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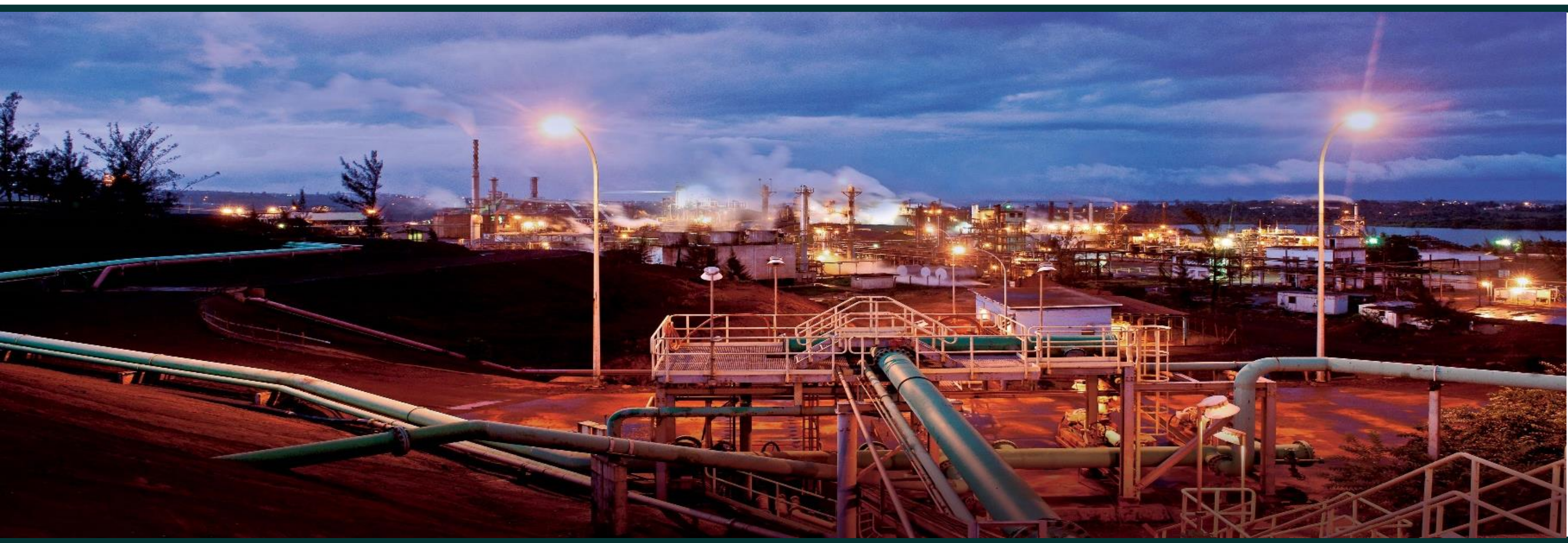

NI 43-101 Technical Report for the Mineral Resource and Mineral Reserve Estimate on the Moa Project, Province of Holguin, Cuba.

Effective Date: 31st August 2022
Report Date: 31st March 2023

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1.0 SUMMARY

1.1 INTRODUCTION

Micon International Co Limited (Micon) was contracted by Sherritt International Corporation (Sherritt) to prepare a NI 43-101 Technical Report (the Report) on the Mineral Resource and Mineral Reserve estimates of the Moa Joint Venture Project (Moa Project or the Project) located in the Province of Holguin, Cuba.

The Report was prepared to support disclosure of Mineral Resource and Mineral Reserve estimates in Sherritt's 2022 Annual Information Form.

Mineral Resources and Mineral Reserves are reported in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (May 2014; the 2014 CIM Definition Standards) and were prepared using the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (November 2019; 2019 CIM Guidelines).

The Moa Project is a producing nickel and cobalt operation that mines and processes nickel laterite deposits for refining into finished nickel and cobalt in Canada.

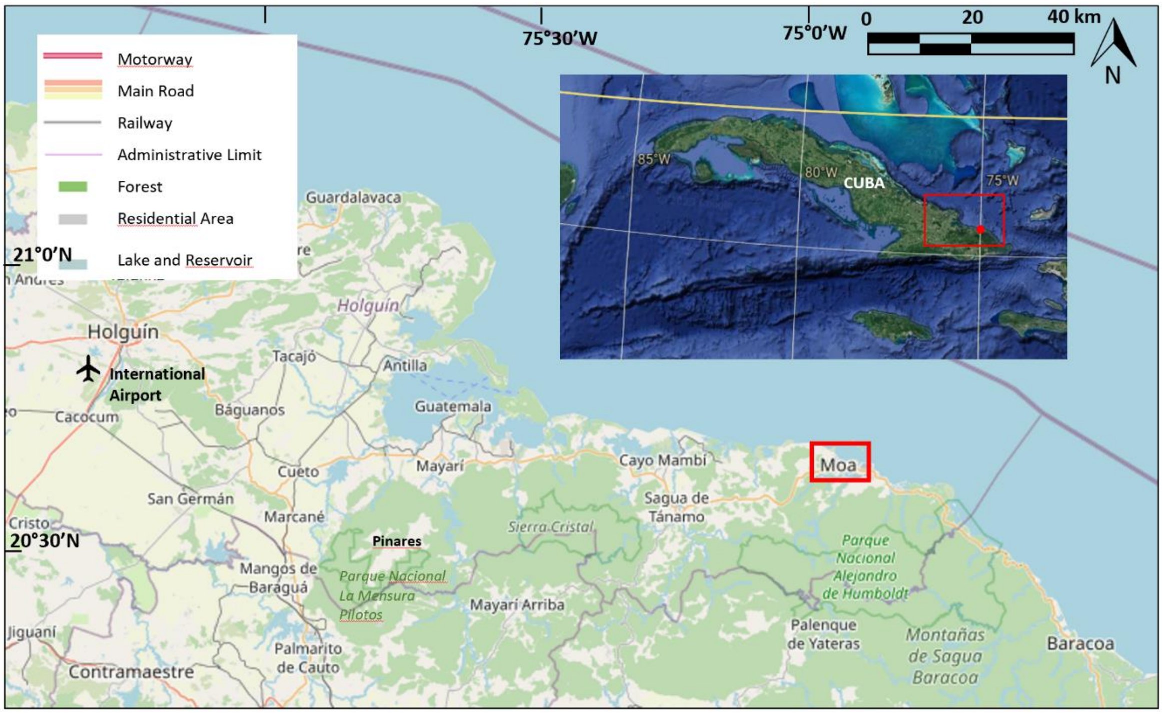
Sherritt and General Nickel Company S.A. (GNC), a Cuban State company, are equal (50:50) partners in the Moa Joint Venture (Moa JV) that is the operator of the Moa Project. The Moa JV was formed on 1st December 1994. The Moa JV comprises three companies:

- Moa Nickel S.A. (Moa Nickel) – owns and operates the Moa Project, mining and processing facilities;
- The Cobalt Refinery Company Inc. (CRC) – owns and operates the Fort Saskatchewan, Alberta metals refinery; and,
- International Cobalt Company Inc. (ICCI) – located in Nassau, Bahamas, acquires mixed sulphides from Moa Nickel and other third-party feeds, contracts with CRC for the refining of such purchased materials and then markets finished nickel and cobalt.

1.2 PROPERTY DESCRIPTION AND LOCATION

The Moa nickel laterite deposits are located south, west and southeast of the city of Moa in the Province of Holguin in north-eastern Cuba (Figure 1.1) the Pedro Sotto Alba processing plant (PSA Plant) operated by Moa Nickel lies on the southern edge of the residential area of the city of Moa.

Figure 1.1: Location of the Moa Project



Source: Micon (2023)

1.3 OWNERSHIP

The Moa Project consists of a total of 11 nickel laterite deposits, one calcium carbonate deposit, one serpentine quarry and 14 mining concessions that are held in the name of Moa Nickel. Historically, Moa Nickel has had the right to mine the limonite, along with normal mining dilution at the top and bottom of the limonite horizon. Since 2013, Moa Nickel also has the right to explore and mine saprolite underlying the limonite in some of the deposits.

Moa Nickel was granted mining rights on 1st December 1994. Mining operations commenced the same year.

The Moa Project surface rights are sufficient for mining and processing operations.

The Moa JV pays the Cuban state a royalty and territorial contribution calculated on the basis of 5% and 1% of the net sales value (free on board Moa port, Cuba) of its production of nickel and cobalt contained in mixed sulphides.

An annual canon of US$2.00, US$5.00 or US$10.00 for each hectare (ha) of each concession is payable depending on whether the area is a prospecting, exploration, or exploitation area.

1.4 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

The city of Moa lies along the paved highway that connects the provincial capital of Holguin to the smaller cities of Cueto, Mayari, Nicaro and Sagua de Tanamo.

The city of Holguin is about 190 km to the west, a driving time of about 2.5 to 3.0 hours. The nearest large international airports are at Holguin to the west, and at Santiago de Cuba on the south coast.

A well-developed network of secondary paved roads and dirt roads provides access from the plant site to the operating mining areas of Moa Occidental and Moa Oriental that lie south of the city and the plant site. Dirt roads provide access from Moa Oriental into the Camarioca concessions. The La Delta, Cantarrana, and Santa Teresita concessions that collectively host the “Satellite deposits” are accessible by dirt roads and forestry roads connected to the paved highway that links the cities of Moa and Baracoa. The Playa La Vaca area can be accessed directly from paved and dirt roads connected to the Holguin-Moa paved highway and to the city of Moa.

The Moa region has a tropical humid climate, with average daily high temperatures around 28°C in summer and average daily lows around 21°C in the winter. Monthly rainfall is consistently above 100 mm with peak rainfall months in October to December. Mining operations are conducted year-round.

Moa Nickel’s main facilities, the site of the processing plant and the offices for technical and administrative work, are easily accessible from the city of Moa, with many workers commuting to the plant using local buses.

The water supplies for Moa and the PSA Plant are drawn from one water bore at Veguita, near the PSA Plant, and from the Nuevo Mundo reservoir on the Moa River.

The city of Moa and the PSA Plant are served by the national electric power grid, and grid powerlines cross the mine site. The nearest power plant is at Felton, some 85 km west of Moa.

The deposits lie on the undulating north slope of the Cuchillas del Moa, an east-west trending range of forested mountains with a total relief of approximately 1,175 m.

The world’s first high pressure acid leach (HPAL) process plant was constructed in Moa in 1961 and is still operating. The Cuban Government’s state mining company was the sole operator, with technical assistance from the Soviet Union, until the early 1990s.

1.5 GEOLOGY AND MINERALISATION

The nickel laterites of the Moa Project are examples of the oxide type of nickel laterites.

Nickel laterites on the Moa Nickel properties are formed above the Moa-Baracoa ophiolite massif, composed of partially serpentinised harzburgites and lesser dunites. The Moa-Baracoa massif, together with the adjoining Mayarí-Cristal ophiolite, is the most extensive complex in the belt of ultramafic rocks of an ophiolite belt that crops out discontinuously for more than 1,000 km along the northern margin of Cuba.

The laterite profile overlying the bedrock is composed of four principal horizons. From bottom to top, these are: (1) serpentinised peridotite, (2) saprolite, (3) limonite and (4) ferricrete.

The saprolite zone at Moa Oriental is poorly developed relative to the overlying limonite, but is more commonly seen in the Camarioca deposits. The boundary between the saprolite zone and the peridotite substrate (the “weathering front”) is extremely irregular.

The saprolite zone passes upwards in the weathering profile to a limonite zone, which is dominated mineralogically by goethite and hematite. Two subzones are defined: a lower limonite with faint remnants of a primary structure ("*ochre estructural*" or structured limonite) and an upper limonite in which the structure is collapsed ("*ochre inestructural*" or massive limonite). Structured limonite is the largest and most important zone in terms of nickel and cobalt content. Nickel grades range from 1 Ni% to 1.5 Ni% in the limonite zone, with approximately 0.1 Co% to 0.15 Co%.

Ferricrete overlies the entire profile.

1.6 EXPLORATION

Exploration activities, other than drilling and exploration pitting to collect density samples, have included topographic surveys, drone surveys, hydrogeological studies, geological mapping and geophysical surveys using ground penetrating radar (GPR).

Topographic surveys were completed in different campaigns to locate exploration drill hole collars. Topographic surveys were completed using digital total stations and were connected to geodesic points surveyed and monitored by the Instituto Cubano de Geodesia y Cartografía.

Surveying with drones was trialled successfully in Camarioca Norte, Zona A and Transfer Zone Sur Pilar in order to delineate stockpiles, in December 2022.

In 2022, a detailed GPR survey was completed at Playa La Vaca-Zona Septentrional where 60 km of east-west parallel lines 25 m apart were run. The GPR survey was used to predict a high-resolution surface contact between the laterites and the bedrock, and the contact between the limonite and saprolite, along GPR lines.

1.7 DRILLING

Exploration drilling on the property has comprised ordinary drill holes (predominantly auger), mineralogical drill holes, and basement drill holes. There are also exploration pits, which are the only source of density samples used to estimate Mineral Resources. The exploration database contains 52,640 drill holes for 509,707 m drilled up to end of 31st December 2022.

Over 90% of the drill holes used for resource estimation are post-1995 Moa JV drill holes. Various drilling programmes from 2005 through to 2008 were carried out by Moa Nickel's contractor, Empresa Geominera Oriente of Santiago de Cuba (Geominera) using a Russian built truck-mounted 135 mm diameter spiral auger drill. A hollow core auger was also used in order to penetrate bedrock in regions where mapping of the bedrock geology had been recommended. In 2008, Moa Nickel acquired its own Canadian-built rotary-head M5Xd drilling machine mounted on a Japanese-built carrier for use in the large development drilling programs on Camarioca Norte and Sur. These were capable of drilling auger, hollow auger and diamond core holes.

All concessions have been drilled using regular spaced squared grids at varying densities, and generally aligned with an east-west axis. Drill hole grid spacing starts with a 300 m grid that is subsequently infilled to 100 m and 33.3 m (or 100/3 m) grid spacings. A final infill drill hole grid with a 16.6 m spacing (or 100/6 m) spacing is sometimes completed before mining and is commonly named the "mining grid".

In most areas, the historical drill holes are drilled based on a 100 m grid, dating from the 1970s; for example, in Camarioca Sur this historical drilling represents 11% of the total number of drill holes. Drill holes from the 1970s in general tend to be longer because they were intended to evaluate both the limonite and the highly saprolitic material.

Most of the remaining drill holes contained in the databases up to the end of December 2022, are post-1995 Moa JV ordinary drill holes. These drill holes tend to terminate within the first few metres of the saprolite, or when hard rock is intersected. Moa JV also drills a small percentage of "basement drill holes" to complete a characterisation of the lower horizons of the lateritic profile and of the basement.

A new rig capable of drilling both auger and core holes is expected to be delivered to the site in 2023. The new machine is also mounted on a Morooka Carrier and will provide the possibility of drilling 130 mm diameter auger holes and 96 mm diameter HQ3 diamond core holes. This will allow drill holes to reach greater depths as the machine can switch to core drilling upon reaching the basement/fresh rock.

Exploration pits were dug with 1.5 m x 1.5 m squared sides and variable depths, but generally cut almost the entire lateritic section. Exploration pits were placed 0.5 m from ordinary drill holes. Samples were extracted from four vertical channels in the walls without altering the volume of the material in its natural state, wrapped in plastic, and sent to Geominera Oriente's Elio Trincado Laboratory (DELABEL) in Santiago de Cuba for density measurements. The bulk density is determined by dividing the wet weight by the volume. The volume is determined by taking the difference between the wet sample weight and the weight of the wet sample, wrapped in thin plastic, and suspended in water.

1.8 SAMPLE PREPARATION, ANALYSES AND SECURITY

The assay grades used for resource estimation are from samples collected in historical drilling campaigns of the 1970s and up to 1995, and samples collected from Moa Nickel campaigns during various periods from 1995 to 2018. The main operator of these campaigns was Geominera, the main drilling contractor in eastern Cuba, and most assays have been completed at DELABEL. Nickel and cobalt assays were completed using atomic absorption spectroscopy (AAS) from 1975; iron was also assayed using this technique from 1977. Before 1975, assays of nickel and cobalt were completed using ultraviolet–visible spectrophotometry. In 1996, inductively coupled plasma optical emission spectroscopy (ICP-OES) assays were introduced in the main Cuban laboratories for completing assays for Fe, Ni, Co, Si, Al, Mg, Cr and Mn in nickel laterites, including DELABEL, Laboratorio Central de Minerales "José Isaac del Corral" (LACEMI) located in Havana, and Centro de Investigaciones para la Industria Minero Metalúrgica (CIPIMM), also in Havana. The LACEMI laboratory currently holds NC ISO/IEC 17025:2006 certification. The accreditation state of CIPIMM is not known.

The DELABEL laboratory is not considered independent of the Moa JV and the Moa Project. It currently holds 17025 accreditations for selected analytical techniques.

Drilling samples are collected directly from the auger after removing the contamination from the walls and placed in a plastic bag, logged, tagged and sealed. The samples are split with a quartering tool and two opposite quarters are placed in a metallic tray, along with the corresponding sample tag, and then dried in electric ovens at 105°C for 24 to 48 hours. Dried samples are crushed and then split with a rotary splitter. The crushed samples are pulverised with a disk mill to 200 mesh and split with a riffle splitter to obtain a sample of approximately 100 g. The 100 g pulp samples are placed in paper bags in batches into cardboard boxes and sent for assay at DELABEL.

At the laboratory, chemical analyses for regular samples are completed for Al_2O_3, SiO_2, MgO, Cr_2O_3, MnO, NiO, CoO, CaO, Fe_2O_3, and loss on ignition (LOI) by sodium carbonate fusion followed by inductively coupled plasma atomic emission spectroscopy (ICP-AES). Iron is also assayed volumetrically by titration with potassium dichromate.

Current quality assurance and quality control (QAQC) comprises internal pulp duplicates that are sent in each 100-sample batch to the primary laboratory, and external pulp duplicates sent to an external laboratory. Moa Nickel has no other QAQC sample protocol in place; no blanks or standards (certified reference materials) are inserted into the sample batch prior to delivery to the laboratory.

The Qualified Person is of the opinion that the QAQC protocols currently in place could be improved to include more robust procedures. This would improve confidence in future data collection used for upgrading resources. However, the work completed to date does demonstrate repeatable results through various laboratories so although the QAQC procedures are not robust, the samples are appropriate for Mineral Resource estimation.

1.9 DATA VERIFICATION

A site visit was conducted in February 2023 by Ms. Beatrice Foret, and Mr. Bryce Reid. During that visit, inspections of the sample preparation facility, assay laboratory, two slurry preparation plants (SPPs) and the HPAL plant, tailings storage facility (TSF), and Zona Septentrional open pit were conducted. Observation of on-going drilling, sample collection and drilling was also completed.

The relevant Qualified Persons have reviewed the sample collection and analysis methodologies and are of the opinion that those methodologies are within current industry standards and the resulting data can be used in Mineral Resource and Mineral Reserve estimates.

The mine design and production scheduling utilise the 2022 Mineral Resource Models prepared for all the concessions as described in this NI 43-101 to report tonnage and qualities.

As the Moa Project is currently in production, the mine operating costs and sustaining capital expenditures used for the completion of this report were based on actual historical cost data, provided by Sherritt and Moa Nickel. Unit costs used in the estimation of future mine capital expenditures associated with road construction, new mine infrastructure and mine fleet expansion were based on actual offers from contractors and suppliers in Cuba, provided by Sherritt and Moa Nickel.

The relevant QPs have reviewed all the inputs for performing the Life-of Mine (LoM) Schedule and Economic Analysis and are of the opinion that this data is reasonable to estimate and report Mineral Reserves for the Moa Project.

1.10 MINERAL PROCESSING AND METALLURGICAL TESTING

A batch testwork programme was completed in 2021 in which approximately 2 t of ore (wet basis) was collected from various ore deposits and shipped to Fort Saskatchewan for the economic cut-off grade (ECOG) Project. Altogether 491 drill core samples were collected from 40 drill holes. The individual composites (39 composite samples) as well as the limonite/saprolite blend mixtures were tested in pressure leach tests and leach residue settling tests.

The LoM plan includes economic factors and blending criteria based on the testwork and on observational studies of the operation. These studies will improve ore selectivity to target economic material only, and improve control of the plant feed blend.

The recoveries achieved by the PSA Plant, which produces the mixed sulphide intermediate product, and the refinery in Fort Saskatchewan, which produces nickel and cobalt metal products from the mixed sulphide intermediate, are provided in Table 1.1.

Table 1.1: Metal Recoveries from 2020 to 2022

Parameter	2020	2021	2022	3 Year Average
Nickel Recovery				
From Slurry Prep Plant to Mixed Sulphide (%)	87.9	87.7	85.0	86.7
From Mixed Sulphide to Metal (%)	98.0	98.3	98.4	98.3
Overall (%)	86.1	86.2	83.5	85.2
Cobalt Recovery				
From Slurry Prep Plant to Mixed Sulphide (%)	89.8	89.5	90.1	92.1
From Mixed Sulphide to Metal (%)	91.1	93.0	90.1	91.4
Overall (%)	81.9	83.2	81.2	84.2

Nickel and cobalt recovery estimates for the LoM are based on operational correlations derived from historical PSA Plant data from 2018 to 2022. The components of these correlations include: nickel and cobalt extractions in HPAL, ore type (composition of the ore), wash ratio in the counter-current decantation (CCD) wash circuit, and number of CCD stages.

The magnesium content of the ore is a key parameter influencing and limiting HPAL operations. Magnesium primarily influences acid consumption and the consumption of neutralising reagents. The aluminium content of the ore is also a key parameter influencing the acid consumption. It is important to note that while this is only half the effect of magnesium, there is typically twice as much aluminium (about 4 wt%) as magnesium (0.4 wt% to 2 wt%).

The PSA Plant data, as well as data from the ECOG batch test programme, have also shown that the settling properties of both the ore and the leach residue deteriorate with increasing silicon content in the ore.

Additional continuous testwork is planned in 2023 to study the deposits and ore types in the next ten years of the LoM plan. These data will be used to further optimise ore selection and the feed blending strategy.

1.11 MINERAL RESOURCE ESTIMATES

Mineral Resources were estimated for 11 deposits on the Moa Project, using all the drill hole data available up to December 2018 (47,655 drill holes for 462,863 m). Between 2019 and 2022, 4,549 holes have been drilled, mainly infill drilling for exploitation (16 m by 16 m grid) or drilled to support upgrade of Indicated Mineral Resources to Measured Resources (33 m by 33 m or 35 m by 35 m grid). The data from 2022 was not ready and validated to be used in a resource estimation and the drill holes from 2019 to 2021 were not used to update the resource models. Given the drilling grids were all less than 40 m spacing threshold to classify Measured Mineral Resources, the impact of not incorporating this new drilling in the estimation is expected to be insignificant.

Topography surfaces were provided as pointsets and triangulated meshes with different file formats. The resolution of topographic surfaces varies from one area to another, and there is no high-resolution topography surface covering the entire Moa Project. Surfaces of mining areas do not include any in-pit material and there is no way to accurately determine the volume of in-pit waste dumps with the information available.

Two main domains were defined to interpolate grade variables; limonite and saprolite. The interpolation was completed in block models with blocks with a horizontal section of 8.33 m by 8.33 m, and 12.5 m by 12.5 m. Blocks 3 m high were created for Moa Oriental, Camarioca Norte, and Zona A, to maintain the block definition in areas with active mining; blocks 2 m high were used in the other concessions.

Density values were assigned as the average of the density values measured from the exploration pits. Different average density values were assigned to saprolites, limonite, and the limonite with ferricrete and pisolite.

Nickel, iron, cobalt, magnesium, aluminium, manganese, silica and chromium were interpolated in the block models, for separate domains of the limonite and saprolite, using ordinary kriging.

The Mineral Resources were depleted with the mining surface with an effective date of 31st August 2022.

Mineral Resourced were classified using the 2014 CIM Definition Standards, with confidence classifications based on the confidence, quality and quantity of the informing data, the confidence in the geological interpretation of the deposit and the “reasonable prospects for economic extraction” of these resources.

Mineral Resources in areas with a drill hole spacing of 40 m or less were classified as Measured Resources, as this level of drilling provides high confidence in the geology and grade continuity. The category of Indicated Mineral Resources was assigned to blocks supported by drill holes with spacings between 40 m and 80 m. This level of drilling provides adequate data to have moderate to high confidence in the deposit geology and grades. Inferred Mineral Resources were informed by drill holes with spacings of 80 m to 120 m.

The Mineral Resources were estimated using an ECOG formula, with a selection of the potentially economic blocks completed on a block-by-block basis. To define the cut-off grade, a methodology was used based on a net value calculation. This methodology considers both the positive economic contribution of nickel and cobalt grades, as well as the additional cost associated with magnesium and aluminium grades and impacts of ore quality on plant recovery. The net value formula is:

Net Value = Revenue from Ni + Revenue from Co – Costs > 0.

Even though the Moa deposits are shallow and are not highly sensitive to optimisation, it is recommended to use resource optimised pit shells to report Mineral Resources in the future, instead of a block-by-block ECOG. This ensures alignment with the current industry practices of using a pit shell to address the regulatory requirement that resources should have “reasonable prospects for eventual economic extraction”.

Some blocks which return a net value with the current ECOG formula have not been included in the Mineral Resources and/or Mineral Reserves estimates, as they are considered encumbered by other constraints such as buffer zones around water courses or infrastructure, steep slopes that could present mining difficulties, and blocks that have iron grades below 25 Fe%, and/or very low nickel grades, below 0.7 Ni%.

The Mineral Resources for the Moa Project per the Metallurgical category of magnesium with an effective date of 31st August 2022 are presented in Table 1.2. Mineral Resources are reported by magnesium categories: as the magnesium content of the ore is a key parameter influencing and limiting HPAL operations, this element is used in the LoM plan to define the ore bins and for summarising the blending criteria.

Table 1.2: Mineral Resource Statement for the Moa Project (per Metallurgical Category - Magnesium) effective date as at 31st August 2022

Category	Tonnage (Mt)	Grade						Contained Metal	
		Ni (%)	Co (%)	Fe (%)	Mg (%)	Al (%)	SiO_2 (%)	Ni (kt)	Co (kt)
Magnesium (0 Mg% - 3 Mg%)									
Measured	91.28	1.07	0.13	46.6	1.12	5.28	5.28	977.0	121.6
Indicated	36.68	1.01	0.12	43.9	1.22	5.06	7.98	369.0	44.3
Measured + Indicated	**127.96**	**1.05**	**0.13**	**45.8**	**1.15**	**5.22**	**6.05**	**1346.0**	**165.9**
Inferred	32.2	1.0	0.1	43.8	1.4	5.2	7.5	314.5	39.3
Magnesium (>=3 Mg%)									
Measured	6.83	1.12	0.11	39.6	3.83	4.29	13.05	76.6	7.7
Indicated	21.74	1.17	0.09	31.4	6.51	3.83	21.45	254.6	18.6
Measured + Indicated	**28.57**	**1.16**	**0.09**	**33.4**	**5.87**	**3.94**	**19.44**	**331.2**	**26.3**
Inferred	10.0	1.1	0.1	35.6	5.0	4.3	17.1	104.8	9.9
All Magnesium Categories									
Measured	98.11	1.07	0.13	46.1	1.31	5.21	38.36	1053.7	129.2
Indicated	58.43	1.07	0.11	39.3	3.19	4.60	54.09	623.6	62.9
Measured + Indicated	**156.54**	**1.07**	**0.12**	**43.6**	**2.01**	**4.98**	**48.10**	**1677.2**	**192.1**
Inferred	42.2	1.0	0.1	41.9	2.3	5.0	47.2	419.3	49.2

Notes:

1. Mineral Resources are reported in situ, with an effective date of 31st August 2022, using the 2014 CIM Definition Standards.
2. The Qualified Person for the estimate is Ms Beatrice Foret, MAusIMM (CP), a Micon employee.
3. Mineral Resources are reported inclusive of those Mineral Resources converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
4. Mineral Resources are reported on a 100% basis. Sherritt and GNC are equal (50:50) partners in the Moa JV Moa Project.
5. The reporting cut-off is calculated as a Net Value = Revenue from Ni + Revenue from Co – Cost >0, and Ni>=0.7% and Fe>=25%. The costs are equal to the sum of mining costs, processing costs and nickel selling cost of US$2.00/lb, including Moa port and loading, freight and insurance, CRC refining and royalties. The processing cost has a fixed component of US$69.76/t and a variable cost related to Fe, Mg and Al content. Revenue was calculated at the market price of US$9.7/lb for nickel and US$28.1/lb for cobalt, with nickel and cobalt Mixed Sulphide Product to Product recovery of 98.2% and 92%, respectively. SPP to MSP nickel and cobalt recovery is variable and depends on iron content. The cut-off grade for the estimated Mineral Resource is based on similar mining operations in other countries and reasonable assumptions on mining and processing.
6. No stockpiled material is included in the Mineral Resources.
7. The block model grades were estimated using the ordinary kriging method.
8. The Mineral Resources volumes and tonnages have been rounded to reflect the accuracy of the estimate, and numbers may not add up due to rounding.

As of the Report Effective Date, the Qualified Person responsible for the Mineral Resources estimate, Beatrice Foret, is not aware of any known current environmental, permitting, legal, title, taxation, socio-economic, marketing or political factors that might materially affect these Mineral Resource estimates that are not discussed in this Report. However, these factors could impact the Mineral Resources and if any such risk materialise the affected areas must be re-evaluated to confirm changes in the Mineral Resources.

1.12 MINERAL RESERVE ESTIMATES

Resource block models were used to estimate Mineral Reserves. Pit optimisation software was used to generate an optimised reserve pit shell for each of the deposits prior to building of the LoM plan. Inferred Mineral Resources were set to waste. An optimal reserve pit shell was selected for each deposit.

Mineral Reserves were modified to include mining losses (15%) and dilution (5%). In addition, power line corridors were excluded, and a few isolated areas were excluded; and blocks with missing deleterious elements were classified as Probable Mineral Reserves.

Pit slopes are vertical and the pits are very shallow. No geotechnical design considerations were used in constraining the Mineral Reserve estimate.

No hydrological design considerations were used in constraining the Mineral Reserve estimate.

Process blending criteria factoring in key aspects like acid consumption, silicon content, and nickel to cobalt ratio were developed for the operation.

Blending bins were defined using nickel and magnesium:

- Nickel (low grade 0.7 Ni% to 1 Ni%, high grade >=1 Ni%), and,
- Magnesium (three ranges: 0 Mg% to 1 Mg%, 1 Mg% to 3 Mg%, 3 Mg% to 4 Mg%).

The Mineral Reserves are summarised and reported in Table 1.3.

Micon is not aware of any known environmental, permitting, legal, title, taxation, socio-economic, marketing, and political or other factors that pose a risk of materially affecting the Mineral Reserve estimates, this is a well-established operating mine. However, these factors could impact the economic mineability of the Mineral Reserves and if any such risk materialise the affected areas must be re-evaluated to confirm changes in the Mineral Reserves.

Table 1.3: Moa Project Mineral Reserves as at 31st August 2022

Category	Tonnage (Mt)	Grades						Contained Metal	
		Ni (%)	Co (%)	Fe (%)	Mg (%)	Al (%)	SiO_2 (%)	Ni (kt)	Co (kt)
Magnesium 0-3 Mg %									
Proven	79.41	1.02	0.13	45.12	1.08	5.23	5.10	806.3	100.3
Probable	30.45	0.97	0.12	43.58	1.22	5.13	7.79	295.6	35.6
Proven + Probable	**109.86**	**1.00**	**0.12**	**44.70**	**1.12**	**5.20**	**5.85**	**1,101.9**	**136.0**
Magnesium ≥3 Mg %									
Proven	4.08	1.11	0.11	39.57	3.47	4.38	12.23	45.4	4.6
Probable	3.24	1.08	0.11	37.73	3.50	4.57	14.87	35.0	3.4
Proven + Probable	**7.32**	**1.10**	**0.11**	**38.76**	**3.48**	**4.46**	**13.40**	**80.5**	**8.0**
All Magnesium Categories									
Proven	83.49	1.02	0.13	44.85	1.20	5.19	5.45	851.8	104.9
Probable	33.69	0.98	0.12	43.02	1.44	5.08	8.47	330.6	39.1
Proven + Probable	**117.18**	**1.01**	**0.12**	**44.33**	**1.27**	**5.16**	**6.32**	**1182.4**	**144.0**

Notes:

1. Mineral Reserves are reported with an effective date of 31 August 2022, using the 2014 CIM Definition Standards.
2. The Qualified Person for the estimate is Michiel Breed, a Micon employee.
3. Mineral Reserves are reported on a 100% basis. Sherritt and GNC are equal (50:50) partners in the Moa JV Moa Project.
4. The reporting cut-off is calculated as a Net Value = Revenue from Ni + Revenue from Co – Cost >0, and Ni>=0.7% and Fe>=25%. The costs are equal to the sum of mining costs, processing costs and nickel selling cost of US$2.00/lb, including Moa port and loading, freight and insurance, CRC refining and royalties. The processing cost has a fixed component of US$69.76/t and a variable cost related to Fe, Mg and Al content. Revenue was calculated at the market price of US$7.1/lb for nickel and US$21.3/lb for cobalt, with nickel and cobalt Mixed Sulphide Product to Product recovery of 98.2% and 92%, respectively. SPP to MSP nickel and cobalt recovery is variable and depends on iron content. Mineral Reserves include a 15% allocation for ore loss and a 5% dilution factor.
5. An additional process blending criteria of Mg<4% was used to define the Mineral Reserves.
6. The Mineral Reserves volume and tonnage have been rounded to reflect the accuracy of the estimate, and numbers may not add up due to rounding.

1.13 MINING METHODS

Ore is extracted using conventional open cut mining techniques using hydraulic excavators and articulated haul trucks as primary mining equipment. Due to the shallow nature of the orebodies and the composition of the limonite, there is no requirement for blasting on site.

Once the topsoil and vegetation has been stripped the exposed overburden or waste material is mined in benches of 2 m or 3 m high. This material is transported using articulated haul trucks to mined out areas as backfill or to the nearest designated waste dump site outside of the mining area.

Ore mining is completed in the same way maintaining ore terraces to the full depth of the targeted ore. The plant feed is selected based on fixed cut-off grades for nickel and iron and the ore is hauled to the SPP where it is dumped over a set of grizzly bars for further processing or to designated stockpiles at the SPP or designated areas closer to the mining areas. If direct dumping on the grizzly is not available, the feed can be dumped in an open area close to the SPP so that rehandling equipment can access it when material is required. The stockpiles are currently designed to store ore for the wet season when some concessions are less accessible.

With the application of the ECOG methodology, and the implementation of the new blending and stockpiling strategy, the material will be stockpiled and blended using six Mg/Ni bins at the required ratios to meet the defined blending criteria.

The operation will be transitioning to this new stockpiling strategy in 2023 (preparation) and 2024 (trial implementation).

Waste or overburden material is hauled to defined locations outside of each orebody. The distance to haul is reduced as much as practicable to lower operational costs and reduce tyre wear. When the waste dumps have been completed, they are dozed down to allow reclamation.

The production schedule is based on 4.6 Mt/a run of mine (RoM) feed to the PSA Plant; the estimated LoM is 26 years. Further to this a constant feed rate to the plant is required by maintaining a stockpile level around 350,000 t.

The aim is to mine at a constant volume as far as possible, this will reduce the need to adjust the mining rates and associated mining fleet provided to produce the required tonnes. This will reduce any fluctuations in production costs per tonne mined.

The average life of mine stripping ratio is 0.4 (t_{waste}:t_{ore}). A mixed fleet of trucks and excavators is employed, comprising several hydraulic excavators (up to 7 m^3 bucket capacity) and a large fleet of articulated haul trucks (ranging from 39-t to 55-t payload) to move all of the ore and waste material. The fleet size is considered to be sufficient for the first fourteen years of the LoM, and there is a capital budgeted for fleet expansion when the Satellites Deposits come into production, based on a fleet calculation study.

1.14 RECOVERY METHODS

The Moa JV includes unit operations, located adjacent to the mine site at Moa, that produce a mixed sulphide intermediate product. The mixed sulphide intermediate is then transported to the Moa JV refinery in Fort Saskatchewan where refined nickel and cobalt metal is produced.

At the Moa Project, the main unit operations include slurry preparation, high pressure acid leach, counter-current decantation wash circuit, neutralisation and sulphide precipitation. The main unit operations at the refinery in Fort Saskatchewan include an oxidising leach, a nickel-cobalt separation step, purification circuits and finally nickel and cobalt hydrogen reduction to produce metal products.

1.15 PROJECT INFRASTRUCTURE

Mine infrastructure includes paved roads, haulage roads and exploration roads, mine workshops, mining camps, an “old” slurry preparation plant (OSPP), a new slurry preparation plant (NSPP) that is under construction, waste dumps, stockpiles proximal to mining faces and a RoM stockpile close to the SPP, sedimentation ponds, power, gas and water supply, and slurry pipelines.

Steam required by the PSA Plant is supplied by fuel oil fired boilers and sulphuric acid plants. The majority of power for the plant is generated by steam driven turbine generators within the plant’s powerhouse. However, the plant is also connected to the National Grid through a 110 kV substation. Approximately 6 MW is imported from the National Grid. Water supply for the plant comes from a man-made reservoir which is supplied by the Moa River. The reservoir is adjacent to the plant. The processing plant requires fuel oil, liquefied petroleum gas (LPG) and diesel. The fuel oil is delivered to site via a pipeline which is owned and operated by a third party. The diesel fuel is delivered to the plant site and mine on a daily basis.

Historically tailings were stored in the Acid Leach Tailings Facility (ALTF), which is now closed. Tailings are currently stored in the North Extension Tailings Facility (NETF). Water is recovered from tailings and recycled for use in the plant. The NETF is predicted to be full by the end of 2023 at which point tailings will be sent to the Area 22 Phase 3 TSF that is currently under construction, is due for completion prior to 2024, and is anticipated to have capacity to receive tailings until mid-way through 2026. After this date, all tailings is expected to be sent to the Moa West TSF, which is in the pre-feasibility study phase. Moa West is expected to provide tailings storage capacity beyond the current Moa Project LoM. There is a risk that Moa West may not be developed in time to provide tailings storage continuity after Area 22 Phase 3 is filled to capacity. The Moa JV management team are aware of and are monitoring this risk. If Moa West cannot be developed on time, other interim storage options near the existing ALTF, NETF and Area 22 Phase 3 would be considered.

The port facilities are located approximately 5 km from the PSA Plant and access is by paved road. The port handles the bulk input commodities, mixed sulphide product, spare parts, and capital assets purchased abroad required for the operations.

1.16 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

Mineral Resources and Mineral Reserves are located at the Moa Project site and are a part of the Moa JV. For the purposes of demonstrating sustainability and corporate social responsibility, the Moa JV and Moa Nickel rely on Sherritt, Moa JV and Moa Nickel-level policies, management systems, and standards. Sherritt publicly discloses information on behalf of these entities in its financial reporting, as well as Sherritt's and Moa JV's sustainability and corporate social responsibility commitments and updates are publicly disclosed on an annual basis.

Environmental studies were performed in the development stage of the mine. No significant environmental constraints that materially affect mine development or permitting requirements were identified. All relevant environmental factors and management considerations were incorporated into the Operating Licence of the mine by local regulatory authorities.

All costs related to progressive reclamation, final closure, and post-closure monitoring requirements have been identified and included in the economic models. All costs related to on-going monitoring and compliance with requirements set out in the various permits issued have been accounted for.

All environmental laws and regulations applicable to the local jurisdiction where the Moa Nickel site operates have been identified. The Moa Nickel site is in material compliance with all local laws and regulations. All costs related to permitting and, where applicable, monitoring and compliance activities have been identified and included in the economic models for the Project.

A social impact assessment was completed at the early development stage and applicable requirements have been incorporated into Moa Nickel's operating licence. No restrictions have been placed on the mine design or operation as a result of social factors, cultural, Indigenous, or archaeological issues or agreements.

Sherritt and Moa Nickel maintain active engagement with local stakeholders for the betterment of the operations, employees, and the communities in which they operate. Sherritt and Moa Nickel are firmly committed to providing a safe and respectful work environment and to upholding human rights throughout their supply chain.

1.17 CAPITAL AND OPERATING COSTS

Estimates of the capital and operating costs used in the economic assessment of the Moa Project are expressed in first quarter 2023 United States dollars, without provision for escalation. Where appropriate the exchange rate of US$0.76/CAD has been applied, being the average rate over the period 2019-2021 on which historical unit costs are based.

1.17.1 Capital Expenditure

Table 1.4 summarises the estimated LoM capital expenditures for the Moa Project.

Table 1.4: Capital Expenditure Summary

Item	Annual Avg. Yrs 1-5 (US$'000)	Annual Avg. Yrs 6-20 (US$'000)	Annual Avg. LoM (US$'000)	LoM Total (US$'000)
Mining	17,305	18,826	18,534	481,879
Slurry Preparation	3,126	228	785	20,420
Processing Plant	21,619	13,143	14,773	384,101
Infrastructure and TSF	18,253	2,943	5,887	153,072
Sub-Total Moa Project Capital	**60,303**	**35,141**	**39,980**	**1,039,472**
CRC Capital	16,441	10,830	11,952	298,805
Grand Total Capital	**76,744**	**45,455**	**51,472**	**1,338,277**
Mine Closure and Rehabilitation	6,100	4,198	4,563	118,648

In addition to ongoing sustaining capital expenditure, the mining forecast makes provision for new haul road and drainage construction, periodic mining fleet replacement and expansion to meet demands of the mining schedule. The Moa Project slurry preparation and processing plant capital in Yrs 1-5 includes a NSPP and an intensive programme of refurbishment or replacement for the PSA Plant. The Moa Project's infrastructural capital in Yrs 1-5 includes Area 22 TSF expansion and construction of the new Moa West TSF.

At the CRC refinery in Fort Saskatchewan, average annual capital expenditures for Yrs 1-5 are notably higher than the LoM average due to the construction of a new ammonium sulphate handling facility, in addition to a refurbishment programme for the process plant, equipment and buildings.

Overall, average annual capital expenditures for Yrs 1-5 are also notably higher than the LoM average as they include capital deferred in prior years as a result of the low commodity price environment.

1.17.2 Operating Costs

Table 1.5 summarises the LoM cash operating costs for the Moa Project.

Table 1.5: LoM Cash Operating Costs

Parameters	LoM Total (US$'000)	Treated (US$/t)	Nickel (US$/lb)
Mining Costs	1,013,553	8.65	0.64
Processing Costs	5,694,540	48.60	3.57
Refining Costs	3,408,605	29.09	2.14
Sub-Total Cash Operating Costs	**10,116,698**	**86.33**	**6.34**
Cobalt Credits	(3,630,763)	(30.98)	(2.28)
Other Net By-Product Credits	(200,906)	(1.71)	(0.13)
Selling Expenses	272,207	2.32	0.17
General & Administrative Costs	197,014	1.68	0.12
Royalty and Territorial Contribution	640,026	5.46	0.40
Total Cash Cost	**7,394,275**	**63.10**	**4.64**

Operating cost estimates in the base case reflect actual unit costs averaged over the period 2019-2021 applied to the volumes of material moved and processed in each forecast period of the LoM. Mining costs reflect the mostly owner-operated fleet, with ore mining costs adjusted as appropriate to account for the length of haul to the closest SPP.

Annual costs for transport and refining of mixed sulphide precipitates at the CRC refinery in Fort Saskatchewan are shown exclusive of G&A costs at the refinery, and exclusive of net of credits for sales of by-product ammonium sulphate fertilizer, both of which are included separately in total cash costs.

1.18 ECONOMIC ANALYSIS

1.18.1 Base Case

The results of the economic analyses discussed in this section represent forward-looking information as defined under Canadian securities law. 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. Please see Section 22.0 for a description of those risks.

The economic assessment excludes Sherritt's 100% owned fertilizer business, potential third-party feed opportunities at CRC, and the expected impact of the Moa JV expansion programme noted in Section 1.19.

The objective of the study was to determine the viability of the proposed LoM production plan and schedule at the base case market prices for nickel and cobalt. The sensitivity of the base case Net Present Value (NPV) to changes in level of revenue drivers, operating costs, capital expenditure and discount rate is examined, and the impact of changes in specific assumptions regarding the prices of nickel, cobalt, sulphur, diesel and fuel oil are identified in an alternative scenario.

The base case analysis was based on forecast reference prices of US$15,700/t (US$7.12/lb) for nickel and US$47,000/t (US$21.32/lb) for cobalt. More detail on the long-term average price rationale is provided in Section 14.11.1 of this Report.

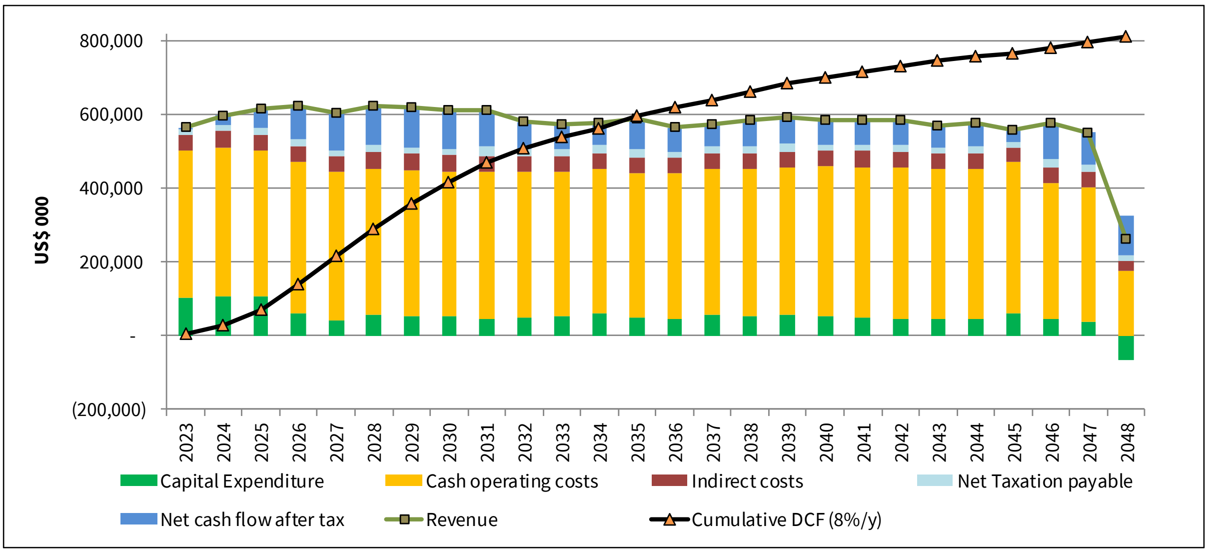
Table 1.6 summarises the LoM cash flows for the base case, and Figure 1.2 presents the annual cash flows graphically. Details of the annual cash flows are given in Section 22.0.

Table 1.6: LoM Cash Flow Summary – Base Case

Parameter	LoM Total (US$'000)	Processed (US$/t)	Nickel (US$/lb)
Gross Revenue (Nickel)	**11,132,570**	**95.00**	**6.98***
Mining Costs	1,013,553	8.65	0.64
Processing Costs	5,694,540	48.60	3.57
Refining	3,408,605	29.09	2.14
Sub-Total Cash Operating Costs	**10,116,698**	**86.33**	**6.34**
Cobalt Credits	(3,630,763)	(30.98)	(2.28)
Other Net By-Product Credits	(200,906)	(1.71)	(0.13)
Selling Expenses	272,207	2.32	0.17
General & Administrative Costs	197,014	1.68	0.12
Royalty & Territorial Contribution	640,026	5.46	0.40
Total Cash Cost	**7,394,275**	**63.10**	**4.64**
Net Cash Operating Margin	**3,738,295**	**31.90**	**2.34**
Sustaining Capital	1,338,277	11.42	0.84
Closure Provision	118,648	1.01	0.07
Change in Working Capital	(86,456)	(0.74)	(0.05)
Net Cash Flow before Tax	**2,367,826**	**20.21**	**1.48**
Taxation	481,038	4.11	0.30
Net Cash Flow after Tax	**1,866,788**	**16.10**	**1.18**

*Note: A reference price of US$7.12/lb Ni is used in the evaluation.
The realised value for the Moa Project is US$6.98/lb Ni.

Figure 1.2: LoM Annual Cash Flows



Source: Micon (2023)

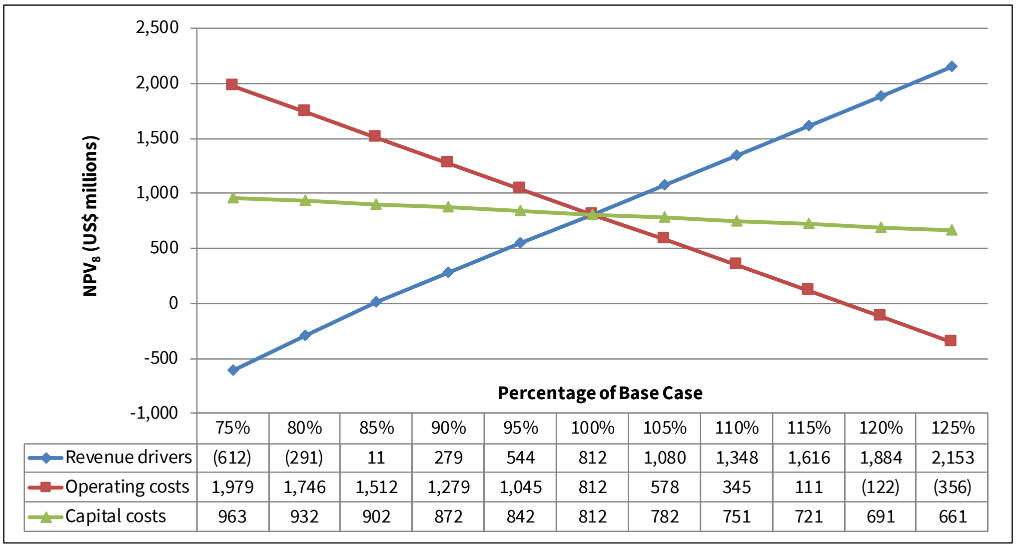
The Moa Project NPV in the base case was calculated using an 8% discount rate. This was considered appropriate for the economic assessment as the Moa Project is a well-established mine and refinery operating in the base metal sector of the industry.

Pre-tax cash flow, when discounted at the rate of 8% per year, provides a pre-tax NPV_8 of US$1,026 million. After-tax, NPV_8 is US$812 million. As an ongoing operation, there is no initial investment (negative cash flow) that would allow an internal rate of return (IRR) or pay-back period to be calculated. The Moa Project is forecast to generate an average operating margin of 25% over the LoM period, measured against total sales of nickel, cobalt and other by-products, or an average operating margin of 34% over the LoM period, measured against only total sales of nickel.

1.18.2 Base Case Sensitivity

Figure 1.3 shows the sensitivity of NPV_8 to changes in metal price, operating costs and capital investment for a range of 25% above and below the base case values.

Figure 1.3: Sensitivity of Base Case NPV_8 to Capital, Operating Costs and Metal Prices



	75%	80%	85%	90%	95%	100%	105%	110%	115%	120%	125%
◆ Revenue drivers	(612)	(291)	11	279	544	812	1,080	1,348	1,616	1,884	2,153
■ Operating costs	1,979	1,746	1,512	1,279	1,045	812	578	345	111	(122)	(356)
▲ Capital costs	963	932	902	872	842	812	782	751	721	691	661

Source: Micon (2023)

NPV_8 is most sensitive to revenue factors: with a 15% reduction in metal prices (i.e., a reduction to approximately US$6.05/lb Ni and US$18.12/lb Co), NPV_8 falls close to zero. The Moa Project is slightly less sensitive to changes in operating costs, with an increase of 17% reducing NPV_8 to near-zero. The least sensitive parameter tested is capital costs, with a 25% increase in capital costs reducing NPV_8 by about 19% to US$661 million.

