palestina Exploration Target	1,113,067,795	0.45%	0.90%	5	10

In section 10.6, it is noted that the Santa Rita deposit is open at depth down plunge from the underground Mineral Resource block model and that there is potential for additional mineral resources and for more value to be added at Santa Rita in future.

31.2.3 Market Approach - Exploration Properties Without Resources

Several groupings of Exploration Permits are held as the Exploration Portion of the Santa Rita Property. SLR has used Comparable Transactions Analysis to value these exploration properties. From information in the CPR, it is apparent that the properties are at various stages of exploration for sulphide Ni-Cu-Co PGM deposits similar to that at the Santa Rita Mine. For valuation purposes, SLR reviewed information in the CPR to infer exploration potential on each of the property groupings as to high, moderate, or low.

SLR searched for sulphide Ni-Cu-Co PGM exploration properties without Mineral Resources or Mineral Reserves in South America on which transactions have taken place within a reasonable time period of the Valuation Date but was unable to identify any. SLR instead used, as a proxy, transactions on copper-dominated mineral properties without Mineral Resources or Mineral Reserves in South America. The following criteria were used:

- Transactions on properties without Mineral Resources being explored for copper and copper-gold.
- Transactions with dates from 2018 to 2022 inclusive for the December 31, 2022 Valuation Date.
- Market transacted properties were identified in Chile, Argentina, Peru, Ecuador, and Brasil.

- Transactions selected were all arm's length, to the best of SLR's knowledge.

The terms of each transaction, as disclosed in press releases and other publicly available company information, were analysed to derive a value for each transacted property. If the deal was for less than a 100% interest, the value was adjusted to a 100% interest. If shares were used as firm commitments, SLR used the closing share price on the date of the announcement of the transaction. Some of the transactions were option deals, for which Option Agreement Transactions Analysis was used to derive a property value.

Details of 31 transacted copper and copper-dominant properties are listed in Table 31-8 as of the date of the announcement of the transaction. A property value was derived for each transaction and divided by the property size to obtain a dollar per hectare ($/ha) value. The $/ha values were further analysed to derive a range to apply to the areas of the exploration properties that are part of the Exploration Portion of the Santa Rita Property. Considerations in choosing an appropriate range of MTR values to apply to the subject property included:

- Examining mean and median values as well as the overall range of values.
- Considering the variability of values as measured by the coefficient of variation (CV), which is the standard deviation divided by the average.
- Eliminating outliers at the high and/or low end of the value range.
- Considering which properties are more similar to the subject property.
- Rounding derived values appropriately.

In Table 31-8, SLR notes the following in its analysis of the $/ha values:

- $/ha values range from $54 to $16,154, with mean and median values of $2,166 and $732, respectively, with a CV of 158%.
- SLR notes that, in general, larger properties tend to have lower values per hectare and smaller properties tend to have higher values per hectare.
- It is apparent that the four smallest properties, less than 600 ha, have much higher $/ha values than the other properties and are not considered further in this analysis.
- Because of the above-noted property size effect, the properties were divided into three groups: 600 ha to 1,500 ha, 1,500 ha to 8,000 ha, and larger than 8,000 ha.
- Within each of these groups, some apparent outliers were identified and not included in further analysis. These are the highest and lowest $/ha values in the 1,500 ha to 8,000 ha group and the two lowest $/ha values in the larger than 8,000 ha group.
- Each of the three size groups was further subdivided into three groups, assumed to represent properties with high, moderate, and low exploration potential.
- For the 600 ha to 1,500 ha group, the highest three $/ha values have average and median values of $2,814 and $2,481 respectively, with a CV of 29%. The middle two $/ha values have average and median values both of $1,333 and a CV of 22%. The lowest four $/ha values have average and median values of $768 and $779, respectively, and a CV of 15%.
- For 1,500 ha to 8,000 ha group, the highest three $/ha values have average and median values of $2,186 and $2,478 respectively, with a CV of 32%. The middle three $/ha values have average and median values of $571 and $565, respectively, and a CV of 22%. The lowest two $/ha values have average and median values both of $314 and CV of 2%.
- The properties larger than 8,000 ha are not subdivided and have average and median values of $200 and $186, respectively, and a CV of 16%.