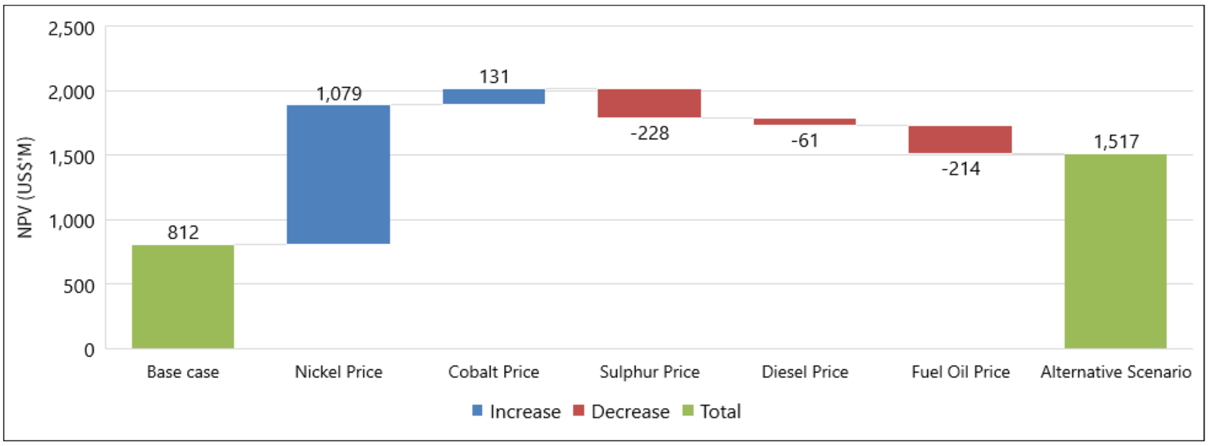
1.18.3 Alternative Scenario

An alternative scenario was developed to investigate the impact of changing specific assumptions regarding the prices of nickel, cobalt, sulphur, diesel and fuel oil, based on recent analyst commodity price forecasts, as shown as shown in Table 1.7. Figure 1.4 summarises the results of that scenario.

Table 1.7: Alternative Scenario Variables

Value Driver	Units	Base Case Price	Alternative Scenario Price
Nickel Reference Price	US$/lb	7.12	9.00
Cobalt Reference Price	US$/lb	21.32	23.50
Sulphur Delivered Price	US$/t	161	230
Diesel Delivered Price	US$/l	0.64	1.00
Fuel Oil Delivered Price	US$/t	320	500

Figure 1.4: Cumulative Impact of Key Value Drivers on NPV$_8$ (Waterfall Chart)



Source: Micon (2023)
Note: NPV figures are rounded to nearest US$1 million and may not sum to total.

The alternative scenario demonstrates significant upside to the Moa Project, yielding NPV$_8$ of US$1,517 million, an increase of US$705 million over the base case.

The LoM Project summary is presented in Table 1.8.

Table 1.8: LoM Project Summary

Parameter	Units	Base Case Value	Alternative Scenario
Proven and Probable Reserve	kt	117,180	same
	Ni %	1.01	same
	Co %	0.12	same
	Mg %	1.27	same
	Al %	5.16	same
	Fe %	44.33	same
LoM Waste to be Mined	kt	47,381	same
Stripping Ratio	W:O	0.40	same
Nominal Ore Mining and Processing Rate	kt/a	4,600	same
LoM Period	Years	26	same
Refined Nickel Production	t	723,552	same
Refined Cobalt Production	t	84,679	same
Nickel Reference Price	US$/lb	7.12	9.00
Cobalt Reference Price	US$/lb	21.32	23.50
Gross Revenue - Nickel	US$ million	11,133	14,069
Gross Revenue - Cobalt	US$ million	3,631	4,002
Royalties & Territorial Contribution Payable	US$ million	640	790
Nickel Revenue per tonne Processed	US$/t	95.00	120.07
Operating Cost avg. (after cobalt credits)	US$/t	63.10	73.73
Net Operating Margin	US$/t	31.90	46.34
Net Operating Margin (EBITDA)	US$ million	3,738	5,429
LoM Capital Expenditures (excl. Working Cap.)	US$ million	1,457	same
LoM Undiscounted Cash Flow Before Tax	US$ million	2,368	4,078
Taxation Payable	US$ million	481	679
LoM Undiscounted Cash Flow After Tax	US$ million	1,887	3,399
NPV After Tax at 6% discount	US$ million	971	1,798
NPV After Tax at 8% discount (Base Case)	US$ million	812	1,517
NPV After Tax at 10% discount	US$ million	690	1,303

1.19 OTHER RELEVANT DATA AND INFORMATION

1.19.1 Moa JV Expansion Programme

In 2021, the Moa JV embarked on a low capital intensity expansion programme to capitalise on the growing demand for high purity nickel and cobalt being driven by the accelerated adoption of electric vehicles (EV). The scope of the expansion programme was narrowed during 2022 to better reflect the evolving intermediate market for nickel and cobalt and to focus on the most critical components of growth in light of supply chain challenges and inflationary price pressures on capital. The current programme is aimed at increasing annual mixed sulphide precipitate (MSP) production by 20% or 6,500 t of contained nickel and cobalt (100% basis).

The expansion programme consists of two phases with phase one focused on the construction of the NSPP at the Moa Project, and phase two focused on the expansion of the PSA Plant including the leach plant sixth train and fifth sulphide precipitation train as well as construction of additional acid storage capacity at the Moa Project. The total capital cost is expected to be US$77.0 million (100% basis) or approximately US$13,200 per additional annual tonne of contained nickel for the full expansion. Growth spending on capital for the expansion programme is expected to be self-funded by the Moa JV primarily using operating cash flows.

The economic analysis for the Moa Project already includes the remaining capital for the construction of the NSPP and the related ore haulage distance and mining fleet benefits; however, does not include any of the incremental MSP production associated with that phase. Therefore, Sherritt estimates US$50 million of additional capital would be required within the Moa Project to complete the expansion programme and realise the increased annual production of MSP by 6,500 t of nickel and cobalt and associated economic benefits. On the assumption that the Moa Project could simply accelerate the mining sequence in order to meet this expected increased production, the LoM would likely be reduced by three to five years, resulting in a LoM of approximately 21 to 23 years. This increased production would shorten the LoM, but would be expected to accelerate the cashflows and improve the NPV of the Moa Project.

1.19.2 Reporting under Cuban Regulation

The 2022 Mineral Resource Estimate (MRE) was presented to the Oficina Nacional de Recursos Minerales (ONRM) in November 2022 and summarised in a Mineral Resource Alignment Technical Report. The report was well received, and a list of agreements were reviewed and accepted by the ONRM in November 2022.

Considering the positive outcome of the November 2022 meetings, as of the Date of this Report, the assumption is made that the ECOG methodology will be approved by the ONRM and that the material defined as Mineral Resources, can be mined and considered Mineral Reserves under the Cuban jurisdiction, after application of adequate modifying factors. The official approval from the ONRM is expected in 2023.

1.20 INTERPRETATIONS AND CONCLUSIONS

Nickel laterites in the Moa Project area are formed on top of the Moa-Baracoa ophiolite massif, and are composed of partially serpentinised harzburgites (an olivine + orthopyroxene and +/- chromite rock) and lesser dunites. The laterite profile overlying the bedrock consists of four principal horizons. From bottom to top these are: (1) serpentinised peridotite, (2) saprolite, (3) limonite and (4) ferricrete.

The exploration, drilling and sampling work metallurgical testwork together with more than two decades of operational experience, permit the estimation of Mineral Resources and Mineral Reserves.

With a production schedule of 4.6 Mt/a RoM feed to the processing plant and maintaining a constant volume mined, the estimated LoM is 26 years. Stockpiling and blending of ore is necessary to ensure that the process feed criteria are stable on a weekly basis.

The PSA Plant uses the HPAL process to recover nickel and cobalt from the limonitic ore to an intermediate mixed sulphide product.

Mixed sulphides produced at the PSA Plant are received at the CRC refinery in Fort Saskatchewan, where commercially pure nickel and cobalt metal products are produced.

Tailings, in the form of slurry are currently stored in the NETF. From 2024 to mid-way through 2026 tailings will be stored in Area 22 Phase 3 TSF, currently under construction. Mine life storage for tailings beyond 2026 is expected to be stored at the Moa West TSF, currently undergoing a pre-feasibility study.

Total LoM capital costs are expected to be US$1,338 million with an additional cost of US$119 million allocated to mine closure and rehabilitation. The estimated LoM operating expenditure is US$7,394 million.

Based on the forecast production, capital and operating cost estimates, the Project base case demonstrates economic viability of the Mineral Reserves to a level of confidence equivalent to a Feasibility Study at a nickel price of US$7.12/lb and a cobalt price of US$21.32/lb, yielding NPV_8 of US$812 million.

The major risks to the Moa Project include not getting approval from the Cuban regulators of the ECOG methodology for both resources and reserves, in which case reserves would substantially decrease based on the FCOG methodology and the ability to realise the LoM plan in this Report would be significantly impacted in the short-term. Risks in the resource estimation include a possible reduction in resource classification at Moa Oriental and Zona A as more exploration data becomes available due to the lack of surveying of waste dumps and back-fill areas and uncertainty regarding mining and processing saprolite material. Operational risks include delays in the implementation of the ECOG strategy and lack of adherence to the blending and stockpiling strategy.

A major opportunity to the Moa Project is demonstrated in the upside potential of the alternative scenario subject to the prices forecast in that scenario being achieved. Opportunities in the resources estimated include the possibility for conversion of Inferred Mineral Resources to a higher category. Operational opportunities include increased recoveries with improved blending of feed into the PSA Plant.

1.21 RECOMMENDATIONS

Short-term recommendations (Phase 1) and long-term recommendations (Phase 2) have been suggested for the Moa Project.

Phase 1 recommendations cover geology, mining, and tailings, and include the following:

- Light detection and ranging (LiDAR) topography surveys;
- Introduction of rigorous QAQC protocols and the use of Certified Reference Material (CRM) and blanks;
- Centralising the geological database;
- Implementing an enhanced dispatch system to allow improvement of equipment utilisation;
- Creating an integrated geological and metallurgical domain model based on granulometry testwork, screen analysis and measurement of rejects at the slurry preparation plant; and,

- Finalising the PFS on the Moa West TSF.

Phase 2 recommendations focus on geology include the following:

- Implementation of routine open pit optimisation; and,
- Creating a multi-phase resource development plan to convert Inferred Resources to a higher classification, collect more data on saprolitic horizons and drill-out old waste dumps.

A preliminary budget to conduct the planned recommendations is show in Table 1.9.

Table 1.9: Budgeted Recommendations

Parameters	Phase 1 (US$'000)	Phase 2 (US$'000)
LiDAR / Drone Survey Equipment and Software	300	-
Certified Reference Material (Annual cost x 3)	80	-
Database Consolidation and QAQC	100	-
Dispatch System for Haulage Fleet	1,480	-
Geometallurgical Testwork and Modelling	1,110	-
Moa West TSF Design Study	1,200	-
Resource Estimation 'Reasonable Prospects' Protocol	-	100
Strategic Mineral Resource Development Plan Yr 1	-	5,000
Strategic Mineral Resource Development Plan Yr 2	-	5,000
Strategic Mineral Resource Development Plan Yr 3	-	5,000
Total	**4,270**	**15,100**

2.0 INTRODUCTION

2.1 PROJECT SUMMARY

Micon International Co Limited (Micon) was contracted by Sherritt International Corporation (Sherritt or the Client) to prepare a NI 43-101 Technical Report (the Report) on the Mineral Resource and Mineral Reserve estimates of the Moa Joint Venture (Moa JV) Project (the Moa Project or Project) located in the Province of Holguin, Cuba.

The Moa Project is a producing nickel and cobalt operation located in Cuba that is exploiting nickel laterite deposits for refining into finished nickel and cobalt in Canada. The Canadian refinery has a designed annual production capacity of 38,200 t of nickel and cobalt, and the capacity of the Moa Nickel S.A. Pedro Sotto Alba Plant (PSA Plant) in mixed sulphides depends on ore quality and grade.

Sherritt and General Nickel Company S.A. (GNC), a Cuban State company, are equal partners in the Moa JV that is the operator of the Moa Project. The Moa JV comprises three companies:

- Moa Nickel S.A. (Moa Nickel) – owns and operates the Moa, Cuba mining and processing facilities;
- The Cobalt Refinery Company Inc. (CRC) – owns and operates the Fort Saskatchewan, Alberta metals refinery; and,
- International Cobalt Company Inc. (ICCI) – located in Nassau, Bahamas, acquires mixed sulphides from Moa Nickel and other third-party feeds, contracts with CRC for the refining of such purchased materials and then markets finished nickel and cobalt.

The Moa JV was formed on 1st December 1994.

2.2 REPORT PURPOSE

The Report was prepared to support disclosure of Mineral Resource and Mineral Reserve estimates in Sherritt's 2022 Annual Information Form.

Mineral Resources and Mineral Reserves are reported in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (May 2014; the 2014 CIM Definition Standards) and were prepared using the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (November 2019; 2019 CIM Guidelines).

2.3 QUALIFIED PERSONS

This Report was prepared by or under the supervision of the Qualified Persons (QPs):

- Béatrice Foret, Micon Mineral Resource Geologist;
- Michiel Frederik Breed, Micon Senior Mining Engineer;
- Christopher Jacobs, Micon Mining Economist; and,
- Bryce Reid, Sherritt Chemical Engineer.

2.4 SITE VISITS

Beatrice Foret visited the Moa Project for 12 days from 1st to 17th February 2022 (refer to Section 12.0 for more details).

Bryce Reid visited the Moa JV Operations four times, from 23rd January to 17th February 2022, 20th May to 27th May 2022, 15th July to 22nd July 2022 and most recently from 12th February to 23rd February 2023.

2.5 SOURCES OF INFORMATION

The key information sources for the Report include the reports and documents listed in Section 3.0 (Reliance on Other Experts) and Section 27.0 (References) of this Report and were used to support the preparation of the Report.

Additional information was sought from Sherritt, Moa JV and Micon personnel where required.

Mr Peter Shankaya, a Micon mining engineer visited the Moa Project for eight days from 7th to 17th February 2022. Mr. Shankaya provided information in his areas of expertise to the QPs (refer to Section 12.0 for more details).

Mr. Mohan Srivastava, a geostatistician with third-party consulting firm RedDot3D Inc. (RedDot3D) visited the Moa Project for 12 days from 1st to 17th February 2022. During that visit Mr. Srivastava provided information in his areas of expertise to the QPs.

2.6 REPORT EFFECTIVE DATE

This Technical Report is based on this information known to Micon:

- Date of database closeout for the Mineral Resource estimation: 31st December 2018;
- Date of Mineral Resource estimate: 23rd September 2022;
- Depletion Date: 31st August 2022;
- Date of Mineral Reserve estimate: 12th December 2022; and,
- Date of Economic Analysis that supports the Mineral Reserves: 29th March 2023.

The overall Report effective date is the depletion date that supports the Mineral Resource and Mineral Reserves, and it is 31st August 2022.

2.7 PREVIOUS TECHNICAL REPORTS

1. Golightly J.P., Plamondan M., Srivastava R.M., NI 43-101F1 Technical Report on the Camarioca Norte and Camarioca Sur Nickel Laterite Properties in Cuba, prepared for Sherritt International Corporation, 9th May 2008.
2. Golightly J.P., Kryski K., Shillabeer J., Srivastava R.M., NI 43-101F1 Technical Report on the Camarioca Norte and Camarioca Sur Nickel Laterite Properties in Cuba, prepared for Sherritt International Corporation, 26th March 2009.

3. Golightly J.P., Kryski K., Shillabeer J., Srivastava R.M., NI 43-101F1 Technical Report on the La Delta and Cantarrana Nickel Laterite Properties in Cuba, prepared for Sherritt International Corporation, 8th May 2009.
4. Beaton D. W., Kryski K. M., Srivastava R.M., NI 43-101 Technical Report on the Central Moa Nickel Laterite Operation in Eastern Cuba, prepared for Sherritt International Corporation, 22nd September 2011.
5. Elias M., O'Callaghan P., Martinez A., Buban K., NI 43-101 Technical Report on the Moa Nickel Project, Cuba, by CSA Global prepared for Sherritt International Corporation, 6th June 2019 (CSA Report No. R117.2019).
6. Srivastava R. M., Reid B., Foret B., Informe técnico. Estimación de los recursos minerales de las concesiones minera asignadas a la empresa mixta Moa Niquel. "Mineral Resource Alignment" Report, prepared for Moa Joint Venture by Moa Nickel, December 2022.

3.0 RELIANCE ON OTHER EXPERTS

The authors of this Report have reviewed and analysed data provided by Moa JV, Sherritt and its local consultants, and have drawn their own conclusions therefrom, augmented by a direct field examination. The authors have not conducted any independent exploration work, drilled any holes, or performed any sampling and assaying programmes.

The author acknowledges the helpful cooperation of the Moa JV management and field staff and the RedDot3D consultants all of whom made any and all data requested available and responded openly and helpfully to all questions, queries and requests for material.

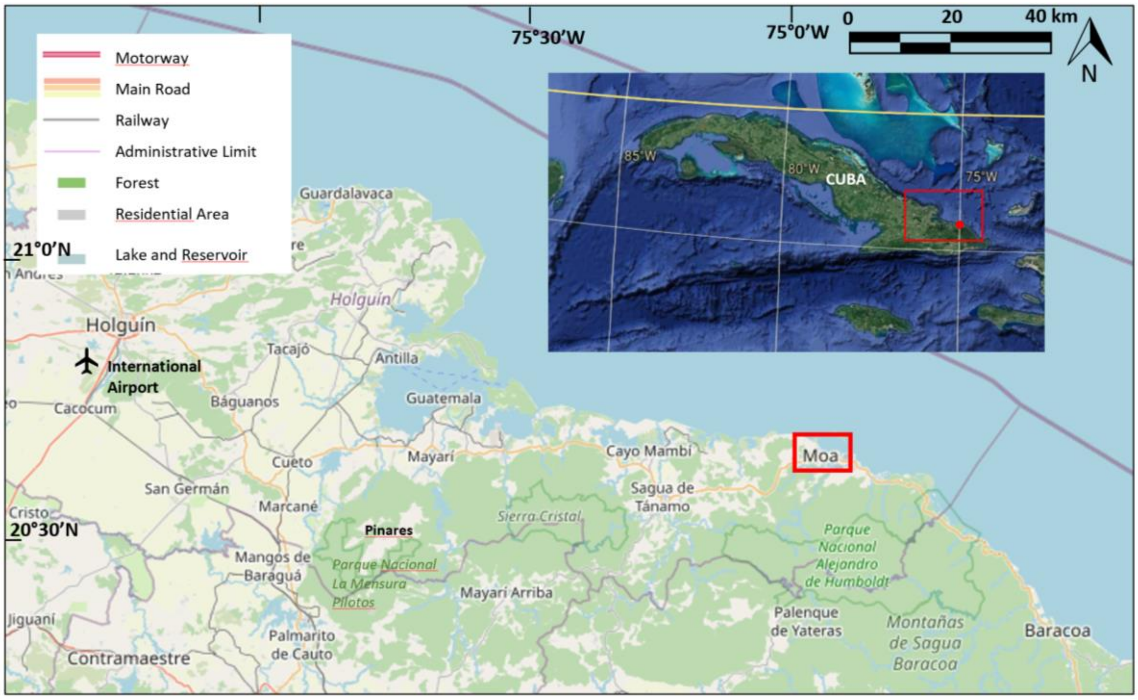
Micon retains the right to change or modify its conclusions if new or undisclosed information is provided, which might change its opinion.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 LOCATION

The Moa nickel laterite deposits are located to the south, west and southeast of the city of Moa in the Province of Holguin in north-eastern Cuba (Figure 4.1). The Pedro Sotto Alba processing plant (PSA Plant) operated by Moa Nickel lies on the southern edge of the residential area of the city of Moa.

Figure 4.1: Location of the Moa Project



Source: Micon (2023)

The coordinates of the centre of the processing and exploitation concessions for the Moa Project are given in the Lambert coordinate system (used at the Moa Project) in Table 4.1.

Table 4.1: Coordinated Centre of the Processing and Exploitation Concessions of the Moa Project

Concession		X	Y
Processing	PSA Plant	698,427	221,346
Exploitation	MO	699,177	217,813
	CN	698,846	213,819
	CS	697,017	210,135
	YO	702,876	217,994
	ST	714,567	210,184
	LD	708,100	214,833
	CR	711,365	214,327
	VS	694,355	223,220
	ZC	693,866	220,133
	ZA	695,112	220,114

4.2 LICENCES

In Cuba, mineral rights are the property of the state, as dictated by the *Mining Law, Law No. 76*, dated 23rd January 1995 (the Mining Law) and are granted exclusively to titleholders. There are three types of concessions: exploration, exploitation, and processing. In addition, there are permits for geological reconnaissance that are not exclusive to the holder.

Mineral exploration and mining concessions are granted under decrees or resolutions by the Cuban Council of Ministers and are administered by the Oficina Nacional de Recursos Minerales (ONRM), the Cuban government agency that oversees and regulates mining activity in the country. Exploration concessions are granted for three years and can be extended for up to two more years. Exploitation concessions are granted for a maximum of 25 years, and can be successively extended for additional periods of 25 years.

The deposits over which Moa JV has mining rights are spread over several separate mineral concessions as listed in Table 4.2 and shown in Figure 4.2. All 14 mining concessions are held in the name of Moa Nickel.

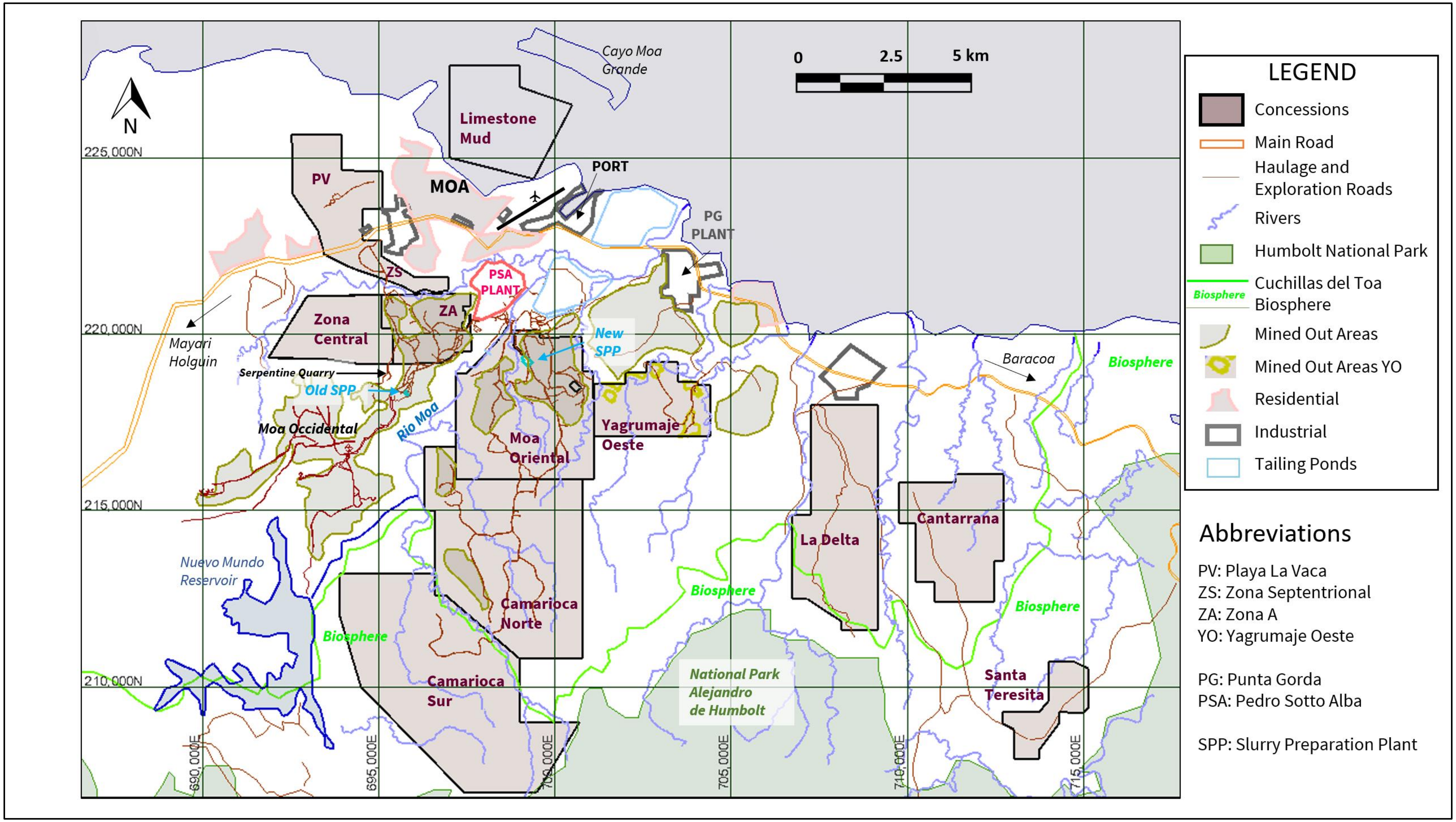
Table 4.2: Moa Nickel Mining Concessions Detail

Concession	Area (ha)	Date From	Date To	Renewal Date
Moa Occidental Sector I (Zona A) and Zona Septentrional [1]	943	Nov 1994	- -	See Note [1]
Moa Oriental [1]	1,464	Nov 1994	- -	
Calcium Carbonate [1]	805	Nov 1994	- -	
Scrap Yard [1]	2	Nov 1994	- -	
Camarioca Norte	2,007	Mar 2005	Mar 2030	Jan 2029
Camarioca Sur	2,367	Mar 2005	Mar 2030	Jan 2029
Zona A Sector II	8	May 2012	May 2032	Feb 2032
Moa Occidental Block O-30	9	May 2012	May 2032	Feb 2032
Yagrumaje Oeste	569	Feb 2013	Feb 2038	Nov 2037
La Delta [2]	1,300	Sept 2018	July 2043	April 2043
Cantarrana [2]	871	Sept 2018	July 2043	April 2043
Serpentine Quarry [3]	9	Oct 2019	Dec 2024	Sept 2024
Playa La Vaca–Zona Septentrional III [4]	754	Nov 2020	Nov 2045	Aug 2045
Santa Teresita [5]	314	Nov 2022	Nov 2045	Sept 2045

Notes:

1. The rights expire when the resources inside of the concession for exploitation are depleted.
2. In September 2018 the La Delta and Cantarrana deposits were approved as concession of exploitation, Agreement 8455/2018.
3. The resources of this area were depleted.
4. Exploration programme was completed in the Playa La Vaca – Zona Septentrional III concession. In November 2020, these deposits were approved as concession of exploitation, Agreement 8944/2020.
5. In November 2022 the Santa Teresita deposit was approved as concession of exploitation, Agreement 9448/2022.

Figure 4.2: Moa Nickel Mining Concessions



Source: Micon (2023)

Moa Nickel holds a processing concession for its PSA Plant, and exploitation concessions for all the eleven deposits described in this Report.

Historically, Moa JV has had the right to mine the limonite, along with normal mining dilution at the top and bottom of the limonite horizon. The limonite zone is defined by the ONRM as that layer of mineralisation where nickel concentration exceeds 1% and iron concentration exceeds 35% of the total material mined for all concessions except for Zona A and Moa Oriental where the nickel equivalent definition includes cobalt:

Zona A:	%NiEq ≥ 1.35, %Ni ≥ 0.90, and %Fe ≥ 35
Moa Oriental:	%NiEq ≥ 1.25, %Ni ≥ 0.90, and %Fe ≥ 35

The Mineral Reserves and Mineral Resources presented in this Report were estimated using an Economic Cut-Off Grade (ECOG). This represents a significant change from the historical practice of using a Fixed Cut-Off Grade (FCOG).

Mining is underway at Zona A, Moa Oriental, Zona Septentrional and Camarioca Norte. The Playa La Vaca and Zona Septentrional deposits are within the same mining licence, but only Zona Septentrional is currently being mined.

The Moa JV also holds a concession to mine calcium carbonate muds (limestone mud) in a lagoon deposit located in the sea, between Cayo Moa and Moa. This material is used to neutralise the nickel and cobalt concentrates in the PSA Plant.

4.3 PERMITS

The Cuban government also required the Moa JV to obtain an environmental permit that sets operating standards in connection, amongst others with its water and air discharges, and a permit to operate bank accounts for each currency in which the joint venture does business in Cuba.

The Moa Project surface rights are sufficient for mining and processing operations.

4.4 ROYALTIES, BACK-IN RIGHTS AND OTHER PAYMENTS

The Moa JV pays the Cuban state a royalty and territorial contribution calculated on the basis of 5% and 1% of the net sales value (free on board Moa Port, Cuba) of its production of nickel and cobalt contained in mixed sulphides.

An annual canon of US$2.00, US$5.00 or US$10.00 for each hectare (ha) of each concession is payable depending on whether the area is a prospecting, exploration or exploitation area.

4.5 ENVIRONMENTAL LIABILITIES

Environmental rehabilitation liabilities associated with the Moa Project include closure costs for building structures, mine earthwork, reforestation, groundwater rehabilitation, tailings management, soil remediation, roads and other construction.

4.6 OTHER RISKS

The Moa Project is subject to certain risks which could affect access, title, or the right or ability to perform work on the properties, tailings management facility, plant site and/or port, in the context of the U.S. embargo and the implementation of all facets of the Helms-Burton Act in the US. This is further discussed in Section 24.2 of this Report.

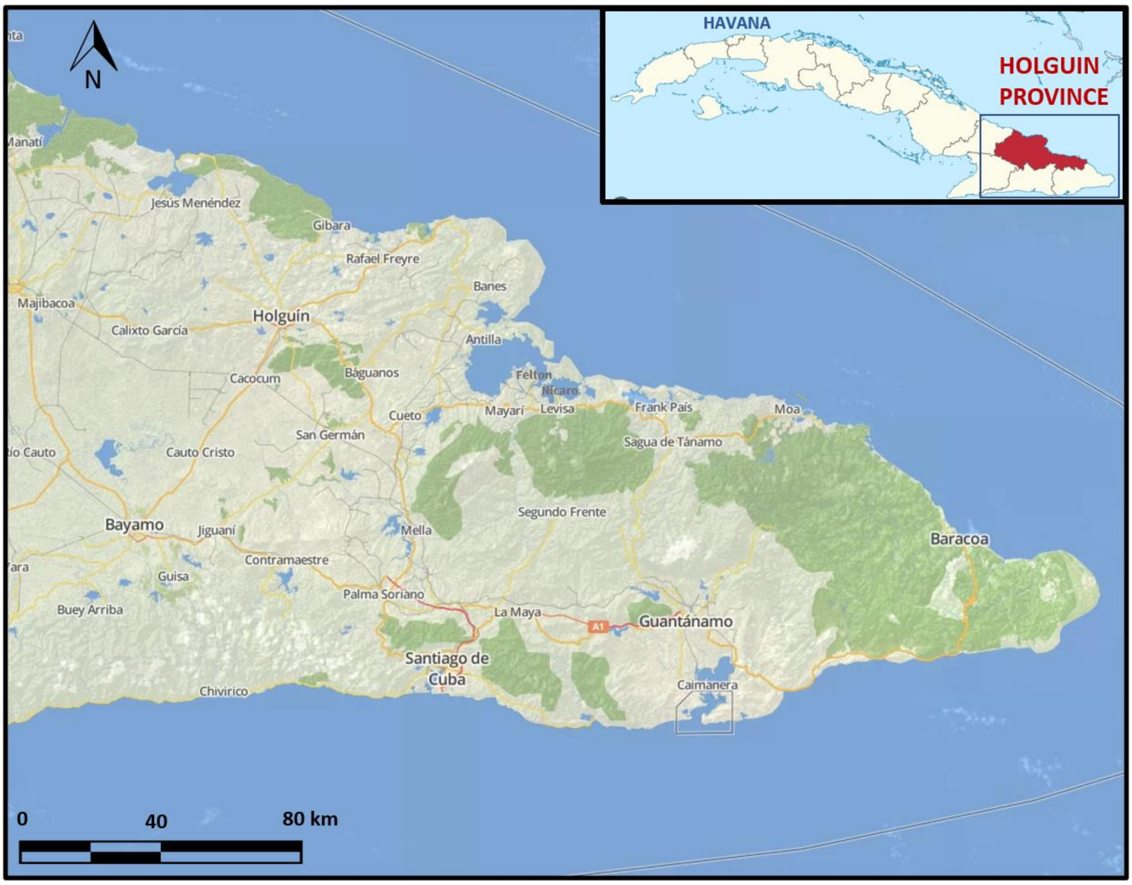
To the extent known to the QP, there are no other significant factors and risks that may affect access, title, or the right or ability to perform work on the Project that are not discussed in this Report.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 ACCESSIBILITY

The city of Moa lies along the paved highway that connects the provincial capital of Holguin to the smaller cities of Cueto, Mayari, Nicaro and Sagua de Tanamo (Figure 5.1). Holguin is approximately 190 km to the west, a driving time of approximately 2.5 to 3.0 hours. There is a public bus service to all neighbouring cities.

Figure 5.1: Roads and Population Centres between Holguin, Santiago de Cuba and Moa



Source: Map adapted by Micon from Openstreetdata (March 2023)

Moa has a small commercial airport with limited flights to Havana. The nearest large international airports are at Holguin to the west, and at Santiago de Cuba, across the island on the southern coast.

An artificial harbour, approximately 950 m by 250 m, opens to the northeast into the 33 km long lagoon behind a coral barrier reef and sea-island which lies as far as 5 km offshore (see Figure 4.2). It is used to import coal, sulphur and petroleum products and to ship mineral products from the nickel processing plants in the area.

Moa Nickel's main facilities, the site of the processing plant and the offices for technical and administrative work, are easily accessible from the city, with many workers commuting to the plant using local buses.

A well-developed network of secondary paved roads and dirt roads provides access from the plant site to the operating mining areas of Moa Occidental and Moa Oriental that lie south of the city and the plant site (refer to Figure 4.2). Dirt roads provide access from Moa Oriental into the Camarioca concessions. In the dry season, the Camariocas roads can be navigated using pickup trucks; in the wet season, even four-wheel drive trucks sometimes have difficulty navigating the roads into Camarioca Sur, especially at the Rio Arroyo crossing.

The La Delta, Cantarrana, and Santa Teresita concessions are accessible by dirt roads and forestry roads connected to the paved highway that links the cities of Moa and Baracoa.

The Playa La Vaca area can be accessed directly from the paved and dirt roads connected to the Holguin-Moa paved highway and to the city of Moa. The use of forestry roads and access through third parties is legally regulated by articles 50 to 55 of the *Mining Law, Law No. 76*.

5.2 CLIMATE

The Moa region has a tropical humid climate, with average daily high temperatures around 28°C in the summer and average daily lows around 21°C in the winter. Monthly rainfall is consistently above 100 mm with peak rainfall months in October to December. There is a risk of tropical storms and hurricanes from early June to late November. Intense rains may temporarily impact access to remote locations and mining activities; however, the risk of floods impacting the processing plant and other facilities is minimised by the Nuevo Mundo water dam, located west of Camarioca Sur (see location on Figure 4.2).

The mine and processing plant are operational year-round.

5.3 LOCAL RESOURCES AND INFRASTRUCTURE

The water supply for the city of Moa and the processing plant are drawn from one water-bore at Veguita, near the PSA Plant, and from the Nuevo Mundo reservoir on the Moa River, 10 km south-southwest of the PSA Plant and 1 km west of Camarioca Sur concession. Water from Nuevo Mundo enters an intake at a small dam just upstream from the haulage road bridge linking the PSA Plant to Moa Oriental.

Moa and the PSA Plant are served by the national electric power grid and grid powerlines cross the mine site. The nearest power plant is at Felton, some 85 km west of Moa (refer to Figure 5.1).

The city of Moa has a population of approximately 72,000 (2021).

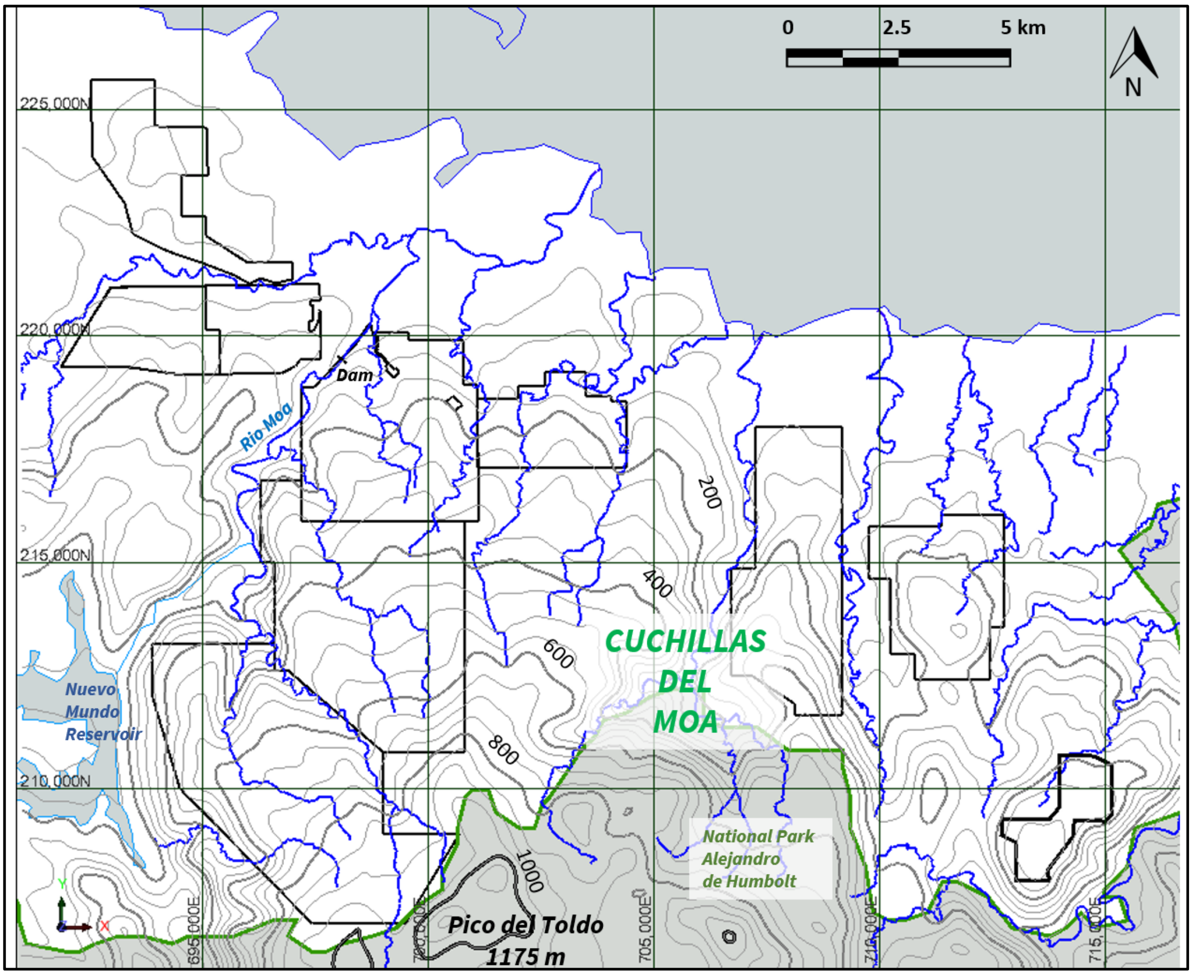
Moa has a university, the Dr Antonio Núñez Jiménez Instituto Superior Minero Metalúrgico de Moa, and a hospital.

The PSA Plant is located 2 km south of Moa and the Tailings Management Facilities (TMFs) and waste disposal areas are immediately to the east of the plant (see locations on Figure 4.2).

5.4 PHYSIOGRAPHY

Moa Nickel's mineral deposits lie on the undulating north slope of the Cuchillas del Moa, an east-west trending range of forested mountains with the highest peak at 1,175 m (Pico del Toldo) that forms the surface expression of the Moa-Baracoa ophiolite massif. All concessions lie on the piedmont of the range (Figure 5.2).

Figure 5.2: Physiography of the Moa Area (concessions marked with black lines)



Source: Micon with topography from ALOX-JAXA

The northern slope of the Cuchillas del Moa is dissected by a slope-parallel network of incised, meandering ravines that serve as tributaries to the right bank of the Moa River, draining to the north-northwest. The deposits tend to form relatively uneroded remnants of a sheet of laterite that was much more extensive before it was incised by ravines that now separate the laterite into plateaux and gentle spurs.

Vegetation on the ultramafic parts of the Moa-Baracoa complex is generally comprised of pine forest with a dense understory of broad-leaved saplings to small trees. The concessions Camarioca Sur, La Delta, Cantarrana and Santa Teresita are located close to the Humboldt Park and the Cuchillas del Toa Biosphere (Biosphere) and part of these concessions are within the buffer zone of this protected area. In these concessions there is high biodiversity and endemism of species of animals and plants (Moa Nickel, 2008, 2014, 2015, 2018); however, mining is allowed in the buffer area, and extra environmental constraints were imposed on Moa Nickel in the environmental permits for mining and geological exploration in these concessions (CITMA, 2005). Mining permits for areas within the Biosphere park boundaries are unlikely to be granted to any mining company, and nickel laterite deposits existing within the park boundaries, such as Pilotos, cannot be explored or mined under any circumstances (UNESCO, 2001). The park boundary approximately coincides with the drainage divide, and the park and concessions shown in Figure 5.3 are in separate watersheds.

The altitudes of the concessions range from approximately 50 m (Zona Central and Playa La Vaca) to around 900 m (Camarioca Sur).

In the low-elevation concessions, the ground cover over laterite comprises broad-leaf thicket to semi-open meadows. The same is true of areas at low elevations (<200 m) east of Punta Gorda where there is no laterite at all. Generally, the valleys in the mine areas are forested, but in Zona Central the flat valleys bottoms can be as much as several hundred metres wide, and are filled with alluvium that provides suitable conditions for small farms.

Low-lying areas in and close to the city of Moa are commonly forested by plantations of Australian pines (*Casuarina equisetifolia*), an introduced species, used as a starter for rehabilitation.

6.0 HISTORY

6.1 INTRODUCTION

The existence of economically viable nickel and cobalt resources in the laterites of eastern Cuba was first established in the 1940s. By the early 1940s, mining began in the nickel laterites near Nicaro (Figure 5.2) and were used to feed a Caron process smelter. By the late 1950s, just prior to the Cuban Revolution, mining commenced in the nickel laterites near Moa, where they began feeding the world's first high pressure acid leach (HPAL) process plant, which has been operating continuously since 1961.

The Cuban government's state mining company began mining in the Moa Occidental concessions in the early 1960s, and continued as the sole operator, with technical assistance from the Soviet Union, until the early 1990s. In 1994, Moa Nickel S.A. was formed as a joint enterprise, an equal 50:50 partnership between Sherritt and GNC. Moa Nickel was granted mining rights to the Moa Oriental and Moa Occidental concessions on 1st December 1994. The company has continued mining operations at Moa Occidental and initiated mining operations at Moa Oriental across the Moa River from Moa Occidental in 2000.

The Camarioca concessions (Norte and Sur), part of the Moa deposits, were first explored in the early to mid-1970s by Soviet geologists in a programme designed to outline nickel laterite resources (Sitnikov et al., 1976). This early exploration programme included auger drilling, test pits, geological mapping and petrographic studies. The evaluation was resumed by Empresa Geominera Oriente of Santiago de Cuba (Geominera) in 2003. In 2005, Moa Nickel was granted the right to continue the exploration and evaluation of the Camariocas deposits.

To the east of the Moa Oriental and Camarioca deposits and separated from them by mineral concessions assigned by the Cuban state to other nickel laterite mining operations, is a group of smaller nickel laterite deposits. These are La Delta, Cantarrana and Santa Teresita and these are referred to as the "Satellite Deposits".

Cantarrana and La Delta were first explored in the 1960s by Soviet Union geologists in a programme designed to outline nickel laterite resources (Adamovich and Chejovich, 1962; Sitnikov et al., 1976). A second exploration programme, the Cupey Project, was conducted by Geominera for Gencor (former South Africa-based mining company) in 1996 as a due diligence check on the earlier work. These early exploration programmes included auger drilling, test pits, geological mapping, petrographic studies, bulk sampling and closely spaced drilling for mining variability studies.

In 2006, Moa Nickel was granted the right to explore and evaluate the three Satellite Deposits.

Santa Teresita was first explored in the 1970s and then during a second exploration programme in the 1990s. In 2008, Moa Nickel acquired new Canadian-built equipment to explore Santa Teresita. The most recent drilling campaign on the concession was performed by Moa Nickel in 2015.

The Yagrumaje Oeste concession was formerly part of the Cupey Project, according to the agreement of the CEM 3754 dated 2000.

Yagrumaje Oeste has been explored by Geominera for the company Comandante Ernesto Che Guevara (Ernesto Che Guevarra) and exploited by Ernesto Che Guevarra until the exploitation rights were transferred to Moa Nickel in 2013. The parts of the deposit containing the highest nickel and cobalt grades have been mined by this company. The areas depleted are shown on Table 4.2.

Between 2013 and 2015, Moa Nickel checked the dataset received from the previous operating company, updated the resource estimation of the deposit and confirmed that the areas contoured as depleted by Ernesto Che Guevarra were actually depleted.

The concession Playa La Vaca-Zona Septentrional was first explored in the 1960s by Soviet Union geologists (Shirikova, I.Y., Sobolev, P.B., 1966). Moa Nickel was granted a permit for geological reconnaissance in October 2011. In 2012, Moa Nickel launched a verification programme to validate the exploration, topography, drilling, chemical analysis and volumetric mass work carried out previously in this concession. Between 2013 and 2015, Moa Nickel completed an important exploration programme, which led to the approval of the concession for exploitation by the ONRM in November 2020. Mining on Zona Septentrional started in 2021.

6.2 PREVIOUS MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

Mineral Resources and Mineral Reserves for the Central Moa deposits, the Satellite deposits, as well as the Yagrumaje Oeste and Playa La Vaca-Zona Septentrional, were reported with an effective date of 31st December 2018 in a NI 43-101 Technical Report dated 6th June 2019 (Elias et al., 2019), using an ECOG for the Mineral Resources for the first time (limonites above 35 Fe% reported) and fixed cut-off grades for the Mineral Reserves.

6.2.1 Previous Mineral Resource and Mineral Reserves Estimates 2018

6.2.1.1 Previous Mineral Resource Estimate 2018

Table 6.1 shows the combined Mineral Resources for 11 concessions:

- The Central Moa deposits (Moa Oriental, Camarioca Norte, Camarioca Sur, Zona Central, Zona A and Zona A Oeste, and a small area called Sector 11 Bloques or Yamaniguey Cuerpo I located in the Moa Occidental Area);
- Yagrumaje Oeste, Playa La Vaca-Zona Septentrional; and,
- The Satellite deposits (La Delta, Cantarrana and Santa Teresita).

The reporting cut-off was calculated as a Net Value = Revenue from Ni + Revenue from Co – Costs >0, applied on a block-by-block basis.

The costs are equal to the sum of processing cost, nickel selling cost of US$2.12/lb, and mining cost of US$5.15/t. The processing cost has a fixed component of US$47.12/t, a haulage cost of US$5.13/t and a variable cost related to the magnesium and aluminium content. Revenue was calculated at a market price of US$6.82/lb for nickel and US$25.23/lb for cobalt, with a nickel and cobalt recovery of 85% and 84%, respectively.

In this Mineral Resource estimate, only environmental protection areas were considered, since past mining practices had shown that Mineral Resources affected by buildings and powerlines were mined when conditions were allowed.

Table 6.1: Mineral Resource Estimates for 11 Concessions, as at 31st December 2018

Classification	Tonnage (Mt)	Nickel (Ni %)	Cobalt (Co %)	Iron (Fe %)	Silica (SiO_2 %)	Aluminium (Al %)	Magnesium (Mg %)
Measured	111.92	1.03	0.13	45.0	5.51	5.13	1.15
Indicated	46.04	0.94	0.12	43.6	7.12	5.16	1.46
Measured + Indicated	**157.96**	**1.00**	**0.13**	**44.6**	**5.98**	**5.14**	**1.24**
Inferred	32.6	0.89	0.13	44.0	6.38	5.35	1.26

Note: ECOG applied

6.2.1.2 Previous Mineral Reserve Estimate 2018

The Measured and Indicated Mineral Resources are inclusive of those Mineral Resources modified to produce the Mineral Reserves.

Nine deposits were deemed suitable to be prepared for conversion to Mineral Reserves these are as follows:

- Moa Oriental (MO);
- Camarioca Norte (CN);
- Camarioca Sur (CS);
- Yagrumaje Oeste (YO);
- La Delta (LD);
- Cantarrana (CR);
- Zona Central (ZC);
- Zona A, including Zona A Oeste (ZA); and,
- Bloque 11.

The Mineral Resources of Playa La Vaca, Zona Septentrional and Santa Teresita had not been converted into Mineral Reserves as they were under exploration concessions at the time of the estimate.

There were limitations to accurate topography surfaces provided from the Moa site, especially for Moa Oriental and Zona A which have had many years of mining upon these deposits.

At the time and in consultation with operational staff, several areas within Moa Oriental and Zona A were excluded due to the following reasons:

- Waste dumps, stockpiles and roads lying on top of resource zones;
- Power lines running over resource zones;
- Pipelines running over resource zones; and,
- Mined out sections that were not picked up by surveying;

The Mineral Reserves were estimated for the period ending 31st December 2018, based on fixed cut-off grades by the ONRM.

“Economic” pit shells were “constrained” by the application of fixed cut-off grades on nickel and iron (1.0 Ni% and 35 Fe% for all concessions except for Moa Oriental and Zona A where the nickel cut-off was 0.9 Ni% - No nickel equivalent cut-off had been applied). This significantly reduced the amount of Mineable Resources converted into Mineral Reserves.

The Mineral Reserves were based on a Life of Mine (LoM) plan and all the reserves blocks had been scheduled. Based on historical reconciliation and for the purposes of allowances for the pit shell “conversion factor”, a mining dilution of 5% and a mining recovery of 85% was applied.

The Mineral Reserve estimate for the nine Concessions as at 31st December 2018 are presented in Table 6.2.

Table 6.2: Mineral Reserves Estimate for Nine Concessions, as at 31st December 2018

Classification	Tonnage (Mt)	Nickel (Ni %)	Cobalt (Co %)	Iron (Fe %)
Proven	43.6	1.17	0.13	42.3
Probable	9.8	1.14	0.12	40.5
Proven + Probable	**53.4**	**1.16**	**0.13**	**42.0**

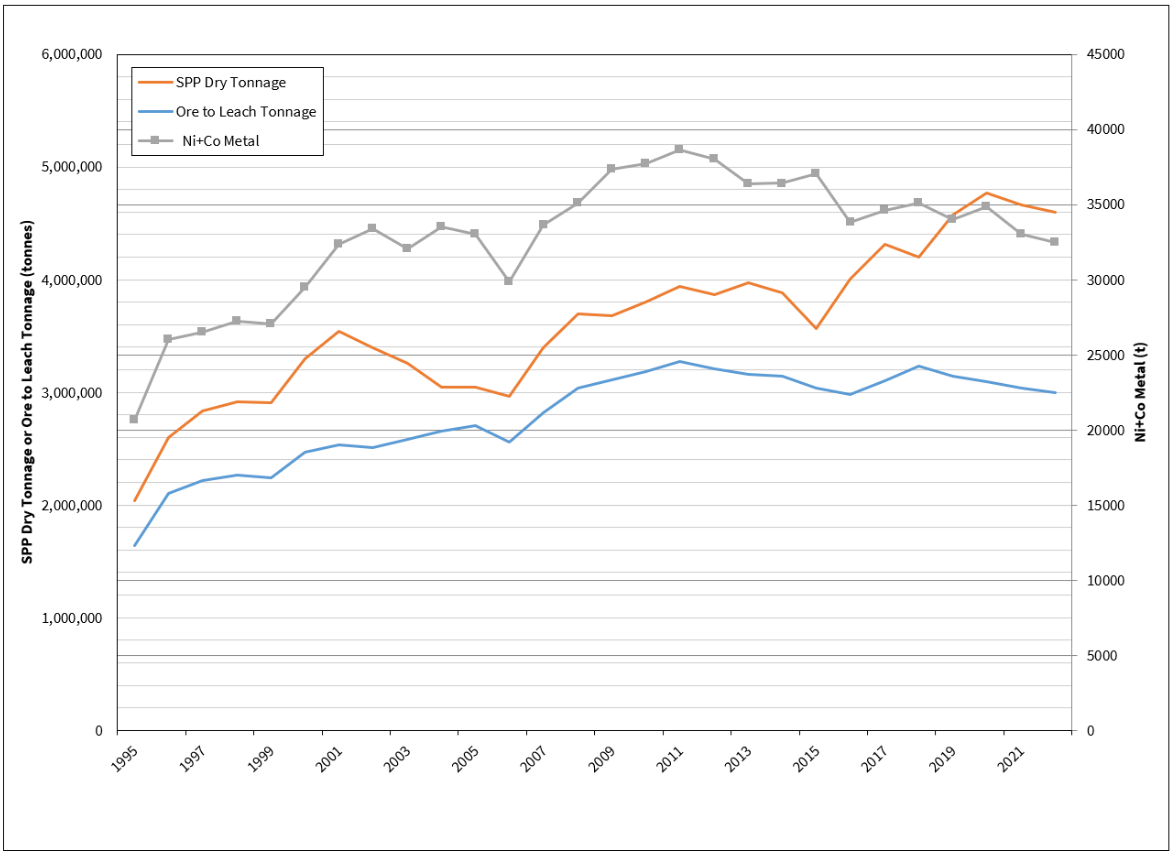
Note: Fixed cut-off grades applied

The 2018 Mineral Resource and Mineral Reserve estimates are superseded by the 2022 Mineral Resource and Mineral Reserve estimates presented in Sections 14.0 and 15.0 of this Report, respectively.

6.3 PRODUCTION HISTORY

The Moa JV was formed in 1994 and has been consistently producing nickel and cobalt since that time. Through improved reliability of operations and several optimisation efforts, metal production had steadily risen to increased levels until a peak in 2011 at 38,641 t of nickel and cobalt. Since 2011, metal production has been on a slightly decreasing plateau. During 2022, 32,496 t of nickel and cobalt was produced. The throughput increased to 4.6 Mt in 2022. The nickel and cobalt production in mixed sulphides since the formation of the Moa JV is presented in Figure 6.1.

Figure 6.1: Summary of Annual Throughput, Ore to Leach and Ni+Co Metal in Mixed Sulphides



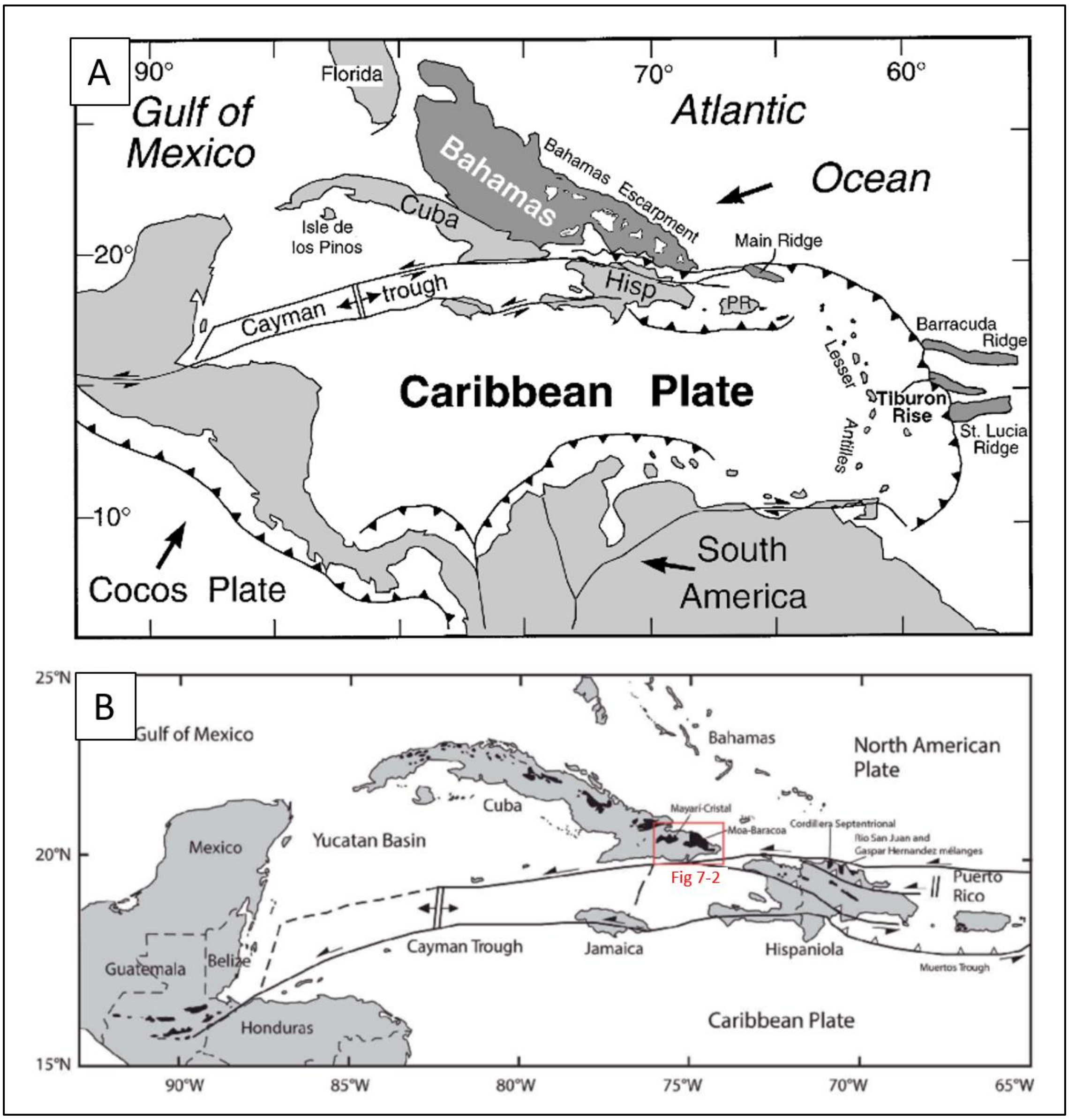
Source: Micon from Sherritt Data (2023)

7.0 GEOLOGICAL SETTING AND MINERALISATION

7.1 TECTONIC SETTING

During the late Cretaceous era from the Aptian to the Campanian (approximately 70 Ma to 125 Ma), Cuba and Hispaniola formed an island arc that was created during the collision of the Atlantic and the proto-Caribbean oceanic plates (Figure 7.1).

Figure 7.1: A. Tectonics along the Northern Caribbean Plate Boundary from Cuba to Hispaniola (Hisp) B. Simplified Geological Map of Greater Antilles showing the Main Ophiolitic Units in Black



Source: A: After Mann et al, (1984); B: Modified from Wadge et al, (1984).

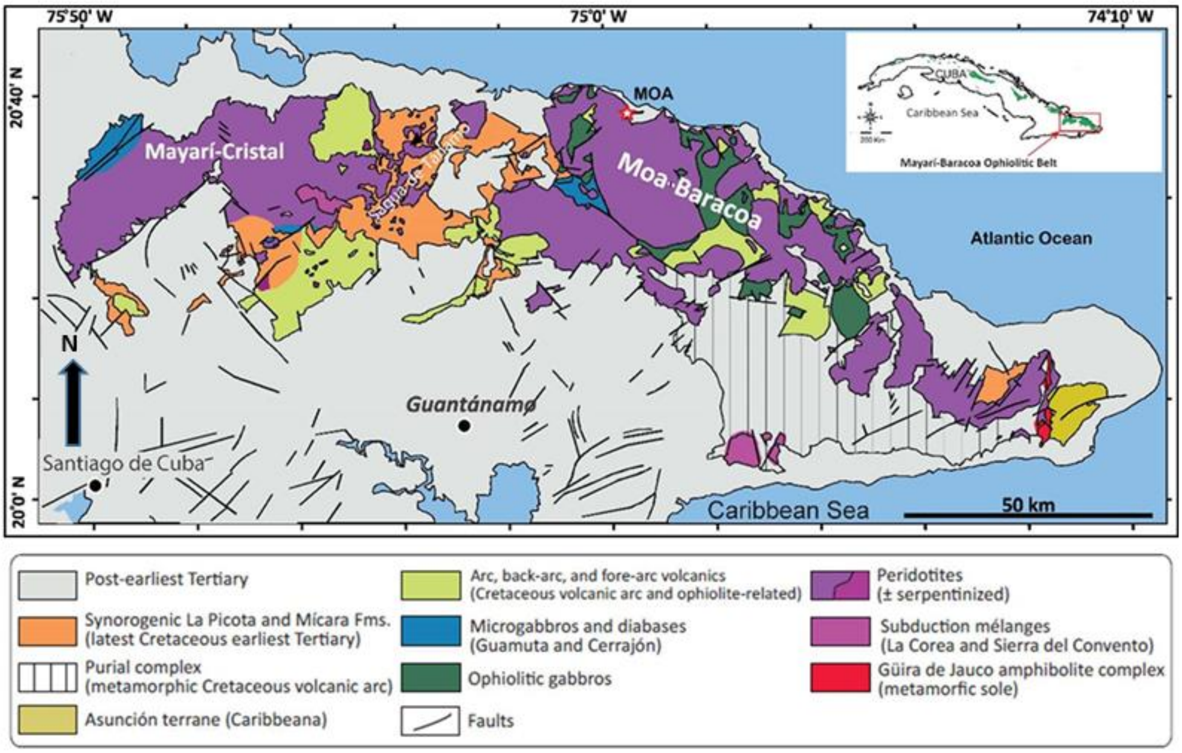
After a reversal of subduction polarity, a number of slices of oceanic crust were thrust from the southwest above the Tertiary volcanic units and subduction mélange as harzburgite dominated ophiolite complexes above the subduction zone. After uplift, erosion and exposure of these ophiolites along the northern half of the island, the ultramafic units in the three largest, easternmost of these formed a deep weathered crust of nickeliferous laterites. The eastern two of these in the

Holguin province, the Mayari-Cristal and Moa-Baracoa ophiolites (each approximately 950 km²), form highland massifs with approximately 1,000 m relief, and host nickel laterite mineralisation.

7.2 REGIONAL GEOLOGY

The extensive nickel laterite deposits of Cuba are developed over the ultramafic rocks of an ophiolite belt that crops out discontinuously for more than 1,000 km along the northern margin of Cuba. The largest ophiolite complex is in Eastern Cuba which is subdivided in two massifs: Moa-Baracoa and Mayarí-Cristal (Figure 7.2).

Figure 7.2: Mayari-Baracoa Regional Geological Map



Source: Adapted from Proenza et al (2018)

The ophiolite complexes consist of partially serpentinised harzburgites with minor occurrences of dunites, which are in places cut by gabbroic dykes. The Moa-Baracoa massif exhibits a well-developed Moho transition zone.

7.3 LOCAL AND PROPERTY GEOLOGY

Nickel laterites in the Moa Project area are formed on top of the Moa-Baracoa ophiolite massif, and are composed of partially serpentinised harzburgites (an olivine + orthopyroxene and +/- chromite rock) and lesser dunites. There are also some scattered gabbroic dykes, and ultramafic recrystallised rocks with abundant antigorite that produce barren laterites.

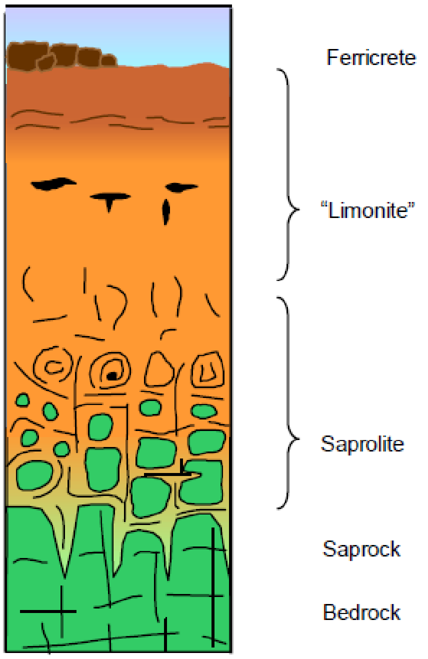
The landscape in the Moa Project area slopes to the north resulting in partial remobilisation and redeposition of limonite downslope. The deposits located to the north had a lateritic profile with a thickness of over 40 m, while the upslope laterite profile is much thinner. To the north near the coast, some rare and small calcium carbonate sand lenses of marine origin have been observed within the limonites, resulting from cyclic marine transgression and regression. Paleontological samples indicate that the marine intercalations are Early Miocene to Pliocene in age.

7.4 MINERALISATION

7.4.1 Laterite Profile

The laterite profile overlying the bedrock consists of four principal horizons. From bottom to top these are: (1) serpentinised peridotite, (2) saprolite, (3) limonite and (4) ferricrete (Figure 7.3). The main rock types are summarised in Table 7.1.

Figure 7.3: Schematic Laterite Profile Developed on Ultramafic Rock in a Tropical Climate (Fe oxide-dominant limonite zone), showing Indicative Chemical Compositions in %.



Fe	MgO	Ni	Co
>50%	<0.5%	<0.6%	<0.1%
40-50%	0.5-5%	0.8-1.5%	0.1-0.2%
10-25%	15-35%	1.5-3%	0.02-0.1%
5%	35-45%	0.3%	0.01%

Source: Elias (2002)

Table 7.1: Moa Project Lithological Codes of the Major Lithologies

Lithological Code		Short Description in Spanish	Detailed Description in English
Code 2008	Code 2022		
OICP	OICP	Ocre Inestructurales Con Perdigones (concreciones ferruginosas)	Dark brown limonite with ferruginous concretions, coarsening towards the surface where they form distinctive blocks. They may also fill fissures in underlying units or form layers or zones below the other units.
OISP	OI	Ocre Inestructural (Sin Perdigones)	Dark brown, massive fine limonite lacking concretions.
OEF	OEF	Ocre Estructural Final	Yellow brown to yellow limonite showing clearly inherited protolith textures and structures, but usually flattened by collapse under overburden weight or by shearing. Black streaks and veinlets of manganese ore are common.
OEI	OEI	Ocre Estructural Inicial	Yellowish limonite grading downwards to reddish or greenish. The protolith texture is clearly recognisable
SL	RML	Serpentina lixiviada, alterada y ocretizada	An inhomogeneous saprolite with patches of limonites and cores of less leached rock showing the net-veinlet texture of the original serpentine.
CG	CM	Corteza por gabro	Clay mottled brown to brick red and light yellow. The protolith texture is clearly visible as whitish 5 mm scale kaolinite pseudomorphs of plagioclase in a darker limonitic matrix.

The lowest part of the profile is represented by tectonised, serpentinised peridotite in which the first stages of weathering are seen at the top. The saprolite zone (which is less represented relative to the overlying limonite at the Moa Project is characterised by the preservation of the primary fabric, a reduction in the quantity of primary minerals and the formation of alteration minerals in the most fractured zones. The boundary between the saprolite zone and the peridotite substrate (the "weathering front") is extremely irregular.

The saprolite zone passes upwards in the profile to a limonite zone, which is dominated by goethite and hematite. Two subzones can be defined: a lower limonite with faint remnants of a primary structure ("*ochre estructural*" or structured limonite) and an upper limonite in which the structure is collapsed ("*ochre inestructural*" or massive limonite). Massive limonite is composed of massive red-brown earthy fine-grained soil with no visible structure. Structured limonite is the largest and most important zone in terms of nickel and cobalt content. Structured limonite is yellow/brown in colour and exhibits remnant structures suggestive of pyroxene, represented by colour changes from the deposition of minerals such as MnO and MgO. Nickel grades range from 1 Ni% to 1.5 Ni% in the limonite zone, with approximately 0.1 Co% to 0.15 Co%.

All zones of the profile are overlain by ferricrete which takes the form of unconsolidated pisolites in a fine-grained matrix or massive hematite comprising amalgamated or welded hematitic pisolites.

The nickel laterites developed from weathering of the ultramafic units of the Moa-Baracoa ophiolite. Olivine in photolytic harzburgites and dunites typically contains 0.2 Ni% to 0.3 Ni%. During prolonged leaching by weathering in a tropical environment, MgO and SiO_2, the principal chemical components, are leached out leaving a fine-grained concentrate of goethite, (Fe, Al, Cr, Ni)O(OH), hematite Fe_2O_3, gibbsite $Al(OH)_3$ and an insoluble residue of chrome spinel from the parent rock.

Magnesium is the first element to be weathered in the lateritic profile. The absence of magnesium is the genetic marker of the lateritisation in any bedrock that occurs at the Moa Project (harzburgite or gabbro). Magnesium does not reprecipitate. Silicon is the second element to be weathered in the lateritic profile. In certain redox conditions, silicon can reprecipitate in the form of amorphous silica or chalcedony.

Iron is a marker of the lateritisation within the harzburgite bedrock, and is negatively correlated with magnesium content. However, when there is a magma differentiation, the liquids become enriched in aluminium (gabbroic rocks), and sometimes in potassium (syenitic rocks). In the gabbroic rocks, the negative correlation between iron and magnesium does not exist, as aluminium takes the place of the iron.

Nickel, manganese and cobalt are leached from the limonite zone and re-precipitated in the intermediate, partially leached saprolite, equivalent to some of the “ochre estructural inicial” and “serpentina lixivada” in the local classification. Manganese is re-precipitated in the saprolite zone as complex black manganese, cobalt and nickel oxides (e.g., asbolane and lithiophorite). Nickel replaces magnesium in the leached serpentine (or more rarely chlorite), or is precipitated as a green-coloured garnierite, a variety of minerals usually dominated by nickel-rich talc, in veinlets in the same zone. Typically nickel grades are highest in the saprolite and progressively decrease above and below it.

Saprolite at the Moa Project is relatively rare in the northern deposits, but is more represented within the slopes of the Camariocas Sur and Norte. Typical saprolite consists of a zone of intercalated structural limonite and grey-green to yellow-green saprolitic clay displaying fairly well-preserved remnant mineral structures of the underlying ultramafic rocks. There is little nickel enrichment at the Moa Project.

The Moa-Baracoa peridotites contain variable amounts of gabbroic dykes and sills. Such bodies produce a markedly different soil profile, more akin to bauxite. They are red or orange in colour, and contain high Al_2O_3, and TiO_2 and low nickel contents. The high Al_2O_3 content is an undesirable element in the Moa Project metallurgical process.

7.4.2 Rocky Limonites

A phenomenon with important implications for mining is limonite containing a significant amount of bedrock or saprolite boulders. This “rocky” or “boulder” limonite was not found at Moa Occidental, and first started to be encountered in Moa Oriental as mining progressed to the south, upslope and towards the neighbouring Camarioca Norte concession. Based on the drill hole data and examination of outcrops in the Camariocas, it appears that rocky limonite will frequently be encountered during the mining of the Camarioca deposits.
Rocky limonite is difficult to identify on from drilling alone for two reasons:

1. Boulders are large but comprise a significant but subordinate proportion of the limonite and therefore have a small probability of being sampled.
2. Rock fragments tend to be rejected by augers and are therefore undersampled.

Even where mined, the fraction of rock in rocky limonite is not well known because, to date, the rocks have been rejected at the SPP and make little contribution to the truck and slurry samples used to characterise the mill feed composition.

Preliminary results suggest that ground penetrating radar (GPR) in conjunction with drilling may be able to outline some rocky limonite. GPR detects zones with abundant boulders. In Camarioca Norte, such bouldery zones are seen in most GPR profiles. Drill holes penetrating these zones in some cases penetrate limonite zones (instead of saprolite) suggesting this represents bouldery limonite. This methodology has been tested in regions of Moa Oriental where mining has confirmed the presence of rocky limonite, in an effort to determine if GPR can be used to assist with short-term production planning.

The abundance of rocks in rocky limonite appears to be greatest in the lower part of the limonite zone. These observations are consistent with the view that the rocky limonite originates from mass flow and mixing of bouldery saprolite and limonite due to the mid-Tertiary period of coastal and submarine erosion experienced by Moa Oriental and the Camarioca deposits to the south.

There is some evidence that rocky limonite will not be as abundant in Camarioca Norte as in Moa Oriental. The large limonite deposits in Camarioca Norte have a better development of saprolite below their central parts than do the Moa Oriental deposits. This is consistent with in situ development of the laterite profile, and not with significant accumulations of transported lateritic material.

7.4.3 Mineralisation Extents

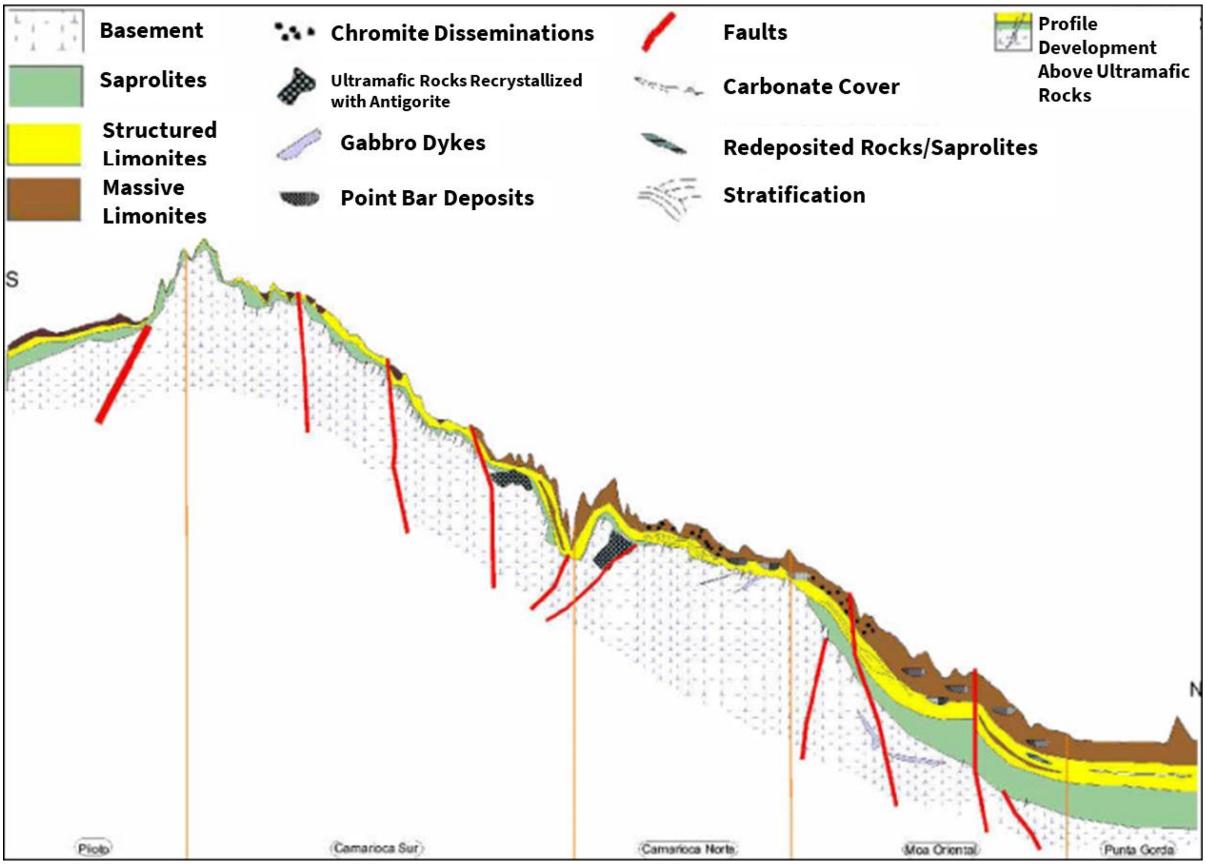
The length, width and average thickness of the mineralisation observed at each concession are detailed in Table 7.2.

Table 7.2: Mineralisation Extents by Concession

Concession	Mineralisation Extents			Mineralisation Style
	Length (km)	Width (km)	Average Thickness (m)	
Moa Oriental	4.8	3.8	8.4	Laterite profile with rocky limonite
Camarioca Norte	5.8	4.4	6.3	Laterite profile with rocky limonite
Camarioca Sur	6.2	6.5	5.5	Laterite profile with rocky limonite
Yagrumaje Oeste	2.4	3.2	5.3	Typical laterite profile
Santa Teresita	4.0	4.3	8.0	Typical laterite profile
La Delta	4.9	2.4	8.1	Typical laterite profile
Cantarrana	2.7	1.9	6.0	Typical laterite profile
Playa La Vaca	1.3	1.9	3.0	Typical laterite profile
Zona Septentrional III	1.6	3.2	11.1	Typical laterite profile
Zona Central	1.6	2.5	8.7	Typical laterite profile
Zona A, including Zona A Oeste	2.2	2.8	10.6	Typical laterite profile

Figure 7.4 shows a generalised and simplified cross-section through the deposits, with limonite shown in yellow and brown and saprolite shown in green. At low elevations, the limonite horizon is generally thicker and simpler, with fewer undulations caused by bedrock pinnacles and troughs. As one moves uphill from the flats near the coast, the overburden generally becomes thinner, and the limonite horizon becomes thicker and more erratic.

Figure 7.4: Generalised and Simplified Cross-Section through the Nickel Laterite Deposits Near Moa (Facing West)

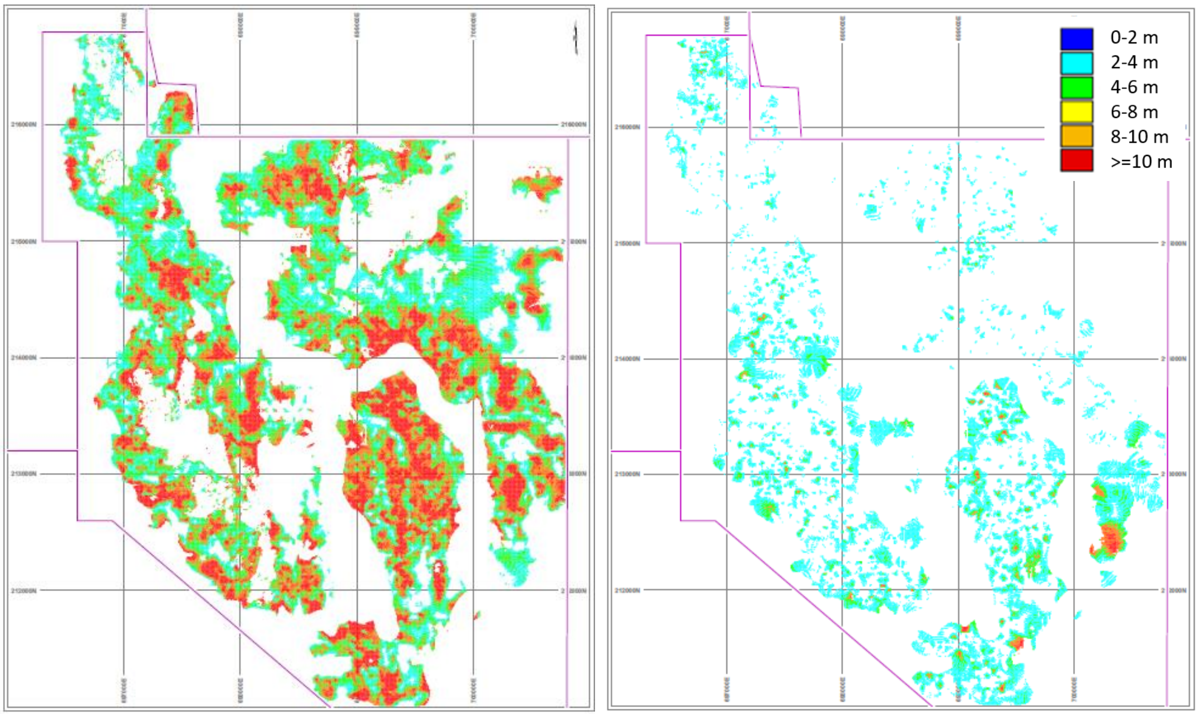


Source: ISMM (2007)

Examples of the orientation of the drilling in relation to the laterite profile are included in Figure 10.8 and Figure 10.10 for the Camarioca Sur area in Section 10.0.

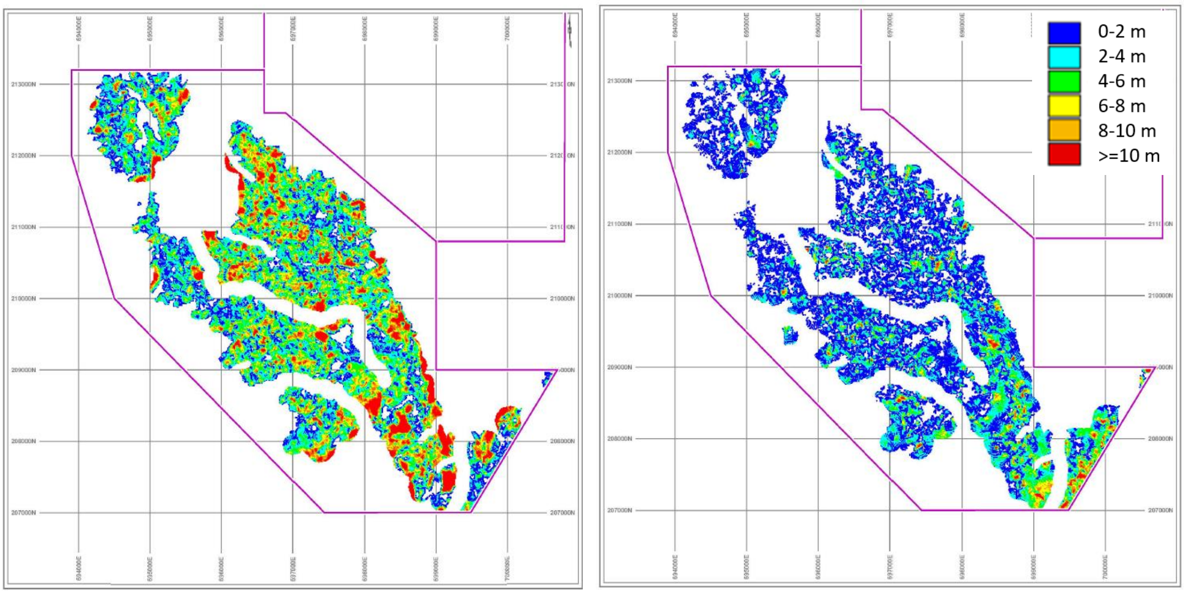
Figure 7.5 to Figure 7.12 display the thickness of limonite and saprolite layers for eight concessions to illustrate the changes in thicknesses observed. These thickness maps have been produced from the block models depleted at 31st December 2021 for the deposits (deposits already partially depleted are Camarioca Norte, Yagrumaje Oeste and Zona Septentrional).

Figure 7.5: Thickness at Camarioca Norte - Limonite (left) and Saprolite (right)



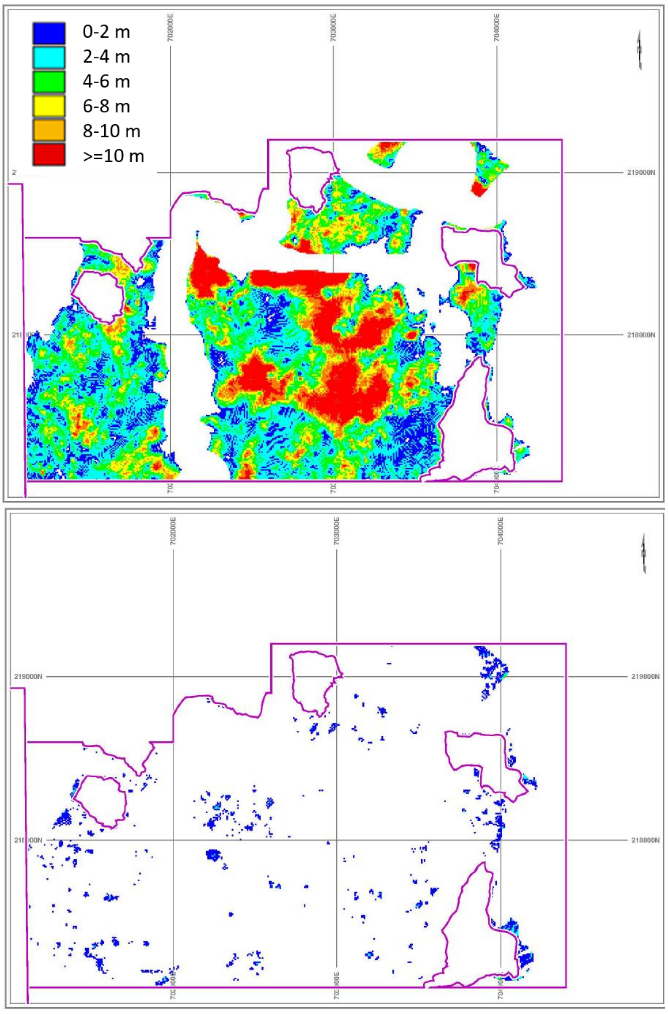
Source: RedDot3D (2022)

Figure 7.6: Thickness at Camarioca Sur - Limonite (left) and Saprolite (right)



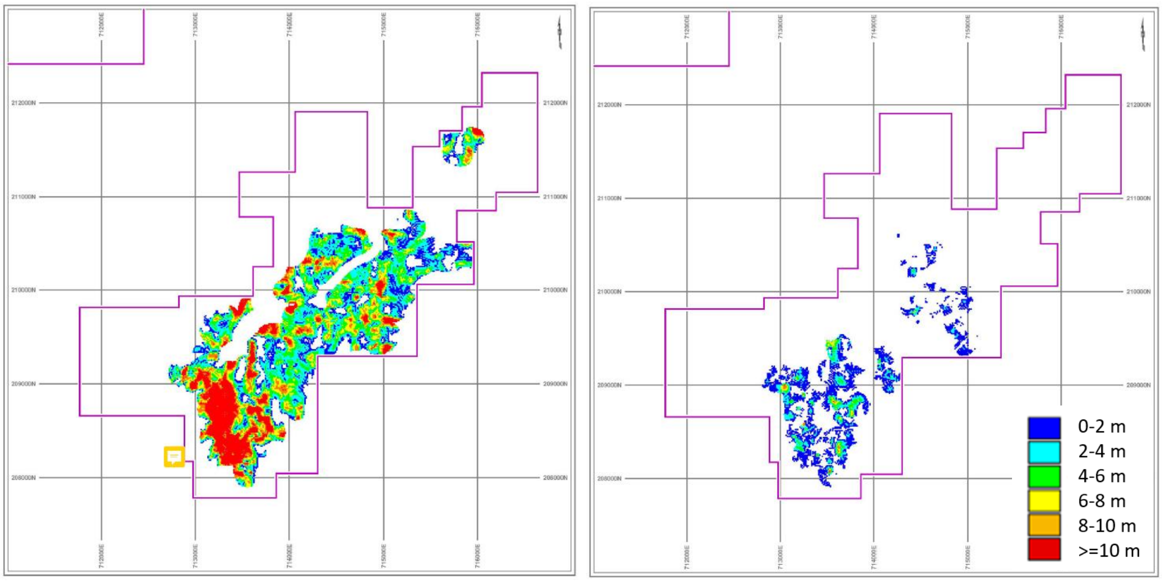
Source: RedDot3D (2022)

Figure 7.7: Thickness at Yagrumaje Oeste - Limonite (top) and Saprolite (bottom)



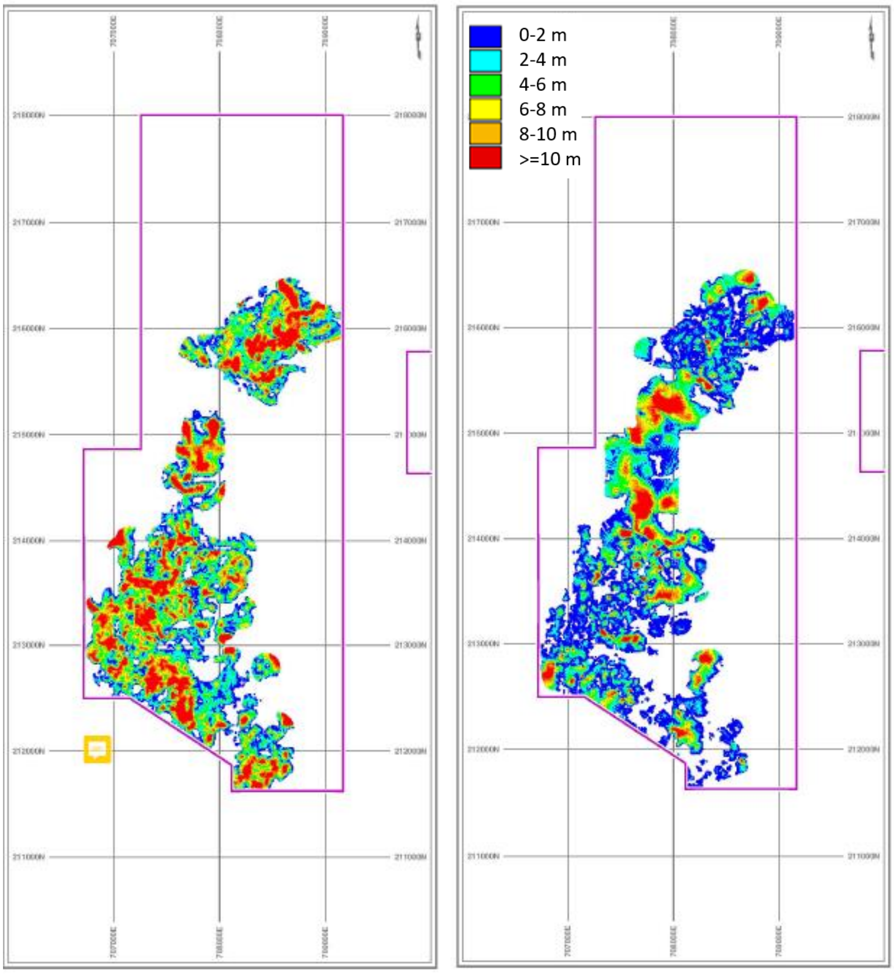
Source: RedDot3D (2022)

Figure 7.8: Thickness at Santa Teresita - Limonite (left) and Saprolite (right)



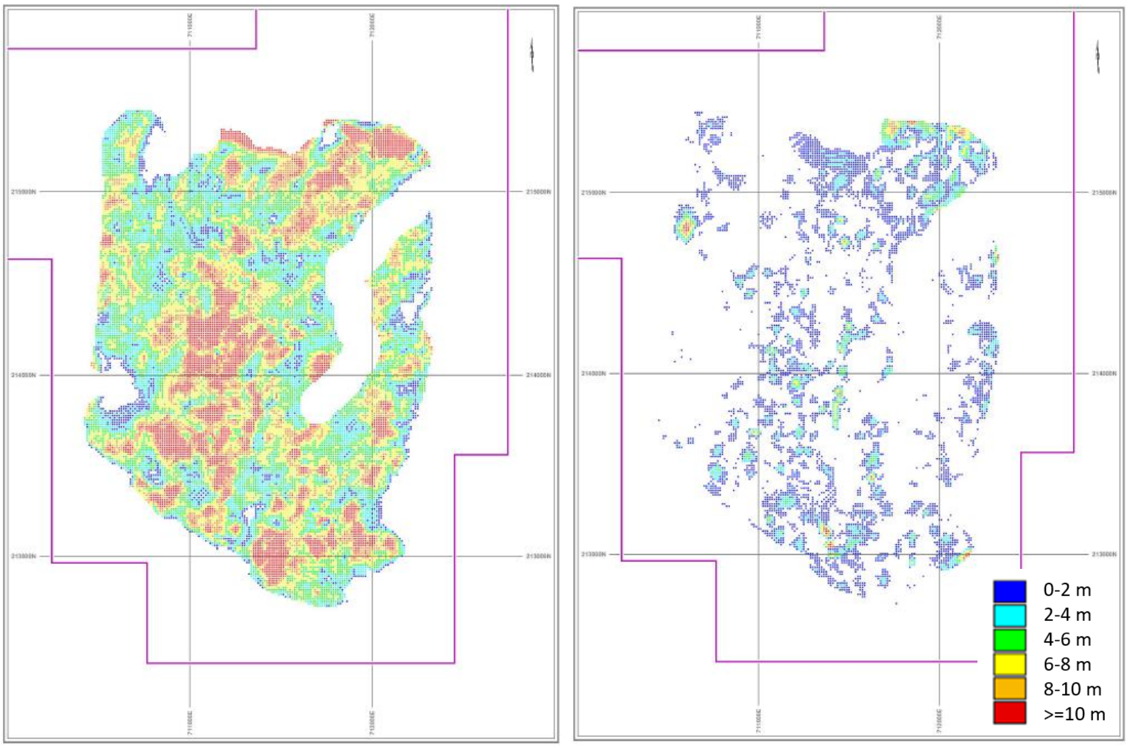
Source: RedDot3D (2022)

Figure 7.9: Thickness at La Delta - Limonite (left) and Saprolite (right)



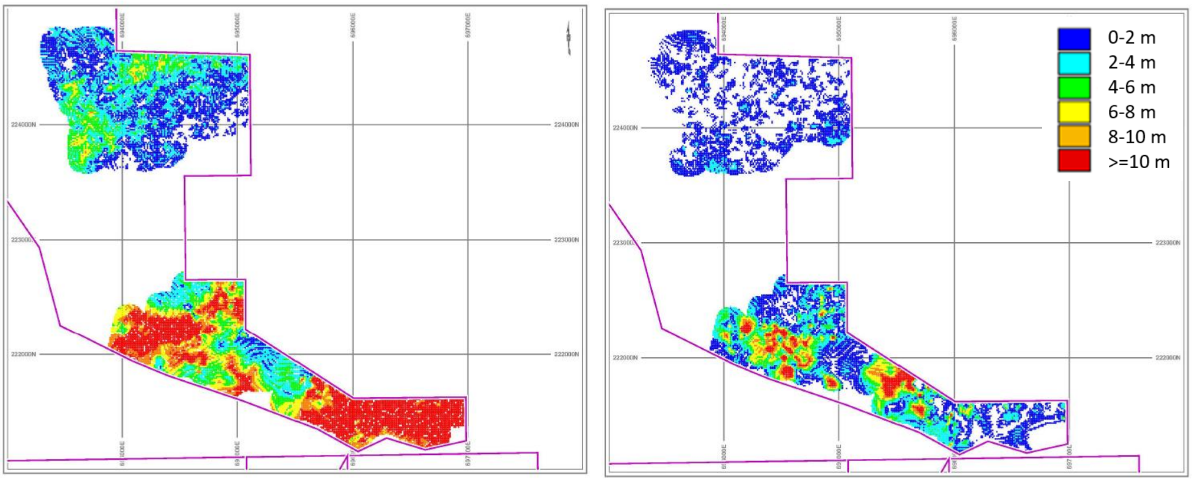
Source: RedDot3D (2022)

Figure 7.10: Thickness at Cantarrana - Limonite (left) and Saprolite (right)



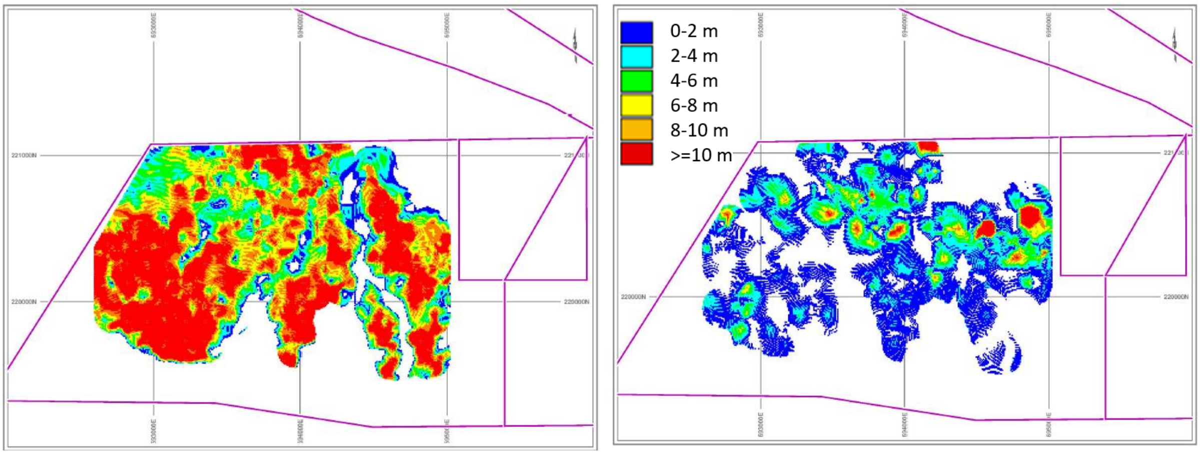
Source: RedDot3D (2022)

Figure 7.11: Thickness at Playa La Vaca and Zona Septentrional III - Limonite (left) and Saprolite (right)



Source: RedDot3D (2022)

Figure 7.12: Thickness at Zona Central - Limonite (left) and Saprolite (right)



Source: RedDot3D (2022)

8.0 DEPOSIT TYPES

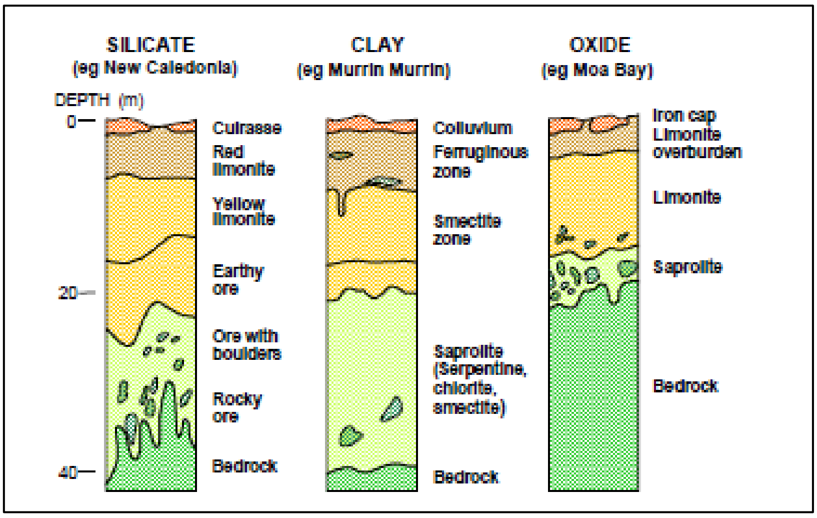
Nickel laterite is the product of lateritisation of magnesium-rich or ultramafic rocks which have primary nickel contents of 0.2 Ni% to 0.4 Ni% (Golightly, 1981). Such rocks are generally dunites, harzburgites and peridotites occurring in ophiolite complexes, and to a lesser extent, komatiites and layered mafic-ultramafic intrusive rocks in cratonic platform settings (Brand et al., 1998).

The process referred to as "lateritisation" is essentially chemical weathering taking place in seasonally humid climates over long periods of time in conditions of relative tectonic stability, allowing the formation of a thick regolith with distinctive characteristics. In summary, the process involves the breakdown of primary minerals and the release of some of their chemical components into groundwater, the leaching of mobile components, the residual concentration of immobile or insoluble components, and the formation of new minerals which are stable in the weathering environment. The net effect of the mineral transformations and the differential mobility of elements involved produces a stratified or layered mantle of weathered material overlying the parent rock from which it was formed, which is generally referred to as the "laterite profile". The processes, and the character of the resulting laterite, are controlled on regional and local scales by the dynamic interplay of factors such as climate, topography, tectonics, primary rock type and structure.

Despite the complexity and interplay of controls, there are a number of broad features of the laterite profile that are common to most examples, and it is possible to describe the range of laterite types formed over ultramafic rocks in terms of three main categories on the basis of the dominant mineralogy developed in the profile (Figure 8.1):

- **Oxide laterites**: Comprised largely of iron hydroxides and oxides in the upper part of the profile, overlying altered or fresh bedrock;
- **Clay laterites**: Comprised largely of smectitic clays in the upper part of the profile; and,
- **Silicate laterites**: Comprised of hydrated magnesium-nickel silicates (serpentine, garnierite) occurring deeper in the profile, which may be overlain by oxide laterites.

Figure 8.1: Schematic Comparison of Principal Laterite Profile Types



Source: Elias (2002)

The Moa deposits are considered to be the best-known example of the oxide type of nickel laterites (Gleeson et al., 2003).

In the presence of water, primary rock-forming minerals (mainly olivine and/or serpentine, orthopyroxene and less commonly clinopyroxene) break down by hydrolysis, releasing their constituents as ions into aqueous solution. Olivine is the most unstable mineral and is the first to be weathered; in humid tropical environments the Mg^{2+} is totally leached and lost to groundwater, and silicon is largely leached and removed. Fe^{2+} is also released but is oxidised and precipitated as ferric hydroxide, initially amorphous or poorly crystalline, but progressively recrystallising to goethite which forms pseudomorphs after olivine. Orthopyroxene and serpentine hydrolyse after olivine, also releasing magnesium, silicon and being replaced by goethitic pseudomorphs. Initially, while co-existing ferro-magnesium minerals remain unweathered and support the rock fabric, the transformation is isovolumetric and primary rock textures are preserved, but as the extent of destruction of primary minerals increases, relict primary textures are lost by collapse and compaction of the fabric resulting in a textureless massive goethite. The mineralogical transformation involving loss of magnesium and residual concentration of iron results in the obvious and familiar chemical trend in laterites of magnesium contents decreasing upwards and iron contents increasing upwards through the laterite profile.

Nickel and cobalt behave differently to the major elements. Nearly all of the original nickel and cobalt in the ultramafic bedrock occurs in solid solution in olivine and olivine-derived serpentine. As these minerals break down, the released nickel and cobalt ions have a chemical affinity for the newly formed poorly-crystalline iron hydroxides and are incorporated and concentrated into their structure by a combination of adsorption and replacement of Fe^{3+}.

Concentrations of 1.5 Ni% and 0.1 Co% are seen in massive goethite developed from olivine containing original concentrations of 0.3 Ni% and 0.02 Co%. Nickel and cobalt are also incorporated strongly into manganese oxides (asbolanes) where these are precipitated by redox reactions as veins and surface coatings on minerals and in fractures.

The first-formed iron hydroxides resulting from the breakdown of ultramafic minerals are amorphous or poorly crystalline. Their crystallinity improves with time to well-structured goethite with a characteristic yellow-brown colour, which is progressively replaced by red-brown hematite as the goethite dehydrolises. The colour change is reflected in the commonly used terminology of “yellow limonite” and “red limonite” for the lower and upper parts of the “limonite” zone, respectively. The transformation of goethite to hematite is accompanied by a loss of nickel, as hematite cannot accommodate in its lattice the nickel formerly contained within the goethite. At the very top of the profile, a nodular fabric develops in the red limonite, which develops further to an indurated crust as the nodules coalesce and harden. This crust is known as ferricrete or iron crust.

It is the opinion of the QP that the Moa deposit has a similar genesis as described above and it is applicable to the project area and suitable for exploration programme designs.

9.0 EXPLORATION

9.1 INTRODUCTION

Exploration activities on the Moa Project, other than drilling and pitting, have included topographic surveys, drone surveys, hydrogeological studies, geological mapping and geophysical surveys with GPR. These activities have been conducted in order to better understand the geology and hydrogeology of the deposits, not to identify new mineral occurrences or targets. Exploration work was commissioned before 1995 by the Cuban state, and since 1995 the exploration work has been commissioned by the Moa JV through Moa Nickel.

9.2 GRIDS AND SURVEYS

9.2.1 Topographic Surveys

Topographic surveys were completed in different campaigns to locate exploration drill hole collars. Most of the topographic surveys have been executed by Moa Nickel contractors, GEOCUBA Oriente Sur (GEOCUBA) and Geominera. Topographic surveys are completed using digital total stations (e.g. Leica TC805 and TS 06). Surveys are connected to geodesic points surveyed and monitored by the Instituto Cubano de Geodesia y Cartografía (ICGC).

Topographic surveys are also completed by Moa Nickel on a daily basis in areas with active mining, using digital total stations. The company surveys are intended to deplete mined material and only account for the base of the mined surfaces, and not for in-pit dumped material such as waste dumps, mining roads or stockpiles.

9.2.2 Drone Surveys

Surveying with drones has been tested in 5 Bloques (known as Transfer Zona Sur Pilar) and in a sector of the Moa Oriental. Following these initial tests and recommendations from Micon, a further six drone surveys were flown over Camarioca Norte, Zona A and Transfer Zone Sur Pilar, with the goal of delineating stockpiles at the end of December 2022. The quality of the surveys is satisfactory and calculations of the volume of material contained in the stockpiles is within an acceptable margin of the volumes reported by the mine.

9.2.3 Digital Elevation Models

The current digital elevation models of the Moa Project are a combination of topographic surveys completed for exploration and exploitation in different time periods and may not be accurate outside the drilled region. The actual topography does not include the material that has been remobilised. It was recommended by previous consultants, and again by Micon that the topography should be updated using light detection and ranging (LiDAR) methods or a similar technology. This technique has been tested GEOCUBA in Playa La Vaca-Zona Septentrional and a full LiDAR survey is scheduled to be conducted across the Moa Project during 2023.

9.2.4 Steep Slope Surveys

In this Report, steeper slopes >10° are determined from a regional satellite topography grid, the Advanced Land Observing Satellite (ALOS) data from the Japanese Space Agency (JAXA) that provides elevation values approximately every 30 m on the ground. This regionally consistent topography data allows a reliable determination of the slope from a single source of information.

Micon recommends that surveys of the open-pits, waste dumps and stockpiles are completed at the end of every month, and that the haulage roads are surveyed in 3D. Micon also recommends that depletion of mined material is performed using 3D solids, discounted from a master topography.