Considering the average and median values of each group and its overall range, SLR recommends $/ha ranges for the various property size groups and assumed exploration potential as follow:

Recommended range of $/ha values for properties 600 ha to 1,500 ha

High exploration potential	$2,000 to $3,000
Moderate exploration potential	$1,000 to $2,000
Low exploration potential	$500 to $1,000

Recommended range of $/ha values for properties 1,500 ha to 8,000 ha

High exploration potential	$1,500 to $3,000
Moderate exploration potential	$400 to $800
Low exploration potential	$200 to $400

Recommended range of $/ha values for properties larger than 8,000 ha

Moderate exploration potential	$150 to $300

Table 31-8 Comparable Transactions on Copper Properties in South America without Resources
ACG Acquisition Company Limited – Santa Rita Mine

Property	Location	Transaction Date	Equity Earned	Buyer	Seller	Area (ha)	Deal Value 100% Basis	Value US$/ha
Sierra Miranda	Chile	3-Aug-18	100	Coro Mining	Capex S.A.	379	6,122,449	16,154
Esperenza	Argentina	26-Jan-21	80	Libero Copper & Gold	Latin Metals	462	3,984,286	8,624
Lana Corina	Chile	21-Mar-22	80	Culpeo Minerals	SCM Antares	550	4,400,000	8,000
Sombrero	Peru	19-Dec-18	80	Auryn Resources	Corporacion Aceros Arequipa	520	2,628,750	5,055
Margarita & Cotatuda	Chile	8-Mar-21	100	Torq Resources	Undisclosed	1,045	3,904,040	3,736
Sarita Este	Argentina	3-Dec-19	51	Golden Minerals	Cascadero Copper	830	2,058,824	2,481
Cristal 2	Chile	4-Dec-18	70	Wealth Minerals	New Energy Metals	900	2,001,809	2,224
Mollecruz	Peru	250Jun-18	100	Auryn Resources	Undisclosed	1,000	1,537,688	1,538
Cristal 1	Chile	1-Mar-18	100	Darien Res. Dev. Corp.	Undisclosed	900	1,016,162	1,129
Llanos & Mercedes	Chile	14-May-19	100	Coro Mining	Undisclosed	667	593,434	890
10 Mining Concessions	Peru	1-Apr-18	100	Chakana Copper	Private Vendor	631	520,408	825
El Palmar	Ecuador	12-Aug-20	100	Sunstone Metals	Undisclosed	800	585,859	732
Porphyritic Copper Project	Peru	29-Apr-19	100	Fidelity Minerals Corp.	Undisclosed	1,200	750,163	625
Tarqui	Ecuador	19-Mar-19	70	BHP Group	Luminex Resources	4,817	22,942,857	4,763
Arikepay	Chile	16-Oct-21	70	Gold Fields	Candente Copper	1,800	4,864,706	2,703
Valeriano	Chile	23-Sep-19	100	ATEX Resources	Investoir Group	3,705	9,182,076	2,478
Planalto	Brazil	5-Nov-18	49	Capstone Mining	Lara Exploration	4,726	6,510,204	1,378
Nord	Chile	31-Oct-19	100	Encantada SpA	Mirasol Resources	1,967	1,372,449	698
Tamarugo	Chile	3-Jul-19	51	Solaris Resources	Freeport-McMoran	5,100	2,882,353	565
Don Enrique	Peru	28-Feb-22	100	EV Resources	Private Vendor	1,800	808,081	449
Panteria	Peru	23-Nov-21	100	Gold Stare Resources	Peruvian Metals	2,000	635,151	318
El Camino II	Argentina	27-May-22	100	NOA Lithium Brines	Aldebaran Resources	2,750	853,535	310
Resguardo	Chile	29-Jun-22	100	Alturas Minerals	Minera Resguardo	3,891	497,462	128