9.3 HYDROGEOLOGY EXPLORATION

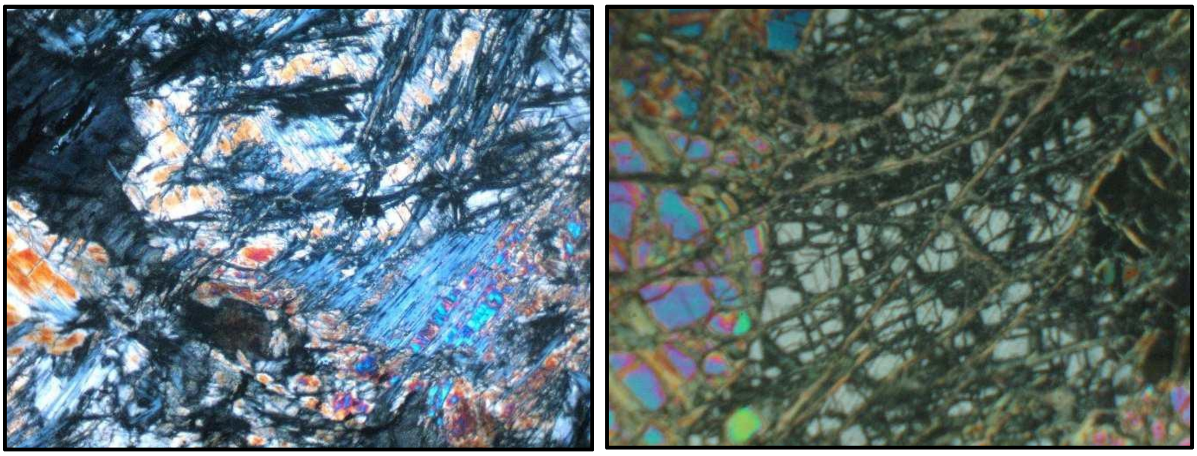
Hydrogeology studies were completed by Geominera Oriente for all the deposits after 2012, including Camarioca Sur, the Satellite deposits, and Playa La Vaca-Zona Septentrional. The studies included measurements of the water level in the hydrogeological wells, and in some ordinary drill holes; pumping and permeability tests on hydrogeological drill holes; streamflow measurements of the main surficial streams crossing the property; and chemical assays of underground and surface waters.

9.4 GEOLOGICAL MAPPING

Geological mapping after 1995 has been completed by the Centro Internacional de la Habana S.A (commissioned by Moa Nickel), consisting of professionals and professors of the local university. Field work was completed along accessible outcrops and cleared paths prepared for drilling. A total of 270 km of traverse has been completed in Camarioca Sur (5,145 points documented for a density of 620 points per square km), 13.75 km in Playa La Vaca-Zona Septentrional (262 points documented for a density of 19.0 points per square km), 20 km in Santa Teresita (363 points documented for a density of 18.6 points per 9 square km), 57 km in La Delta (1,108 points documented for a density of 73.6 points per square km), and 88 km in Cantarrana (1,670 points documented). Outcrop samples were collected, documented, and used for mineralogical and petrographical studies, along with samples collected from drill holes (Figure 9.1). A total of 65 samples were taken from rock outcrops at La Delta, with 24 of them selected for petrographic analysis. 34 rock samples were also taken at Cantarrana, of which 26 were selected for petrographic analysis. Geological maps were created, also using supplemental information from drill hole data.

Historical mapping and reports completed in 1970s campaigns (e.g. in Camarioca Sur and Norte) were reviewed and reinterpreted by Moa Nickel after 1995. Historical mapping included mapping of the basement and studies on paleontological samples that were used to investigate the energy of the redeposition of non-in-situ limonite (López-Martínez et al., 2008).

Figure 9.1: Examples of Thin Sections from Camarioca Sur Showing Harzburgite with Serpentinisation (Cross-Polarised Light)

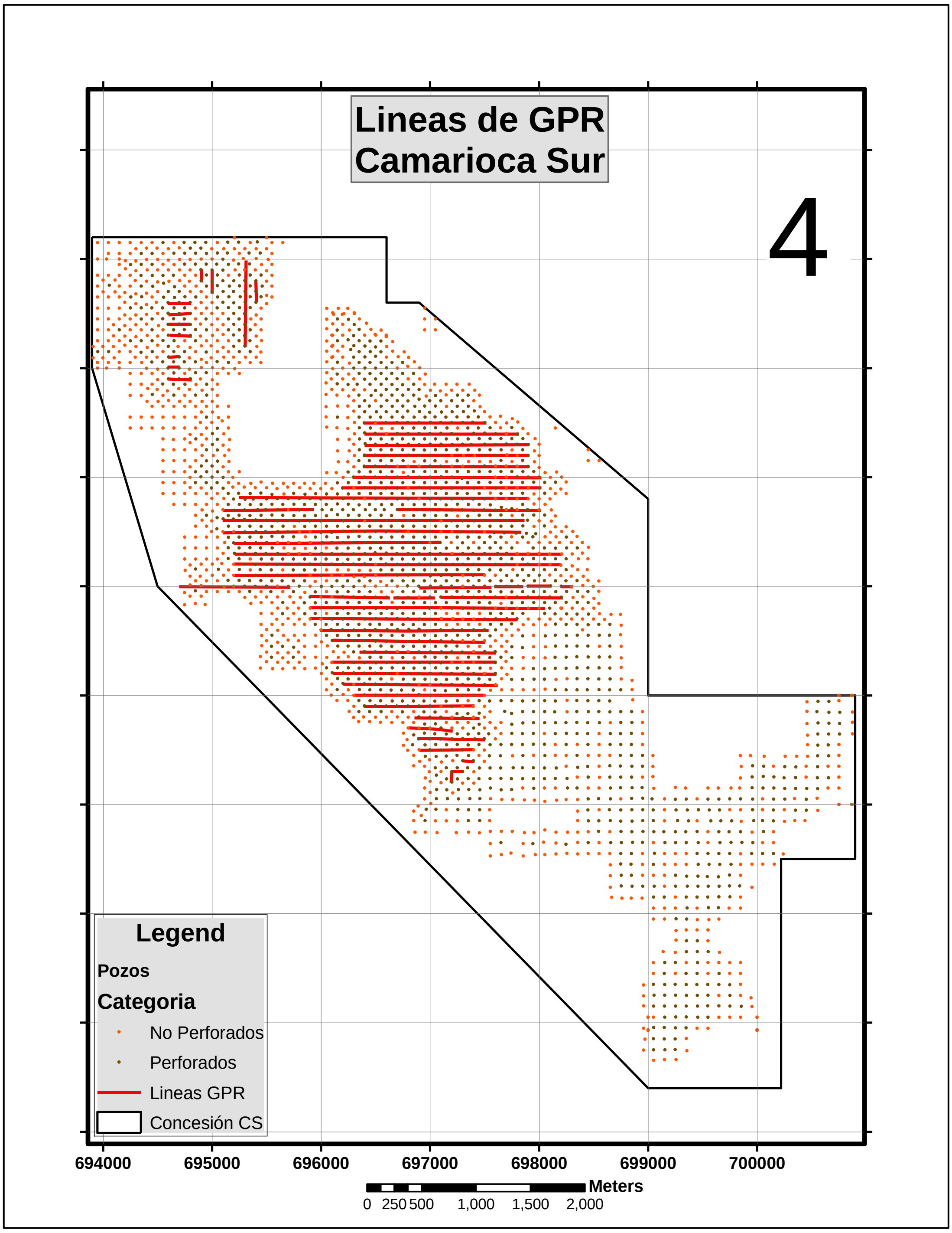


Source: Elias et al. (2019)

9.5 GEOPHYSICAL SURVEYS

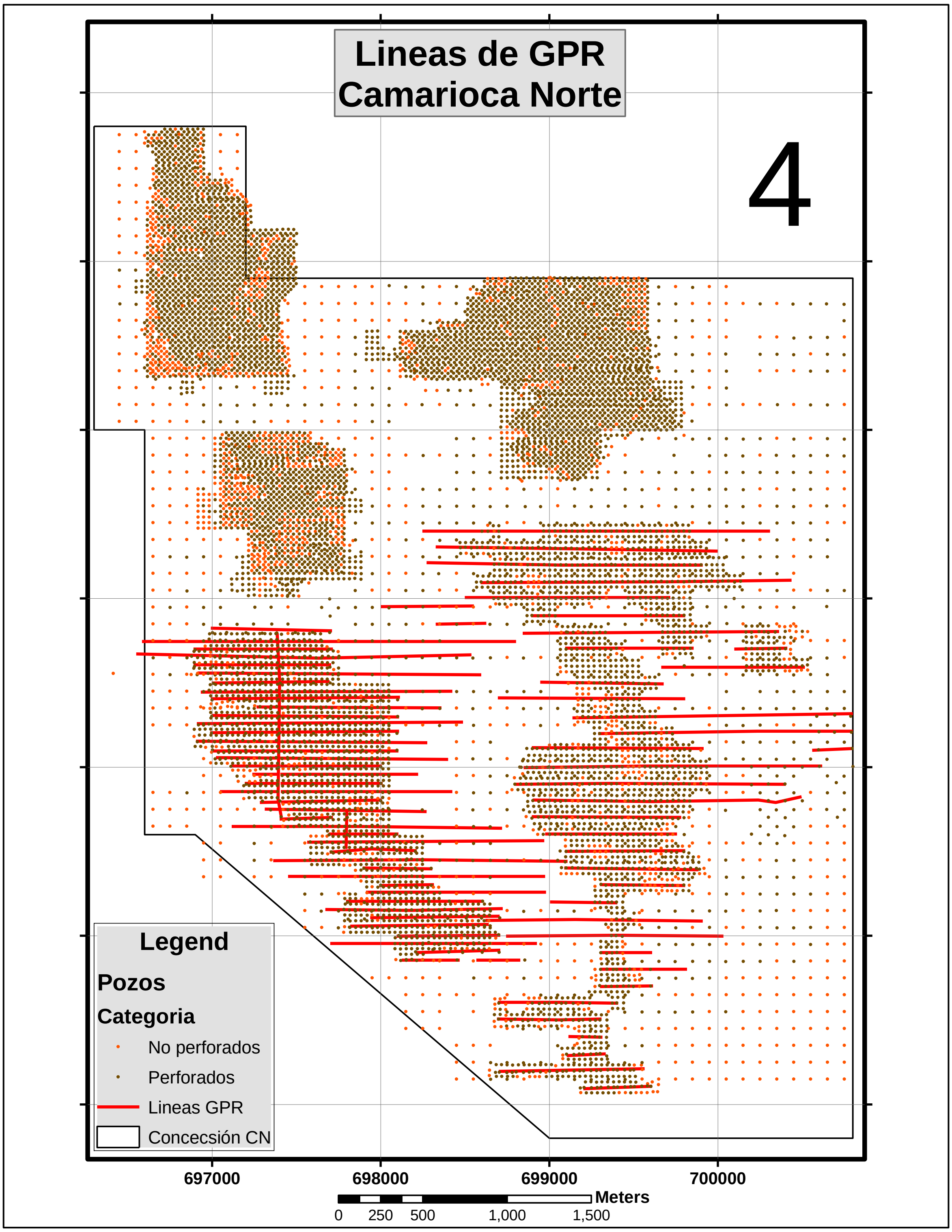
Approximately 150 km of GPR lines were acquired and interpreted in Camarioca Sur and Norte by GroundProbe Pty Ltd (GroundProbe) around 2005 and 2006. The survey used a 50 MHz towed antenna system, which GroundProbe claims was designed specifically for the laterite electrical properties. GPR lines were completed along parallel lines 100 m and 50 m apart and their locations are shown in Figure 9.2 and Figure 9.3.

Figure 9.2: Location of GPR Lines Completed at Camarioca Sur



Notes: Pozos: drill holes, no perforados: planned but not drilled, perforados: drilled, Lineas GPR: GPR lines, Concesión CS: concession boundary Camarioca Sur
Source: Moa Nickel (2006)

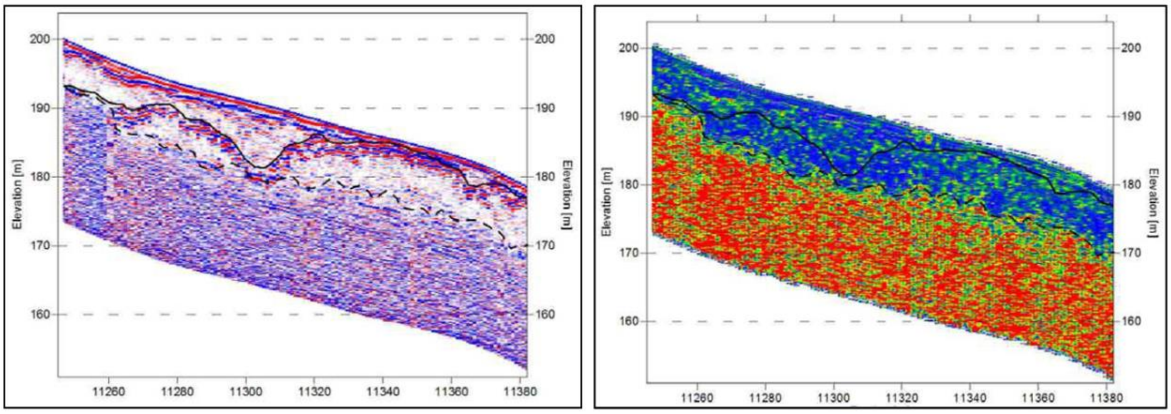
Figure 9.3: Location of GPR Lines Completed at Camarioca Norte



Notes: Pozos: drillholes, no perforados: planned but not drilled, perforados: drilled, Lineas GPR: GPR lines, Concesión CN: concession boundary Camarioca Norte
Source: Moa Nickel (2006)

The GPR survey was used to predict a high-resolution surface contact between the laterites and the bedrock, and the contact between the limonite and saprolite, along GPR lines. The resulting surfaces were corrected using drill hole data. As illustrated in Figure 9.4 only a low-resolution lithological contact between GPR lines was obtained; and for this reason, GPR lines were not used in interpreting profile changes in the geological model at this time.

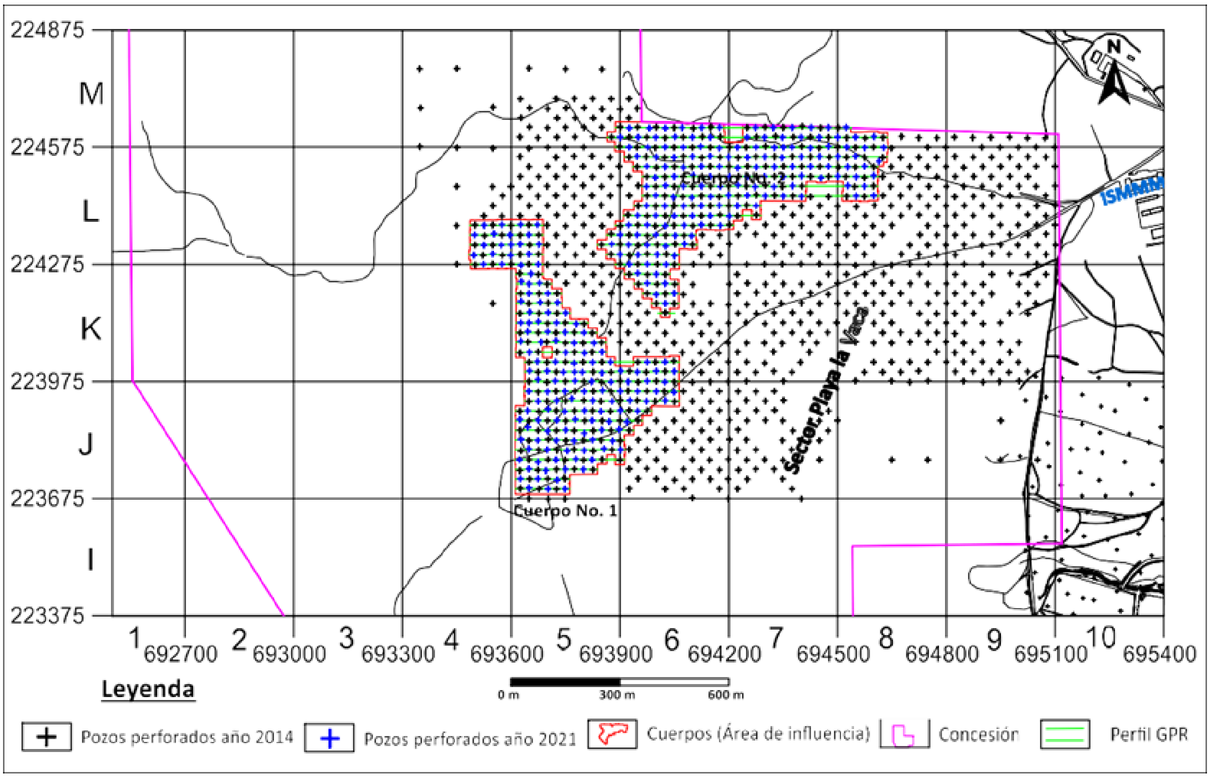
Figure 9.4: Example of True Relative Amplitude and Instantaneous Polarity Plots Showing Interpretations of the Base of the Bedrock and the Rocky Saprolite



Source: Elias et al. (2019)

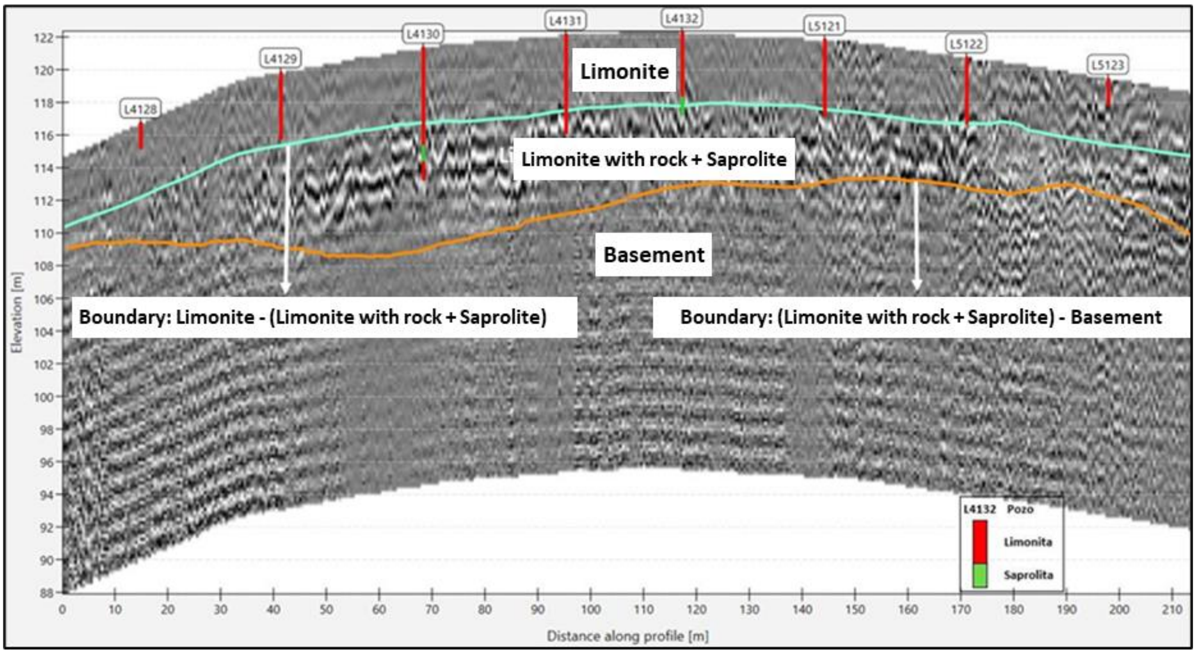
In 2022, a more detailed GPR survey was trialled at Playa La Vaca where 60 km of east-west parallel lines 25 m apart were completed (Figure 9.5). The results of one profile are illustrated in Figure 9.6.

Figure 9.5: Location of GPR Lines Conducted at Playa La Vaca



Notes: Pozos perforados año 2014: drill holes 2014, Cuerpos (Area de influencia): mineralised bodies (areas) Concesión: concession boundary, Perfil GPR (GPR lines).
Source Moa Nickel (2022)

**Figure 9.6: GPR Geophysics Radargram Profile
(performed by Jan Francke, Groundradar Studio)**



Source: Moa Nickel (2022)

The boundary interpretations depicted in turquoise and orange were used to generate the limonite bottom and basement roof surfaces that were then used to update the block model to delimit the areas of limonite containing rock fragments. Micon is of the opinion that these more closely spaced GPR surveys could be used to aid geological modelling prior to resource estimation, but in conjunction with deeper drilling that targets all types of altered material. Following more thorough validation of the technique using drill hole data, trenching, and ultimately mining, GPR is believed by Micon to be a useful supporting tool to guide exploration.

9.6 EXPLORATION PITS

Exploration pits (or “criollo pits” or criollo holes”) are usually contracted to Geominera and are dug with 1.5 m x 1.5 m squared sides and a variable depth, but generally cut through almost the entire lateritic section. The location of the pits is planned to cover the entire area of the deposit. Exploration pits are placed 0.5 m from ordinary drill holes, so that the data gathered from the pit can be compared to the data and interpretations made from the drill hole. The number of pits per deposit may vary from one concession to another. Pit locations, labelled as “density pits” are included in the drill collar location figure, Figure 10.2, in Section 10.0. The exploration pit walls are carefully mapped. Monologic squared samples are extracted from four vertical trenches in the walls without altering the volume of the material in its natural state, wrapped in plastic, and sent to the laboratory in Santiago de Cuba for density measurement. Figure 9.7 shows an example of an exploration pit, taken during a previous consultant’s site visit, as none were in progress during the QP’s visit.

Figure 9.7: Camarioca Sur Exploration Pit Example
Left: Markdown of an Exploration Pit Located next to Drill Hole (X=696404.44, Y=211407.50)
Right: Same Exploration Pit after Sample Trenches Excavated in the Pit Walls

Source: Elias et al. (2019)

9.7 MINERALOGY

In 2008, using material from “criollo” pits and from cores drilled for bulk density tests, Geominera examined several hundred samples using X-ray diffraction (XRD) and optical methods. A total of 285 of these samples were from the Moa Occidental and Moa Oriental concessions; and 421 were from the Camarioca Norte and Camarioca Sur concessions. Samples were representative of all lithologies and mineralisation types. Table 9.1 summarises the principal minerals detected Table 9.2 gives the average composition of the mineralogical samples in the main lithologies at the Moa Project that were used to help design the process flow.

Table 9.1: Principal Minerals Identified by Geominera by XRD

Mineral	Chemical Formula	Mineral	Chemical Formula
Serpentine	$(Mg\ Fe,Ni)_3Si_2O_5(OH)_4$	Lithiophorite	$Al,Li,MnO_2(OH)_2$
Montmorillonite	$(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot n(H_2O)$	Chrome Spinel	$(Fe,Mg)\ (Cr,Fe)_2O_4$
Kaolinite	$Al_2Si_2O_5 \cdot 11(H_2O)$	Hematite	Fe_2O_3
Nontronite	$Na_{0.3}Fe_2(Si,Al)_4O_{10}(OH)_2 \cdot n(H_2O)$	Maghemite	Fe_2O_3
Gibbsite	$Al(OH)_3$	Trevorite	$NiFe_2O_4$
Goethite	$FeO(OH)$	Willemseite	$(Ni,Mg)_3Si_4O_{10}(OH)_2$
Magnetite	Fe_3O_4	Chlorite	$Mg_6Si_4O_{10}(OH)_8$
Asbolane	$(Co,Ni)_{1-y}\ (MnO_2)_{2-x}\ (OH)_{2-2y} + 2x.n(H_2O)$	Enstatite	$Mg_2Si_2O_6$

Table 9.2: Average Mineralogical Composition of the Major Lithologies (based on XRD and Optical Analysis of 136 Samples from the 2008 Drilling Programme)

Lithology	Serpentine (%)	Clay* (%)	Gibbsite (%)	Goethite (%)	Magnetite (%)	Chromite (%)	Asbolite (%)	Hematite (%)	Maghemite (%)
OICP	3.3	8.2	15.5	55.0	3.6	8.3	0.6	2.7	1.7
OISP	3.7	7.2	14.0	60.3	2.3	6.9	0.5	2.5	1.5
OEF	3.7	7.4	13.1	59.5	2.7	7.3	1.2	2.4	1.6
OEI	21.2	15.8	7.5	39.6	3.3	7.6	0.8	0.9	1.5
SL	54.4	23.2	1.6	8.5	5.1	4.6	0.0	0.0	0.2
CG	6.3	35.0	36.2	16.6	1.1	1.5	0.0	0.8	0.4

Note: *Clay includes all of the minerals in the kaolinite group.

10.0 DRILLING

10.1 INTRODUCTION

There are three main categories of exploration drilling at the Moa Project made up of exploratory drill holes, mineralogical drill holes, and basement drill holes. There are also exploration pits, which are the only source of bulk samples used for density measurements that are subsequently used in the resource estimation, and hydrogeological drill holes which are not described in this section. The exploration database contains 52,648 drill holes totalling 509,707 m drilled up to 31st December 2022 (Table 10.1).

Table 10.1: Exploration Drill Hole Database up to end of December 2022

Concession or Deposit Area	No. of Drill Holes	Metres (m)	Common Spacing between Drill Holes (m)
Moa Oriental	13,025	128,913	33 x33, 25 x 25, 16 x 16
Camarioca Norte	8,891	77,928	100 x 100, 33 x 33, 25 x 25
Camarioca Sur	9,756	74,598	35 x 35, 33 x 33, 25 x 25, 16 x 16
Yagrumaje Oeste	4,884	33,355	33 x 33, 25 x 25
Santa Teresita	943	7,240	100 x 100, 35 x 35
La Delta	2,047	21,795	100 x 100, 35 x 35
Cantarrana	2,636	21,830	300 x 300, 100 x 100, 35 x 35
Zona Septentrional	1,408	19,381	100 x 100, 25 x 25
Playa La Vaca	1,197	4,773	100 x 100, 35 x 35, 25 x 25
Zona Central	1,465	19,778	100 x 100, 33 x 33
Zona A y Zona A Oeste	4,065	59,073	33 x 33, 25 x 25, 16 x 16
11 Bloques*	2,331	41,045	16 x 16
Total	**52,648**	**509,707**	-

Note* This concession is now depleted.

All drilling completed between the period November 2018 to the end of December 2022 is documented in Table 10.2. Drilling at the La Delta concession began in late 2022, but is still in progress and therefore not reported as complete. Drilling at Camarioca Sur is planned for 2023 (950 holes of 6,650 m) and Figure 10.1 shows the area that is planned to be drilled.

The databases for 2022 drilling were not ready for input to Mineral Resource Estimation.

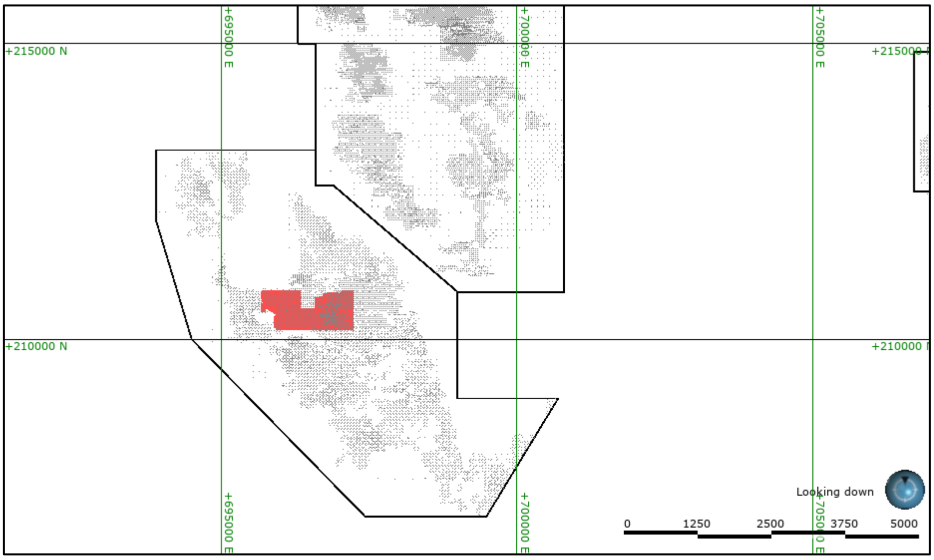
The new drilling data from 2019-2021 was completed for exploitation purposes as infill of previous grids on Camarioca Sur, Zona Septentrional and Playa La Vaca. The infill grids are all less than 40 m spacing, the threshold to classify Measured Mineral Resources, the impact of incorporating this new drilling in the estimation is expected to be insignificant.

Table 10.2: Drilling Completed between November 2018 and December 2022

Concession	Year	No. of Drill Holes	Metres (m)	No. of Assays	Depth			Common Spacing between Drill Holes
					Minimum (m)	Maximum (m)	Average (m)	
Moa Oriental	2022	323	1,211	1,306	1	14	3.7	33 x 33
Camarioca Norte*	2022	240	2,425	2,482	1	27.5	10.1	16 x 16
Camarioca Sur	2019	2,313	17,071	18,171	0.5	28	7.4	35 x 35, 16 x 16
La Delta	2022-23	In progress						25 x 25
Zona Septentrional	2020	698	8,708	8,954	1.5	33	12.5	25 x 25
Playa La Vaca	2021	287	1,380	1,449	1	10	4.8	35 x 35
Zona Central	2022	650	10,661	11,936	2.4	48	16.4	16 x 16
Zona A y Zona A Oeste *	2022	38	407	417	1	18	8.5	16 x 16
Total		**4,549**	**41,863**	-	-	-	-	-

Note: *Drilling carried out at Camarioca Norte and Zona A y Zona A Oeste in 2022 has not been verified by Micon as the databases are not yet finalised on site and only the planned drill holes collar locations were provided by Moa JV. These numbers therefore may change upon validation.

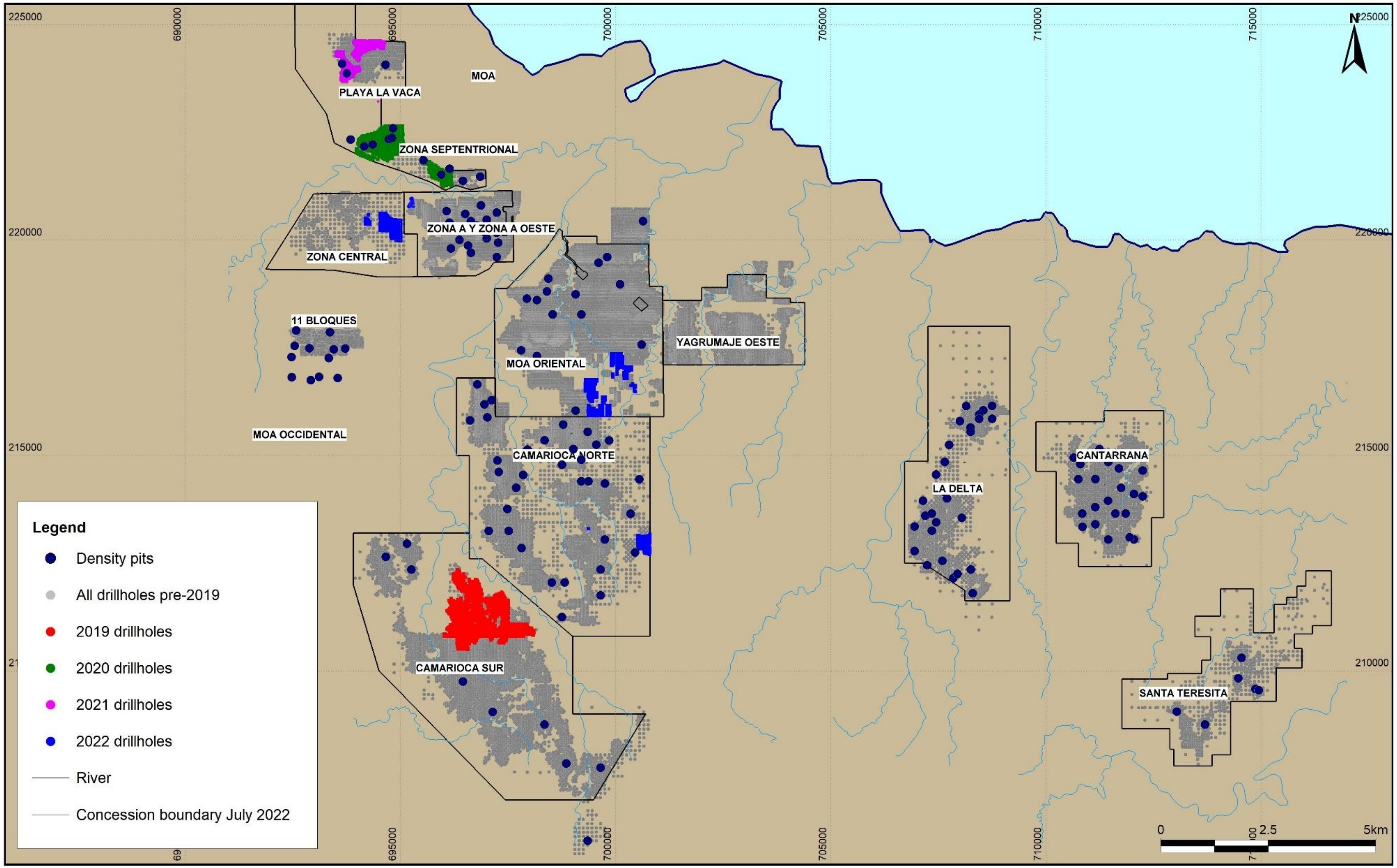
Figure 10.1: Area Planned to be Drilled (red) on a Grid of 16 m x 16 m at Camarioca Sur in 2023 (Grey is Existing Drilling)



Source: Micon (2022)

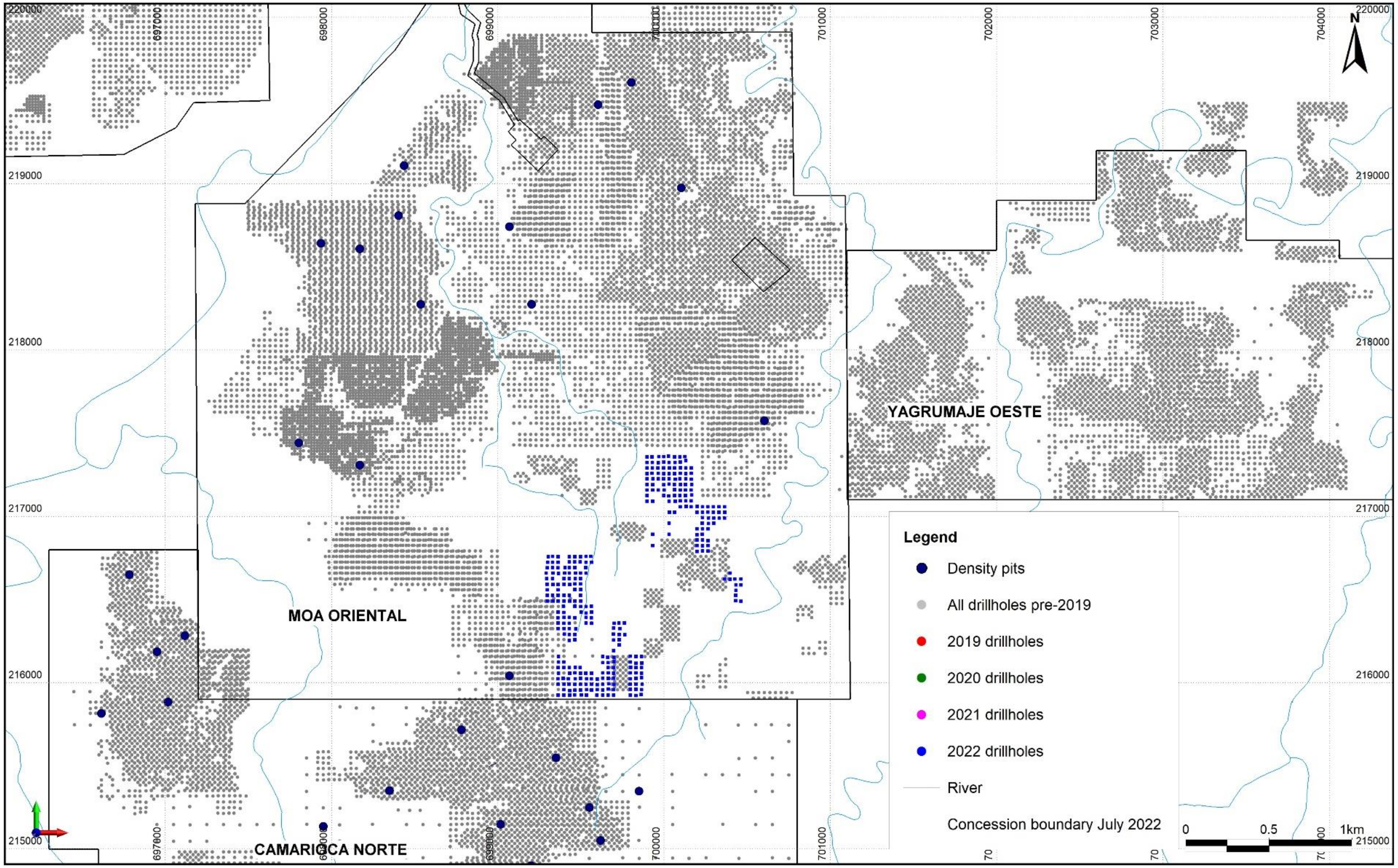
The spatial distribution of all exploration drill holes up to the end of December 2022 is shown in Figure 10.2. Separate location maps zooming on the concessions are provided from Figure 10.3 to Figure 10.7. All concessions have been drilled using regular spaced squared grids at varying densities, and generally aligned with an east-west axis. Drill hole grid spacing starts with a 300 m grid that is subsequently infilled to 100 m and 33.3 m (or 100/3 m) grid spacings. A final infill drill hole grid with a 16.6 m spacing (or 100/6 m) spacing is sometimes completed before mining and is commonly named the “mining grid”. However, there are drill holes at 16 m spacing that were drilled and assayed as regular exploration drill holes, using the same laboratories, sample preparation, and assaying protocols. There is also 35 m x 35 m drilling grid based on a diamond shape, or rotated square, infill grid of the 100 m grid.

Figure 10.2: Locations of Drill Holes Coloured by Year (November 2018 to December 2022) and Exploration (Density) Pits



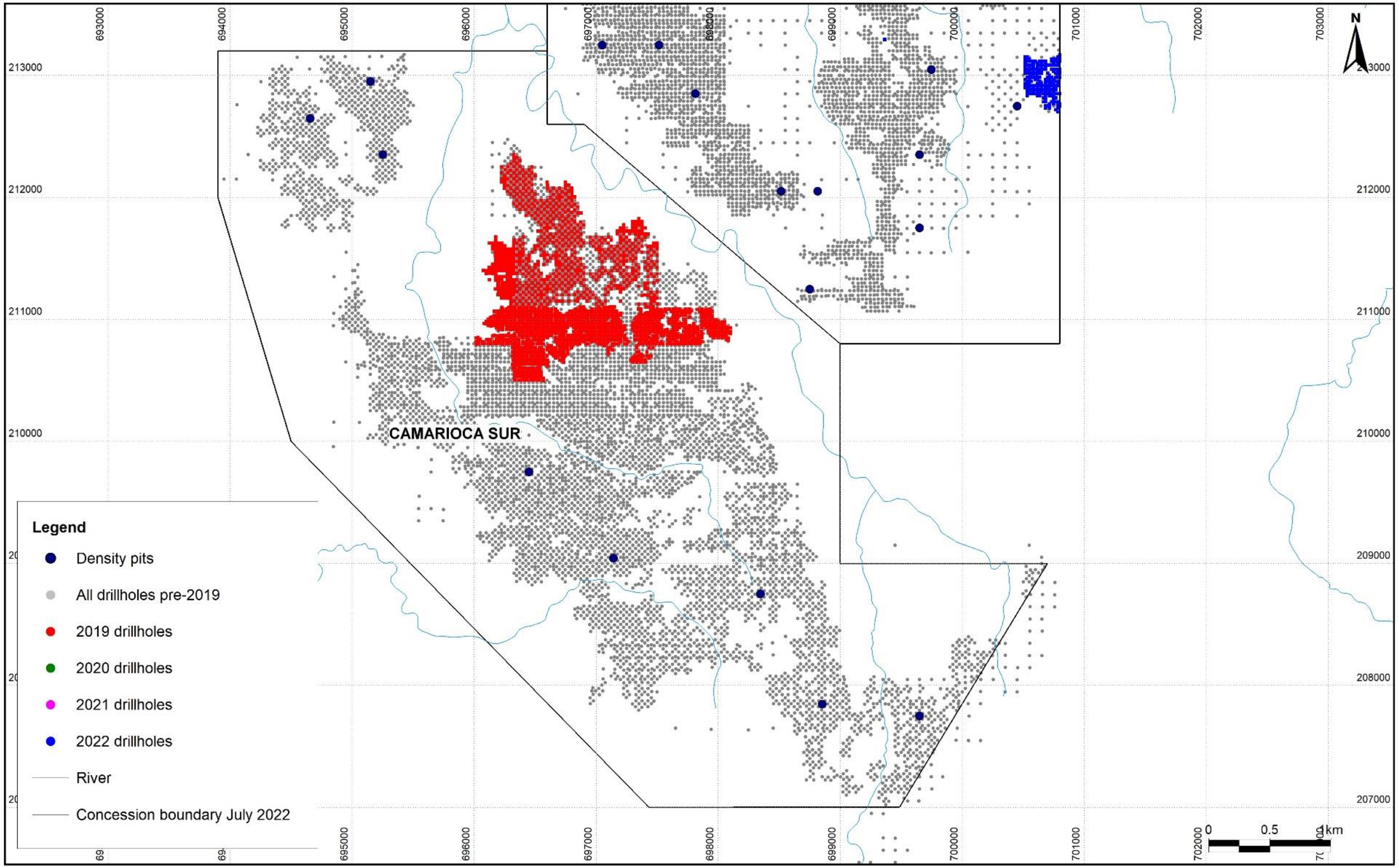
Source: Micon (2023)

Figure 10.3: Yagrumaje Oeste Location Map of Drill Holes and Exploration (Density) Pits



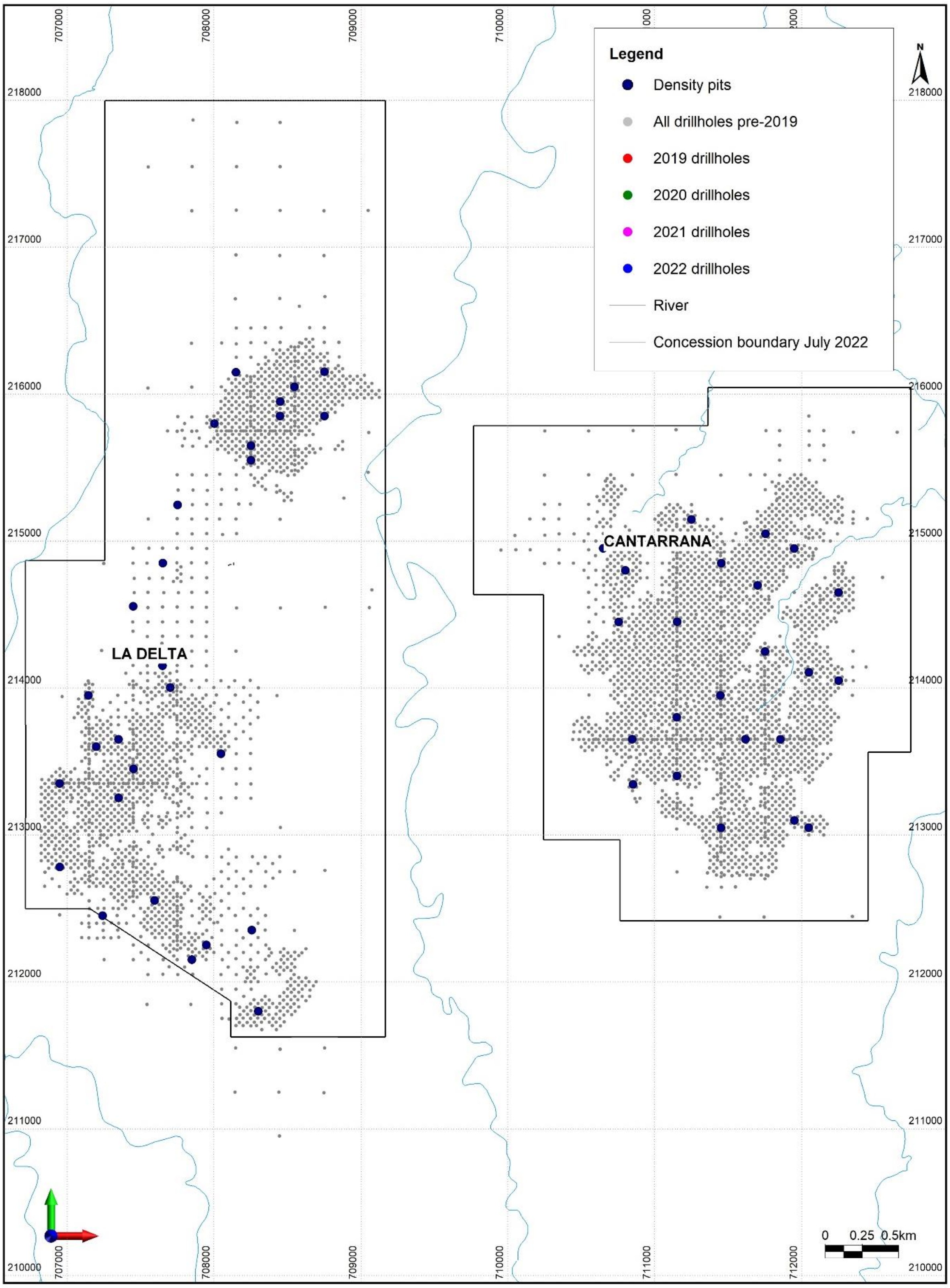
Source: Micon (2023)

Figure 10.4: Camarioca Sur Location Map of Drill Holes and Exploration (Density) Pits



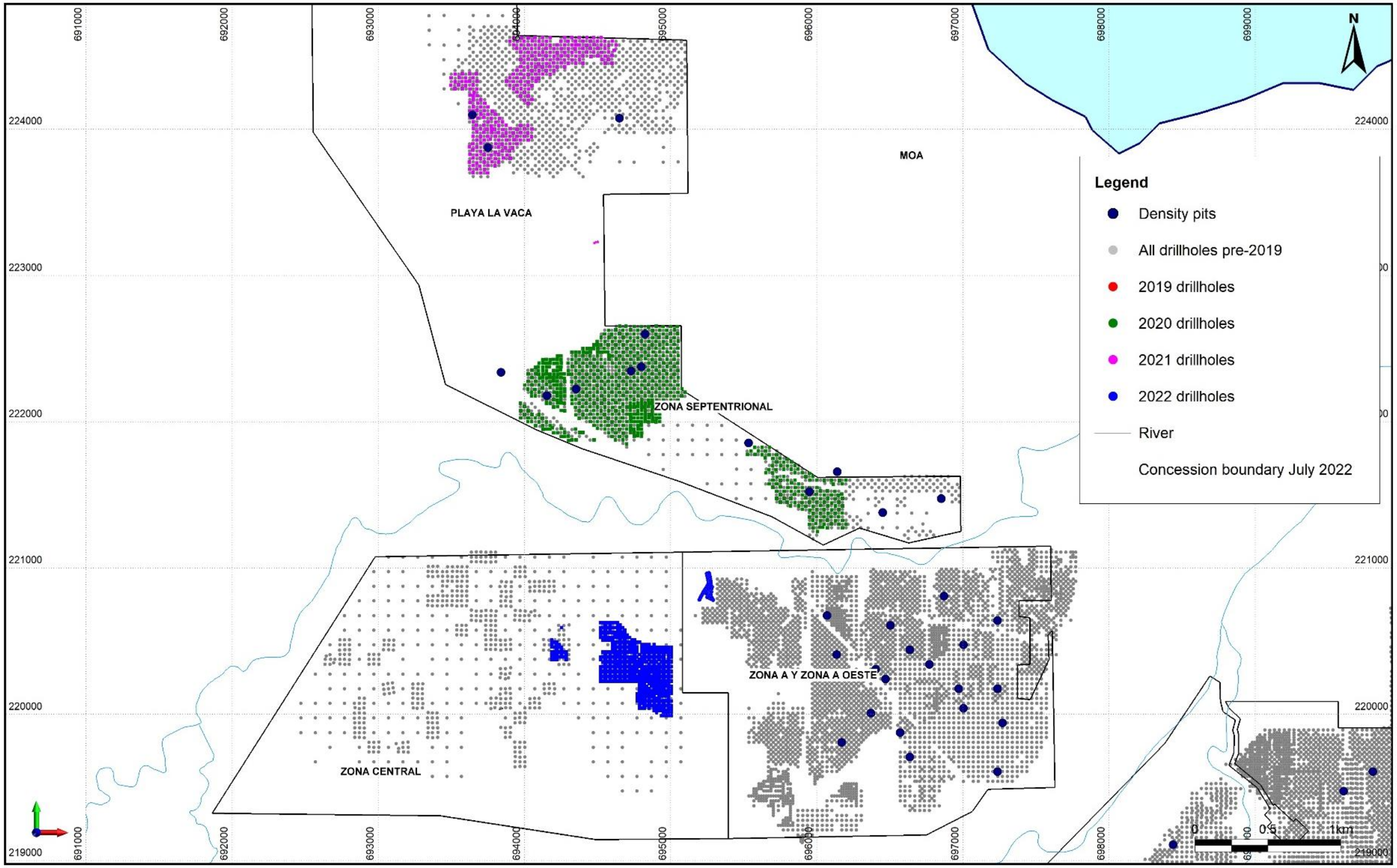
Source: Micon (2023)

Figure 10.5: La Delta and Cantarrana Location Map of Drill Holes and Exploration (Density) Pits



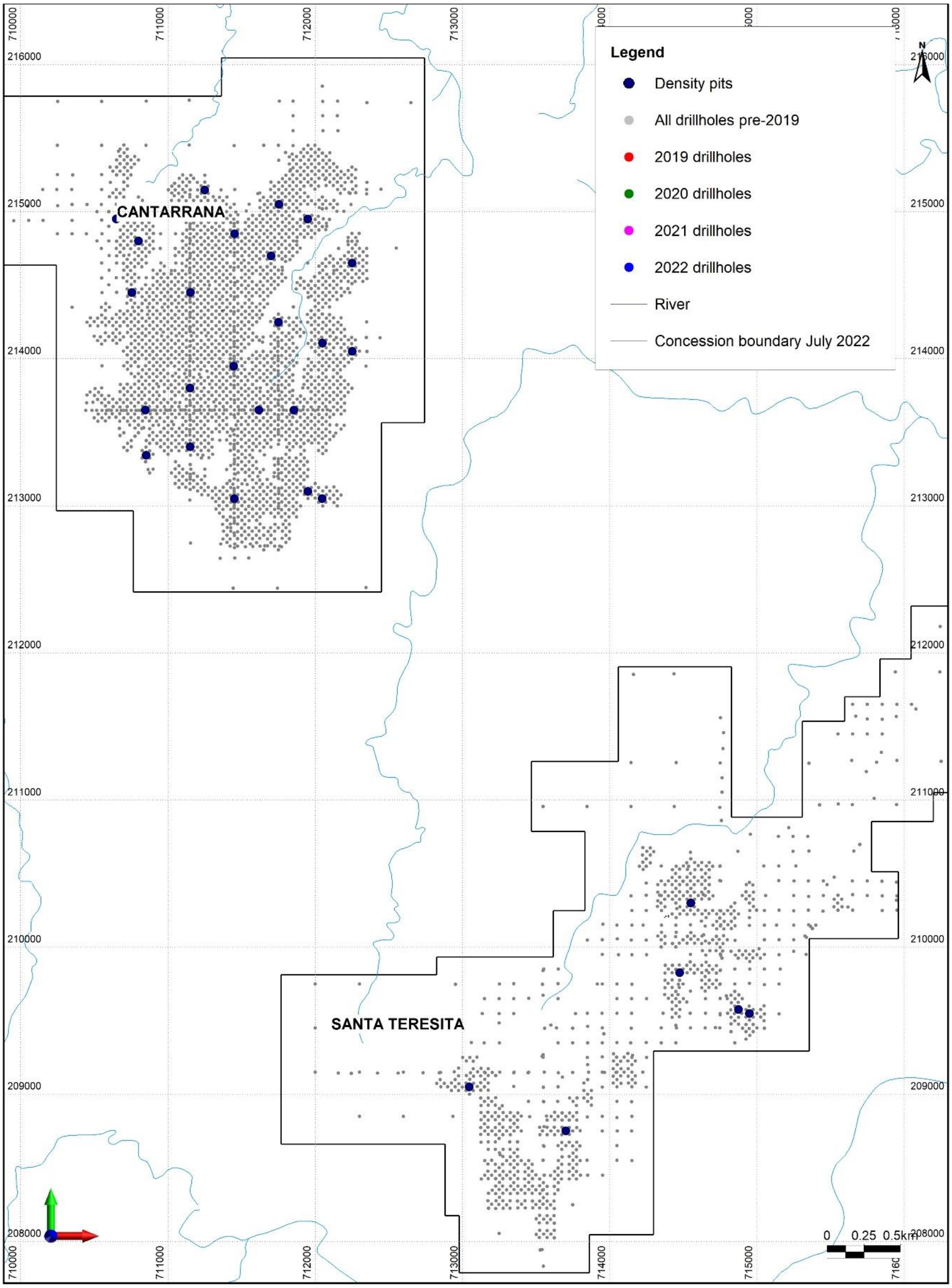
Source: Micon (2023)

Figure 10.6: Playa La Vaca, Zona Septentrional, Zona Central and Zona A y Zona A Oeste Location Map of Drill Holes and Exploration (Density) Pits



Source: Micon (2023)

Figure 10.7: Cantarrana and Santa Teresita Location Map of Drill Holes and Exploration (Density) Pits

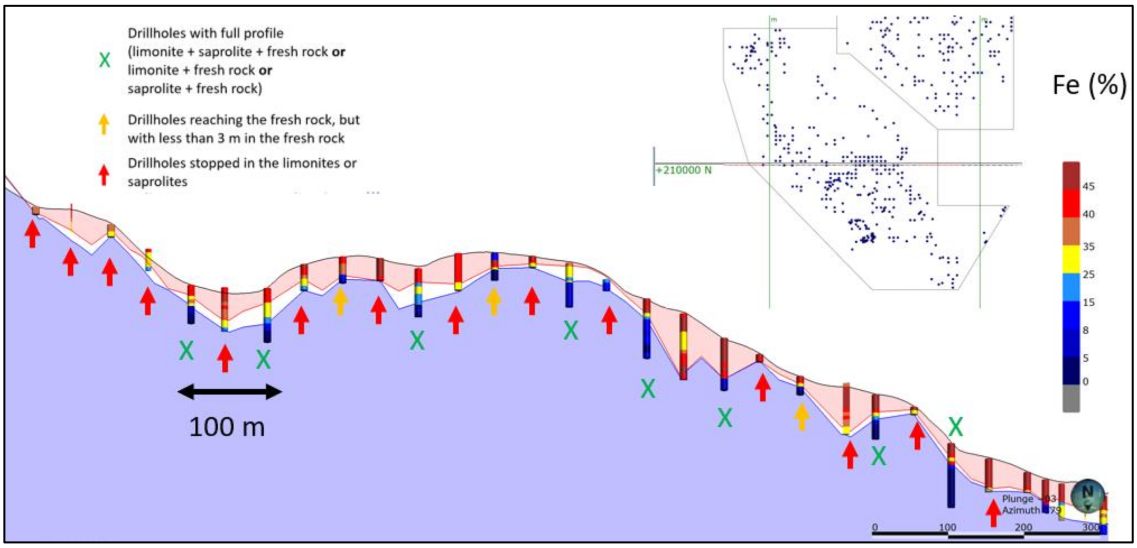


Source: Micon (2023)

10.2 HISTORICAL DRILL HOLES (PRE-1995)

In most areas, the drill holes are drilled based on a 100 m grid, dating from the 1970s; for example, in Camarioca Sur this historical drilling represents 11% of the total number of drill holes. Drill holes from the 1970s in general tend to be longer because they were intended to evaluate both the limonite and the highly saprolitic material suitable for the Caron metallurgical process (drill holes with a green cross in Figure 10.8).

Figure 10.8: Camarioca Sur Example Cross-Section with Historical Drill Holes every 100 m (N 209,502)



Source: Micon (2022)

The exploration drilling programmes from the 1960s and 1970s used a Russian built truck-mounted 135 mm diameter spiral auger drill (Beaton et al., 2011). The Qualified Person did not have access to the protocols describing the drilling, sampling and assaying procedures used in these historical drilling campaigns.

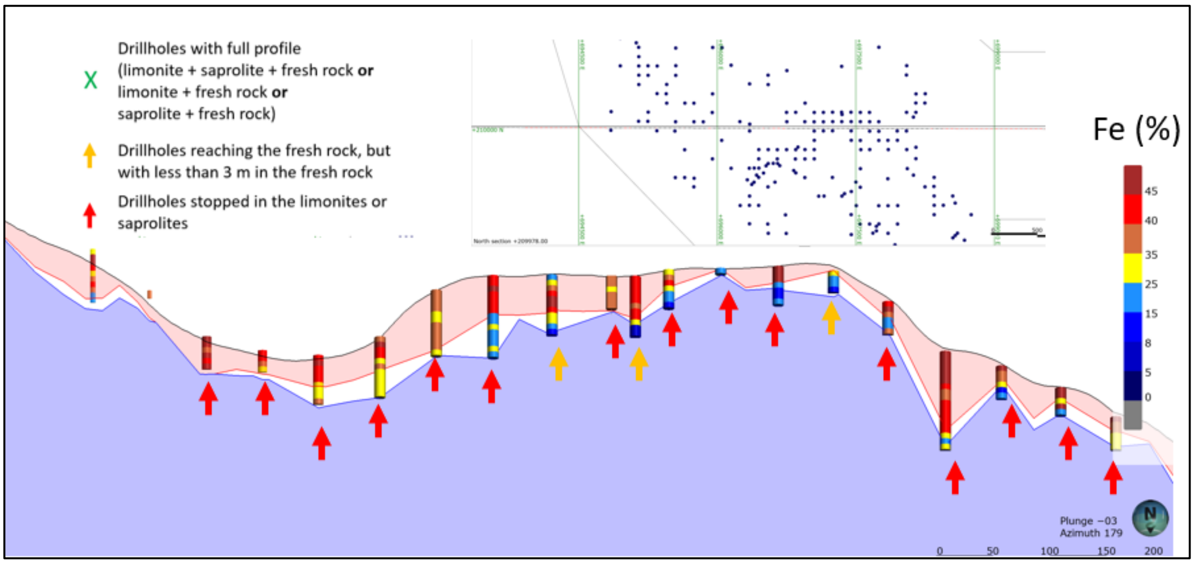
10.3 CURRENT MOA NICKEL DRILL HOLES (POST-1995)

Most of the remaining drill holes, over 90% of the drill holes contained in the databases up to the end of December 2022, are post-1995 Moa JV ordinary drill holes. These drill holes tend to terminate within the first few metres of the saprolite, or when hard rock is intersected (Figure 10.9).

Moa JV also drills a small percentage of "basement drill holes" to complete a characterisation of the lower horizons of the lateritic profile and of the basement.

Figure 10.10 B shows the spatial distribution of drill holes reaching the bedrock in comparison to the spatial distribution of the database used for resource estimation (Figure 10.10 A). The majority of these drill holes are pre-1995 drill holes.

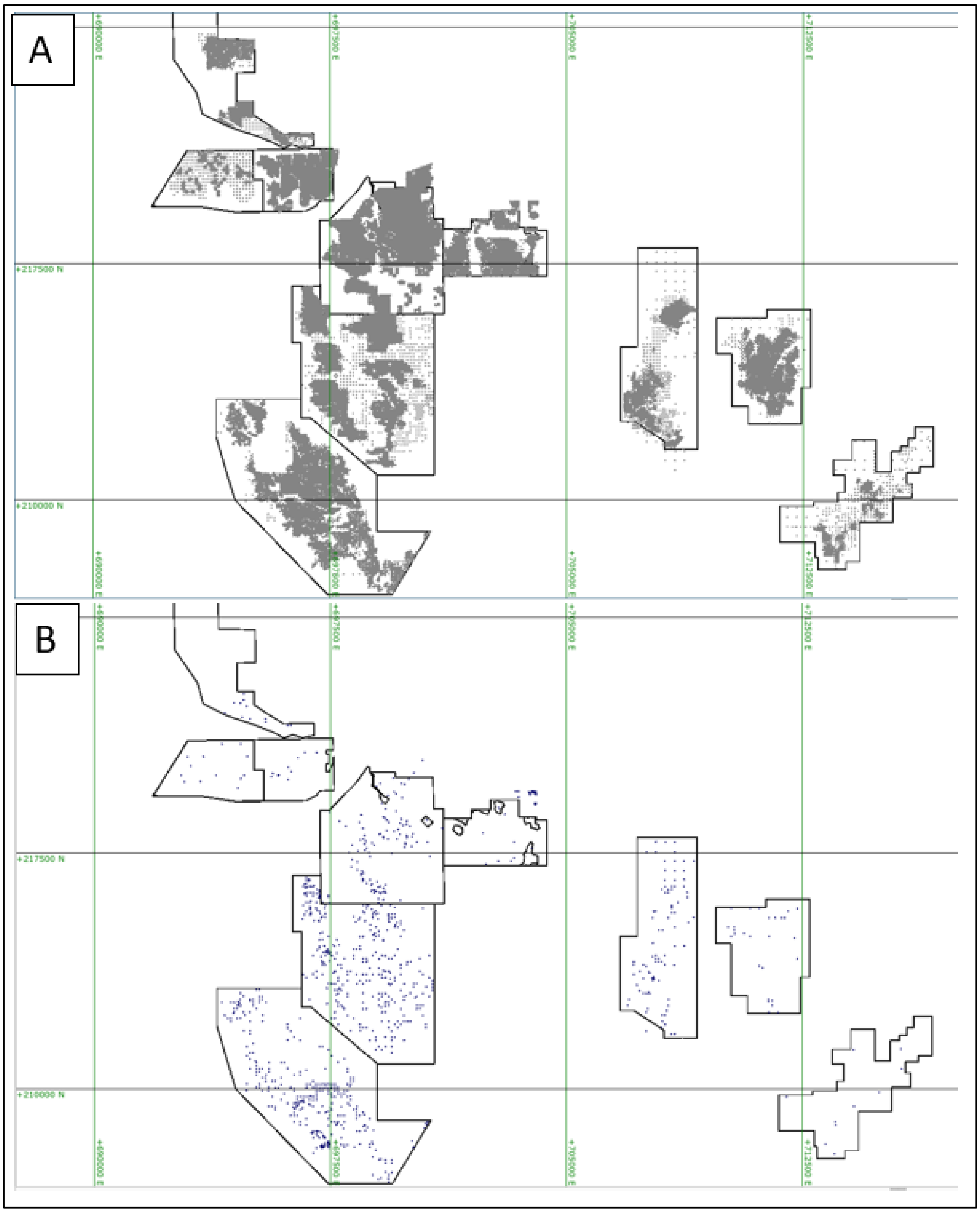
Figure 10.9: Camarioca Sur Example Cross-Section (N 209,502+26 m= N 209,978)



Source: Micon (2022)

Note: This is a typical section with post-1995 drill holes stopping in the limonites or when a few metres of saprolites or fresh rock are reached.

Figure 10.10: Distribution of the Drill Holes Reaching the Bedrock and Concession Limits
A - Database Used for Resource Estimation in Grey
B - Drill Holes Reaching the Bedrock in Dark Blue (at least 1 m)



Source: Micon (2022)

Only a few mineralogical drill holes are drilled per deposit (under 1% of the total number of drill holes) usually using hollow auger drilling, in order to collect samples for mineralogical analysis with XRD (see Section 9.7), and to investigate the geochemical composition by analysing via granulometric fraction. Mineralogical samples are also collected from ordinary and basement drill holes.

10.4 DRILL METHODS

Moa JV's contractor, Geominera used a Russian built truck-mounted 135 mm diameter spiral auger drill for various drilling programmes from 2005 to 2008. In 2003, a hollow core auger with an 89 mm outer diameter and a 71 mm inner diameter was also used in order to penetrate bedrock in regions where mapping of the bedrock geology had been recommended (Beaton et al., 2011).

In 2008, Moa JV acquired its own Canadian-built rotary-head M5Xd drilling machine mounted on a Japanese-built MST 800 Morooka Carrier. The drill fleet consists of four units capable of drilling up to 178 mm diameter solid stem auger holes, 95 mm diameter hollow auger holes, and 71 mm diameter core holes (Beaton et al., 2011).

A new rig capable of drilling both auger and core holes is expected to be delivered to the site in 2023. The new machine is also mounted on a Morooka Carrier and will provide the possibility of drilling 130 mm diameter auger holes and 96 mm diameter HQ3 diamond core holes. This will allow drill holes to reach greater depths as the machine can switch to core drilling upon reaching the basement/fresh rock.

Ordinary drill holes and some of the basement drill holes are currently drilled with 140 mm diameter auger drilling on a track-mounted rig, as shown in Figure 10.11. The access route is first cleared and drill pads are prepared as required, then drill hole collar locations are marked with a stake labelled with the identification of the planned drill hole. If the drill hole cannot be completed for any reason, the drill rig is moved a few metres and the hole is restarted.

Figure 10.11: Ordinary Exploration Drilling Completed by the Moa Project Operators

Source: Micon (2022)

Note: From top left to bottom right: Drilling machine setting up on a drill pad; drilling in progress; drill bit extracted after drilling and ready for sampling; drill bit being cleaned of contaminated material; drill hole collar labelling; sample collection; sample documentation.

Sampling is completed at the drill sites. The bit is extracted, moved away from the drill hole collar by two operators using a rope. Approximately 2 cm of material representing possible contamination is removed with a metal blade. Contamination can be visually identified by experienced drillers. Samples are collected in plastic bags at 1 m intervals or when there is a change in lithology, and then placed in an ordered line.

The process for basement drill holes is similar, but there is a change of tool after the limonite horizon, and diamond drill holes are continued into the fresh rock for at least 2 m.

10.5 LOGGING

A field geologist completes the logging, and a sample identification tag is added to the sample bag and sealed. Core logging involves the recording of core length, core recovery, core description, protolith, type of alteration and percentage in which it is present, dominant lithology colour, structure, texture, grain size and relict fragments, degree of lateritisation, cracks, veins and minerals or alteration filling and mineralogy.

Sample bags are then placed in a pickup truck or in the drilling rig support truck and transported to a local base camp. The stake with the drill hole ID is placed back and surveyed by a surveyor using total station instruments. The drilling process is very dynamic, since most drill holes are only 5 m to 20 m in length.

10.6 RECOVERY

Recovery in laterites is typically satisfactory and close to 100%. There are areas where, due to the characteristics of the material, it is not possible to achieve a good recovery, using auger or core. The causes can be diverse, from an underground cave to an area through which the water table passes.

If recovery is not satisfactory for 2 m, it is described in the logging and the hole is re-drilled 50 cm north of the first location.

10.7 COLLAR SURVEYS

Collar location surveys have been completed in different campaigns, for example Camarioca Sur was surveyed in 2011 by GEOCUBA to locate collars from the 35 m by 35 m drilling campaign, and in 2008 by Geominera to locate drill holes from the 33 m by 33 m drilling campaign. Collar surveys are completed using digital total stations (e.g. Leica TC 805 and TS 06). Surveys are connected to geodesic points surveyed and monitored by the ICGC.

10.8 DOWN HOLE SURVEYS

No downhole surveys are performed because the drill holes in the Moa Project area are typically vertical, and <30 m deep.

10.9 DRILLING, SAMPLING AND RECOVERY FACTORS

There are no drilling, sampling or recovery factors in the drilling used to support Mineral Resource estimation that could materially impact the accuracy and reliability of the estimate known to the QP.

10.10 SAMPLE LENGTH/TRUE THICKNESS

Drill intercepts typically reflect the true thickness of the laterite profile. Examples of the orientation of the drilling in relation to the laterite profile were included as Figure 10.8 and Figure 10.9 for the Camarioca Sur area.

10.11 TYPICAL EXAMPLES OF DRILL HOLES

Table 10.3 to Table 10.5 show typical intercepts encountered at the Moa Project. Examples are taken from Camarioca Norte, Camarioca Sur and Playa La Vaca and Zona Septentrional.

10.12 COMMENT ON DRILLING

In the opinion of the QP, the quantity and quality of the logged geological data, collar, and downhole survey data collected in the drill programmes are sufficient to support the Mineral Resource and Mineral Reserve estimations and mine planning.

Drilling has generally been completed at regularly-spaced intervals and is considered representative of the deposits and mineralisation style. Drilling was not specifically targeted to the high-grade portions of the deposits, rather, a relatively consistent drill spacing was completed, depending on the drill programme purpose.

Drill orientations are generally appropriate for the mineralisation style and the orientation of mineralisation for the bulk of the deposit area.

Table 10.3: Typical Drill Hole Intercepts Encountered in the Camarioca Norte Concession

Selection Criteria	Concession	Drill Hole ID	Easting (X)	Northing (Y)	Elevation (Z)	Azimuth (°)	Dip (°)	Total Hole Depth (m)	Intercept Depth from (m)	Intercept Depth to (m)	Drilled Intersection Length (m)	Nickel Grade (Ni %)	Cobalt Grade (Co%)	Iron Grade (Fe%)	Status
No Grade	Camarioca Norte	CN_2424	697450.40	214384.50	410.31	0	90	21.0	0.0	21.0	21.00	0.17	0.01	4.49	Waste
Typical Hole	Camarioca Norte	CN_2436	697450.64	213747.34	461.87	0	90	26.5	0.0	23.5	23.50	1.28	0.10	34.23	Ore
Typical Hole	Camarioca Norte	CN_2436	697450.64	213747.34	461.87	0	90	26.5	23.5	26.5	3.00	0.31	0.01	5.55	Waste
Typical Hole	Camarioca Norte	CN_2941	697643.80	214649.50	376.48	0	90	20.6	0.0	1.0	1.00	0.78	0.08	48.50	Ore
Typical Hole	Camarioca Norte	CN_2941	697643.80	214649.50	376.48	0	90	20.6	1.0	5.0	4.00	0.59	0.06	47.00	Waste
Typical Hole	Camarioca Norte	CN_2941	697643.80	214649.50	376.48	0	90	20.6	5.0	18.3	13.30	1.04	0.10	42.07	Ore
Typical Hole	Camarioca Norte	CN_2941	697643.80	214649.50	376.48	0	90	20.6	18.3	20.6	2.30	0.29	0.01	5.71	Waste
Typical Hole	Camarioca Norte	CN_3096	697694.54	212598.19	496.39	0	90	27.0	0.0	13.3	13.30	1.04	0.11	33.60	Ore
Typical Hole	Camarioca Norte	CN_3096	697694.54	212598.19	496.39	0	90	27.0	13.3	22.5	9.20	0.51	0.02	7.69	Waste
Typical Hole	Camarioca Norte	CN_3096	697694.54	212598.19	496.39	0	90	27.0	22.5	25.0	2.50	0.80	0.02	10.28	Ore
Typical Hole	Camarioca Norte	CN_3096	697694.54	212598.19	496.39	0	90	27.0	25.0	27.0	2.00	0.24	0.01	5.55	Waste
Typical Hole	Camarioca Norte	CN_5863	699116.00	215550.90	392.02	0	90	17.0	0.0	13.0	13.00	1.16	0.12	46.07	Ore
Typical Hole	Camarioca Norte	CN_5863	699116.00	215550.90	392.02	0	90	17.0	13.0	17.0	4.00	0.43	0.02	6.10	Waste
Typical Hole	Camarioca Norte	CN_7757	699601.38	212700.09	548.92	0	90	25.0	0.0	25.0	25.00	1.55	0.26	38.36	Ore
Typical Hole	Camarioca Norte	CN_911	697016.00	216083.20	309.87	0	90	19.0	0.0	16.0	16.00	1.88	0.05	18.62	Ore
Typical Hole	Camarioca Norte	CN_911	697016.00	216083.20	309.87	0	90	19.0	16.0	19.0	3.00	0.31	0.01	6.30	Waste
High Grade in Low Grade Hole	Camarioca Norte	CN_6154	699184.20	214850.10	402.04	0	90	24.8	0.0	2.0	2.00	0.54	0.07	47.90	Waste

Table 10.4: Typical Drill Hole Intercepts Encountered in the Camarioca Sur Concession

Selection Criteria	Concession	Drill Hole ID	Easting (X)	Northing (Y)	Elevation (Z)	Azimuth (°)	Dip (°)	Total Hole Depth (m)	Intercept Depth from (m)	Intercept Depth to (m)	Drilled Intersection Length (m)	Nickel Grade (Ni %)	Cobalt Grade (Co%)	Iron Grade (Fe%)	Status
No Grade	CS	CS_4970	697449.00	208234.87	810.61	0	90	27.0	0.0	27.0	27.00	0.12	0.02	5.65	Waste
Typical Hole	CS	CS_1871	696326.19	209574.60	688.04	0	90	21.0	0.0	15.0	15.00	0.87	0.09	25.98	Ore
Typical Hole	CS	CS_1871	696326.19	209574.60	688.04	0	90	21.0	15.0	21.0	6.00	0.54	0.03	10.91	Waste
Typical Hole	CS	CS_5221	697549.20	209146.60	766.21	0	90	27.0	0.0	1.0	1.00	0.69	0.06	44.70	Waste
Typical Hole	CS	CS_5221	697549.20	209146.60	766.21	0	90	27.0	1.0	14.5	13.50	0.91	0.05	25.12	Ore
Typical Hole	CS	CS_5221	697549.20	209146.60	766.21	0	90	27.0	14.5	17.0	2.50	0.43	0.01	7.26	Waste
Typical Hole	CS	CS_5221	697549.20	209146.60	766.21	0	90	27.0	17.0	25.0	8.00	1.07	0.01	11.21	Ore
Typical Hole	CS	CS_5221	697549.20	209146.60	766.21	0	90	27.0	25.0	27.0	2.00	0.31	0.00	5.90	Waste
Typical Hole	CS	CS_569	695101.69	210898.64	575.75	0	90	16.0	0.0	1.0	1.00	0.50	0.07	45.60	Waste
Typical Hole	CS	CS_569	695101.69	210898.64	575.75	0	90	16.0	1.0	15.0	14.00	0.93	0.08	28.53	Ore
Typical Hole	CS	CS_569	695101.69	210898.64	575.75	0	90	16.0	15.0	16.0	1.00	0.66	0.04	16.80	Waste
Typical Hole	CS	CS_6429	698251.20	210450.60	735.88	0	90	36.0	0.0	1.0	1.00	0.40	0.03	43.50	Waste
Typical Hole	CS	CS_6429	698251.20	210450.60	735.88	0	90	36.0	1.0	12.0	11.00	1.35	0.12	41.72	Ore
Typical Hole	CS	CS_6429	698251.20	210450.60	735.88	0	90	36.0	12.0	14.0	2.00	0.65	0.02	10.40	Waste
Typical Hole	CS	CS_6429	698251.20	210450.60	735.88	0	90	36.0	14.0	34.7	20.70	1.28	0.02	9.11	Ore
Typical Hole	CS	CS_6429	698251.20	210450.60	735.88	0	90	36.0	34.7	36.0	1.30	0.20	0.01	5.40	Waste
Typical Hole	CS	CS_712	695228.11	212824.29	436.19	0	90	17.0	0.0	14.0	14.00	1.05	0.10	33.93	Ore
Typical Hole	CS	CS_712	695228.11	212824.29	436.19	0	90	17.0	14.0	17.0	3.00	0.47	0.02	8.56	Waste
Typical Hole	CS	CS_7490	699652.35	207498.38	919.70	0	90	17.0	0.0	17.0	17.00	1.10	0.09	25.75	Ore
High Grade in Low Grade Hole	CS	CS_5014	697450.90	209850.10	699.33	0	90	29.2	0.0	1.0	1.00	0.47	0.09	43.10	Waste
High Grade in Low Grade Hole	CS	CS_5014	697450.90	209850.10	699.33	0	90	29.2	1.0	13.0	12.00	1.19	0.09	27.65	Ore

Table 10.5: Typical Drill Hole Intercepts Encountered in the Playa La Vaca and Zona Septentrional Concessions

Selection Criteria	Concession	Drill Hole ID	Easting (X)	Northing (Y)	Elevation (Z)	Azimuth (°)	Dip (°)	Total Hole Depth (m)	Intercept Depth from (m)	Intercept Depth to (m)	Drilled Intersection Length (m)	Nickel Grade (Ni %)	Cobalt Grade (Co%)	Iron Grade (Fe%)	Status
No Grade	ZS	ZS_D10134B	695149.00	221874.00	31.47	0	90	11.0	0.0	11.0	11.00	0.38	0.04	37.43	Waste
Typical Hole	PV	PV_K816B	694600.13	224225.98	91.04	0	90	8.4	0.0	6.4	6.40	1.46	0.08	37.57	Ore
Typical Hole	PV	PV_K816B	694600.13	224225.98	91.04	0	90	8.4	6.4	8.4	2.00	0.31	0.01	6.42	Waste
Typical Hole	PV	PV_L5120B	693900.00	224326.06	118.56	0	90	9.6	0.0	7.7	7.70	1.20	0.14	48.35	Ore
Typical Hole	PV	PV_L5120B	693900.00	224326.06	118.56	0	90	9.6	7.7	9.6	1.95	0.25	0.01	5.62	Waste
Typical Hole	ZS	ZS_B1516	696700.06	221525.13	42.67	0	90	20.5	0.0	7.0	7.00	0.37	0.05	47.80	Waste
Typical Hole	ZS	ZS_B1516	696700.06	221525.13	42.67	0	90	20.5	7.0	20.5	13.50	1.22	0.08	42.99	Ore
Typical Hole	ZS	ZS_C1238B	695751.00	221776.20	42.63	0	90	32.5	0.0	7.0	7.00	0.29	0.06	31.42	Waste
Typical Hole	ZS	ZS_C1238B	695751.00	221776.20	42.63	0	90	32.5	7.0	8.0	1.00	0.88	0.14	35.42	Ore
Typical Hole	ZS	ZS_C1238B	695751.00	221776.20	42.63	0	90	32.5	8.0	13.0	5.00	0.53	0.06	39.39	Waste
Typical Hole	ZS	ZS_C1238B	695751.00	221776.20	42.63	0	90	32.5	13.0	28.5	15.50	1.39	0.07	24.63	Ore
Typical Hole	ZS	ZS_C1238B	695751.00	221776.20	42.63	0	90	32.5	28.5	32.5	4.00	0.33	0.01	6.44	Waste
Typical Hole	ZS	ZS_E7138B	694350.56	222175.52	48.16	0	90	28.6	0.0	4.0	4.00	0.39	0.04	43.54	Waste
Typical Hole	ZS	ZS_E7138B	694350.56	222175.52	48.16	0	90	28.6	4.0	26.6	22.60	1.44	0.08	35.64	Ore
Typical Hole	ZS	ZS_E7138B	694350.56	222175.52	48.16	0	90	28.6	26.6	28.6	2.00	0.36	0.02	8.74	Waste
Typical Hole	ZS	ZS_E894B	694749.63	222275.06	69.27	0	90	27.7	0.0	10.0	10.00	0.91	0.12	40.31	Ore
Typical Hole	ZS	ZS_E894B	694749.63	222275.06	69.27	0	90	27.7	10.0	11.0	1.00	0.27	0.01	9.61	Waste
Typical Hole	ZS	ZS_E894B	694749.63	222275.06	69.27	0	90	27.7	11.0	19.0	8.00	0.80	0.04	17.28	Ore
Typical Hole	ZS	ZS_E894B	694749.63	222275.06	69.27	0	90	27.7	19.0	27.7	8.70	0.35	0.02	8.31	Waste
High Grade in Low Grade Hole	ZS	ZS_E692	694099.94	222275.53	43.15	0	90	12.0	0.0	2.0	2.00	0.56	0.08	46.53	Waste
High Grade in Low Grade Hole	ZS	ZS_E692	694099.94	222275.53	43.15	0	90	12.0	2.0	3.0	1.00	0.71	0.11	46.86	Ore
High Grade in Low Grade Hole	ZS	ZS_E692	694099.94	222275.53	43.15	0	90	12.0	3.0	7.0	4.00	0.56	0.08	48.18	Waste
High Grade in Low Grade Hole	ZS	ZS_E692	694099.94	222275.53	43.15	0	90	12.0	7.0	11.0	4.00	1.57	0.07	33.77	Ore
High Grade in Low Grade Hole	ZS	ZS_E692	694099.94	222275.53	43.15	0	90	12.0	11.0	12.0	1.00	0.64	0.04	13.72	Waste

11.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 INTRODUCTION

The assay grades used for resource estimation are from samples collected in historical drilling campaigns from the 1970s and up to 1995, and samples collected from Moa JV campaigns during various periods from 1995 to 2018. Assays from the period between November 2018 and the end of December 2022 (exploitation drilling) were not used for resource estimation, but are included in the quality assurance and quality control (QAQC) analysis where QAQC control samples have been made available. The sample preparation, analysis, and security for drilling are described in detail in this section. The sampling and logging process for exploration drilling have been described in Section 10.0.

11.2 OTHER SAMPLES

Apart from the exploration drill samples (auger and diamond), other laterite samples collected at the Moa Project come from grade control drilling (similar to exploration sampling), haul truck sampling at the SPP, mineralogical samples, settling samples and samples collected in process streams before and after the SPP. There is also sampling on the calcium carbonate deposit.

Some mineralogical samples are collected from regular and mineralogical drill holes for qualitative mineralogy tests with XRD and chemical analysis of granulometric fractions. Rock samples of the basement have been also collected to create thin sections for optical mineralogy analysis. This information was not used for resource estimation, but was reviewed to verify the mineralogical assumptions about the composition of the basement rocks. The number of samples collected is appropriate for general studies or characterisations, but not for modelling.

Settling samples are collected to assess the speed of settling of the fines in suspension. These samples are collected to predict the performance in the ore thickening tanks located in the PSA Plant.

Grade control samples from drill holes, from haul trucks and settling samples are prepared and assayed by X-ray fluorescence analysis in the Moa JV's internal laboratory located on site, along with thickener slurry samples. These samples are not used in the Mineral Resource and Mineral Reserve estimates presented in this Report.

11.3 SAMPLE PREPARATION AND ANALYSIS (1970S TO 1995)

Pre-1995, most nickel laterites in the Moa Project area were drilled using auger drilling and diamond drilling and using sampling procedures similar to those used for the post-1995 drilling campaigns. Geominera Oriente is the main drilling contractor in eastern Cuba, and the majority of the assays are completed in their Elio Trincado laboratory (DELABEL) located in Santiago de Cuba. The DELABEL laboratory achieved International Standards Organisation (ISO) 17025:2000 certification registered with ONARC (National Accreditation Body for the Republica de Cuba) on 12th June 2002. Other laboratories have less frequently been used: Laboratorio Central de Minerales "José Isaac del Corral" (LACEMI) and Centro de Investigaciones para la Industria Minero Metalúrgica (CIPIMM), both located in Havana. The LACEMI laboratory currently holds NC ISO/IEC 17025:2006 certification. The accreditation of CIPIMM is not known.

Nickel and cobalt assays were completed using atomic absorption spectroscopy from 1975 onward; iron was also assayed using this technique from 1977 onward. Before 1975, nickel and cobalt assays were completed with ultraviolet-visible spectrophotometry (Sánchez González, 2011). In 1996, inductively coupled plasma optical emission spectroscopy (ICP-OES) assays were introduced in the main Cuban laboratories for completed assays for Fe, Ni, Co, Si, Al, Mg, Cr and Mn in nickel laterites, including DELABEL, LACEMI and CIPIMM (Abad Peña, E., 2014).

The Qualified Person responsible for this section did not complete any validation or verification of samples collected between 1970 and 1995, and did not have access to the protocols describing, the drilling, sampling and assaying procedures used in historical drilling campaigns. However, historical drilling was validated by the Moa JV with external consultants, as discussed in Section 12.0 of this Report.

11.4 SAMPLE PREPARATION AND ANALYSIS (1995 TO 2022)

11.4.1 Sampling and Sample Preparation

A sample of auger drilling usually consists of seven consecutive chips (auger screw lifts) representing 1 m of drilling. The samples are collected directly from the auger after removing the contamination from the walls and placed in a plastic bag, logged, tagged and sealed. Sample batches are then transported to the local camp or directly to Geominera’s sample preparation facilities in Moa by Moa Nickel staff in a company-owned pickup truck (Figure 11.1).

Figure 11.1: Sampling in Progress at the Moa Project During the Site Visit by the Qualified Person

Source: Micon (2022)

The samples are split with a quartering tool and two opposite quarters are placed in a metallic tray, along with its corresponding sample tag, and then dried in electric ovens at 105°C for 24 hours (Figure 11.2).

Figure 11.2: Sample Preparation and Subsampling Equipment at Geominera's Sample Preparation Facility in Moa

Source: Micon (2022)

Dried samples are crushed with a cylinder or jaw crusher to reduce particles sizes to approximately 1 mm, and then split with a rotary splitter. The crushed samples are then pulverised with a disk mill to 200 mesh and split with a riffle splitter to obtain a sample of approximately 100 g. The 100 g pulp samples are placed in paper bags with its original sample tag and placed in batches of 94 samples and six duplicate samples into cardboard boxes and sent for assay at the Elio Trincado laboratory (Figure 11.2).

An air brush and a manual brush are used to clean the pulveriser between every sample. The same equipment is used to clean the crusher.

11.5 DENSITY

Density samples are collected from exploration pits "density pits" described in Section 10.0 and plotted on Figure 10.2. The number of density pits by concession is given in Table 11.1.

Table 11.1: Number of Exploration Pits by Concession

Concession	No. of Pits
Moa Oriental	13
Camarioca Norte	33
Camarioca Sur	9
Yagrumaje Oeste	-
La Delta	28
Cantarrana	23
Santa Teresita	6
Playa La Vaca - Zona Septentrional	28
Zona Central	-
Zona A y Zona A Oeste	20
11 Bloques	12
Total	**172**

The QP observed that no density pits have been performed on Zona Central and Yagrumaje Oeste. For these concessions, a density average determined from nearby concessions has been used for resource estimation.

The exploration pit walls are carefully mapped. Monologic squared samples are extracted from four vertical trenches in the walls without altering the volume of the material in its natural state, wrapped in plastic, and sent to the DELABEL laboratory in Santiago de Cuba for density measurement.

The wrapped samples are put in cylindrical storage tubes and delivered to DELABEL. Moisture and bulk density are determined from these samples at DELABEL. The moisture content is determined by weight difference between the wet sample and the same sample after oven drying at 105°C. Depending on the how well the sample is wrapped and the period of time between sample collection and when the moisture determination is performed, there will be a certain inaccuracy of the moisture determination. The bulk density is determined by dividing the wet weight by the volume. The volume is determined by taking the difference between the wet sample weight and the weight of the wet sample, wrapped in thin plastic, and suspended in water.

From the density data, several density domains have been defined and an average value was assigned to each domain during the Mineral Resource Estimation as presented in Table 11.2.

Table 11.2: Density Domains defined for Mineral Resource Estimation using Data obtained from the Density Pits

Deposit	Condition	Density
Camarioca Norte and Sur, Moa Oriental, Zona A, 11 Bloques and Yagrumaje	Bedrock: Fe <12%	1.3
	Saprolite: 12% <= Fe <35%	0.9
	Limonite without ferricrete: (Fe >35%) and (Ni >= 1%, or Ni <1% and Co >= 0.09%)	1.0
	Limonite with ferricrete: Fe >35% and Ni <1% and Co <0.09%	1.2
La Delta, Santa Teresita, Cantarrana	Bedrock: Fe <12%	1.3
	Saprolite: 12% <= Fe <35%	0.9
	Limonite without ferricrete: (Fe >35%) and (Ni >= 1%, or Ni <1% and Co >= 0.09%)	1.0
	Limonite with ferricrete: Fe >35% and Ni <1% and Co <0.09%	1.3
Playa la Vaca y Zona Septentrional	Bedrock: Fe <12%	1.3
	Saprolite: 12% <= Fe <35%	1.0
	Limonite without ferricrete: (Fe >35%) and (Ni>= 0.5%, or Ni <0.5% and Co >= 0.09%)	1.2
	Limonite with ferricrete: Fe >35% and Ni <0.5% and Co <0.09%	1.6

11.5.1 Assaying

Chemical analyses for regular samples are completed at DELABEL. The DELABEL laboratory is not considered independent from the Moa JV company and the Moa Project. Until approximately 2008 when the Moa JV acquired its own drills, Geominera was also contracted to conduct the drilling and sampling. Geominera still conducts the exploration pitting for the Moa JV.

The DELABEL laboratory first achieved ISO 17025:2000 certification (ISO for laboratories) registered with ONARC on 12th June 2002. The laboratory has re-applied for the accreditation regularly since, the last accreditation obtained dates of 2018 (ISO/IEC 17025:2006). During the laboratory visit by the QP, the laboratory was applying for the ISO/IEC 17025:2017 accreditation. The DELABEL laboratory stated that their laboratory analyses more than 80% of Cuba's laterite samples.

Analysis of Al_2O_3, SiO_2, MgO, Cr_2O_3, MnO, NiO, CoO, CaO, Fe_2O_3, and loss on ignition (LOI) are completed by sodium carbonate fusion followed by ICP-atomic emission spectroscopy (ICP-AES). Iron is also assayed volumetrically by titration with potassium dichromate. Other additional assaying techniques may be used for mineralogical samples.

11.5.2 Quality Assurance/Quality Control

Approximately 6% to 7% of the pulp duplicate samples, known on site as "Control Interno", previously prepared by Moa JV personnel, are sent in each 100 sample batch to the primary laboratory. The QP has received duplicate assays reflecting 6% to 7% of the samples assayed post-2005 (4.5% for chromium). With the exception of a small duplicate assay dataset from 1985, those provided by Moa JV are all post-2005. The percentages calculated are possibly over-estimated as many collars and assays contained in the drill hole database are missing dates which could have been part of drilling campaigns post-2005.

No blanks or standards (certified reference materials or CRMs) are inserted into the sample batch prior to delivery to the laboratory.

The QP has made a recommendation to purchase a selection of nickel laterite CRMs with grade ranges representative of the different limonitic horizons and insert these at regular intervals into the sample stream, along with blank material from a limestone quarry in Sagua de Tánamo. The standards will help to assess bias between laboratories whilst the blanks will help to control the sample preparation process. A Standard Operating Procedure (SOP) is being developed by Micon in conjunction with the Moa JV geology team. The SOP will include documentation on how the QAQC data should be regularly checked and monitored with data displayed on monitoring plots and action taken when the results diverge from the targets. Once these new procedures are in place and working effectively, the reference materials can then be prepared with samples collected from the Moa Project area.

The Moa JV advised the QP that approximately the same percentage of pulp duplicates are sent to an external laboratory, usually SGS laboratories in South Africa and Laboratorios Isaac del Corral in Havana, and are referred to as "Control Externo". The QP has, however, only been provided with external duplicate assays reflecting 2% to 3% of the samples assayed post-2005.

SGS is independent of the Moa JV and the Moa Project. SGS has a quality system compliant with the ISO 9001 Model for Quality Assurance and ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories. Laboratorios Isaac del Corral is not certified and cannot be considered independent from the Moa JV and the Moa Project given its relationship with the Cuban government which is a 50% owner of the Moa JV.

The primary laboratory carries out its own internal QAQC, introducing duplicates and standards known as SNi, L1, L2, L3, and L4, which are representative of saprolite and different grade ranges of limonite. However, the results of the internal QAQC are not provided to Moa JV. The QP visited the primary laboratory during the site visit and also reviewed the results of the non-independent laboratory audits completed by Sherritt personnel.

11.5.2.1 Internal Pulp Duplicates

The results of the primary laboratory internal pulp duplicate control samples ("Control Interno") assays were reviewed by the QP. Table 11.3 contains a count of the total number of internal pulp duplicate samples provided by Moa JV. These cover ten concessions, across drill campaigns from 2005 to 2021, and one small campaign at Moa Oriental in 1985.

Table 11.3: Summary of the Control Interno Samples Provided by Moa JV

Concession	Ni	Co	Fe	Al	SiO_2	Cr	Mg	Mn	Year
CN	1,058	1,058	1,058	1,058	1,058	1,058	1,058	1,058	2005
CS	4,123	4,123	4,123	4,123	4,123	1,866	4,123	4,123	2005, 2011, 2019
CR	750	748	748	748	748	748	748	748	2013
LD	684	682	682	682	682	682	682	682	2012
MO	213	213	213	0	0	0	0	0	1985
PV	449	449	449	449	449	449	449	449	2013, 2014, 2021
ZS	1,114	1,114	1,114	1,114	1,114	1,114	1,114	1,114	2011, 2013, 2014, 2020
ST	260	260	260	260	260	260	260	260	2015
YO	1,444	1,444	1,444	1,444	1,444	0	1,444	0	2007
ZC	241	241	241	241	241	241	241	241	2005
Total	**10,336**	**10,332**	**10,332**	**10,119**	**10,119**	**6,418**	**10,119**	**8,675**	**-**

Summary statistics for nickel are presented in Table 11.4. Overall, the results show a strong convergence, with correlation coefficients ranging from 0.91 to 0.99.

Table 11.4: Summary Statistics for Nickel in Control Interno Pulp Duplicate Samples

Concession	Element	Parameters	Original	Duplicate
CN	Ni (%)	Mean	1.06	1.06
		Standard Deviation	0.38	0.39
		Correlation Coefficient	0.99	
		No. of Samples	1,058	
CS	Ni (%)	Mean	1.06	1.06
		Standard Deviation	0.39	0.38
		Correlation Coefficient	0.97	
		No. of Samples	4,123	
CR	Ni (%)	Mean	0.95	0.96
		Standard Deviation	0.39	0.39
		Correlation Coefficient	0.91	
		No. of Samples	750	
LD	Ni (%)	Mean	1.04	1.05
		Standard Deviation	0.51	0.51
		Correlation Coefficient	0.99	
		No. of Samples	684	
MO	Ni (%)	Mean	1.24	1.25
		Standard Deviation	0.36	0.38
		Correlation Coefficient	0.95	
		No. of Samples	213	
PV	Ni (%)	Mean	1.38	1.40
		Standard Deviation	0.40	0.41
		Correlation Coefficient	0.99	
		No. of Samples	449	
ZS	Ni (%)	Mean	0.88	0.88
		Standard Deviation	0.58	0.58
		Correlation Coefficient	0.95	
		No. of Samples	1,114	
ST	Ni (%)	Mean	0.99	0.95
		Standard Deviation	0.39	0.37
		Correlation Coefficient	0.97	
		No. of Samples	260	
YO	Ni (%)	Mean	0.95	0.94
		Standard Deviation	0.35	0.35
		Correlation Coefficient	0.99	
		No. of Samples	1,444	
ZC	Ni (%)	Mean	1.00	1.00
		Standard Deviation	0.31	0.32
		Correlation Coefficient	0.96	
		No. of Samples	241	

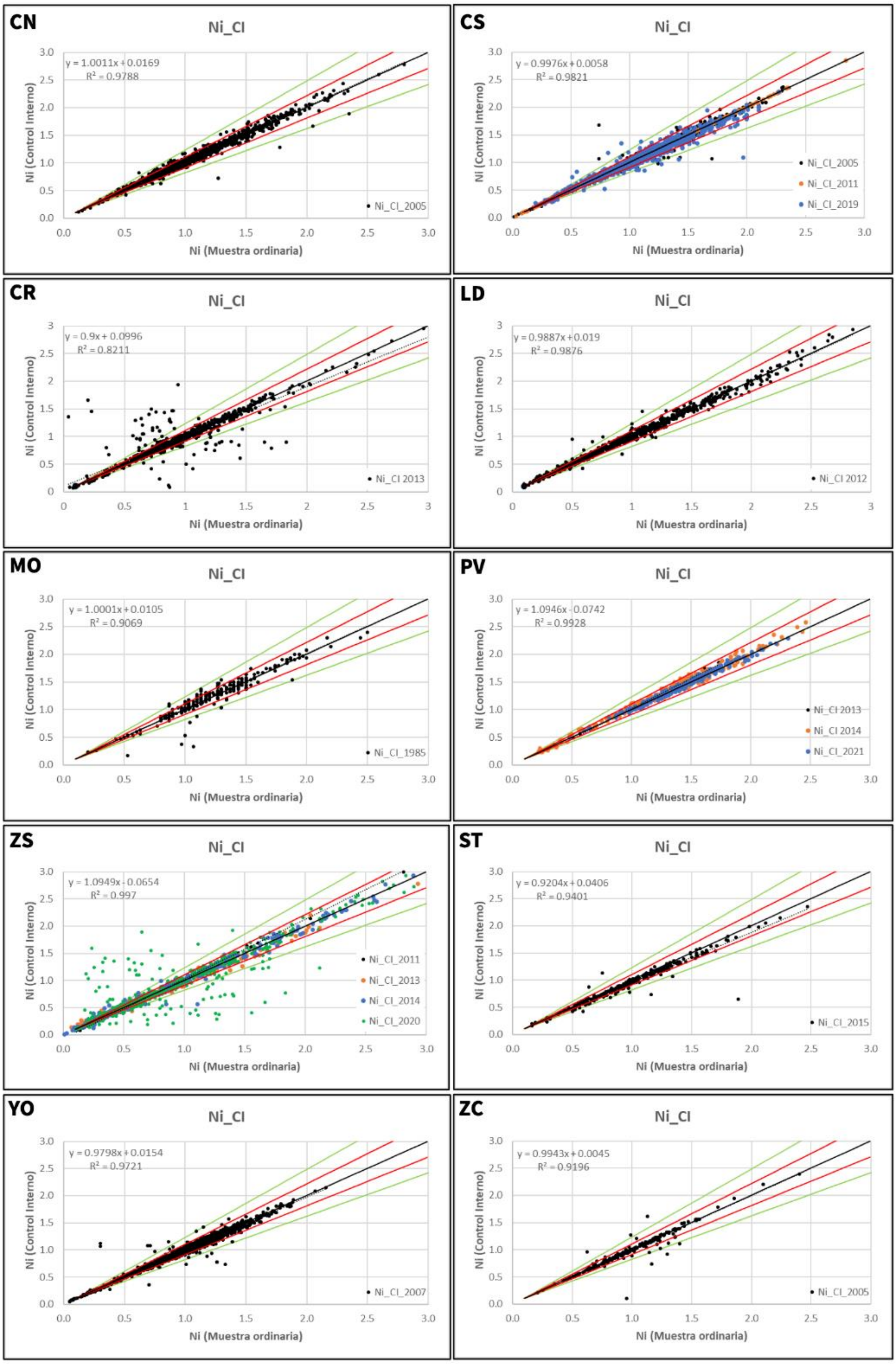
Scatterplots of original versus internal pulp duplicate samples were generated by the QP for eight elements in each concession to assess the relationship between the original assays and the duplicate assay results. Plots for nickel are presented in Figure 11.3. The plots show five correlation lines; the central black line is the 1:1 line, the red lines denote ±10% error and the green lines denote ±20% error. The ±20% error limits indicate the industry acceptable range of analytical error.

Internal duplicate controls reproduced well in the majority of concessions with a reasonably tight spread of results. The majority of analyses plot inside the ±10% error limits which is an acceptable level of error due to the natural sample variability when selecting duplicate samples.

The exceptions are Cantarrana and Zona Septentrional, where the results show a minor bias towards the original assay at Cantarrana and towards the duplicate assay at Zona Septentrional. There is also a lack of precision in the lower to mid-grade ranges which falls outside the ±20% error limits. At Zona Septentrional, the data cover multiple drill campaigns and when the year is plotted by colour it is apparent that the samples outside the ±20% error limits all relate to a 2020 drill campaign (green dots). Figure 11.4 covers the period from January 2020 to July 2020 on a month-by-month and shows that the time period between April and June 2020 which contains the least precision. Unfortunately, it is not known whether any action was taken to investigate this issue at the time, but the QP assumes that action was taken as the issue did not continue into 2021. The same patterns are observed in the multi-element plots. This example highlights the importance of introducing a more rigorous QAQC protocol as soon as possible, whereby CRMs would allow for a more thorough investigation into the biases observed.

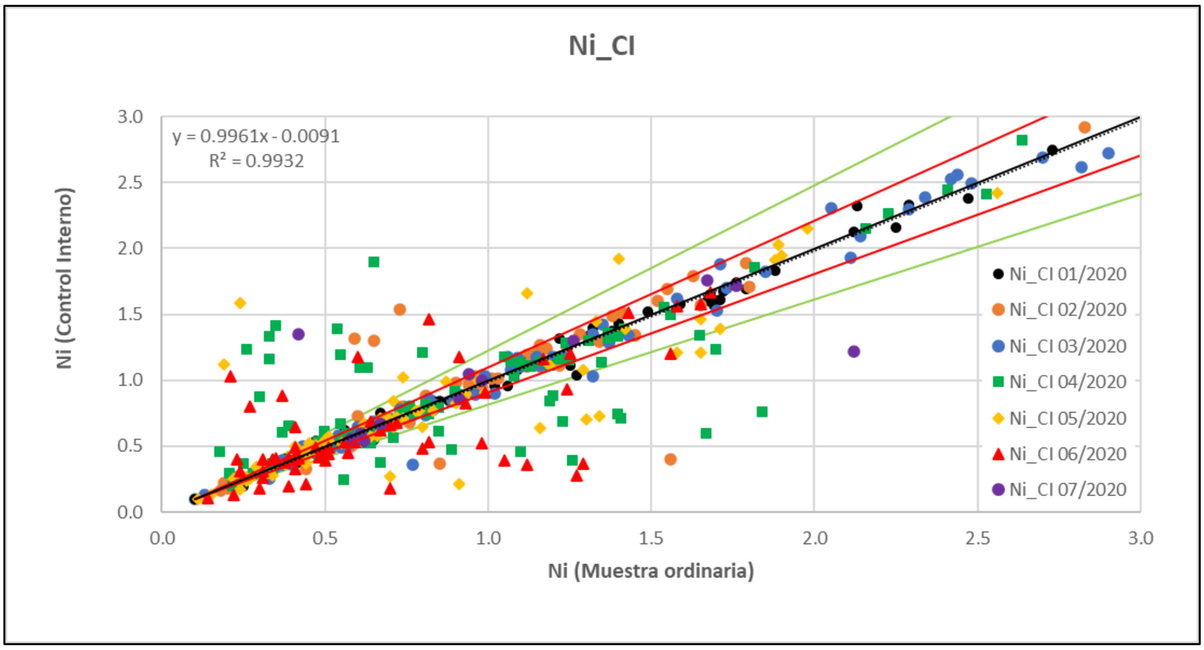
Absolute error plots were also generated by the QP for all the Control Interno samples, these plots present the absolute difference of the original assay value from the mean of assay pairs. The plots illustrate the accuracy of analysis for sample pairs. The error plot for nickel at Camarioca Norte as an example is presented in Figure 11.5. The percentages of pairs with analytical errors of less than ±20% is 99% and less than ±10% is 98%, which is acceptable in this case. The QP concluded that the results of the internal duplicate quality control assays demonstrate acceptable reproducibility of the original assays.

Figure 11.3: Scatterplots of Internal Pulp Duplicated Assays (y axis) vs Original Assays (x axis)



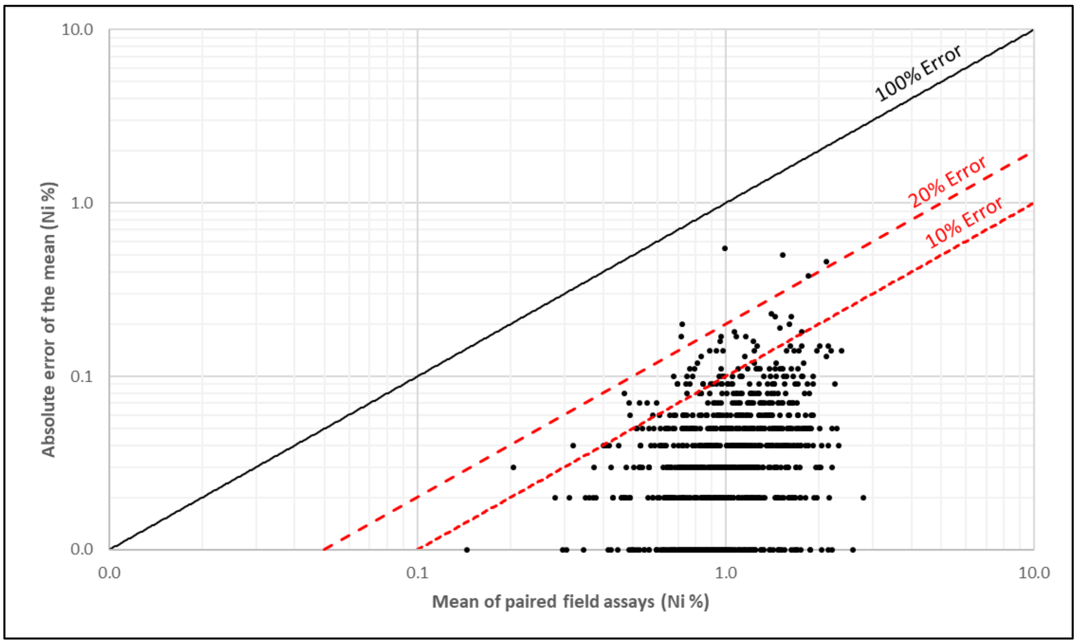
Source: Micon (2023)

Figure 11.4: Scatterplot of Internal Pulp Duplicate Assays (y axis) vs Original Assays (x axis) at Zona Septentrional, Coloured by Month



Source: Micon (2023)

Figure 11.5: Absolute Error Plot of Internal Original and Pulp Duplicate Nickel Samples at Camarioca Norte



Source: Micon (2023)

11.5.2.2 External Pulp Duplicates

The results of the external pulp duplicate control samples ("Control Externo") analysed by the secondary laboratory were reviewed by the QP. Table 11.5 contains a count of the total number of external pulp duplicate samples provided by Moa JV. As with the internal pulp duplicates, these cover ten concessions, across drill campaigns from 2005 to 2021 with one small campaign at Moa Oriental in 1985.