Mogote	Argentina	11-May-22	85	Syndicate Minerals	Golden Arrow Resources	8,000	1,935,928	242
San Martin	Peru	30-Nov-20	51	JOGMEC	Hannan Metals	32,900	7,843,137	238
Cerro Blanco & Morros Blancos	Chile	14-Apr-21	80	Austral Gold	Pampa Metals	13,800	2,635,714	191
San Pietro	Chile	17-Mar-22	100	Golden Exploration	Sumitomo Metal Mining	18,448	3,356,000	182
Arcas	Chile	11-Sep-19	75	Rio Tinto Mining	Aethon Minerals	51,600	8,993,197	174
Caballos	Argentina	9-Mar-21	70	Hanaq Argentina	Golden Arrow Resources	12,000	2,042,857	170
Santa Gracia	Chile	6-Jan-21	90	Stuve Gold	Undisclosed	11,500	1,083,333	94
La Poncha	Argentina	22-Mar-21	100	Sable Resources	Undisclosed	18,114	971,717	54
				All transactions	Average	6,736	3,532,730	2,166
					Median	1,967	2,042,857	732
					Std Dev	11,058	4,399,832	3,416
					CV	164%	125%	158%
				Properties 600 ha to 1,500 ha	Average	925	2,654,891	2,814
				Fifth to 7th highest $/ha	Median	900	2,058,824	2,481
					Std Dev	110	1,082,170	809
					CV	12%	41%	29%
				Properties 600 ha to 1,500 ha	Average	950	1,276,925	1,333
				Eighth to 9th highest $/ha	Median	950	1,276,925	1,333
					Std Dev	71	368,775	289
					CV	7%	29%	22%
				Properties 600 ha to 1,500 ha	Average	824	612,466	768
				Tenth to 13th highest $/ha	Median	734	589,647	779
					Std Dev	261	97,477	115
					CV	32%	16%	15%
				Properties 1,500 ha to 8,000 ha	Average	3,410	6,852,329	2,186
				Fifteenth to 17th highest $/ha	Median	3,705	6,510,204	2,478
					Std Dev	1,485	2,178,924	709
					CV	44%	32%	32%
				Properties 1,500 ha to 8,000 ha	Average	2,956	1,687,628	571
				Eighteenth to 20th highest $/ha	Median	1,967	1,372,449	565
					Std Dev	1,859	1,072,452	124
					CV	63%	64%	22%
				Properties 1,500 ha to 8,000 ha	Average	2,375	744,343	314
				Twenty-first to 22nd highest $/ha	Median	2,375	744,343	314
					Std Dev	530	154,421	5
					CV	22%	21%	2%
				Properties larger than 8,000 ha	Average	20,795	3,607,735	168
					Median	15,957	2,339,286	178
					Std Dev	14,563	3,082,555	65
					CV	70%	85%	39%
				Properties larger than 8,000 ha without 2 lowest $/ha	Average	22,791	4,467,806	200
					Median	16,124	2,995,857	186
					Std Dev	16,535	3,122,675	32
					CV	73%	70%	16%

Racommended Range of $/ha Values - Properties 600 ha to 1,500 ha

High Exploration Potential	**$2,000 to $3,000**
Moderate Exploration Potential	**$1,000 to $2,000**
Low Exploration Potential	**$500 to $1,000**

Racommended Range of $/ha Values - Properties 1,500 ha to 8,000 ha

High Exploration Potential	**$1,500 to $3,000**
Moderate Exploration Potential	**$400 to $800**
Low Exploration Potential	**$200 to $400**

Racommended Range of $/ha Values - Properties Larger than 8,000 ha

Moderate Exploration Potential	**$150 to $300**

Table 31-9 shows the application of these $/ha ranges to the Santa Rita exploration properties outside of the Santa Rita Mining Concession where the operations and infrastructure are located.