Table 11.5: Summary of Control Externo Samples Provided by Moa JV

Concession	Ni	Co	Fe	Al	SiO_2	Cr	Mg	Mn	Year
CN	797	797	797	797	797	797	797	797	2005
CS	704	702	702	702	702	702	702	702	2005, 2011, 2019
CR	750	748	748	748	748	748	748	748	2013
LD	416	414	414	414	414	414	414	414	2012
MO	34	34	34	0	0	0	0	0	1985
PV	239	239	239	239	239	239	239	239	2013, 2014, 2021
ZS	521	521	521	521	521	521	521	521	2011, 2013, 2014, 2020
ST	260	260	260	260	260	260	260	260	2015
YO	714	714	714	714	714	0	714	0	2007
ZC	101	101	101	101	101	101	101	101	2007
Total	**4,536**	**4,530**	**4,530**	**4,496**	**4,496**	**3,782**	**4,496**	**3,782**	**-**

Summary statistics for nickel are presented in Table 11.6. The results are very similar to the internal pulp duplicates with correlation coefficients ranging from 0.90 to 1 for the ten concessions.

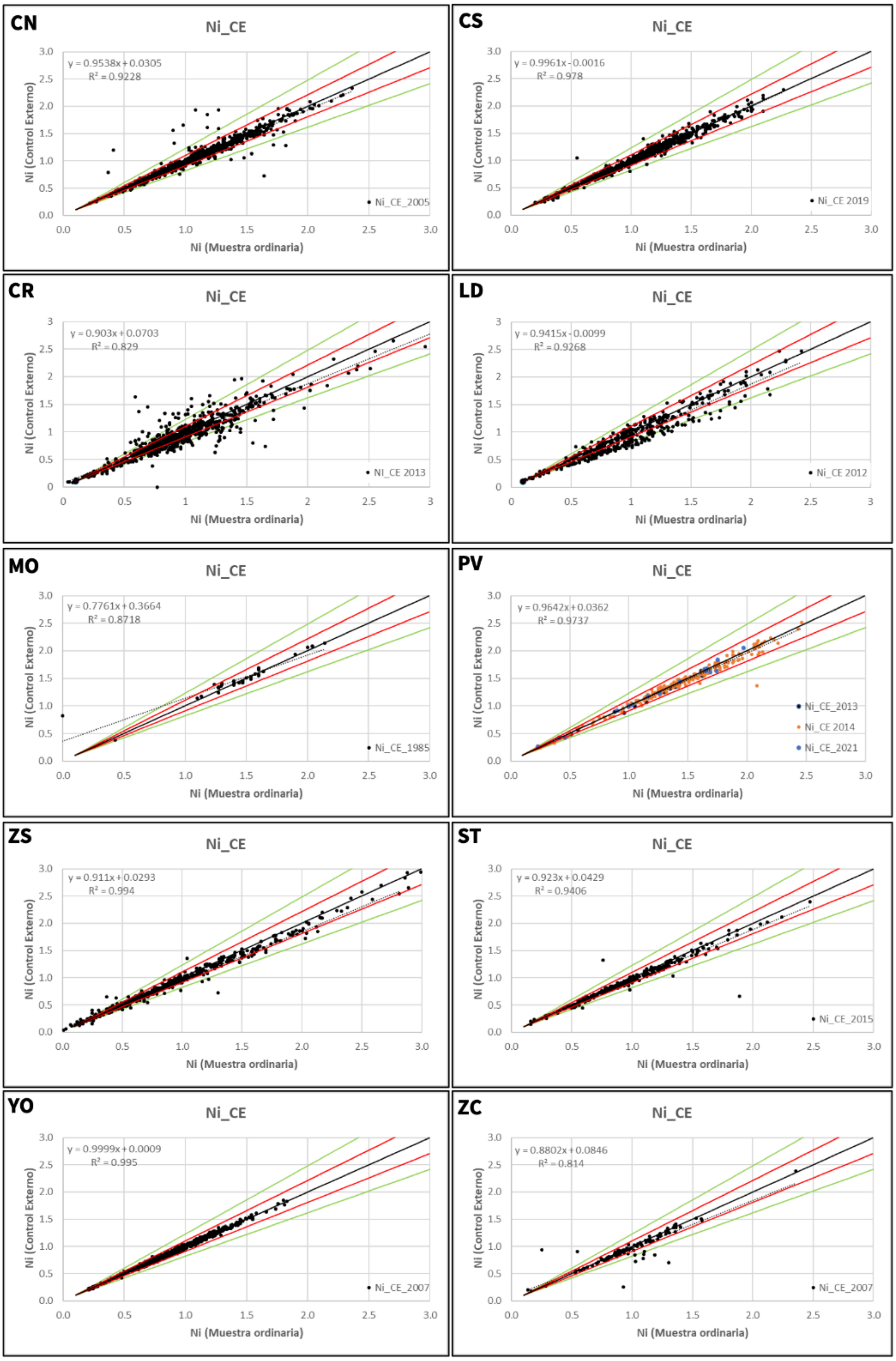
Scatterplots of original versus external pulp duplicate samples were also generated by the QP for eight elements in each concession. Plots for nickel are presented in Figure 11.6. External duplicate controls reproduced well overall with a reasonably tight spread of results. The majority of analyses plot inside the ±10% error limits which is an acceptable level of error.

At Cantarrana, La Delta, Zona Septentrional, Zona Central and to a slight degree at Santa Teresita, there is a negative bias observed (Elias et al., 2019). At the time, some of the external duplicates assayed at the SGS laboratories were re-assayed in Sherritt's analytical laboratories in Fort Saskatchewan, and results were in favour of the primary laboratory (Figure 11.7), showing lower relative error and bias in comparison with SGS results. The Sherritt analytical laboratory has current ISO 9001:2015 accreditation and is not independent.

Table 11.6: Summary Statistics for Nickel in Control Externo Pulp Duplicate Samples

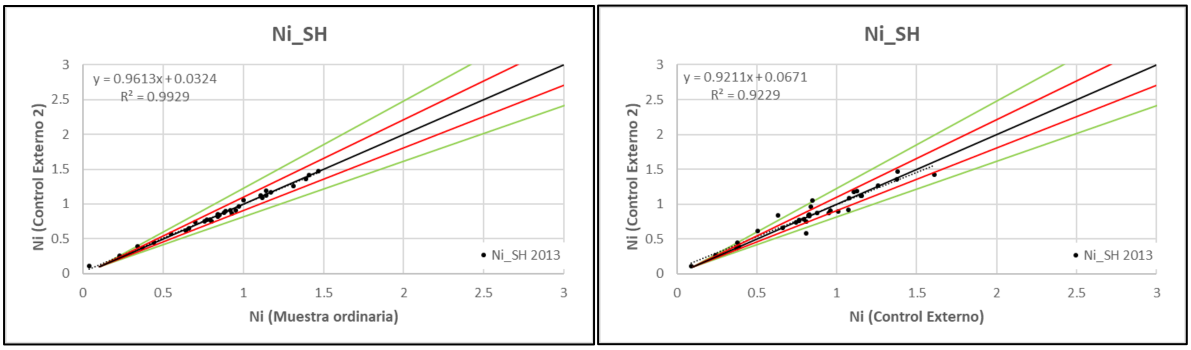
Concession	Element	Parameters	Original	Duplicate
CN	Ni (%)	Mean	1.09	1.07
		Standard Deviation	0.35	0.35
		Correlation Coefficient	0.96	
		No. of Samples	797	
CS	Ni (%)	Mean	1.08	1.07
		Standard Deviation	0.38	0.38
		Correlation Coefficient	0.99	
		No. of Samples	704	
CR	Ni (%)	Mean	0.95	0.93
		Standard Deviation	0.39	0.39
		Correlation Coefficient	0.91	
		No. of Samples	750	
LD	Ni (%)	Mean	0.99	0.93
		Standard Deviation	0.43	0.42
		Correlation Coefficient	0.96	
		No. of Samples	416	
MO	Ni (%)	Mean	1.42	1.47
		Standard Deviation	0.39	0.33
		Correlation Coefficient	0.93	
		No. of Samples	34	
PV	Ni (%)	Mean	1.41	1.40
		Standard Deviation	0.44	0.43
		Correlation Coefficient	0.99	
		No. of Samples	239	
ZS	Ni (%)	Mean	0.89	0.86
		Standard Deviation	0.59	0.56
		Correlation Coefficient	0.99	
		No. of Samples	521	
ST	Ni (%)	Mean	0.99	0.96
		Standard Deviation	0.39	0.37
		Correlation Coefficient	0.97	
		No. of Samples	260	
YO	Ni (%)	Mean	0.85	0.85
		Standard Deviation	0.31	0.31
		Correlation Coefficient	1.00	
		No. of Samples	714	
ZC	Ni (%)	Mean	0.98	0.97
		Standard Deviation	0.32	0.31
		Correlation Coefficient	0.90	
		No. of Samples	101	

Figure 11.6: Scatterplots of External Pulp Duplicated Assays (y axis) vs Original Assays (x axis)



Source: Micon (2023)

Figure 11.7: Scatterplots of External Pulp Duplicates from Cantarrana



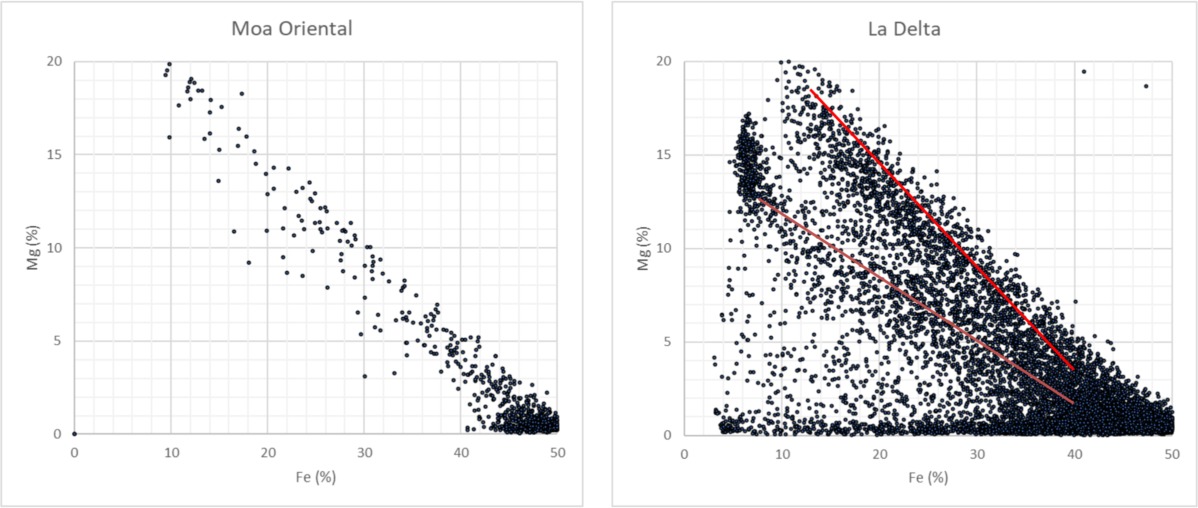
Left: Sherritt Fort Saskatchewan laboratory (y axis) vs primary laboratory (x axis), and
Right: Sherritt Fort Saskatchewan laboratory (y axis) vs SGS laboratory (x axis)
Source: Micon (2023)

11.5.2.3 MgO versus Mg assays in the database

Historically at the Moa Project, when drilling and assaying has been complete, the magnesium assays were sometimes done as Mg assays and sometimes done as MgO assays. Within the database, there are some concessions where the field labelled "Mg" contains a mixture of Mg assays and MgO assays.

Scatterplots between the data in the field labelled "Mg" versus the data in the field labelled "Fe" were plotted for each concession to examine the extent of the issue. For Camarioca Sur, Cantarrana, Moa Oriental and Yagrumaje Oeste there appears to be a clear inverse relationship (Fe goes up as Mg goes down) with one population and therefore no mixing of Mg and MgO (see Figure 11.8 left plot). However, at Camarioca Norte, Zona Central, La Delta, Playa La Vaca, Santa Teresita, Zona A y Zona A Oeste and Zona Septentrional there appear to be two sub-populations within the cloud of points (see Figure 11.8 right plot).

Figure 11.8: Scatterplots between Mg and Fe Assays in the Database

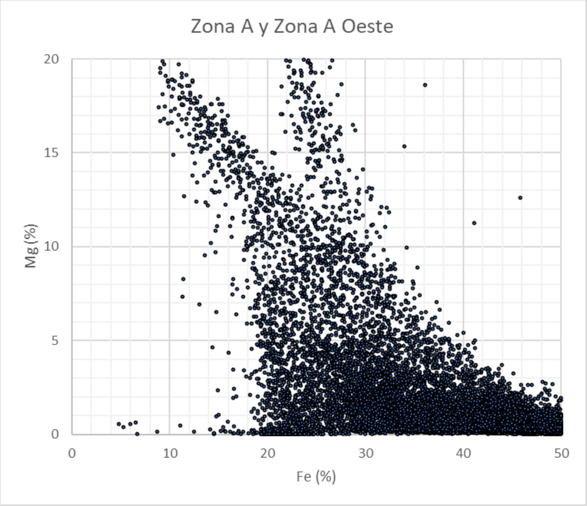


Left: Drilling campaign at Moa Oriental in 2022, and Right: Drilling campaign at La Delta in 2012
Source: Micon (2023)

The two sub-populations are highlighted with the red and orange lines in the scatterplot on the right in Figure 11.8. The lines that pick out the two sub-populations differ in their slope by exactly 1.66, which is the factor used to convert Mg to MgO. This could also be an issue with other elements, such as Mn and MnO, or Al and Al_2O_3, but it is difficult to see sub-populations in a scatterplot as there is not another element with which those elements correlate well.

Figure 11.9 illustrates a unique example whereby it appears that some of the Mg assays were corrected in the database unnecessarily. It is possible that the dataset with the orange trendline relates to one drilling campaign where it was believed the assays were of MgO, when in fact they were actually Mg and required no conversion. If ancillary information such as the year that the hole was drilled (and assayed), or who drilled it was recorded in the database, then the diagnosis and correction of problems like this could be traced back to a particular drilling campaign.

Figure 11.9: Scatterplot between Mg and Fe at Zona A y Zona A Oeste



Source: Micon (2023)

It is recommended that the databases for the Camarioca Norte, Zona Central, La Delta, Playa La Vaca, Santa Teresita, Zona A y Zona A Oeste and Zona Septentrional concessions are further interrogated to assess whether it might be possible to correct the Mg assay values. It may not be such a simple task as illustrated in the La Delta example whereby the mixing has occurred within the same year/drilling campaign.

11.5.2.4 Conclusions

The QP is of the opinion that the QAQC results do not currently meet what is considered the industry standard for robust QAQC protocols. However, the work does demonstrate repeatable results through various laboratories. The QP is of the opinion that although the QAQC procedures are not robust, the samples are appropriate for Mineral Resource estimation. This is due to several factors – the high number of drill holes/samples distributed throughout the deposit, there is reasonable correlation between the exploration datasets and the mining results and the fact that operations have been ongoing using these data for almost 20 years. However, there is room for improvement in the quality assurance protocols and quality control procedures. The QP recommends the following:

- Updating sampling and assaying SOPs;
- Including blind QAQC CRM samples, representative of grade distribution and material types, coarse blanks, and coarse (field) duplicates, introduced by Moa JV, into the sample preparation and analysis chain;

- Increasing the percentage of external pulp duplicate samples above 5% of the total assay count;
- Regular monitoring of QAQC results should be conducted for each batch of samples returned; and,
- Develop as part of the SOP a plan which clearly states the actions required when QAQC samples show irregularities and document any actions that are taken.

11.5.3 Database Compilation and Validation

Drill hole databases are typically stored in Microsoft Access file format. Compilation of the databases is completed on site or subcontracted to a consulting group adjunct to the local university, Instituto Superior Minero Metalúrgico Moa (ISMMM), and then reviewed by the resource and exploration geology team on site. Drill hole logs are entered manually in the database and then combined with drill hole assays, which are always received in digital format from the laboratories.

The Qualified Person notes that the databases are not available to the corporate office or Sherritt facilities in Fort Saskatchewan and recommends maintaining a backup of drill hole data for security reasons in either of the two offsite locations, along with digital block models and other relevant resource and reserve data.

11.6 QUALIFIED PERSON’S OPINION AND CONCLUSIONS

As noted in Section 11.1, the QP was unable to verify the sampling and assaying quality of the historical samples collected between 1970 and 1995. However, the QP believes these samples are appropriate to use in the Mineral Resource and Reserve estimates since validations completed by the Moa JV show satisfactory results.

It is the Qualified Person’s opinion that security, sample collection, preparation, security and analytical procedures undertaken on the Moa Project during the 1995 to 2022 drill programmes are appropriate for the style of mineralisation. Duplicate assays provided sufficient confidence in assay values for their use in the estimation of Mineral Resources.

The Qualified Person notes the absence of blanks and reference materials (standard samples) in the current QAQC programme, but if the recommendations listed in Section 11.5.2.4 are implemented this will help to bring the QAQC protocol in line with industry standard best practices.

12.0 DATA VERIFICATION

The Moa Project was visited by Beatrice Foret and Bryce Reid in February 2022 (see Section 2.4). Ms Foret was accompanied by Micon's Peter Shankaya for a portion of the visit.

Also present during the February site visit were Julian Nanez from Sherritt (Operations and Mine Planning Advisor), Mohan Srivastava and Alan Lambden from RedDot3D.

The purposes of the site visit was as follows:

- Meet the Moa JV key technical and management staff;
- Observe the operation, understand current practices, understand the requirements of the operation and its limiting factors;
- Review all aspects of the geology, exploration, sampling and assaying operations, data collection, database compilation, deposit modelling and QAQC programme;
- Review all aspects of the mining operation;
- Observe the measurements of tonnes and grades throughout the operation all the way from drilling to the mixed-sulphide product;
- Gather information and data to serve as input for the LoM Schedule, QAQC and reconciliations studies; and,
- Gain a better understanding of Cuban mining rules and regulations to align Cuban and Canadian reports, which were to be compiled in a Mineral Resource Alignment Report.

During the visit, the following activities were carried out:

- Overview of geology, exploration, mining and processing;
- Visit to the Moa JV sample preparation facility Geominera Oriente, and to the pulp storage facility on site;
- Visit to the assay laboratory Elio Trincado in Santiago de Cuba;
- Visit to the two SPPs and to the HPAL plant;
- Visit to the tailings storage facility (TSF);
- Visit to the Zona Septentrional open-pit with an observation on ore demarcation;
- Observation of on-going drilling, sample collection and drilling (Geominera and Moa JV drill rigs);
- Observation of GPR lines data acquisition;
- Mining engineering visits to the Camariocas Norte and Sur, Moa Oriental, Zona Septentrional and Playa La Vaca deposits;
- Review of data collection, historical drilling analysis, database processing and QAQC with the exploration geologist;
- Discussions with the geology and mining teams;
- Observed the operation of the PSA Plant;

- Reviewed inputs for performing the LoM Schedule with the Moa Process Technology team; and,
- Discussions with process technology teams, review of process operating data and observation of metallurgical test work.

A dataset from Geominera of 2008 in La Delta and Cantarrana was compared to a nearby subset of assays from the original 1960s drilling (Golightly, 2009). The old data appear to have satisfactory agreement with new data to the extent expected of locations approximately 70 m apart. Small factors calculated on nickel and iron were recommended to be used in resource estimation in this study. This approach was not taken in the current mineral resource estimate, but the level of confidence has been adjusted accordingly. Saprolites have been classified as Inferred or Indicated as a maximum resource category. When saprolite material is classified as Indicated, this means that this is supported by more recent basement drilling (and historical drilling).

It is important to use the historical data as it is necessary to model the bottom of the saprolites and permits the estimation of the saprolitic horizon, based on core samples.

Written protocols for sampling, assaying, sample QAQC, logging, database storage, and sample security, were reviewed and discussed with the local team. The QP noted that protocols were out of date or incomplete with respect to the actual practices employed at site; however, procedural updates were further discussed and documented in internal reports and coincide with procedures observed in the field.

There is a QAQC programme in place that includes the use of duplicate pulp assays sent to the primary laboratory and to an umpire laboratory, either SGS (previously in Toronto, Canada and now in South Africa; accredited), Laboratorios Isaac del Corral in Havana (not accredited), and Sherritt laboratories located in Fort Saskatchewan Canada (accredited). The current QAQC programme does not include the use of blanks, standards or field/coarse reject duplicates. There is an evident willingness and desire to implement practical ideas that improve the quality of the work, and a great deal of interest in approaches used by commercial assay laboratories faced with similar problems elsewhere in the world.

Reconciliations studies and field observations suggest that auger sampling is adapted to sample the limonites, which are the majority of the ore that has been mined, and which contains low quantities of magnesium and boulders. Over the last five years, the operation has tended to include more and more material with higher magnesium grades, as the operation is moving from concessions with thick limonite intervals, to concessions with thinner limonite intervals and with a more developed saprolitic profile.

Auger sampling is not adapted to sample the saprolites; they are more heterogeneous and contain boulders that tend to be avoided by the auger drill. This is one of the reasons the saprolites have all been classified as Indicated or Inferred Mineral Resources, and not as Measured Mineral Resources. The QP recommends that the recently purchased drill rig, which has the capacity to drill the full profile, is used to acquire additional data on the saprolitic horizons.

Some of the current concessions were transferred from other companies to Moa JV, always through ONRM. An example is Yagrumaje Oeste, previously held by the mining company Ernesto Che Guevara. Drilling results obtained by previous owners were include in the concession transfer package. The Moa JV has in place verification procedures that include drill hole twinning, metallurgical tests, and resurveying of 5% of the collar locations. This validation also includes drill holes from historical campaigns, drilled between 1970 and 1995.

The relevant QP has reviewed the sample collection and analysis methodologies and are of the opinion that those methodologies are to current industry standards and permit a meaningful investigation of the mineralisation at the Moa Project for the purpose of resource estimation under the 2019 CIM Guidelines and provide the basis for the conclusions and recommendations reached in this Report.

The mine design and production scheduling utilise the 2022 Mineral Resource Models prepared for all the concessions as described in this study to report tonnage and qualities.

As the Moa Project is currently in production, the mine operating costs and sustaining capital expenditures used for the completion of this Report were based on actual historical cost data, provided by Sherritt and Moa Nickel. Unit costs used in the estimation of future mine capital expenditures associated with road construction, new mine infrastructure and mine fleet expansion were based on actual offers from contractors and suppliers in Cuba, provided by Sherritt and Moa Nickel.

The relevant QP has observed the metallurgical testwork and reviewed the plant data to support the ECOG inputs.

The relevant QPs have reviewed all the inputs for performing the LoM Schedule and Economic Analysis and are of the opinion that this data is reasonable to estimate and report Mineral Reserves for the Moa Project.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

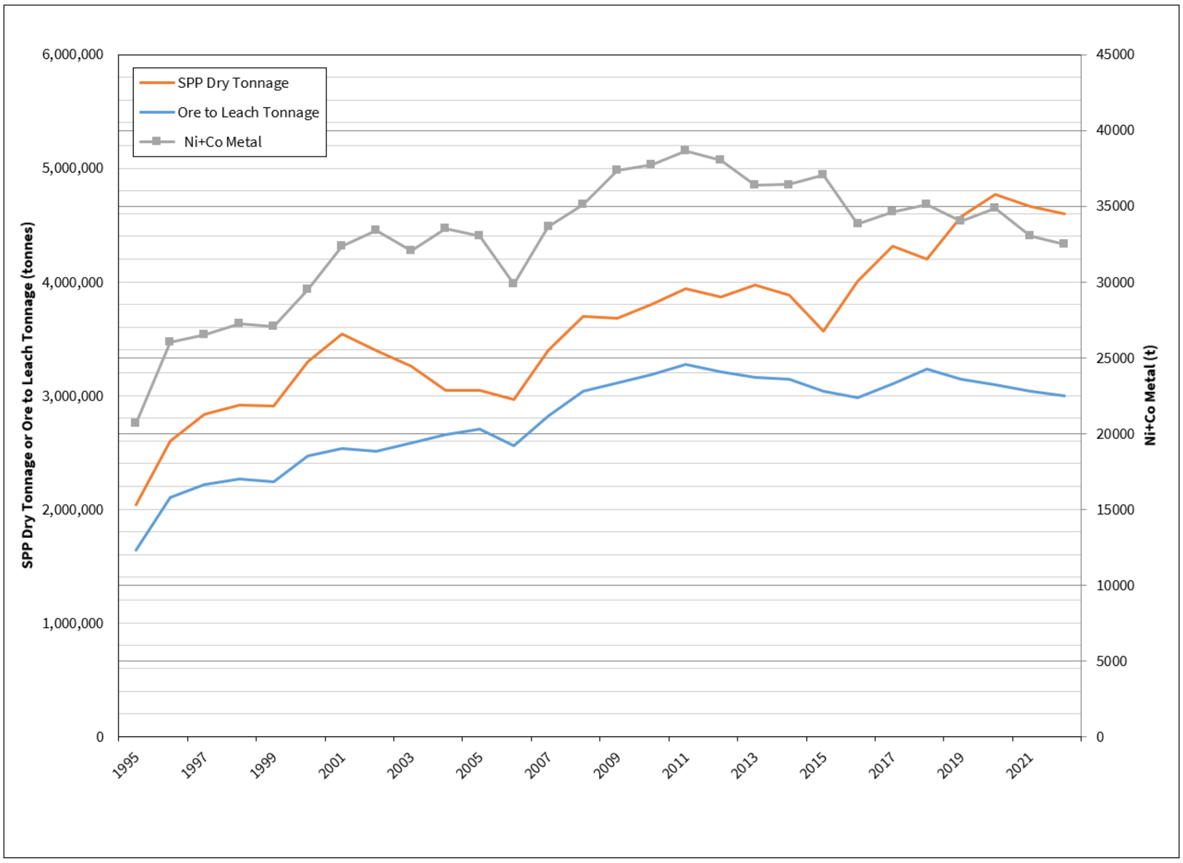
13.1 MINERAL PROCESSING

The PSA Plant uses a HPAL process to recover nickel and cobalt from lateritic ores. In the HPAL process, metals are dissolved from the laterite using sulphuric acid at high temperatures (approximately 245°C at the PSA Plant) and pressure (approximately 4,000 kPa at the PSA Plant). Nickel, cobalt, copper, zinc, manganese, magnesium and a portion of the aluminium are carried in the acidic solutions as sulphates. Most of the iron, chromium and silicon, and the balance of the aluminium, will remain in the solid leach residue as stable oxides and hydroxides.

13.2 PLANT PERFORMANCE

Through improved reliability of operations and several optimisation efforts, metal production has steadily risen to increased levels until a peak in 2011 at 38,641 t of nickel and cobalt. Since, metal production is on a slightly decreasing plateau, production was at 32,496 t of nickel and cobalt in 2022. The ore throughput has increased to reach 4.6 Mt in 2022 (Figure 13.1).

Figure 13.1: Summary of Annual Throughput, Ore to Leach and Ni+Co Metal in Mixed Sulphides



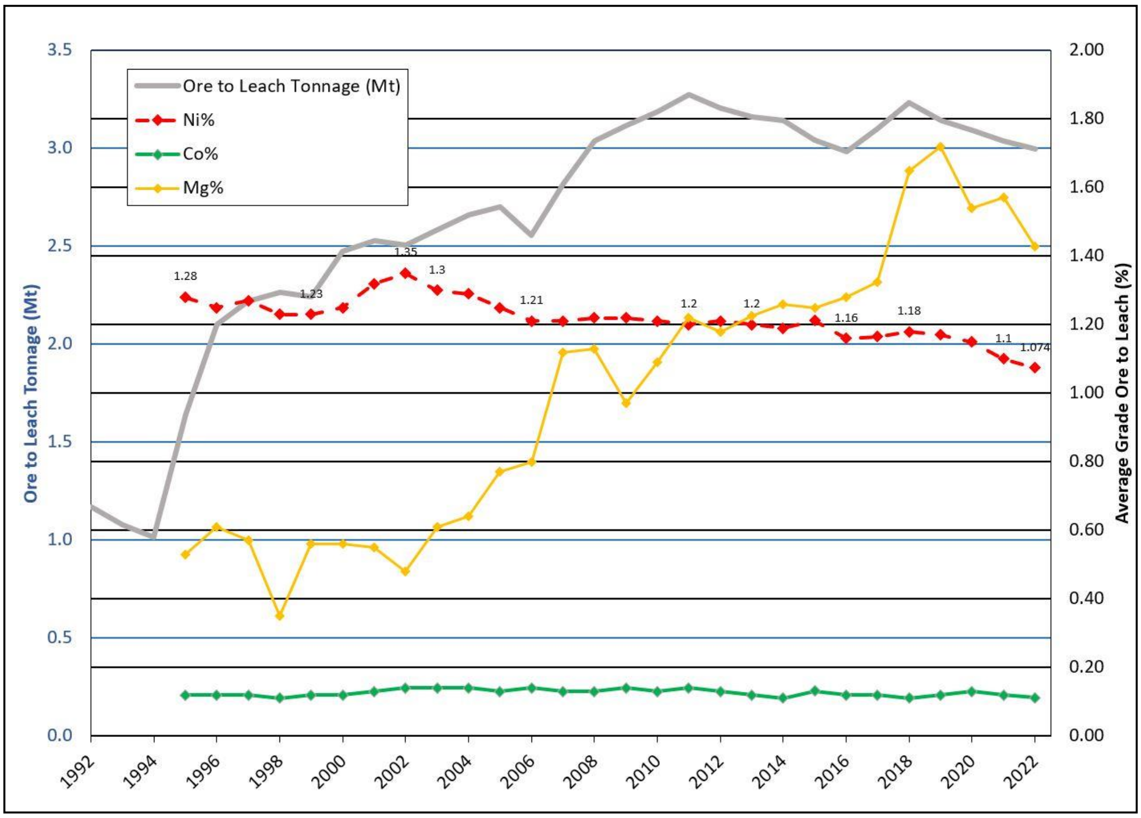
Source: Micon from Sherritt Data (2023)

The nature of the feed changed as mining moved to different types of ore material, and by incorporating a higher quantity of dilution with saprolite material. The quantity of rejects at the SPP has increased, especially since 2016.

Over the years the nickel grades have slowly decreased (1.28 Ni% to 1.07 Ni%), however, cobalt grades stayed stable around 0.11 Co% to 0.12 Co%. Magnesium grades have slowly increased (0.5 Mg% to 1.4 Mg%), iron grades have decreased (46 Fe% to 41 Fe%). Silica grades have increased (4 SiO_2% to 7 SiO_2%). The concentration of deleterious elements has increased as the mine moved from Moa Occidental to Moa Oriental.

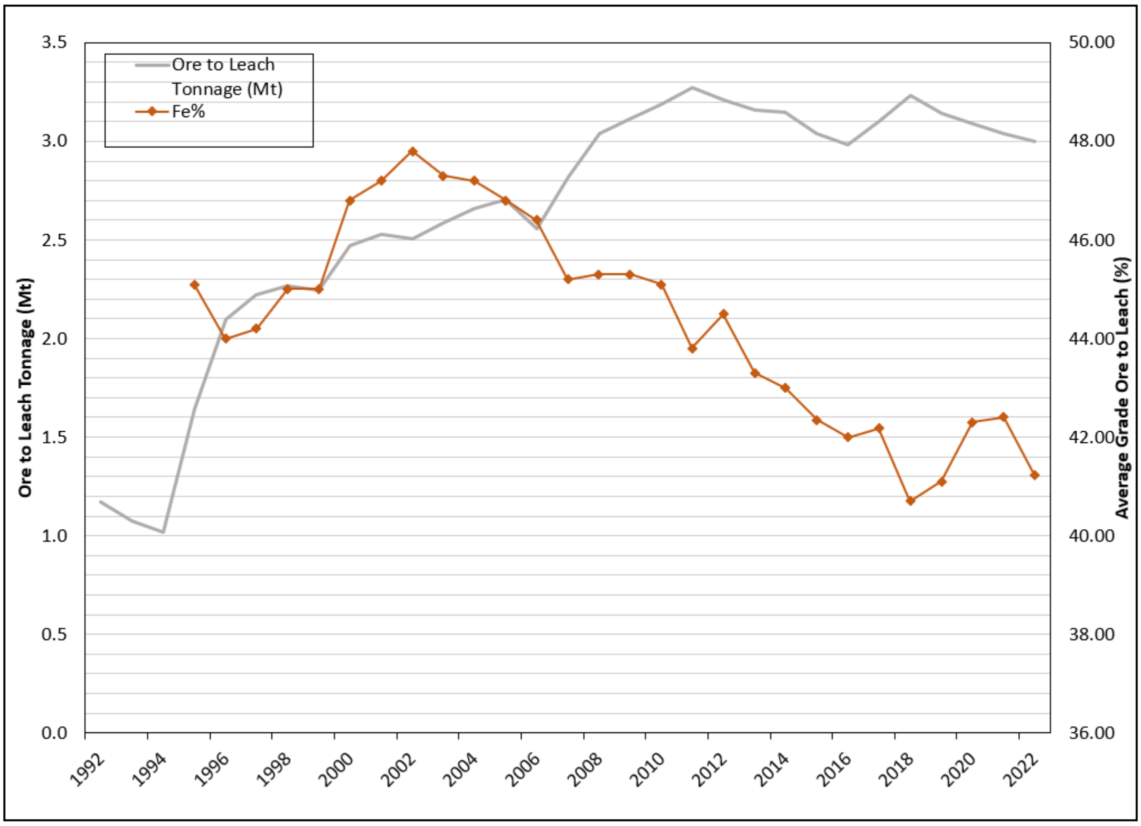
Figure 13.2 to Figure 13.4 present the tonnage and average grades of the ore material to leaching from 1994 to 2022 for nickel, cobalt and magnesium, iron and silica, respectively.

Figure 13.2: Tonnage and Average Grades (Ni, Co, Mg) of the Ore Material to Leaching, 1994 to 2022



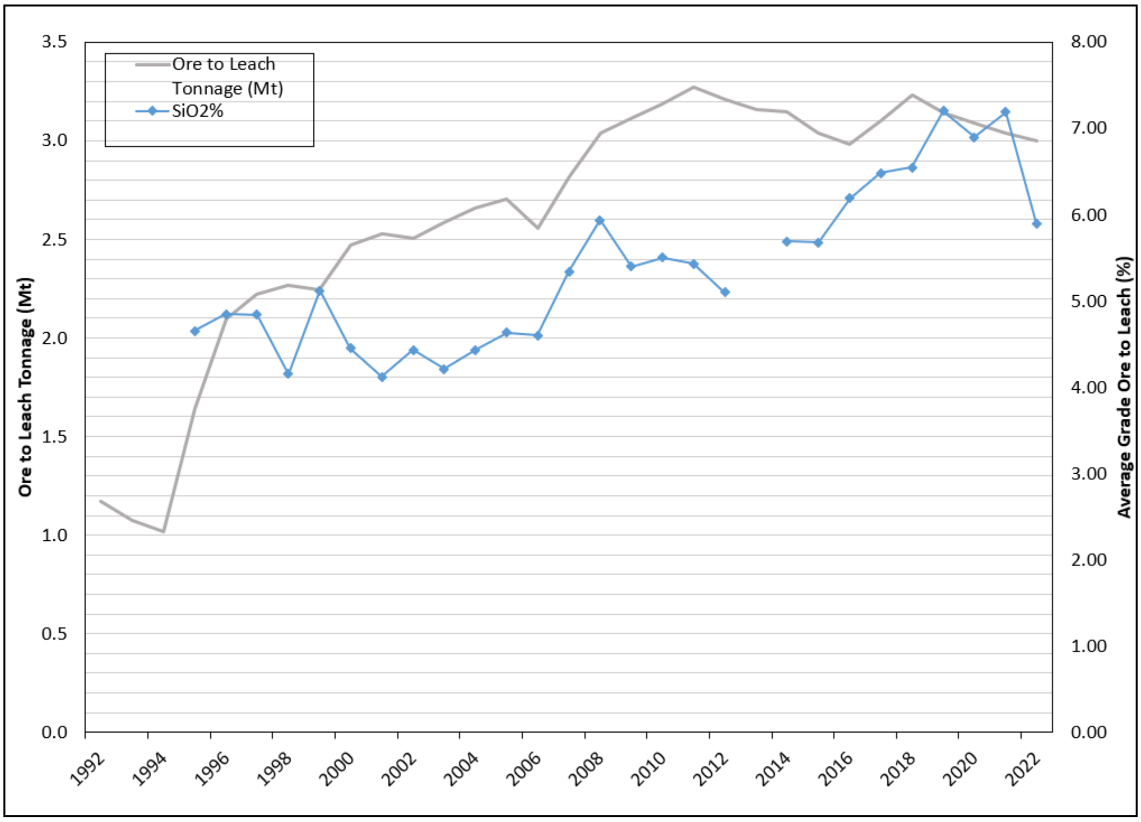
Source: Micon from Sherritt Data (2023)

Figure 13.3: Tonnage and Average Grades (Fe) of the Ore Material to Leaching, 1994 to 2022



Source: Micon from Sherritt Data (2023)

Figure 13.4: Tonnage and Average Grades (SiO_2) of the Ore Material to Leaching, 1994 to 2022



Source: Micon from Sherritt Data (2023)

13.3 TESTWORK SUPPORTING PLANT DESIGN

The PSA Plant was originally constructed by the Moa Bay Mining Company. The selected process for the PSA Plant was based on an extensive programme of batch and continuous testwork. The tests demonstrated that high extractions of nickel and cobalt were obtained from low magnesium lateritic ores with a minimum dissolution of iron and aluminium by operating the leach at temperatures in the range of 230°C to 260°C. A 10 t/d pilot plant was subsequently built to confirm the amenability of the Moa ore to pressure leaching and to develop process design criteria for the commercial plant. Two pilot plant campaigns demonstrated the technical feasibility of the overall process. Since the plant commenced operation, metal extractions have averaged 94% to 95% with good control of acid addition.

In 1993, Sherritt completed an extensive refurbishment and expansion of its Fort Saskatchewan nickel and cobalt refinery to allow efficient processing of mixed sulphides from Moa Nickel.

13.4 METALLURGICAL TESTING

In 2001, batch and continuous testwork was carried out on samples of limonite and limonite/saprolite blends from the Moa Oriental and Camarioca Norte concessions. The samples were taken from drill cores obtained on a 100 m x 100 m grid representing the complete laterite profile and are considered to be representative of the ore bodies. The continuous testwork included evaluation of ore slurry settling, high pressure acid leach, and counter-current decantation (CCD) washing of the leach discharge residues.

Drill hole samples indicate that the Camarioca Norte and Camarioca Sur ore material typically averages 1.5 Mg% to 1.7 Mg% and 3.0 Si% to 3.5 Si%, which is higher than ore material historically processed at the PSA Plant (prior to approximately 2001). This testwork therefore offers insight into the behaviour of higher magnesium and silica content ores in the ore thickeners, HPAL and the CCD wash circuit.

The chemical analyses of the ore material types tested in 2001 are summarised in Table 13.1.

Table 13.1: Chemical Composition of Ore Material Types Tested (2001)

Ore Material Location	Ore Material Type	Ni (Ni %)	Co (Co %)	Al (Al %)	Cr (Cr %)	Fe (Fe %)	Mg (Mg %)	Mn (Mn %)	Si (Si %)
Moa Oriental	Limonite	1.52	0.144	3.87	1.79	48.0	0.22	0.53	1.26
	2% Mg Blend	1.57	0.130	3.62	1.70	43.7	2.27	0.47	3.37
	4% Mg Blend	1.58	0.119	3.41	1.61	39.2	4.17	0.43	5.32
Camarioca Norte	Limonite	1.56	0.156	3.64	1.89	50.1	0.37	0.68	1.17
	2% Mg Blend	1.74	0.116	3.20	1.67	46.4	2.11	0.54	2.75
	4% Mg Blend	1.91	0.100	2.74	1.43	40.8	4.32	0.39	4.82

In 2021, batch testwork was conducted on limonite and limonite/saprolite blends from various deposits. A total of 39 composite samples were prepared for metallurgical testing. The samples were collected from the following deposits: Camarioca Norte (CN), Zona Septentrional (ZS), Playa La Vaca (PV), Zona Central (ZC), Moa Oriental (MO), Zona A (ZA), Zona A Oeste (ZAO), Camarioca Sur (CS), Yagrumaje Oeste (YO), La Delta (DE) and Cantarrana (CA). Ore blends for the various tests were selected with a focus on ore deposits that are scheduled to be processed in the next ten years (2023 to 2033).

Nickel content in the selected limonite composite samples varied from 0.64 Ni% to 1.2 Ni%. Magnesium content in the saprolite samples ranged from 3 Mg% to 15 Mg%. Silicon content in the saprolite samples ranged from 6 Si% to 15 Si%. This 2021 testwork offers insight into the behaviour of low-grade limonite and limonite/saprolite blends in the ore thickeners, HPAL and CCD wash circuit.

The particle size distribution of the ore material samples tested in 2021 are provided in Table 13.2.

Table 13.2: Particle Size Distribution of Ore Material Types Tested (2021)

Composite ID	Weight % Passing				
	2.0 mm	1.2 mm	840 µm	500 µm	44 µm
CNLB-1	99.2	98.5	98.0	97.5	89.9
CNLF-1	99.7	99.5	99.3	98.8	96.0
CNLF-2	99.8	99.5	99.3	98.9	92.0
CNLFP1	89.8	85.2	83.6	80.9	70.2
CNLFP2	96.9	95.5	94.6	94.2	88.3
CNLFP3	99.5	99.1	98.5	97.2	91.8
CNLBP4	99.7	99.3	99.1	97.4	92.7
CNSB	97.9	97.0	96.0	94.5	83.1
CNLB-2	99.6	99.2	98.9	98.4	91.1
ZSLB	99.5	99.2	99.0	99.0	83.9
ZSLF	81.0	72.8	69.8	66.3	50.6
ZSSB	53.6	39.1	22.4	21.9	19.2
MOLFLSi	98.7	97.8	97.3	97.1	91.7
MOLFHSi	83.8	82.2	81.4	81.0	76.9
ZCLFRed	81.9	75.5	73.4	71.4	63.2
ZCLFOx	92.5	89.9	87.2	85.2	79.3
PVLFLSi	53.7	45.6	42.4	41.4	35.7
PVLBLSi	79.7	75.0	73.0	72.4	66.8
ZALFLSi	99.6	99.2	98.8	97.9	79.1
ZAOLFHSi	53.1	52.4	51.6	50.5	42.1
ZAOSB	86.9	82.7	79.9	77.6	60.1
CAFFLSi	100	99.9	99.8	99.8	98.0
CALFLSi	99.6	99.2	98.9	98.7	93.0
CALFHSi	99.2	97.4	95.1	93.2	68.5
DELFHSi	97.0	94.2	89.2	86.4	57.7
DELB	99.8	99.4	98.6	96.0	71.1
YOLBP1	99.0	98.2	97.4	97.0	91.2
YOLBP2	99.9	99.7	99.5	99.3	89.7
YOLBP3	99.9	99.9	99.8	99.7	91.5
YOLFLSi	99.7	99.5	99.4	99.4	95.9

The composite ID summarises the deposit from which the sample was taken, the type of ore based on Moa JV's criteria for ore characterisation (LB – limonite, LF – low grade limonite, SB - saprolite) and provides some description of the chemical composition of the grab samples (LSi – low silicon, HSi – high silicon, Red - reducing, Ox - oxidising). For instance, CNLB-1 simply indicates the Camarioca Norte limonite Sample 1, while MOLFLSi simply indicates Moa Oriental low grade limonite low Si.

13.4.1 Ore Thickening

In 2001, material settling testwork was carried out in a continuous laboratory scale Supaflo thickener, using flocculant Percol 455. The settling tests were carried out at 25°C with a feed solids content of approximately 5%. Initial scoping tests were carried out in graduated cylinders to define the optimal feed density and flocculant dosage. 200 l samples of slurry were prepared, and this slurry was continuously pumped into the feed well of the thickener.

A bed of solids was allowed to build until the bed reached the lower portion of the feed well. The underflow pump was then started at a flow rate which maintained the bed at a constant level. Underflow samples were taken when the system reached steady state. Samples of overflow were also taken at steady state to determine the overflow clarity. The results are summarised in Table 13.3.

Table 13.3: Ore Thickening Testwork Results (2001)

Ore Material Type	Loading ($t/m^2/hr$)	Flocculant (g/t)	Underflow (% solids)
Moa Oriental Limonite	0.25–0.30	40	45
Camarioca Norte Limonite	0.40	50	45
Moa Oriental 2% Mg Blend	0.20–0.30	70	45
Camarioca Norte 2% Mg Blend	0.12–0.20	50	45
Moa Oriental 4% Mg Blend	0.30	80	45
Camarioca Norte 4% Mg Blend	0.20–0.30	50	45

The highest loadings were achieved with the Camarioca Norte limonite. Flocculant requirements generally increased with increasing magnesium and silica content of the ore material.

In 2021, ore settling tests were conducted in 1 l graduated cylinders at room temperature (20°C), without flocculant, as the majority of the ore processed at the PSA Plant continues to be thickened without the use of flocculant. The settling test feed slurry solid content was adjusted to approximately 12.5 wt% to 13.5 wt% by dilution with an appropriate amount of water, again consistent with how the majority of the ore is currently processed in the commercial operation. After mixing the slurry, motor-driven rakes were installed and the settled slurry interface level was recorded at pre-determined time intervals throughout the test. After seven days (the typical residence time in the commercial thickeners at the PSA Plant), the rake was carefully removed, and the overflow solution was decanted. The settled slurry was recovered and filtered to recover the solids. The settled slurry solid contents, as calculated from the interface levels that were measured at 48 h during the tests, for composite samples from various deposits are shown in Table 13.4.

The batch settling test results showed that blends of limonite with saprolite composite ore material did not settle to as high a density as the limonite samples alone, as shown in Table 13.4. Samples from the ZS and ZA deposits showed that the settled solids content of the limonite/saprolite blends decreased linearly with increasing the saprolite ore in the blend. In contrast, samples from the CN deposit showed that the addition of even small amounts of saprolite in the ore feed blend can result in a very significant decrease in settled slurry solids content. Additional factors such as the particle size distribution of the settled solids, the amount of clay material, etc., should also be taken in consideration when evaluating the settling properties of laterite ores.

Table 13.4: Settling Test Results for Limonite and Saprolite Blends (2021)

Ore Material	ID	Blend Ratio Limonite:Saprolite	Settled Solids % Solids (48 h)
Limonite	CNLB-1	Alone	51
Saprolite	CNSB	Alone	39
Blend	CNLB-1 + CNSB	9(CNLB-1): 1 (CNSB)	42
Blend	CNLB-1 + CNSB	8(CNLB-1): 2 (CNSB)	41
Limonite	ZSLB	Alone	50
Blend	ZSLB + ZSSB	9(ZSLB): 1(ZSSB)	51
Blend	ZSLB + ZSSB	8(ZSLB): 2(ZSSB)	43
Blend	ZSLB + ZSSB	7(ZSLB): 3(ZSSB)	41
Blend	ZSLB + ZSSB	6(ZSLB): 4(ZSSB)	39
Blend	ZSLB + ZSSB	5(ZSLB): 5(ZSSB)	34
Limonite	ZALFLSi	Alone	52
Saprolite	ZAOSB	Alone	13
Blend	ZALFLSi + ZAOSB	8.5(ZALFLSi):1.5(ZAOSB)	50
Limonite	CSLFLSi	Alone	70
Limonite	CSLFP1	Alone	38
Limonite	CSLFP2	Alone	38
Limonite	CSLFP3	Alone	40
Blend	CSLFLSi + CSLFP1	7:3	49
Blend	CSLFLSi + CSLFP2	7:3	48
Blend	CSLFLSi + CSLFP3	7:3	44
Limonite	CSLBLMg	Alone	47
Limonite	ZSLF	Alone	62
Limonite	YOLF	Alone	35
Blend	CSLBLMg+YOLF	1:9	38
Blend	CSLBLMg+YOLF	3:7	42
Blend	ZSLF+YOLF	1:9	41
Blend	ZSLF+YOLF	3:7	43

13.4.2 High Pressure Acid Leaching and Leach Residue Settling

13.4.2.1 Moa Oriental

In 2001, batch high pressure acid leach tests were conducted in a 4 l autoclave to evaluate the leach performance of limonite/saprolite blends in comparison with limonite alone, under the same conditions used in the commercial PSA Plant. The tests included characterisation of the liquid-solid separation behaviour of the leach discharge slurries. Test conditions and results are summarised in Table 13.5.

Table 13.5: Leach Performance Testwork Results with Moa Oriental Ore Material (2001)

Parameter	Test				
	M1	M1a	M2	M5	M7
Feed	Limonite 1	Limonite 2	70:30[1]	4% Mg	2% Mg
Slurry solids (%)[2]	35.2	35.4	35.1	35.0	35.1
Mg analysis (%)	0.21	0.25	4.16	4.17	2.27
Temperature (°C)	245	245	245	245	245
Retention time (minutes)	90	90	90	90	90
Acid (kg/t)	250	250	390	375	375
Nickel Extraction					
45 minutes (%)	96.1	96.3	88.1	90.2	70.1
60 minutes (%)	96.8	97.0	93.8	95.0	79.8
Cobalt Extraction					
45 minutes (%)	95.7	96.9	95.2	93.4	92.9
60 minutes (%)	95.9	96.6	96.7	95.2	95.1
H_2SO_4 (g/l)					
90 minutes (%)	40.2	33.0	39.8	41.5	31.5

Notes:

1. A blend of 70% limonite and 30% saprolite.
2. The HPAL feed slurry, which is heated indirectly in the batch test equipment, contains additional water compared with settled ore slurry, to account for water added by condensing steam via direct heating at the Moa Plant

The results confirm that nickel extraction in excess of 95% is attainable from Moa Oriental ore in the acid leach process. The results also highlight the importance of acid addition on final metal extraction and extraction kinetics, particularly at elevated magnesium contents.

Batch settling tests, in 2 l cylinders, were carried out on the discharge slurries from the batch leach tests. Slurries were diluted with synthetic wash circuit product solution and tests were carried out at 65°C. The results are presented in Table 13.6. While high flocculant requirements and low final settled solids content were features of the settling tests on the batch leach discharge slurries, significantly improved results were obtained in the subsequent settling tests carried out on the continuous leach discharge slurries.

Table 13.6: Batch Settling Testwork Results with Moa Oriental Batch Leach Discharge Slurries

Test	Flocculant (g/t)	% Solids		Settling Rate (cm/hr)	Unit Area (m^2/t/d)	Suspended Solids (mg/l)
		Initial	Final			
M1	123	10.5	54.0	350	0.084	53
M1a	213	8.5	48.3	406	0.093	30
M2	303	8.9	39.5	364	0.092	34
M5	156	8.6	42.4	743	0.048	43
M7	212	10.5	42.9	1,177	0.023	55

A 198 h pilot plant campaign was conducted using a 30 l continuous autoclave to evaluate the response of Moa Oriental limonite material and limonite/saprolite blends (2% Mg and 4% Mg) to high pressure acid leaching and leach residue settling under the conditions operated at the PSA Plant. The ore slurry feed to the autoclave contained 35% solids.

For the batch leach tests described previously, heating of the ore slurry is accomplished indirectly in the pilot plant, necessitating addition of more water with the feed slurry than would be present in the commercial plant, to account for water that is added by condensing steam during direct heating in the commercial plant.

Acid addition targeted specific free acid concentrations in the discharge solution. Leaching was carried out at a temperature of 245°C and retention times varied from 60 minutes to 90 minutes. The results are summarised in Table 13.7. Metal extractions in excess of 95% were achieved for the limonite ore, while extractions approached 95% for the 2% and 4% Mg blends. With further optimisation of acid addition, extractions in excess of 95% can be expected for the higher magnesium and silica content ores.

Table 13.7: Pilot Plant Campaign Testwork Results with Moa Oriental Ore Material

Parameter	Time Period				
	1	2	3	7	8
Ore Material Type	Limonite	4% Mg blend	4% Mg blend	2% Mg blend	Limonite
Duration (hours)	24	18	18	18	18
Acid addition (kg/t)	247/246	374/420	359	302	245
Temperature (°C)	244	245	245	245	245
Retention Time (minutes)	88	88	90	90	62
DX H_2SO_4 (g/l)	28, 32	42, 45	34	35	29
DX Extraction					
Nickel (%)	96.6 / 96.6	94.8 / 95.9	94.8	94.6	96.4
Cobalt (%)	96.2 / 96.2	95.3 / 95.2	95.9	94.9	95.9

Note: DX discharge solution

A two-stage CCD wash circuit was integrated with the continuous high pressure acid leach circuit. The settling behaviour of the autoclave discharge slurry was also assessed hourly by free settling in a benchtop cylinder. The settling velocity of the residue generated from the limonite feed was higher than the settling velocity of the residues generated from the blends with saprolite. Leach discharge slurry was diluted to 15% solids prior to flocculation with Percol 455. Flocculant additions to the first thickener varied from 80 g/t to 180 g/t. The results are summarised in Table 13.8.

Table 13.8: Pilot Plant Campaign Testwork Results with Moa Oriental Ore Material with Integration of Two-Stage CCD Wash Circuit

Parameter	Time Period				
	1	2	3	7	8
Ore Material Type	Limonite	4% Mg blend	4% Mg blend	2% Mg blend	Limonite
Feed (% solids)	15	13	14	15	15
Flocculant Addition (g/t)	78	104	130	162	181
Underflow (% solids)	56	44	36	46	52
Overflow Clarity (mg/l)	117	86	123	342	121
Unit Area (m^2/t/d)	0.47	0.47	0.47	0.44	0.32

In parallel, samples of the leach discharge slurry were subjected to thickening tests in a continuous laboratory scale Supaflo thickener, using Percol 455 flocculant. The settling tests were carried out at 65°C with a feed solids content of approximately 10%. Initial scoping tests were carried out in graduated cylinders to define the feed density and flocculant dosage. 100 l slurry samples were prepared, and this slurry was continuously pumped into the feed well of the thickener. A bed of solids was allowed to build until the bed reached the lower portion of the feed well. The underflow pump was then started at a flow rate which maintained the bed at a constant level. Underflow samples were collected when the system reached steady state. Samples of overflow were also taken at steady state to determine the overflow clarity. The results are summarised in Table 13.9.

Table 13.9: Thickening Test Results for Pilot Plant Campaign Testwork with Moa Oriental Ore Material

Parameter	Time Period				
	1	2	3	7	8
Ore Material Type	Limonite	4% Mg blend	4% Mg blend	2% Mg blend	Limonite
Loading (t/m^2 h)	0.34	0.19–0.29	0.20–0.40	0.20	0.30
Flocculant (g/t)	68	47	48	53	48
Underflow (% solids)	61.7	47.2–48.1	44.5–45.0	45.3	51.2

The underflow solids content and solids loading decreased with increasing magnesium content of the feed blends.

In 2008, studies were undertaken to understand the effect of magnesium content of the ore in relation to acid consumption. Magnesium consumes acid when magnesium-bearing minerals are dissolved, and also through buffering effects, via the formation of magnesium complexes with the bisulphate ion at higher temperatures (HPAL temperature). Comparisons of the laboratory data were made to the PSA Plant data.

A commercial Moa Oriental ore sample (leach plant feed) from January 2008 was used in 43 batch leach tests. At this time, the plant was feeding about 80% of its ore material from Moa Oriental. The average chemical composition of these samples and the ore material that was processed in the plant at the same time are shown in Table 13.10.

Table 13.10: Average Chemical Composition of Samples Used for Batch Leach Tests and the Ore Material Processed in the PSA Plant

Sample	Ni (Ni %)	Co (Co %)	Al (Al %)	Fe (Fe %)	Mg (Mg %)	Mn (Mn %)	Si (Si %)
Batch Test	1.1	0.13	4.5	44.7	1.0	0.8	2.8
Plant	1.2	0.13	3.9	44.1	1.3	0.8	2.8

The results of the batch leach tests showed that nickel and cobalt extractions increased with increasing acid concentrations in the HPAL discharge solution, but extractions decreased as the magnesium concentration in the solution increased, indicating a reduction in leach kinetics. The decreased extraction is due to the increased presence of dissolved bisulphate ions that are stabilised by association with magnesium ions as complex ionic species in solution at the leach temperature, resulting in the reduction of “at temperature” acidity. The result is that an additional 30 kg/t of acid is required to compensate for the buffering effect alone of a 1% weight increase in magnesium content of the feed. In total, combined with acid consumed in the dissolution of magnesium from the ore, an additional 70 kg/t per 1% weight increase in magnesium is required. Moa Plant data from January 2008 to February 2009 indicated that additional acid of between

60 kg/t and 70 kg/t was added when nickel extraction between 93% and 95% was achieved, providing good agreement with the batch test results.

Nickel and cobalt extractions typically increased to in excess of 97% for acid addition above 300 kg/t in the batch leach tests. Settling rates and trends for undiluted and diluted leach discharge slurries appear to be similar to those reported in the plant operation.

In 2021, batch high pressure acid leach tests conducted with Moa Oriental composites gave typical nickel extraction behaviour, ranging between 96% and 97% within a 60-minute batch retention time (Table 13.11). Cobalt extractions were mostly similar to nickel extractions, reaching approximately 97% extraction by a 50-minute batch retention time.

Table 13.11: Pressure Leach Test Results with Moa Oriental Composites (2021)

Leach Test	Sample ID	Mn:C	H_2SO_4 Addition (kg/t)	Final Solution			Extraction			
							50 mins		60 mins (Discharge)	
				H_2SO_4 (g/l)	ORP[1] (mV)	TOC[2] (mg/l)	Ni (%)	Co (%)	Ni (%)	Co (%)
S3-1	MOLFLSi	4.6	246	13.5	374	111	96.2	96.5	96.5	96.6
S3-2	MOLFHSi	10.2	320	33.2	838	0.05	96.7	97.3	96.5	97.3

Notes:
1. Oxidation-Reduction Potential (ORP) of the solution.
2. Total Organic Carbon (TOC) measurements.

Batch cylinder settling tests with the discharge slurries and no flocculant addition are shown in Table 13.12. The tests were conducted in 1 l graduated cylinders in a water bath maintained at 80°C, with readings taken at 1 and 2 hours, following the PSA Plant testing procedure.

Table 13.12: Leach Slurry Settling Test Results with Moa Oriental Composites (2021)

Leach Test	Sample ID	Si in Residue Solids (wt%)	Fe in Residue Solids (wt%)	Settling Rate (mm/2 h)	Settled Solids % Solids (48 h)
S3-1	MOLFLSi	1.05	47.5	109	47
S3-2	MOLFHSi	4.19	41.8	4	39

Note: Settling rate is the distance in mm from the liquid surface to the solid-liquid interface after 2 h.

The Moa Oriental sample with a high silicon content showed poor settling characteristics (settling rate of 4 mm/2 h), and the settled solids content was only approximately 39% after 48 h.

13.4.2.2 Camarioca Norte

The pressure leach tests conducted on Camarioca Norte samples in 2001 confirmed that a nickel extraction above 95% is attainable in the HPAL process, as shown in Table 13.13. Nickel and cobalt extractions for the 2% and 4% Mg blends were significantly lower than for the limonite alone, indicating the need for further optimisation of acid addition and retention time. The results indicate that acid addition in excess of 290 kg/t is required to achieve a nickel extraction of 95% with the high magnesium content ores.

Table 13.13: Leach Performance Testwork Results with Camarioca Norte Ore Material

Parameter	Test		
	C1	C2	C4
Feed	Limonite 1	4% Mg	2% Mg
Slurry Solids (%)	35.1	35.2	35.2
Mg Analysis (%)	0.37	4.32	2.11
Temperature (°C)	245	245	245
Retention Time (minutes)	90	90	90
Acid (kg/t)	240	345	295
Nickel Extraction			
45 minutes (%)	96.0	90.8	94.7
60 minutes (%)	96.2	93.1	95.5
Cobalt Extraction			
45 minutes (%)	95.4	87.6	91.7
60 minutes (%)	95.9	92.0	93.6
H_2SO_4 (g/l)			
90 minutes (%)	27.8	33.0	42.5

Batch settling tests were carried out on the discharge slurries from the batch leach tests. The results are presented in Table 13.14. Settled solids contents decreased and flocculant requirements increased with increasing magnesium content.

Table 13.14: Batch HPAL Discharge Slurry Settling Testwork Results with Camarioca Norte Ore Material

Test	Flocculant (g/t)	% Solids		Settling Rate (cm/hr)	Unit Area (m^2/t/d)	Suspended Solids (mg/l)
		Initial	Final			
C1	151	8.9	48.0	529	0.067	231
C2	427	8.4	41.8	396	0.094	17
C4	255	8.8	45.2	719	0.050	15

A 156 h pilot plant campaign was conducted using a 30 l continuous autoclave to evaluate the response of Camarioca Norte limonite ore material and limonite/saprolite blends (2% Mg and 4% Mg) to high pressure acid leaching and liquid-solid separation under the conditions operated at the Moa Plant. The ore slurry feed to the continuous pilot plant autoclave contained 35% solids. (As for the leach tests described previously, heating of the ore slurry is accomplished indirectly in the pilot plant, necessitating addition of more water with the autoclave feed slurry than would be present in the commercial plant, to account for water that is added by condensing steam during direct heating in the commercial plant). Acid addition targeted a 35 g/l free acid concentration in the discharge solution. Leaching was carried out at a temperature of 245°C or 255°C and retention times varied from 60 minutes to 90 minutes. The results are summarised in Table 13.15. Nickel extraction exceeded 95% for the limonite sample with a retention time of 60 minutes, and for the blends with a retention time of 90 minutes.

Table 13.15: Pilot Plant Campaign Testwork Results with Camarioca Norte Ore Material

Parameter	Time Period			
	1	2	3	5
Ore Material Type	Limonite	Limonite	4% Mg blend	2% Mg blend
Duration (hours)	27	18	18	18
Acid addition (kg/t)	256	250	363	304
Temperature (°C)	244	245	245	254
Retention Time (minutes)	93	60	90	91
DX H_2SO_4 (g/l)	24.9	26.7	31.4	36.4
DX Extraction				
Nickel (%)	96.7	95.5	95.4	95.7
Cobalt (%)	96.0	94.8	94.8	94.0

Note: DX discharge solution

A two-stage CCD wash circuit was integrated with the continuous high pressure leach circuit. Leach discharge slurry was diluted to 15% solids prior to flocculation with Percol 455. Flocculant additions to the first thickener varied from 80 g/t to 180 g/t. The results are summarised in Table 13.16.

Table 13.16: Pilot Plant Campaign Testwork Results with Camarioca Norte Ore Material with Integration of Two-Stage CCD Wash Circuit

Parameter	Time Period			
	1	2	3	5
Ore Material Type	Limonite	Limonite	4% Mg blend	2% Mg blend
Feed (% solids)	16	15	9	14
Flocculant Addition (g/t)	168	110	239	201
Underflow (% solids)	50	62	54	51
Overflow Clarity (mg/l)	162	178	348	238
Unit Area (m^2/t/d)	0.45	0.30	0.55	0.51

In parallel, samples of the leach discharge slurry were subjected to thickening tests in a continuous laboratory scale Supaflo thickener, using flocculant Percol 455. The results are summarised in Table 13.17. The target underflow solids content of 50% solids was achieved for all feeds.

Table 13.17: Pilot Plant Campaign Testwork Thickening Test Results with Camarioca Norte Ore Material

Parameter	Time Period			
	1	2	3	5
Ore Material Type	Limonite	Limonite	4% Mg blend	2% Mg blend
Loading (t/m^2 hr)	0.29	0.29	0.30	0.29
Flocculant (g/t)	74	75	82	51
Underflow (% solids)	50.8	50.6	51.2	59.1

In September 2007, approximately 70 samples from 25 Camarioca Norte drill holes representing each of the major mining areas were selected for studies of the settling rates for the leached slurries. The material selected for these studies spanned a range of chemical compositions with magnesium contents ranging from 0.1 Mg% to 2.2 Mg%, and silicon content ranging from 0.5 Si% to 12 Si%. The average chemical composition of these samples is shown in Table 13.18.

Table 13.18: Average Chemistry of Camarioca Norte Samples Used for Settling Tests

Ni (Ni %)	Co (Co %)	Ni + Co (Ni% + Co%)	Fe (Fe %)	Mg (Mg %)	Mn (Mn %)	Al (Al %)	Si (Si %)	Cr (Cr %)	Cu (Cu %)	Zn (Zn %)
1.205	0.164	1.368	45.72	0.47	0.98	4.52	1.94	1.94	0.017	0.042

Leaching was completed in a 4 l capacity autoclave under the following conditions:

- 300 kg of acid per tonne of ore;
- Temperature of 246°C;
- Pressure of 3,600 kPa;
- 28% solids in the feed slurry; and,
- Leach retention time of 60 minutes.

Settling tests were conducted after batch leaching by cooling the leached samples to 100°C and then placing the sample in a 1 l graduated cylinder for liquid-solids interface measurement after one and two hours. Final averaged slurry settling results were considered acceptable although some samples were noted to give below average results.

This work followed earlier work in 2005 and 2006 conducted at the PSA Plant on samples from Camarioca Norte and Sur which indicated settling rates on ore material and leached slurry to be variable, highlighting the need for proper ore blending prior to feeding the plant.

In 2021, as part of the ECOG study, HPAL and leach discharge slurry settling tests were performed with Camarioca Norte composite samples. As shown in Table 13.19, pressure leach tests with Camarioca Norte samples yielded nickel extractions in the range of 95.5% to 98.5% after 50 minutes batch retention time, which is equivalent to approximately 75 minutes retention time in a continuous, multi-stage reactor, similar to the leach reactors at the PSA Plant. Cobalt extractions were mostly similar to the nickel extractions, reaching at least 96% extraction after 50 minutes batch retention time.

Table 13.19: Pressure Leach Test Results with Camarioca Norte Composites (2021)

Leach Test	Sample ID	Blend Ratio	Mn:C	H_2SO_4 Addition (kg/t)	Final Solution			Extraction			
					H_2SO_4 (g/l)	ORP[1] (mV)	TOC[2] (mg/l)	50 mins		60 mins (Discharge)	
								Ni (%)	Co (%)	Ni (%)	Co (%)
S1-1	CNLB-1	-	6.6	260	15.4	387	407	96.6	96.7	97.0	97.0
S1-2	CNLF-1	-	4.7	240	21.9	686	24.8	97.2	96.9	97.4	96.9
S1-3	CNLF-2	-	3.0	230	15.0	392	33.5	96.7	96.0	97.0	96.4
S1-4	CNLFP1	-	1.1	366	24.4	351	417	95.7	95.7	95.8	96.4
S1-5	CNLFP2	-	2.0	260	18.9	432	76	97.3	97.1	97.5	97.2
S1-6	CNLFP3	-	7.9	235	19.3	730	0.05	nss	nss	96.8	96.4
S1-7	CNLBP4	-	7.7	240	9.0	741	0.05	97.8	97.1	97.9	97.1
S1-8	CNSB	-	6.6	676	44.2	393	N/A	98.5	97.0	98.7	96.9
S1-9	CNLB-2	-	6.1	275	21.0	635	6.32	96.6	95.8	96.8	95.9
S1-10	CNLB1+CNSB	(9:1)	6.6	291	18.9	377	280	96.6	96.3	96.9	96.4
S1-11	CNLB1+CNSB	(8:2)	6.6	320	26.0	373	324	96.4	96.0	97.1	96.1

Notes:

1. Oxidation-Reduction Potential (ORP) of the solution.
2. Total Organic Carbon (TOC) measurements.
3. nss – not sufficient solids.

The leaching behaviour as a function of depth within a hole was also investigated. Samples in the upper part of the hole were reducing in nature while samples towards the bottom of the hole were oxidising in nature. The HPAL oxidising-reducing conditions can be modified by ferrous iron released from gangue material, organic carbon that reacts with ferric iron to generate ferrous and the MnO_2 component of the ore that reacts with chromic chromium (Cr^{3+}) to form chromate chromium(Cr^{6+}). Ores with a high Mn/C ratio often generate Cr^{6+} and are oxidising in nature. Ores with a low Mn/C ratio often generate ferrous sulphate and are reducing in nature.

Leach slurry settling tests were conducted in 1 l graduated cylinders in a water bath maintained at 80°C, with readings taken at 1 and 2 hours. Settling tests with the Camarioca Norte leach residue slurries yielded settling rates mostly ranging from 85 mm/2 h to 120 mm/2 h, which was higher than the typical sedimentation rate achieved with current plant feed samples (typical settling rates for PSA Plant leach residue slurries range from 50 mm/2 h to 90 mm/2 h), with solid contents in the settled slurry ranging from 45% to 55% after 48 h retention time, as shown in Table 13.20.

Table 13.20: Leach Discharge Slurry Settling Test Results with Camarioca Norte Composites (2021)

Leach Test	Sample ID	Blend Ratio	Si in Residue Solids (wt%)	Fe in Residue Solids (wt%)	Settling Rate (mm/2 h)	Settled Solids % Solids (48 h)
S1-1	CNLB-1	-	0.97	52.2	115	51
S1-2	CNLF-1	-	1.28	54.7	116	47
S1-3	CNLF-2	-	0.85	56.5	97	46
S1-4	CNLFP1	-	2.70	47.1	24	38
S1-5	CNLFP2	-	1.07	55.2	86	45
S1-6	CNLFP3	-	1.09	55.4	87	47
S1-7	CNLBP4	-	1.39	57.1	126	52
S1-8	CNSB	-	6.60	37.1	213	58
S1-9	CNLB-2	-	1.80	46.9	114	55
S1-10	CNLB1+CNSB	(9:1)	1.53	46.7	110	49
S1-11	CNLB1+CNSB	(8:2)	2.09	45.6	124	54
S1-12	CNLB2+CNSB	(9:1)	2.28	46.0	125	53
S1-13	CNLB2+CNSB	(8:2)	2.76	45.0	123	55

13.4.2.3 Economic Cut Off Grade Samples

Between March 2020 and August 2021, approximately 2 t of ore material (wet basis) was collected from various ore deposits and shipped to Fort Saskatchewan for the ECOG project, which seeks to improve control of the plant feed blend by targeting potentially economic material only. The samples were produced using auger drills and each sample was comprised of typically a 1 m depth interval from a single drill hole. Altogether, 491 drill core samples were collected from 40 drill holes. The samples were collected from the following deposits: Camarioca Norte, Zona Septentrional, Playa La Vaca, Zona Central, Moa Oriental, Zona A, Zona A Oeste, Camarioca Sur, Yagrumaje Oeste, La Delta and Cantarrana. Based on the analyses of grab samples, several drill core samples were blended to produce more representative materials than a single drill hole metre, and to give a range of ore compositions for testing in the batch test programme. These blended materials were referred to as composite samples. The individual composites (39 composite samples) as well as the limonite/saprolite blend mixtures were tested in batch pressure leach tests and leach residue settling tests, with the results summarised in Table 13.21.

Table 13.21: Pressure Leach Test Results with ECOG Composites (2021)

Leach Test	Sample ID	Blend Ratio	Mn:C	H_2SO_4 Addition (kg/t)	Final Solution			Extraction			
					H_2SO_4 (g/l)	ORP (mV)	TOC (mg/l)	50 mins		60 mins (Discharge)	
								Ni (%)	Co (%)	Ni (%)	Co (%)
S2-1	ZSLB	-	13.6	230	31.1	704	N/A	97.2	95.0	97.2	95
S2-2	ZSLF	-	9.7	295	18.7	758	N/A	89.2	96.9	92.1	96.9
S2-3	ZSLB+ZSSB	(9:1)	12.7	250	35.0	722	N/A	97.3	95.0	97.2	95.1
S2-4	ZSLB+ZSSB	(8:2)	11.8	270	38.7	687	N/A	97.5	94.3	96.8	94.5
S2-5	ZSLF	-	9.7	315	18.0	762	N/A	93.0	98.7	93.1	96.9
S3-3	ZCLFRed	-	1.1	248	11.1	371	175	94.4	85.0	96.0	85.5
S3-4	ZCLFOx	-	4.4	282	17.3	709	0.05	96.3	96.3	96.5	96.5
S3-5	PVLFLSi	-	2.4	305	12.7	384	168	93.9	91.4	94.8	91.4
S3-6	PVLBLSi	-	2.0	287	12.6	396	101	95.9	92.9	96.1	93.1
S3-7	ZALFLSi	-	12.7	247	11.2	753	0.05	96.2	96.9	96.5	97.0
S3-8	ZAOLFHSi	-	10.3	248	24.6	714	0.05	96.5	97.0	96.6	97.1
S3-9	ZALFLSi+ZAOSB	(8.5:1.5)	13.3	367	33.2	727	0.05	96.0	95.8	96.5	96.0
S4-1	CAFFLSi	-	8.3	214	12.3	693	10	95.8	96.5	97.3	96.5
S4-2	CALFLSi	-	2.6	227	17.6	380	45	96.4	89.1	96.6	89.7
S4-3	CALFHSi	-	19.0	350	13.0	680	<0.05	95.1	98.1	95.2	98.2
S4-4	DELFHSi	-	14.9	330	11.8	670	<0.05	94.5	94.6	95.2	95.0
S4-5	DELB	-	23.3	297	12.7	721	<0.05	96.2	95.3	96.4	95.6
S4-6	YOLBP1	-	1.4	215	19.0	424	32	97.0	90.4	97.7	90.1
S4-7	YOLBP2	-	8.3	246	16.6	636	<0.05	96.2	93.0	96.2	93.4
S4-8	YOLBP3	-	28.8	232	8.3	712	<0.05	96.3	95.3	96.8	96.3
S4-9	YOLFLSi	-	6.6	225	19.2	688	5	95.6	94.7	96.1	95.8
S4-10	CSSBLMg	-	5.4	227	25.9	N/A	N/A	96.9	95.2	nss	nss
S4-11	CSLFHSi	-	4.1	327	35.8	498	3	96.3	95.7	96.5	96.5
S4-12	CSLFLSi	-	5.8	256	9.2	373	<0.05	93.4	94.4	93.6	94.6
S4-13	CSLBLMg	-	4.6	329	27.8	497	<0.05	97.5	96.5	97.5	96.7
S4-14	CSLFLSi+CSLFP1	(7:3)	3.42	298	19.5	368	79	94.9	95.3	95.0	95.4
S4-15	CSLFLSi+CSLFP2	(7:3)	3.78	284	9.4	359	46	94.8	94.9	95.0	95.3
S4-16	CSLFLSi+CSLFP3	(7:3)	4.81	303	21.0	383	3	95.6	96.1	95.8	96.3
S4-17	YOLBP3	-	28.8	232	8.3	674	<0.05	96.5	96.2	96.7	96.4
S4-18	YOLFLSi	-	6.64	226	13.9	624	<0.05	95.8	95.7	96.0	95.9
S4-19	CSSBLMg	-	5.4	226	14.2	649	4	96.9	96.9	97.0	96.2
S4-20	CSLFLSi	-	5.78	275	11.7	370	<0.05	94.1	95.7	94.4	95.6
S4-21	CSLFLSi+CSLFP2	-	3.78	285	16.0	360	59	94.5	95.5	95.0	95.5
S4-22	CALFHSi	-	19	350	10.8	683	<0.05	94.7	97.3	94.9	97.3
S4-23	YOLF	-	-	268	14.6	713	<0.05	95.7	94.6	96.1	96.3
S4-24	YOLF+CSLBMg	(9:1)	106	274	21.3	739	<0.05	96.4	96.4	96.7	96.6
S4-25	YOLF+CSLBMg	(7:3)	31	287	21.5	748	<0.05	96.7	96.9	96.8	96.6
S4-26	YOLF+ZSLF	(9:1)	169	271	15.6	730	<0.05	95.9	96.5	96.1	96.7
S4-27	YOLF+ZSLF	(7:3)	51.1	277	18.9	753	<0.05	95.4	96.9	95.9	96.3

The performance varied by material type and deposit. This indicates that special care should be taken when controlling the blend of material fed to the plant. The latest LoM plan, used in this Report, includes economic factors and blending criteria based on the testwork presented here and on observational studies of the operation. These studies will improve material selectivity to target potentially economic material only, and improve control of the plant feed blend. Additional continuous testwork is planned in 2023 to optimise the feed blending strategy of the mineralisation included in the next ten years of the LoM plan.

The majority of the samples behaved as expected in the 2021 leach tests. When the predicted acid requirement based on the feed composition was applied in these tests, nickel and cobalt extractions in the expected range were obtained. A small number of samples provided unexpected results, which will be investigated further in the continuous test programme for mineralisation planned for production in the next ten years. Specific observations from the 2021 batch test programme include:

1. Leach tests conducted on the Zona Septentrional sample ZSLB and blends of ZSLB and ZSSB (Tests S2-3 and S2-4) gave nickel extractions greater than 97% at 50 minutes batch retention time. In contrast, ZSLF (Test S2-2) responded poorly, with approximately 92% Ni extraction after 60 minutes and a terminal acid concentration of 18 g/l H_2SO_4. With an increased acid addition from 295 kg/t to 315 kg/t in Test S2-5 (20 kg/t excess acid above the calculated acid requirement), nickel extraction increased slightly from 92% to 93% after 60 minutes batch retention time.
2. Leach tests performed on the Zona Central, Playa La Vaca, Zona A, Zona A Oeste and a blend of Zona A and Zona A Oeste samples (Tests S3-1 to S3-9) generally gave typical nickel extraction behaviour, ranging between 95% to 96.5% within 60 minutes batch retention time. Extractions were below 95% in Tests S3-3 and S3-5 after 50 minutes batch retention time. It is important to note that the ore material was reducing in the above-mentioned tests, suggesting that an excess acid addition would have been required to maintain the extraction above 95% within 50 minutes batch retention time.
3. Samples from the Cantarrana, Camarioca Sur, La Delta and Yagrumaje Oeste deposits mostly yielded 95% to 97% Ni extraction within 50 minutes batch retention time. Nickel extraction lower than 94.5% was obtained with the Camarioca Sur sample CSLFLSi in Tests S4-12 and S4-20. Test S4-20 was conducted under the same operating conditions as Test S4-12, but with the addition of an extra 20 kg/t acid. The excess acid slightly improved the nickel extraction from 93.4% to 94.1% after 50 minutes batch retention time.
4. The leach residue from the Yagrumaje Oeste deposit had the best settling characteristics compared to the other deposits. Samples from this deposit yielded sedimentation rates mostly ranging from 85 mm/2 h to 120 mm/2 h, which was higher than the typical sedimentation rate achieved with current plant samples (typical settling rates for Moa Nickel leach residue slurries range from 50 mm/2 h to 90 mm/2 h). Samples from the Zona Septentrional deposit showed the poorest settling behaviour, most likely due to the relatively high Si content (>3.5% Si) and the relatively low iron content (<45%) in the samples.

13.4.3 Metal Recoveries

The PSA Plant performance is continually monitored, and metallurgical accounting is carried out to monitor overall metals recovery, as well as the efficiency of unit operations. After mining, the major losses of nickel and cobalt occur in the SPP, the HPAL circuit, the CCD wash circuit, mixed sulphide precipitation and the refinery. The two most significant losses are in HPAL where the nickel and cobalt extraction is practically limited to less than 97%, but typically ranges from 93.5% to 95.5%, and in the CCD wash circuit, with soluble losses ranging from 5% to 12%, but more typically near the lower end of this range. The recoveries achieved by the PSA Plant, which produces the mixed sulphide intermediate product, and the refinery in Fort Saskatchewan, which produces nickel and cobalt metal products from the mixed sulphide intermediate, are provided in Table 13.22.

Table 13.22: Metal Recoveries from 2020 to 2022

Parameter	2020	2021	2022	3 Year Average
Nickel Recovery				
From Slurry Prep Plant to Mixed Sulphide (%)	87.9	87.7	85.0	86.7
From Mixed Sulphide to Metal (%)	98.0	98.3	98.4	98.3
Overall (%)	86.1	86.2	83.5	85.2
Cobalt Recovery				
From Slurry Prep Plant to Mixed Sulphide (%)	89.8	89.5	90.1	92.1
From Mixed Sulphide to Metal (%)	91.1	93.0	90.1	91.4
Overall (%)	81.9	83.2	81.2	84.2

13.5 LOM RECOVERY FORECASTS

Nickel and cobalt recovery estimates for the LoM are based on operational correlations derived from historical PSA Plant data from 2018 to 2022. The components of these correlations include:

- Nickel and cobalt extractions in HPAL;
- Ore type (composition of the ore);
- Wash ratio in the CCD wash circuit; and,
- Number of CCD stages.

P-values were used to filter out the variables that were deemed statistically irrelevant. The correlation was also tested using the sum of squared errors. The application of the regression was repeated several times to yield a correlation comprised of the statistically relevant variables only.

13.6 METALLURGICAL VARIABILITY

Testwork samples for the 2021 metallurgical testwork were selected from various Moa deposits to obtain sufficient quantities of the major material types. This material was blended to support testing of representative plant feeds for three cases: processing of low grade limonite, processing of low magnesium limonite and processing of a low magnesium lateritic and saprolitic blend. The selection of samples for metallurgical testing was based on a nickel cut-off grade of 0.7 wt%, similar to the grade range within the Mineral Resources. Ore blends for the 2021 metallurgical testwork were selected with a focus on deposits that are scheduled to be processed in the next ten years (2023 to 2033). Table 13.23 shows the number of drill samples collected for the 2021 testwork for each deposit and the ore characterisation using PSA Plant criteria.

Table 13.23: Drill Core Samples and Deposit Identification for the 2021 Metallurgical Testwork

Limits of Ni and Fe in %	Number of Drill Core Samples and Deposit Identification										
	CN	ZS	PV	MO	ZA	ZAO	ZC	CS	YO	DE	CA
Ni<0.7, Fe≥35	15	24	6	13	11	4	7	8	0	9	19
Ni≥1, Fe≥35	17	2	11	5	11	4	5	24	11	7	9
Ni≥1, 25≤Fe<35	0	5	3	1	1	2	1	11	0	2	2
0.7≤Ni<1 Fe≥35	15	1	8	22	18	11	12	14	13	16	21
Ni<1, Fe<12	0	0	1	1	5	0	0	4	0	0	0
Ni<1, 12≤Fe<35	4	6	2	2	3	1	4	15	0	10	7
Ni≥1, Fe<12	0	1	0	0	1	1	0	0	0	2	0
Ni≥1, 12≤Fe<25	0	0	2	1	1	4	1	9	0	1	1
Total	**51**	**39**	**33**	**45**	**51**	**27**	**30**	**85**	**24**	**47**	**59**

13.7 DELETERIOUS ELEMENTS

The magnesium content of the ore is a key parameter influencing and limiting HPAL operations. Magnesium primarily influences acid consumption and the consumption of neutralising reagents. The acid requirement equation shows that a change of 1 wt% magnesium in the feed corresponds to an acid requirement of about 60 kg acid per tonne of ore, which is a significant component of the total acid consumption of typically 280 kg/t to 300 kg/t.

The aluminium content of the ore is also a key parameter influencing the acid consumption. From the acid requirement equation, a change of 1 wt% aluminium in the feed corresponds to an acid requirement of about 25 kg acid per tonne of ore. It is important to note that while this is only half the effect of magnesium, there is typically twice as much aluminium (about 4 wt%) as magnesium (0.4 wt% to 2 wt%).

The PSA Plant data, as well as data from the ECOG batch test programme, have also shown that the settling properties of both the ore and the leach residue deteriorate with increasing silicon content in the ore.

13.8 QP COMMENT

The data graphed in Figure 13.1 to Figure 13.4 highlight the need to improve control over the material fed to the plant. Recommendations include:

- Incorporate saprolites in the mine plan as scheduled reserves instead of as dilution to gain control over this highly heterogeneous material with a high magnesium content;
- Increase the proportion of limonites in the blend, low magnesium and low silica, by mining a higher proportion of low-grade (0.7 Ni% to 1 Ni% range) limonite material;
- Integrate the plant constraints into the mine plan; and,
- Further continuous testwork on the material planned in the next ten years will help to optimise ore selectivity and control of the feed blend to the PSA Plant.

14.0 MINERAL RESOURCE ESTIMATES

14.1 INTRODUCTION

Topography surfaces were provided as pointsets and triangulated meshes with different file formats. All topography surfaces were reconstructed and visually validated. No major issues were identified. However, the resolution of topographic surfaces varies from one area to another, and there is no high-resolution topography surface covering the entire Moa Project. Surfaces of mining areas do not include any in-pit material and there is no way to accurately determine the volume of in-pit waste dumps with the information available.

Two main domains were defined to interpolate grade variables; limonite and saprolite. The material ranging from rocky saprolite to fresh bedrock (the bedrock domain) was not interpolated. Laterites with an iron grade over 35 Fe% were assigned to the limonite domain, intervals with iron grades between 35 Fe% and 12 Fe% were assigned to the saprolite domain, and intervals with iron grades below 12 Fe% were assigned to the bedrock domain.

Drill hole intervals were flagged with geochemical domains and then simplified into one single sequence of limonite, saprolite and bedrock. The contact points between domains were extracted and used to generate gridded surfaces that represent the estimation domain boundaries. Blocks were assigned with the interpolation domain with maximum proportion. Drill holes, domain surfaces and block models were then flattened (or unfolded) using the topographic surface before mining as reference.

The interpolation was completed in block models with blocks with a horizontal section of 8.33 m by 8.33 m, and 12.5 m by 12.5 m. Blocks 3 metres high were created for Moa Oriental, Camarioca Norte, and Zona A, to maintain the block definition in areas with active mining; blocks 2 metres high were used in the other concessions.

Density values were assigned as the average of the density values measured from the exploration pits. Different average density values were assigned to saprolites, limonite, and the limonite with ferricrete and pisolite. These lithology groups were selected using iron, nickel and cobalt grade thresholds deduced with classification trees.

Nickel, iron, cobalt, magnesium, aluminium, manganese, silica and chromium were interpolated in the block models, for separate domains of the limonite and saprolite, using ordinary kriging with variogram models deduced from unfolded 1 m composites. The interpolation was completed using a maximum of two or three samples per drill hole (depending on the block height), a maximum of eight or 12 samples, and a minimum of five samples. Search ellipses of 40 m by 40 m by 3 m, 80 m by 80 m by 6 m, and 120 m by 120 m by 20 m, without octants, were used in subsequent search passes. Each block was estimated selecting, when possible, four drill holes around the blocks and restricted to the samples located at the same level of the blocks in the unfolded block model.

The block models were then unfolded, and interpolations were validated with a visual comparison of drill holes and blocks in sections, comparison of average grades and statistical distributions, validation with swath plots, and global change of support (GCOS). All validations were completed per separate estimation domain. All the model validations were satisfactory, and the estimates were considered appropriate for Mineral Resource reporting.

The Mineral Resources were depleted with the mining surface with an effective date of August 2022.

Mineral Resource classification was in adherence to the "Definition Standards for Mineral Resources and Mineral Reserves" adopted by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Council on 10th May 2014 (CIM Council, 2014). The classification of Mineral Resources into Measured, Indicated and Inferred categories was based on the confidence, quality and quantity of the informing data, the confidence in the geological interpretation of the deposit and the "reasonable prospects for economic extraction" of these resources.

Mineral Resources in areas with a drill hole spacing of 40 m or less were classified as Measured Resources, as this level of drilling provides high confidence in the geology and grade continuity. The category of Indicated Mineral Resources was assigned to blocks informed by drill holes with spacings between 40 m and 80 m. This level of drilling provides adequate data to have moderate to high confidence in the deposit geology and grades. Inferred Mineral Resources were informed by drill holes with spacings of 80 m to 120 m. The classification was completed by selecting blocks within classification polygons created as squared buffer zones around drill hole locations.

14.2 BLOCK MODELS

There are independent block models for:

- Moa Oriental;
- Camarioca Norte;
- Camarioca Sur;
- Yagrumaje Oeste;
- Santa Teresita;
- La Delta;
- Cantarrana;
- Playa La Vaca - Zona Septentrional III (PV-ZS or VS);
- Zona Central; and,
- Zona A, including Zona A Oeste.

The interpolation was completed in the block models with blocks with a horizontal section of 8.33 m by 8.33 m, and 12.5 m by 12.5 m. Blocks 3 metres high were created for Moa Oriental, Camarioca Norte, and Zona A, to maintain the block definition in areas with active mining; blocks 2 metres high were used in the other concessions.

14.3 DRILLING SUPPORTING ESTIMATION

The models were based on all available drill hole data up to December 2018. Drill holes used in estimation are summarised in Table 14.1.

Table 14.1: Drill Hole Data Used in Estimation

Concession or Deposit Area	No. of Drill Holes	Metres (m)	Common Spacing between Drill Holes (m)
Moa Oriental	12,362	123,947	33 x33, 25 x 25, 16 x 16
Camarioca Norte	8,651	75,503	100 x 100, 33 x 33, 25 x 25
Camarioca Sur	7,343	56,341	35 x 35, 33 x 33, 25 x 25, 16 x 16
Yagrumaje Oeste	4,884	33,355	33 x 33, 25 x 25
Santa Teresita	943	7,240	100 x 100, 35 x 35
La Delta	2,047	21,795	100 x 100, 35 x 35
Cantarrana	2,636	21,830	300 x 300, 100 x 100, 35 x 35
Zona Septentrional	706	10,631	100 x 100, 25 x 25
Playa La Vaca	910	3,393	100 x 100, 35 x 35, 25 x 25
Zona Central	815	9,117	100 x 100, 33 x 33
Zona A y Zona A Oeste	4,027	58,666	33 x 33, 25 x 25, 16 x 16
11 Bloques*	2,331	41,045	16 x 16
Total	**47,655**	**462,863**	-

Notes:

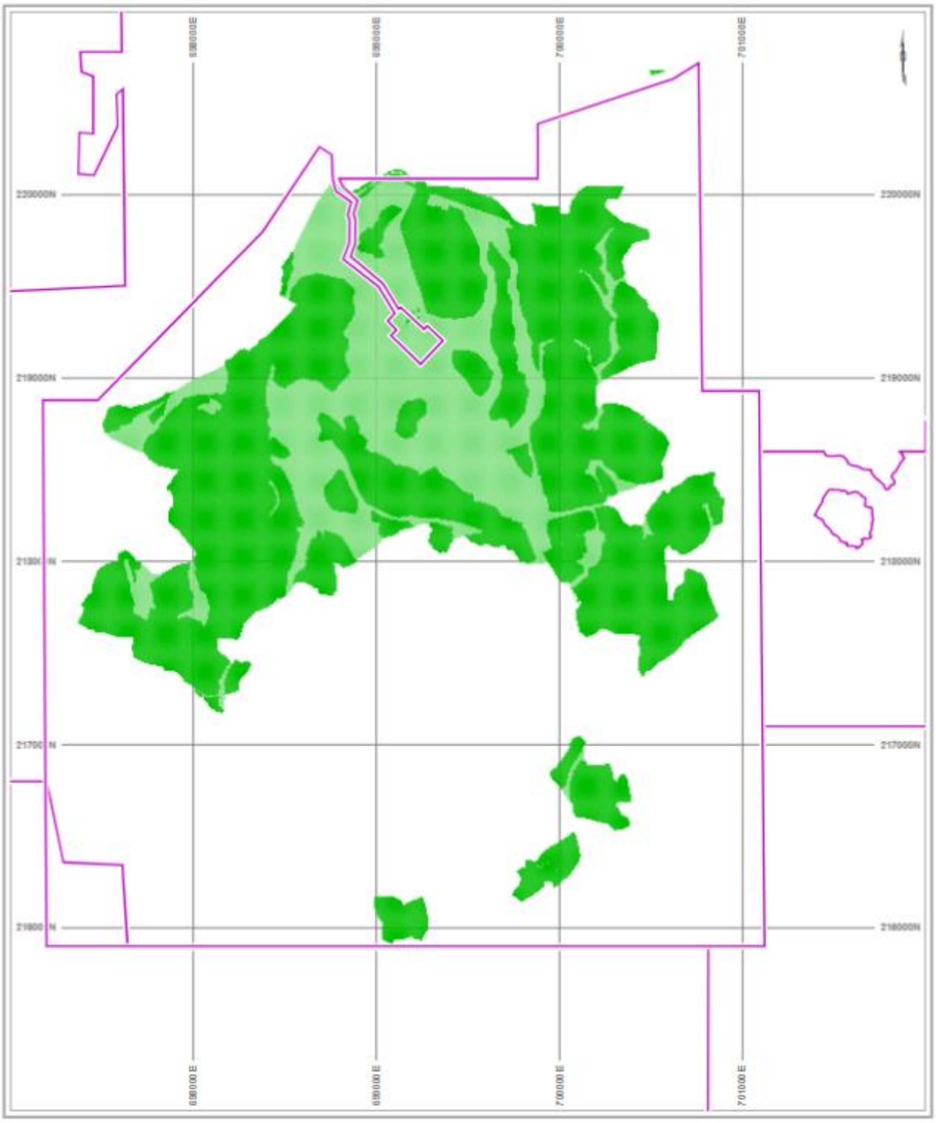
1. Concession now depleted.

14.4 TOPOGRAPHY

Topographic surfaces were provided as pointsets and triangulated meshes with different file formats. All topographic surfaces were reconstructed and visually validated. No major issues were identified. However, the resolution of topographic surfaces varies from one area to another, and there is no high-resolution topography surface covering the entire Moa Project. Surfaces of mining areas do not include any in-pit material and there is no way to accurately determine the volume of in-pit waste dumps with the information available.

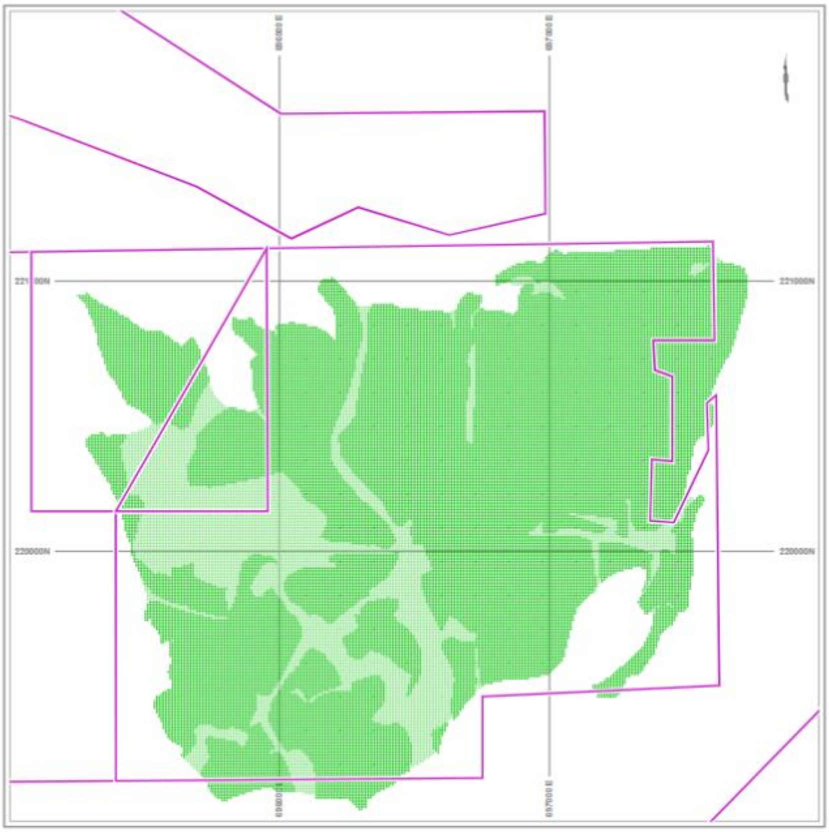
The resources were clipped to the base of mining on 31st August 2022. Areas that are depleted and have been rehabilitated were excluded from the model as shown in Figure 14.1 and Figure 14.2.

Figure 14.1: Moa Oriental Reforested Areas



Source: RedDot3D (2022)

Figure 14.2: Zona A Reforested Areas



Source: RedDot3D (2022)

There is still a possibility of over-estimation of the resources in Zona A and Moa Oriental, due to waste dumps being assigned grades from nearby drill holes. Only the contours of the areas reforested and reclaimed have been received from Moa JV and excluded from the resources. It is possible that some waste dumps that have not been reforested are present as resources in the current Mineral Resource estimate.

14.5 DOMAINING

Two main domains were defined to interpolate grade variables; limonite and saprolite. The material ranging from rocky saprolite to fresh bedrock (the bedrock domain) was not interpolated. Laterites with an iron grade >35 Fe% were assigned to the limonite domain, intervals with iron grades between 35 Fe% and 12 Fe% were assigned to the saprolite domain, and intervals with iron grades <12 Fe% were assigned to the bedrock domain.

Drill hole intervals were flagged with geochemical domains and then simplified into one single sequence of limonite, saprolite and bedrock. The contact points between domains were extracted and used to generate gridded surfaces that represent the estimation domain boundaries. Blocks were assigned with the interpolation domain with maximum proportion. Drill holes, domain surfaces and block models were then flattened (or unfolded) using the topographic surface before mining as reference.

14.6 DENSITY

Density values were assigned as the average of the density values measured from the exploration pits. Different average density values were assigned to saprolites, limonite, and the limonite with ferricrete and pisolite (see Section 11.0). These lithology groups were selected using iron, nickel and cobalt grade thresholds deduced with classification trees.

14.7 INTERPOLATION

Nickel, iron, cobalt, magnesium, aluminium, manganese, silica and chromium were interpolated in the block models, for separate domains of the limonite and saprolite, using ordinary kriging with variogram models deduced from unfolded 1 m composites. The interpolation was completed using a maximum of two or three samples per drill hole (depending on the block height), a maximum of eight or 12 samples, and a minimum of five samples. Search ellipses of 40 m by 40 m by 3 m, 80 m by 80 m by 6 m, and 120 m by 120 m by 20 m, without octants, were used in subsequent search passes. Each block was estimated selecting, when possible, four drill holes around the blocks and restricted to the samples located at the same level of the blocks in the unfolded block model.

14.8 VALIDATION

The block models were unfolded, and interpolations were validated with a visual comparison of drill holes and blocks in sections, comparison of average grades and statistical distributions, validation with swath plots, and global change of support. All validations were completed per separate estimation domain.

All the model validations were satisfactory, and the estimates were considered appropriate for Mineral Resource reporting.

14.9 DELETERIOUS ELEMENTS

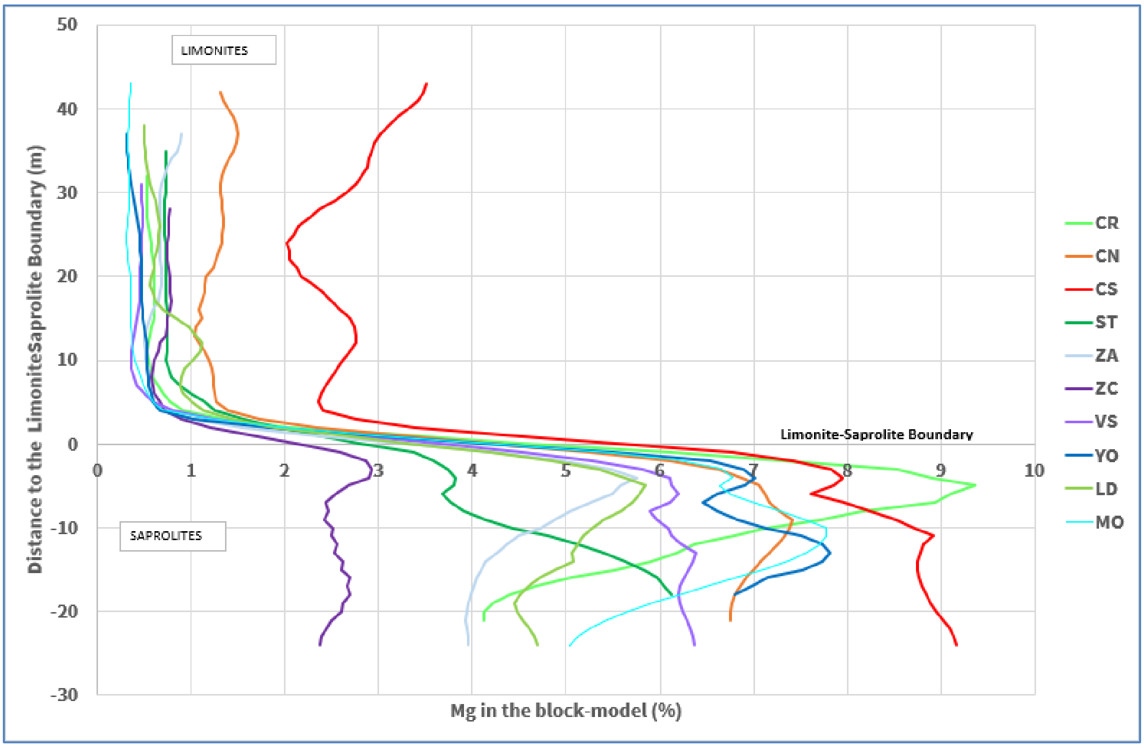
Drill hole information from historical campaigns (prior to 1995) does not include magnesium, silica, aluminium, manganese and chromium assays. The absence of these elements makes it difficult to interpolate them in areas lacking infill drilling. These constituents, particularly magnesium, aluminium and silica, are necessary to predict geometallurgical parameters such as acid consumption, metallurgical processing cost, blending criteria amongst others. The difficulty in estimating magnesium, silica, aluminium, manganese and chromium grades is relevant only in areas where there are only historical drill holes, and these elements were not estimated due to lack of information.

For blocks that had nickel and cobalt estimates, but that lacked magnesium, aluminium and silica grade estimates, deleterious element grades were assigned using vertical trend curves that predict the average grade as a function of height above (or below) the limonite-saprolite boundary. The assignment of reasonable average grades is necessary since excluding the grades of deleterious elements will cause processing costs to be underestimated, causing the economic cut-off grade to incorrectly identify some blocks as profitable when they will, in fact, incur very high acid consumption costs.

Figure 14.3 shows an example of one set of vertical trend curves, the magnesium trends in the ten mineral concessions. The zero line on the y-axis is the limonite-saprolite (LIM-SAP) boundary.

Positive y values represent the height above the LIM-SAP boundary; negative y values represent the depth below the boundary. The curves show, for each concession, the average magnesium grade calculated from the blocks in the block model where magnesium grades could be estimated.

Figure 14.3: Vertical Trend Curves for Magnesium



Source: Micon (2022)

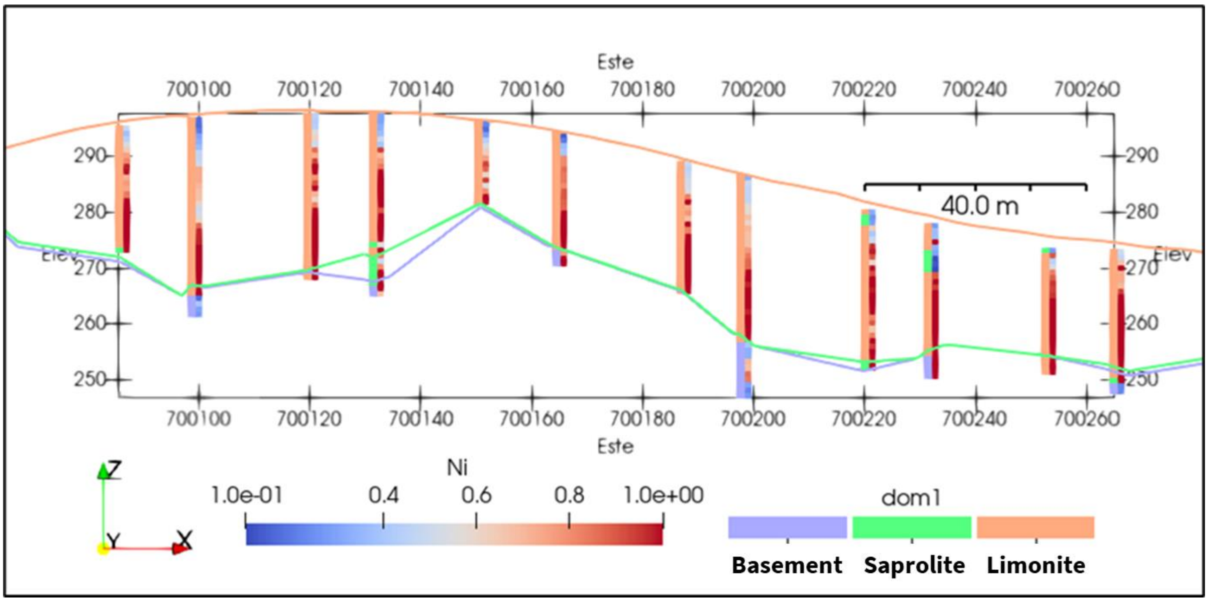
14.10 RESOURCE CONFIDENCE CLASSIFICATION

14.10.1 Mineral Resource Classification for Limonite

Mineral Resources estimated in areas with drill hole spacings of approximately 40 m or less were classified as Measured Mineral Resources. The Indicated Mineral Resources category was assigned to blocks reported by drill holes spaced between 40 m and 80 m apart. Inferred Mineral Resources were reported based on drill holes spaced 80 m to 120 m apart. These distances were defined using the QP's judgment, previous mining experience, and on the basis of knowledge of the geology of the deposits in the region.