Table 31-9: Valuation of Santa Rita Exploration Properties
ACG Acquisition Company Limited – Santa Rita Mine

Property Name	Stage	Area (ha)	Exploration Potential	Recommended $/ha Range		Property Value Range (US$M)	
				Low End	High End	Low End	High End
Santa Rita-Formiga	Exploration Permit	1,524	High	1,500	3,000	2,285,955	4,571,910
Palestina	Exploration Permit	7,611	High	1,500	3,000	11,416,200	22,832,400
Santa Maria	Exploration Permit	5,009	High	1,500	3,000	7,513,500	15,027,000
Machadinho	Exploration Permit	9,164	Moderate	150	300	1,374,635	2,749,269
Aiquira	Exploration Permit	1,421	High	2,000	3,000	2,841,140	4,261,710
Ibitupa	Exploration Permit	1,903	Moderate	400	800	761,388	1,522,776
Pronto Novo	Exploration Permit	2,000	Moderate	400	800	799,992	1,599,984
Ibicui	Exploration Permit	1,967	Moderate	400	800	786,692	1,573,384
Regional	Exploration Permit	4,687	Moderate	400	800	1,874,820	3,749,640
Total		**35,286**				**29,654,322**	**57,888,073**
Total, rounded						**30,000,000**	**58,000,000**

31.3 Valuation Summary

SLR has valued the Santa Rita Mine Portion using two methods: DCF Analysis and Comparable Transactions Analysis. In Table 31-10, weightings are applied to the values derived by each method to derive a Market Value for the Santa Rita Mine Portion. The weightings are based on SLR's view on the confidence that can be placed in each method. For the open pit, the NPV is weighted 80% and the Comparables range 20% because the mine has an operating history and a reliable cash flow forecast. The NPV of the potential underground mine, on the other hand, has no operating history and is based on a PEA with a substantial portion of Inferred Resources used in the DCF model, so is weighted equally with the Comparables range. The Market Value of the Santa Rita Mine Portion is in the range of $876 million to $1,099 million. To this range is added the value of the Palestina Exploration Target and the other exploration properties to derive a total Santa Rita Market Value Range of S911 million to $1,167 million with a mid-point of $1,039 million as of the Valuation Date of December 31, 2022.

Table 31-10: Valuation Summary of the Santa Rita Property
ACG Acquisition Company Limited – Santa Rita Mine

Area	NPV (US$M)	Weight	Comps Analysis Range (US$M)		Weight	Weighted Value Range (US$M)		
			Low	High		Low	High	Mid-Point
Santa Rita Open Pit	546	80%	93	185	20%	455	474	465
Santa Rita Underground	434	50%	408	815	50%	421	625	523
Santa Rita Mine Total	**980**		**500**	**1,001**		**876**	**1,099**	**988**
Palestina Exploration Target			5	10	100%	5	10	8

Area	NPV (US$M)	Weight	Comps Analysis Range (US$M)		Weight	Weighted Value Range (US$M)		
			Low	High		Low	High	Mid-Point
Santa Rita Exploration			**30**	**58**	**100%**	**30**	**58**	**44**
Total Santa Rita	**980**		**535**	**1,069**		**911**	**1,167**	**1,039**

31.4 Key Assumptions, Risks, and Limitations

For the purposes of this valuation, SLR has made a number of additional assumptions and estimates.

- SLR has relied on technical information in the CPR, including that supporting the DCF analysis.
- SLR has relied upon the list of exploration properties listed in the CPR.
- SLR has used information in the public domain and in the proprietary S&P Global Market Intelligence (S&P) database that SLR subscribes to.
- For this valuation, SLR has assumed that the properties outside of the Mining Concession could be explored and that any economic deposits delineated on them could be permitted for development.

Highest and Best Use (HBU) is a valuation concept that would produce the highest value for an asset. The HBU must be physically possible, financially feasible, legally allowed, and result in the highest value (International Valuation Standards 140). For this valuation, SLR has considered only the value of mineral rights or subsurface rights that adhere to the mineral claims and has not considered other possible uses or values such as surface rights, water rights, timber rights, and the like that may also be vested in the Property or parts of the Property.

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