In order to define the Measured Mineral Resource classification distance, profiles were generated for areas drilled with short-spaced drill holes to determine the geological and grade continuity (Figure 14.4). A high continuity is always observed in the limonite horizon. The distance also matches ⅓ of the variogram range and just over ⅓ of the sill; however this was not the criterion used to define the drill spacing distance. The main criterion is that the geological continuity allows for sufficiently reliable enough prediction for detailed mine planning.

Figure 14.4: Moa Oriental - Typical Profile of a Mined Deposit showing Drill Holes with the Estimation Domain (left) and Nickel Grade (right)

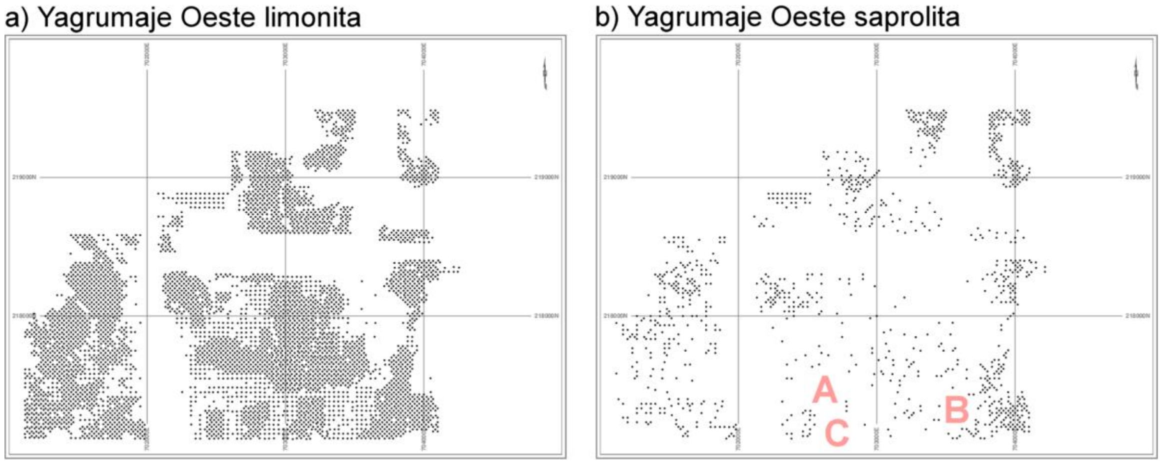


Source: RedDot3D (2022)

14.10.2 Mineral Resource Classification for Saprolite

The 2022 estimate uses of a classification procedure that classifies blocks also in the saprolite layer, using a different methodology to that used to classify the limonite layer. This procedure takes into account the fact that many drill holes terminate at or near the base of the limonite, leaving the saprolite layer with fewer drill holes and a wider average drill hole spacing. Figure 14.5 illustrates an example of this from Yagrumaje Oeste. The red A and B letters in Figure 14.5b show locations where there is 100 m by 100 m drilling in the limonite, which would support an Inferred Mineral Resource confidence classification, but no holes penetrate the saprolite; the C letter shows a location where the limonite drill hole sample can support the estimation of Indicated Mineral Resources, but the saprolite drill hole samples in the same location can barely support Inferred Mineral Resource confidence classifications.

Figure 14.5: Example from Yagrumaje Oeste Showing Drill Holes more Closely Spaced in the Limonite Layer (a) than in the Saprolite Layer (b)

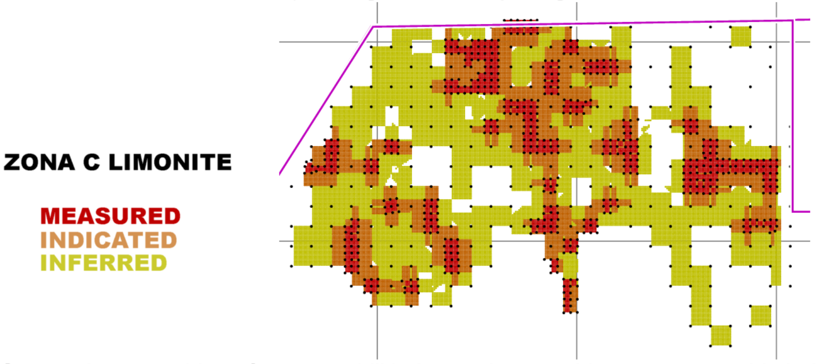


Source: RedDot3D (2022)

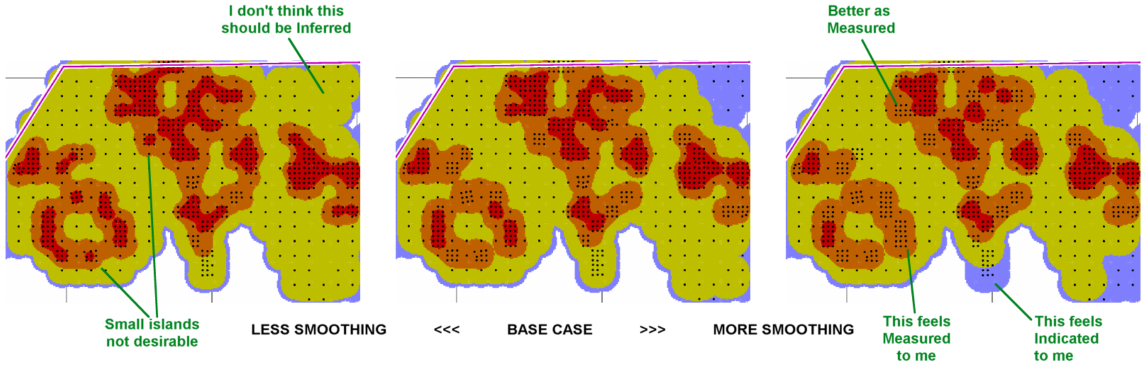
Figure 14.6 shows the key steps in the automated procedure that was developed to classify limonite and saprolite blocks separately, taking into account the drill hole spacing. The first step in the procedure is a calculation of the average drill hole spacing calculated over the closest four holes in each quadrant. When the average distance between the four surrounding holes is colour-coded according to the 40 m to 80 m to 120 m classification rules discussed earlier (Figure 14.6a), the result is not satisfactory as a resource classification because it contains many small islands of one type of classification inside a different classification. A smoothing step was applied (Figure 14.6b) that used a moving window with a radius of 100 m (the normal background grid at the Moa Project). The reason that a 100 m radius works well in most cases is likely because historical practice in the deposits near Moa has been to infill areas with positive results on a 100 m by 100 m grid (from and initial grid of 300 m by 300 m), which makes 100 m by 100 m drilling the normal background grid that is later infilled at tighter spacing (in the case of limonite). The drilling in the saprolite is irregular because most auger drill holes terminate at the first large boulder. Many drill holes have their last sample in limonite and test none of the saprolite.

Figure 14.6: Example from Zona C of the Successive Smoothing of the Average Drill Hole Spacing to Find an Acceptable Balance

a) Average drill hole spacing from closest four holes



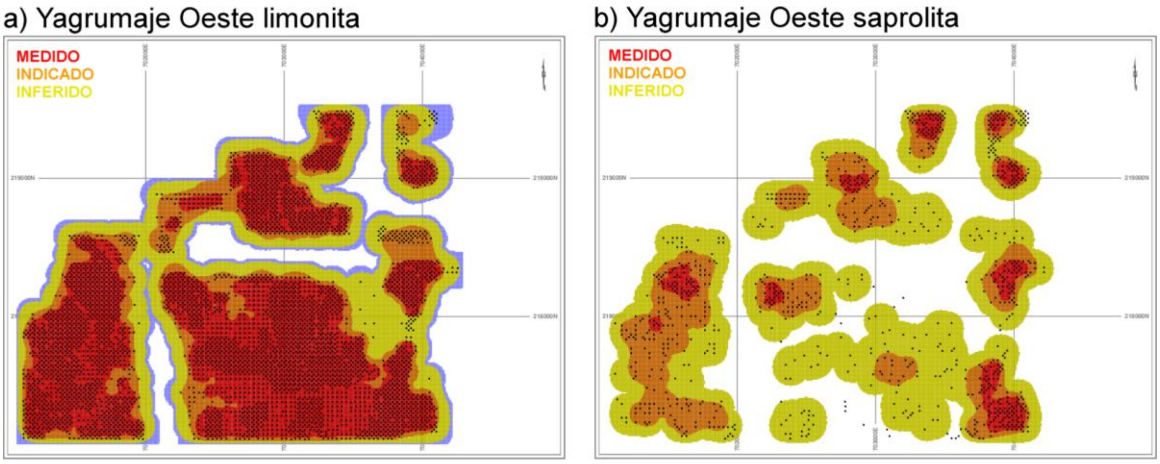
b) Successive smoothing of average drill hole spacing to achieve an acceptable balance



Source: RedDot3D (2022)

Figure 14.7 shows the result of the two-step automated procedure for the Yagrumaje Oeste limonite and saprolite.

Figure 14.7: Yagrumaje Oeste Resource Classification in Limonite and Saprolite



Note: "Medido": Measured, "Indicado": Indicated, "Inferido": Inferred
Source: RedDot3D (2022)

14.10.3 Adjustments to Saprolite Classification

Three adjustments are made to Measured, Indicated and Inferred blocks in the saprolite:

1. Below the limonite-saprolite boundary, Measured blocks were recoded as Indicated to take into account that the spatial continuity is weaker in the saprolite; in particular, the thickness of the saprolite is more variable over short distances than is the thickness of the limonite. Even at 33 m by 33 m spacing, it is difficult to argue that the continuity of the saprolite thickness is "confirmed between points of observation", which is the requirement of the CIM definition. The requirement for Indicated Resources is only that the continuity can reasonably be assumed, which is more in keeping with the nature of the saprolite layer. There is also more mineralogical and elemental heterogeneity in the saprolites than in the limonites, being composed of alternating boulders (poorly altered or unaltered material with high magnesium and low nickel grades) and fines (altered material with low magnesium and high nickel grades). This higher heterogeneity is well illustrated by the magnesium vertical trend curve shown in Figure 14.3.
2. Blocks with iron grades >=35 Fe% below the limonite-saprolite boundary were classified as if they were saprolite blocks, even though they have the iron chemistry of limonite, and are reported as such in the block model. Similarly, blocks with iron grades <35 Fe% above the limonite-saprolite boundary were classified as if they were limonite blocks, even though they have the iron chemistry of saprolite, and are reported as such in the block model. The reason for classifying according to the position relative to the limonite-saprolite boundary is that classifying blocks according to the lithology implied by their iron chemistry would reintroduce small islands of inconsistent classification; for example, if a >=35 Fe% block below the LIM-SAP boundary was classified as limonite, it would likely end up being Measured, but entirely surrounded by Indicated blocks. Furthermore, the nearby density of drilling is better assessed from the block's position relative to the boundary than from its iron chemistry.

   The consequence of this decision to classify according to the limonite-saprolite boundary surface, and not according to iron chemistry, is that some saprolite blocks do end up being classified as Measured. For <35 Fe% blocks sitting above the LIM-SAP boundary, they share the classification of their limonite neighbours, which is often Measured.

3. Blocks inside the environmental protection zones of creeks and rivers were reclassified using the procedures described in the following section below “Environmental Protection Zones”.

14.11 REASONABLE PROSPECTS OF EVENTUAL ECONOMIC EXTRACTION

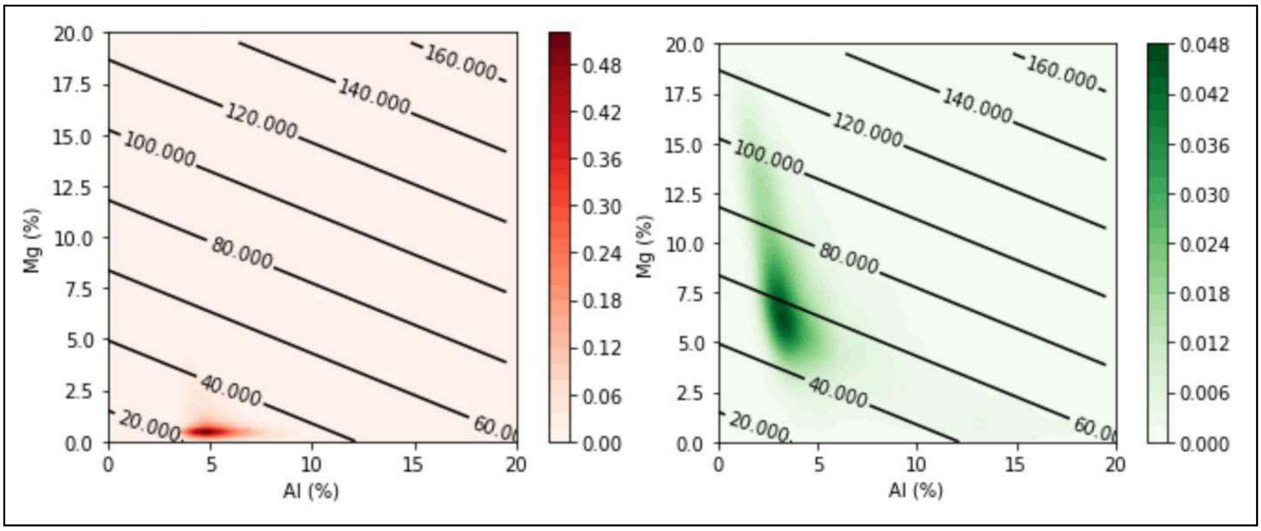
14.11.1 ECOG Formula

The Moa Project is one of three examples of HPAL projects where this technology has been successful, the other examples being Coral Bay and Taganito in the Philippines (both involving entities that are majority owned by Sumitomo Metal Mining Co.). Some examples of economic failures include Bulong, Goro and Murrin Murrin, although the latter is now operating at a consistent rate (Gabb, 2018). Other processes that are more economic, but have lower metal recovery, such as heap leaching (e.g. Srđan Stanković et al., 2020) were not considered.

The economic extraction of nickel and cobalt from lateritic deposits, using pressure acid leach technology (see Section 13.0), depends on the concentration of these two metals, a series of fixed costs, and additional costs associated with the concentration of deleterious elements aluminium, magnesium and silicon (Gabb, 2018).

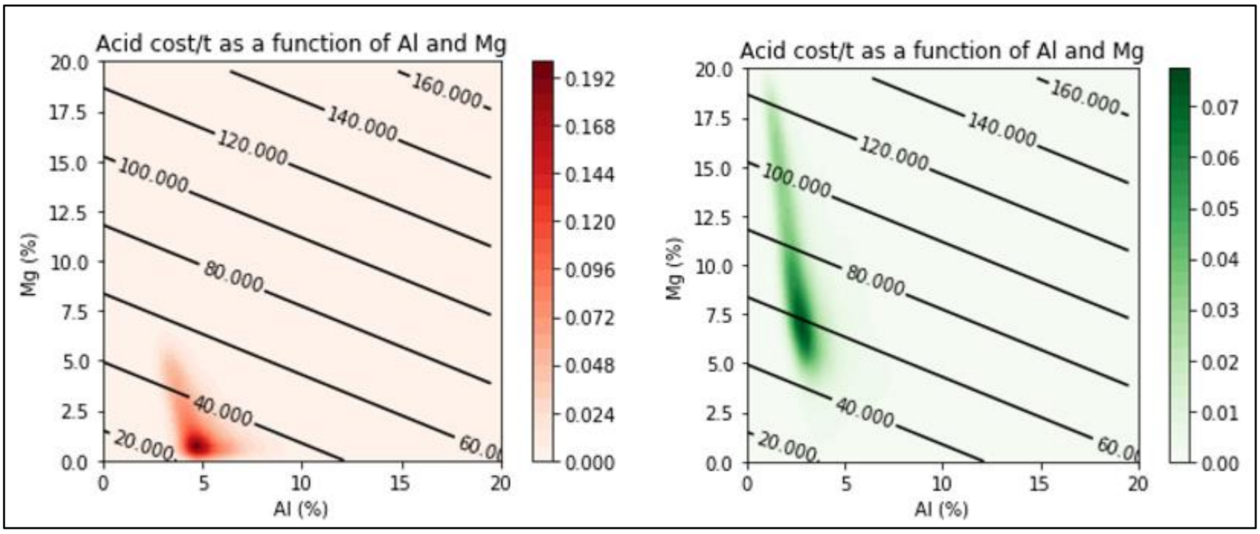
Figure 14.8 and Figure 14.9 show the costs due to acid consumption as a function of aluminium and magnesium grade and the distribution of these two elements in the Moa Oriental and Camarioca Sur deposits, respectively. The plots for other areas are similar. The concentration of aluminium plays a discrete role, and it is most important if laterites contain a component of weathered gabbro. Magnesium plays a discrete role in the limonite, but drives most of the extra cost in processing saprolite.

Figure 14.8: Moa Oriental - Bivariate Density Function of Al% and Mg% Grades on Limonite (left) and Saprolite (right) (extra cost in US$ due to acid consumption (black isolines) to process 1t of laterite)



Source: Elias et al (2019)

Figure 14.9: Camarioca Sur - Bivariate Density Function of Al% and Mg% Grades on Limonite(left) and Saprolite (right) (extra cost in US$ due to acid consumption (black isolines) to process 1t of laterite)



Source: RedDot3D (2022)

Saprolite also contains lower quantities of iron and higher quantities of silicon than limonite. Both of these elements have a strong correlation with the settling properties of the mineralised material and have a significant effect on metallurgical recoveries in the plant.

To define the cut-off grade, a methodology was used based on a net value calculation. This methodology considers both the positive economic contribution of nickel and cobalt grades, as well as the additional cost associated with magnesium and aluminium grades and impacts of ore quality on plant recovery. The Net Value formula is:

Net Value = Revenue from Ni + Revenue from Co – Costs > 0

The current inputs to the ECOG formula are summarised in Table 14.2.

The latest version of the ECOG includes:

- A predictive correlation based on operational data was used to determine the nickel and cobalt metal recoveries at the Moa Project as a function of mineralisation quality. Previously, a fixed value was used for metal recovery in the Moa Project;
- Predictive correlations were also developed to calculate variable limestone consumption costs based on mineralisation quality, similar to acid consumption costs. Previously a fixed cost per tonne of ore was used; and,
- A more refined formula has been developed to predict ore mining, hauling and waste mining costs based on data from the Moa Project operations. The costs vary based on hauling distance and strip ratio. A strip ratio (tonnes of waste/tonnes of ore) has been produced for each deposit from the shape of the resource shell (see Table 14.3), and is used in the mining cost formula.

Table 14.2: Net Value Formula in 2022 for Mineral Resources

Parameter	**Units**	**2022**
	US$	**NetV = Revenue from Ni + Revenue from Co – Cost**
Revenue from Ni	US$	Ni (%)/100 * Ni price (US$/t) * Overall Ni Recovery
Revenue from Co	US$	Co = Co (%)/100 * Co price (US$/t) * Overall Co Recovery
Ni price	US$/lb - US$/t	9.7
Co price	US$/lb - US$/t	28.1
Overall Ni Recovery	%	SPP to MSP Ni Recovery * MSP to Product Ni Recovery
Overall Co Recovery	%	SPP to MSP Co Recovery * MSP to Product Co Recovery
SPP to MSP Ni Recovery	-	0.869 * Fe + 50.5%
SPP to MSP Co Recovery	-	0.869 * Fe + 52.8%
MSP to Product Ni Recovery	%	98.2
MSP to Product Co Recovery	%	92
Cost	US$	Ni selling cost + Mining cost + Processing cost
Ni Selling Cost	-	US$2.00/lb * US$2,204.62 lb/t * Ni / 100
Mining Cost	US$/t / US$	(Tonnes_{ore} * (Ore Mining Cost + Ore transport Cost * Distance + Mining Services) + Tonnes_{waste} * Waste Mining Cost) / Tonnes_{ore}
Ore Mining Cost	US$/t ore	2.02
Ore Transport Cost	US$/t ore/km	0.41
Waste Mining Cost	US$/t waste	1.73
Mining Services	US$/t ore	2.73
Processing Cost	-	Other processing costs + Acid consumption cost + Limestone consumption cost
Fixed Cost/Other Processing Cost	US$/t	69.76
Extra Acid Consumption Cost /Acid Consumption Cost	-	Operational Correlation

Parameter	Units	2022
	US$	NetV = Revenue from Ni + Revenue from Co – Cost
Limestone Consumption Cost	-	Operational Correlation
Ni in Leach Discharge	-	Operational Correlation
Feed Solids to Leach	-	Operational Correlation
Limestone Solid Content	%	35
Limestone Reject	%	25.3
Additional Cut-Off (to exclude material not tested yet or with non-sufficient testwork)		**Fe>=25% and Ni>=0.7%**

Notes:

1. All elements (Ni, Co, Mg, Al, Fe) represent percentages of the calculated ore block.
2. The cobalt related selling costs have been totally included within the nickel selling costs and are thus zero.
3. “SPP to MSP Recovery” means the plant recovery of the metal from the discharge of the Slurry Preparation Plant to the mixed sulphides produced at the Moa Nickel Plant.
4. “MSP to Product Recovery” means the plant recovery of the metal from the mixed sulphides plant to the final refined product.
5. All units in tonnes are considered to be in dry metric tonnes (dmt).
6. The “selling costs” include Moa Port and loading, freight and insurance, CRC refining and Royalties.
7. The calculation for the Mining Costs depends on the plant haulage distance and the strip ratio for each deposit, which is presented in Table 14.3.

Table 14.3: Moa Project - Haulage Distance and Strip Ratios by Concession

Concession		Haulage Distance (km)	Strip Ratio Reserve Shells (02/08/22)	Strip Ratio Resource Shells (16/08/22)
1 – MO	Moa Oriental	9.3	0.11	0.13
2 – CN	Camarioca Norte	14.1	0.12	0.13
3 – CS	Camarioca Sur	21.3	0.09	0.09
4 – YO	Yagrumaje Oeste	12.4	0.13	0.14
5 – ST	Santa Teresita	33.9	0.24	0.26
6 – LD	La Delta	24.4	0.3	0.39
7 – CR	Cantarrana	25.8	0.18	0.18
8 – VS	Playa la Vaca – Zona Septentrional	6.3	0.63	0.58
9 – ZC	Zona Central	4	0.72	0.75
10 – ZA	Zona A	3.8	0.41	0.39

Blocks are considered to have reasonable prospects for eventual economic extraction if they have a positive net value, nickel grade is ≥0.7 Ni% and iron grades are ≥25 Fe% (Net Value > 0, Ni ≥ 0.7 % and Fe ≥25 %).

There are blocks in the resource block models that have very low iron grades, <25 Fe%, and/or very low nickel grades, <0.7 Ni%. The metallurgical recovery factors and acid consumptions costs used in the ECOG formula were established from testwork that did not include such low iron and nickel grades.

For resource blocks that have Ni <0.7% or Fe <25%, there is high uncertainty on the recovery and cost equations established for a different chemical range. It is likely that the recoveries will be lower, and that the costs will be higher. However, this will not be known, or well quantified, until this low-nickel/low-iron material has been tested. This material is currently excluded from estimation, until additional metallurgical testing has been done.

Blocks that did not meet the criteria using the ECOG formula were not reported in the Mineral Resource estimate.

14.11.2 Commodity Price Assumptions

Mineral Resource estimation assumes a long-term price of US$9.7/lb for nickel and US$28.1/lb cobalt. For input into the pit optimisation and in the block-by-block ECOG formula, these numbers have been converted and rounded to US$20,000/t for nickel and US$62,000/t for cobalt. They correspond to approximately 1.3 times the reserve prices. It is common within the mining industry to use a higher commodity price for Mineral Resources than for Mineral Reserves.

The selection of commodity prices is based on a global analysis looking at a combination of historical averages (10-year, 5-year), historical curves, trends and forecasts from various sources, in order to make an informed decision. For commodities that are volatile like nickel and cobalt, attention must be paid to cycles. Historical nickel and cobalt prices are shown in Figure 19.1 and Figure 19.2, respectively.

Both metals present historical upward trends (higher for cobalt, linked to high demand for batteries), and high forecasts for the next 1-to-2-year period, followed by a sudden drop.

14.11.3 Environmental Protection Zones

Environmental protection zones are used to restrict Mineral Resource estimates from encroaching on watercourses that have been classified as environmental protection zones. Typically, this involves the use of buffer zones around the year-round watercourses. Watercourses that are not classified as requiring environmental protection zones, such as small seasonal creeks that would be mined during the dry season, are included in the estimates. However, watercourses, even small seasonal creeks, within the Cuchillas del Toa Biosphere have a buffer zone constraint for estimation purposes.

The buffer zone around all rivers was set to ±100 m on either side of the river, a total width of 200 m. The buffer zone around creeks was set to ±50 m inside the Cuchillas del Toa Biosphere (total width of 100 m) and ±25 m outside the biosphere. Mineral Resources were excluded from public reporting from all river buffer zones, and from the creek buffer zones inside the biosphere. Outside the biosphere, Mineral Resources can be estimated within the creek buffer zones, but the classification was set to Inferred. The reason for lowering the confidence level in creek buffer zones is that the continuity of thickness and grade from drill holes on either side of the creek is questionable. The existence of flowing water, even if only for part of the year, creates a possibility that the laterite layer has been eroded, decreasing the thickness and possibly modifying the nickel grade.

14.11.4 Reforested Areas

Areas that have been reforested were excluded from the Mineral Resource estimates and classified as encumbrances. Such areas, based on information provided by the Moa JV in March 2022, are present within the Moa Oriental, Zona A, Camarioca Norte and Yagrumaje Oeste concessions.

14.11.5 Prohibitively Steep Slopes (>10°)

As outlined in Section 9.2.4, a block in an area with a slope >10° according to the ALOS/JAXA grid was considered to have a steep slope encumbrance, and was removed from the Mineral Resource estimate.

To the Report effective date, no specific study has been carried out on the maximum slope that can be safely operated using current equipment or that achieves an adequate level of environmental protection. The 10° limitation is an historical value that is derived from operational feedback.

Additional studies should be completed to examine safety issues and assess the increased operating costs of mining in inclined areas (different mining equipment, more time-consuming).

14.12 MINERAL RESOURCE STATEMENT

14.12.1 Mineral Resource Estimate

The 2022 estimate was prepared by R. Mohan Srivastava of RedDot3D, and reviewed throughout the process by Beatrice Foret of Micon as the Qualified Person.

The Mineral Resources for the Moa Project per the Metallurgical category of magnesium with an effective date of 31st August 2022 are presented in Table 14.4. Mineral Resources are reported in situ and are reported inclusive of those Mineral Resources that were converted to Mineral Reserves.

Table 14.4: Mineral Resource Statement for the Moa Project (per Metallurgical Category - Magnesium) effective date 31st August 2022

Category	Tonnage (Mt)	Grade						Contained Metal	
		Ni (%)	Co (%)	Fe (%)	Mg (%)	Al (%)	SiO_2 (%)	Ni (kt)	Co (kt)
Magnesium (0 Mg% - 3 Mg%)									
Measured	91.28	1.07	0.13	46.6	1.12	5.28	5.28	977.0	121.6
Indicated	36.68	1.01	0.12	43.9	1.22	5.06	7.98	369.0	44.3
Measured + Indicated	**127.96**	**1.05**	**0.13**	**45.8**	**1.15**	**5.22**	**6.05**	**1346.0**	**165.9**
Inferred	32.2	1.0	0.1	43.8	1.4	5.2	7.5	314.5	39.3
Magnesium (>=3 Mg%)									
Measured	6.83	1.12	0.11	39.6	3.83	4.29	13.05	76.6	7.7
Indicated	21.74	1.17	0.09	31.4	6.51	3.83	21.45	254.6	18.6
Measured + Indicated	**28.57**	**1.16**	**0.09**	**33.4**	**5.87**	**3.94**	**19.44**	**331.2**	**26.3**
Inferred	10.0	1.1	0.1	35.6	5.0	4.3	17.1	104.8	9.9
All Magnesium Categories									
Measured	98.11	1.07	0.13	46.1	1.31	5.21	38.36	1053.7	129.2
Indicated	58.43	1.07	0.11	39.3	3.19	4.60	54.09	623.6	62.9
Measured + Indicated	**156.54**	**1.07**	**0.12**	**43.6**	**2.01**	**4.98**	**48.10**	**1677.2**	**192.1**
Inferred	42.2	1.0	0.1	41.9	2.3	5.0	47.2	419.3	49.2

Notes:

1. Mineral Resources are reported in situ, with an effective date of 31st August 2022, using the 2014 CIM Definition Standards.
2. The Qualified Person for the estimate is Ms Beatrice Foret, MAusIMM (CP), a Micon employee.
3. Mineral Resources are reported inclusive of those Mineral Resources converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
4. Mineral Resources are reported on a 100% basis. Sherritt and GNC are equal (50:50) partners in the Moa JV Moa Project.
5. The reporting cut-off is calculated as a Net Value = Revenue from Ni + Revenue from Co – Cost >0, and Ni>=0.7% and Fe>=25%. The costs are equal to the sum of mining costs, processing costs and nickel selling cost of US$2.00/lb, including Moa port and loading, freight and insurance, CRC refining and royalties. The processing cost has a fixed component of US$69.76/t and a variable cost related to Fe, Mg and Al content. Revenue was calculated at the market price of US$9.7/lb for nickel and US$28.1/lb for cobalt, with nickel and cobalt Mixed Sulphide Product to Product recovery of 98.2% and 92%, respectively. SPP to MSP nickel and cobalt recovery is variable and depends on iron content. The cut-off grade for the estimated Mineral Resource is based on similar mining operations in other countries and reasonable assumptions on mining and processing.
6. No stockpiled material is included in the Mineral Resources.
7. The block model grades were estimated using the ordinary kriging method.
8. The Mineral Resources volumes and tonnages have been rounded to reflect the accuracy of the estimate, and numbers may not add up due to rounding.

14.12.2 Factors that May Affect the Mineral Resource

As of the Report Effective Date, the Qualified Person responsible for the Mineral Resources estimate, Beatrice Foret, is not aware of any known current environmental, permitting, legal, title, taxation, socio-economic, marketing or political factors that might materially affect these Mineral Resource estimates that are not discussed in this Report. However, these factors could impact the Mineral Resources and if any such risk materialise the affected areas must be re-evaluated to confirm changes in the Mineral Resources.

15.0 MINERAL RESERVES ESTIMATES

15.1 INTRODUCTION

Mineral Reserves are estimated for the following concessions:

- Moa Oriental;
- Camarioca Norte;
- Camarioca Sur;
- Yagrumaje Oeste;
- Santa Teresita;
- La Delta;
- Cantarrana;
- Playa La Vaca
- Zona Septentrional;
- Zona Central; and,
- Zona A includes Zona A Oeste.

Although Playa La Vaca and Zona Septentrional are two separate deposits hosted within the same exploitation licence; one pit shell has been calculated for the two deposits.

15.2 CONVERSION FROM RESOURCE TO RESERVES

Resource block models were used to estimate Mineral Reserves. Pit optimisation software was used to generate an optimised reserve pit shell for each of the deposits prior to building of the LoM plan. Inferred Mineral Resources were set to waste.

Not all of the Measured and Indicated Mineral Resources were converted to Mineral Reserves. A portion of the Mineral Resources was excluded in order to accommodate the PSA Plant blending criteria. Mineral Reserves were modified to include mining losses and dilution. In addition:

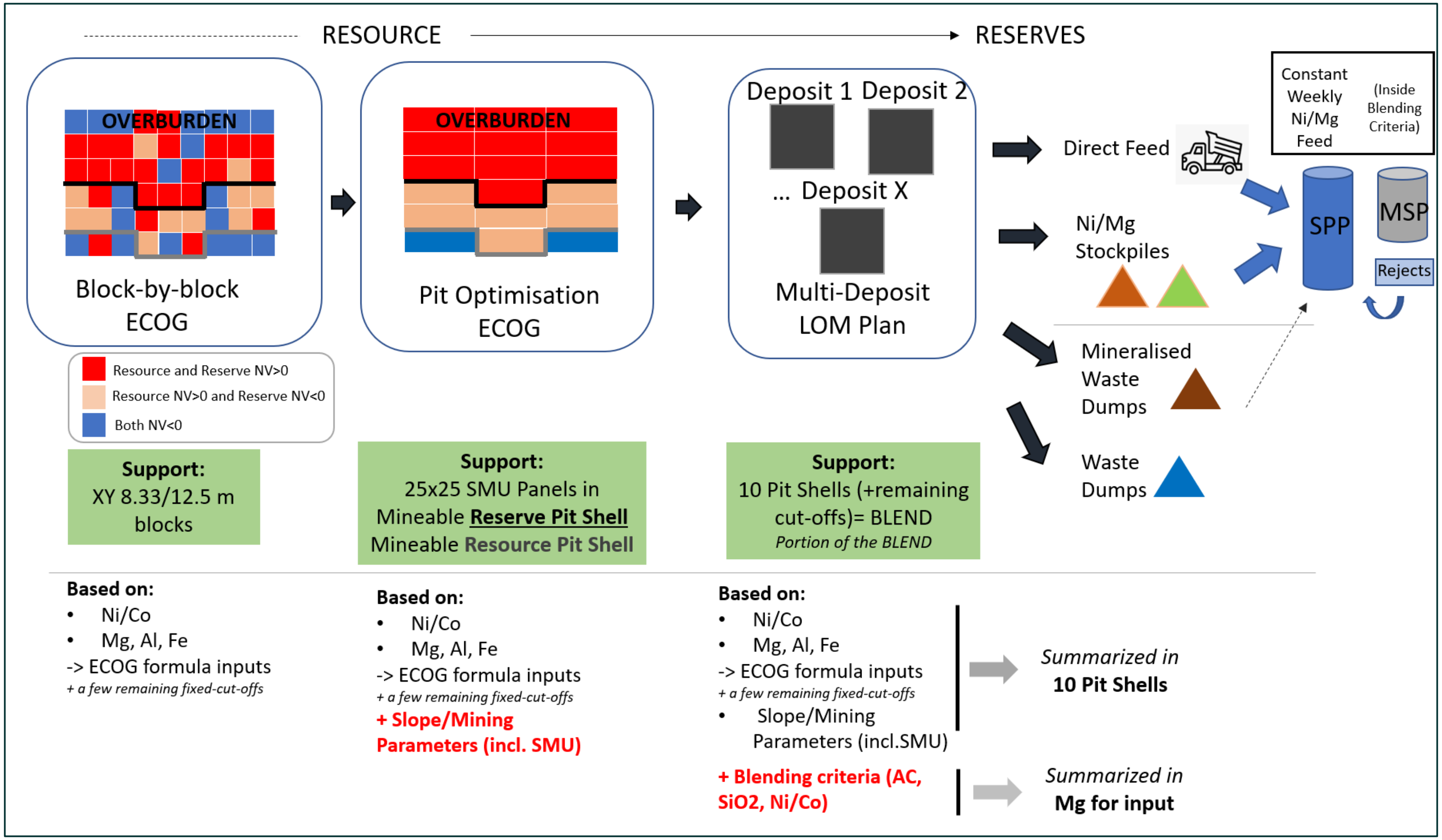
- Power line, gas and water pipeline corridors were excluded;
- Isolated areas were excluded; and,
- Blocks with missing deleterious elements were classified as Probable Mineral Reserves.

15.2.1 Blending Criteria

Blending criteria for the ore feed were defined to control levels of deleterious elements sent to the PSA Plant. However, input parameters and the mine plan can be adjusted to some extent during the mine planning process.

Figure 15.1 shows the process used to define plant feed material.

Figure 15.1: Process to Define the Material to Enter the Feed Material for the PSA Plant (Blend)



Source: Micon (2023)

An optimal reserve pit shell is selected for each deposit. The 25 m by 25 m panels are flagged by ore and waste. All of the mineralisation is then grouped (ore within the 10 shells) to define an average theoretical blend based on the feed characteristics if all the ore panels had been completely mixed. In practise the blend will be achieved through both direct feed and stockpile blending. The multi-elemental content and the distributions (variance) of this theoretical blend are compared to the blending criteria to select, out of the theoretical blend, the material that can be expected to be fed while respecting the blending criteria.

The process blending criteria are:

- AC - Economic ore with high acid consumption (AC);
- Si - Economic ore with a high silicon content must be limited in the overall feed blend; and,
- Ni/Co - Operations will target an optimal nickel to cobalt ratio.

The first two criteria (acid consumption and silicon thresholds) are correlated because of the positive correlation between magnesium and silicon. The third criteria, the Ni:Co ratio, is independent of the other two. To define the blend, the focus has been put on respecting the first two criteria.

Blending bins (Table 15.1) were defined using nickel and magnesium.

- Nickel (low grade 0.7 Ni% to 1 Ni%, high grade >=1 Ni%), and,
- Magnesium (three ranges: 0 Mg% to 1 Mg%, 1 Mg% to 3 Mg%, 3 Mg% to 10 Mg%).

Table 15.1: Blending Bins

Parameter	Description	Magnesium (Mg %)	Nickel (Ni %)	Mg Bin Content
Mg Category 1 “Limonites”	Contains limonitic material, at the top of the alteration profile, where there are only iron oxy-hydroxides (leached and saturated limonites)	<1	>=1	High Grade - Low Mg
			0.7-1	Low Grade - Low Mg
Mg Category 2 “Transition Limonites”	Transition zone; begins where extremely altered minerals appear	1-3	>=1	High Grade – Intermediate Mg
			0.7-1	Low Grade - Intermediate Mg
Mg Category 3 “Saprolites”	Mix of boulders and finer particles, with the proportion of boulders increasing with depth. The high variability of magnesium is definitive of the saprolites. fines are mixed with an increasing quantity of boulders. Remnants of minerals at first and then minerals can be seen. The texture is earthy (brown to green)	3-10	>=1	High Grade - High Mg
			0.7-1	Low Grade - High Mg

Magnesium is the most effective marker of the lateritisation on every concession with harzburgite, dunite or gabbro bedrock, is the most significant contributor to acid consumption, and correlates well with silicon. Magnesium was selected as a proxy for the first two blending criteria. Although there are fewer magnesium analyses than iron analyses in the exploration drill hole data, analytical data for magnesium is always available from the grade control drilling, and can be used to guide production from the detailed mine plan.

Saprock is not a candidate to enter the blend because of the high proportion of boulders.

A 4 Mg% cut-off was selected to allow flexibility to slowly introduce higher magnesium content feeds because the data used in saprolite modelling is of lower quality compared to the limonite modelling for two reasons. Historically fewer data have been collected on saprolites than on limonites, and auger drilling is not optimal for drilling boulders. Saprolites have more variance in the deleterious elements than the limonites, resulting in a lower modelling confidence.

15.2.2 Modifying Factors

The Mineral Reserve conversion factors applied to the Mineral Resources in the open pits, are detailed in Table 15.2.

Table 15.2: Mineral Reserve Conversion Factors to the Mineral Resources

Factor	Value
Ore Loss (%)	15.0
Dilution (%)	5.0

Ore loss accounts for mining practices with dozers and excavators whereby part of the resource is lost when overburden is removed and ore mixes with waste material.

The mining dilution accounts for ore to the processing plant being diluted with other non-grade or low-grade material. Diluting material is material of the same properties as the ore feed which was not included because it did not meet the defined blending criteria. The blending criteria used to define the ore types are detailed in Table 15.3.

Table 15.3: Waste, Ore and Magnesium Blending Categories

Magnesium Content (Mg %)	Mined Material	Nickel Content			
		0 - 0.4 Ni % Waste	0.4 - 0.7 Ni % Mineralised Waste	0.7 - 1.0 Ni % Low Grade	>= 1.0 Ni % High Grade
0 - 1	Limonite		Mineralised Waste	Ore	
1 - 3	Transition				
3 - 4	Saprolite < 4% Mg				
4 - 10	Saprolite 4% - 10% Mg		Waste		
10 - 15	Saprock				
>=15	Bedrock				

The grade for the diluting material is detailed in Table 15.4. These diluting grades are based on averages of the waste for each magnesium category.

Table 15.4: Diluting Material Grade

Material	Nickel (Ni%)	Cobalt (Co%)	Iron (F%)e	Magnesium (Mg%)	Aluminium (Al%)	Silica (SiO_2%)
Limonite (0 – 1 Mg%)	0.53	0.06	43.78	0.46	7.05	4.53
Saprolite (4 - 10 Mg %)	0.97	0.09	34.29	4.83	4.87	16.75
Transitional (1 - 3 Mg %)	0.60	0.08	40.65	1.63	6.97	8.03

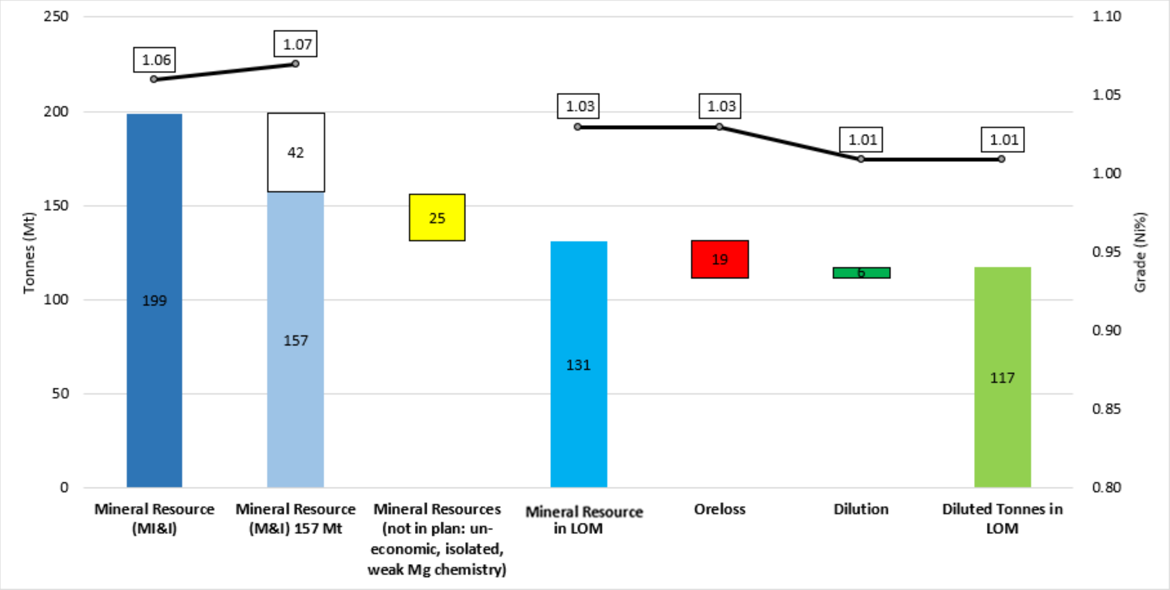
Pit slopes are vertical and the pits are very shallow. No geotechnical design considerations were used in constraining the Mineral Reserve estimate.

No hydrological design considerations were used in constraining the Mineral Reserve estimate.

15.3 MINERAL RESERVE STATEMENT

The Mineral Resource to Mineral Reserve conversion is illustrated in Figure 15.2. This waterfall graph illustrates the rise and fall of tonnes and grade as the reserve conversion factors are applied.

Figure 15.2: In Situ Mineral Resources to Mineral Reserves Conversion



Source: Micon (2023)

The Mineral Reserves for the Moa Project per the Metallurgical category of magnesium with an effective date of 31st August 2022 are presented in Table 15.5. The QP for the estimate is Michiel Breed. Mineral Reserve estimates are reported at the point of delivery to the PSA Plant.

Table 15.5: Moa Project Mineral Reserves as at 31st August 2022

Category	Tonnage (Mt)	Grades						Contained Metal	
		Ni (%)	Co (%)	Fe (%)	Mg (%)	Al (%)	SiO_2 (%)	Ni (kt)	Co (kt)
Magnesium 0-3 Mg %									
Proven	79.41	1.02	0.13	45.12	1.08	5.23	5.10	806.3	100.3
Probable	30.45	0.97	0.12	43.58	1.22	5.13	7.79	295.6	35.6
Proven + Probable	**109.86**	**1.00**	**0.12**	**44.70**	**1.12**	**5.20**	**5.85**	**1,101.9**	**136.0**
Magnesium ≥3 Mg %									
Proven	4.08	1.11	0.11	39.57	3.47	4.38	12.23	45.4	4.6
Probable	3.24	1.08	0.11	37.73	3.50	4.57	14.87	35.0	3.4
Proven + Probable	**7.32**	**1.10**	**0.11**	**38.76**	**3.48**	**4.46**	**13.40**	**80.5**	**8.0**
All Magnesium Categories									
Proven	83.49	1.02	0.13	44.85	1.20	5.19	5.45	851.8	104.9
Probable	33.69	0.98	0.12	43.02	1.44	5.08	8.47	330.6	39.1
Proven + Probable	**117.18**	**1.01**	**0.12**	**44.33**	**1.27**	**5.16**	**6.32**	**1182.4**	**144.0**

Notes:

1. Mineral Reserves are reported with an effective date of 31st August 2022, using the 2014 CIM Definition Standards.
2. The Qualified Person for the estimate is Michiel Breed, a Micon employee.
3. Mineral Reserves are reported on a 100% basis. Sherritt and GNC are equal (50:50) partners in the Moa JV Moa Project.
4. The reporting cut-off is calculated as a Net Value = Revenue from Ni + Revenue from Co – Cost >0, and Ni>=0.7% and Fe>=25%. The costs are equal to the sum of mining costs, processing costs and nickel selling cost of US$2.00/lb, including Moa port and loading, freight and insurance, CRC refining and royalties. The processing cost has a fixed component of US$69.76/t and a variable cost related to Fe, Mg and Al content. Revenue was calculated at the market price of US$7.1/lb for nickel and US$21.3/lb for cobalt, with nickel and cobalt MSP to Product recovery of 98.2% and 92%, respectively. SPP to MSP nickel and cobalt recovery is variable and depends on iron content. Mineral Reserves include a 15% allocation for ore loss and a 5% dilution factor.
5. An additional process blending criteria of Mg<4% was used to define the Mineral Reserves.
6. The Mineral Reserves volume and tonnage have been rounded to reflect the accuracy of the estimate, and numbers may not add up due to rounding.

15.3.1 Factors that May Affect the Mineral Reserve Estimate

Micon is not aware of any known environmental, permitting, legal, title, taxation, socio-economic, marketing, and political or other factors that pose a risk of materially affecting the Mineral Reserve estimates, this is a well-established operating mine. However, these factors could impact the economic mineability of the Mineral Reserves and if any such risk materialise the affected areas must be re-evaluated to confirm changes in the Mineral Reserves.

16.0 MINING METHODS

16.1 MINING METHOD

The Moa Project has been in production since the late 1960's and extracts nickel and cobalt ore material using conventional open cut mining techniques using hydraulic excavators and articulated haul trucks as primary mining equipment. Due to the shallow nature of the orebodies and the composition of the limonite, there is no requirement for blasting on site.

The Moa JV commenced with an expansion project in 2021 on the back of the increasing global demand for high purity nickel and cobalt. The expansion project is targeting an annual increase in mixed sulphide precipitate production by 20% contained nickel and cobalt (100% basis) and is discussed in more detail in Section 24.1.1.

Mining starts with clearing and stripping of topsoil and vegetation by means of bulldozers. The material is pushed into piles from where it is loaded and hauled to other sites where rehabilitation is underway.

This exposes the overburden or waste material. Waste is removed in 2 m to 3 m benches. The material is loaded with hydraulic excavators and transported with articulated haul trucks to mined out areas as backfill or to the nearest designated waste dump site outside of the mining area.

Ore mining is completed in the same way maintaining ore terraces to the full depth of the targeted ore. The plant feed is currently chosen based on fixed cut-off grades for nickel and iron and the ore is hauled to the SPP where it is dumped over a set of grizzly bars for further processing or to designated stockpiles at the SPP or designated areas closer to the mining areas. If direct dumping on the grizzly is not available, the feed is dumped in an open area close to the SPP so that rehandling equipment can access it when material is required. Stockpiles are currently designed to store ore for the wet season when some concessions are less accessible.

With the application of the ECOG methodology, and the planned blending and stockpiling strategy, feed will have to be stockpiled and blended using six Mg/Ni bins at specified ratios to meet blending criteria.

16.1.1 Stockpiling Strategy

The operation will aim to transition to a new stockpiling strategy in 2023 (preparation) and 2024 (trial implementation). The proposed stockpiling strategy is based around maintaining sufficient feed to the SPP while adhering to the blending criteria required to efficiently operate the processing facilities.

The quality of the ore coming from various deposits and various horizons of the alteration profile is too variable to be fed directly to the SPP. To ensure that the process criteria are stable on a weekly basis, the blending of ore from different orebodies and ore types is required to lower the variability of the feed qualities.

The ore material will be mined and stored on a stockpile or directly fed into the SPP ensuring the blending criteria as detailed will be achieved.

Blending criteria for the ore feed were defined to control levels of deleterious elements sent to the PSA Plant. The process blending criteria are:

- AC - Economic ore with high Acid Consumption (AC);
- Si - Economic ore with a high silicon content must be limited in the overall feed blend; and,
- Ni/Co - Operations will target an optimal nickel to cobalt ratio.

The blending criteria defined material categories are detailed in Table 15.3. These six material categories will be mined and stockpiled separately. Material will be loaded from each material category stockpile at the ratio required to achieve the blending criteria. Detailed operational planning will ensure material that can be fed directly to the SPP will be sent directly to the SPP to reduce rehandling.

16.1.2 Waste Dumping

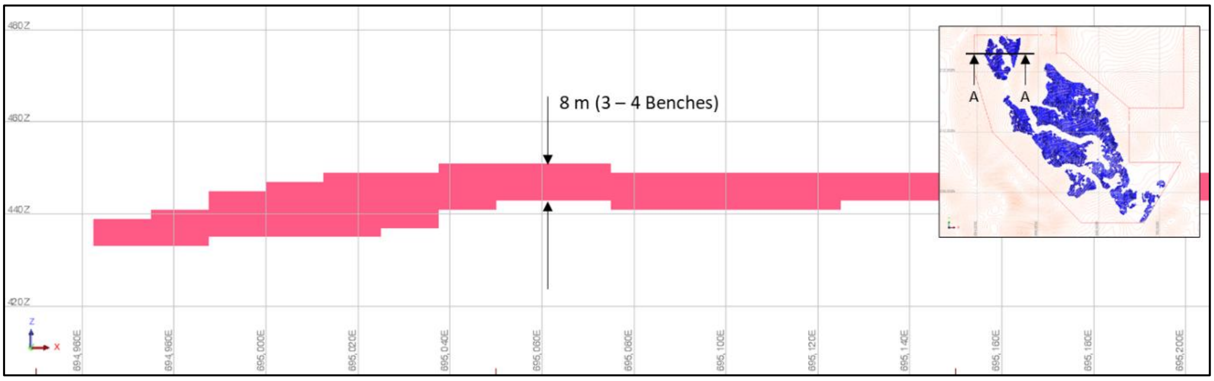
Waste or overburden material is hauled to defined locations outside of each orebody. The distance to haul is reduced as much as practicable possible to lower operational costs and reduce tyre wear. When the waste dumps have been completed, they are dozed down to create a sufficiently flat slope for vegetation to be placed on and grow.

Historical waste dumping has caused some material to be dumped on sections of the orebody in the Moa Oriental and Zona A deposits. This has excluded some material from being included within the Mineral Reserve estimate. It is anticipated that the bulk of this waste material can be rehandled and relocated to allow the material underneath to be assessed as economic and again be included within Mineral Reserves. This aspect should be investigated as it would likely yield an increase in Mineral Reserves.

16.2 GEOTECHNICAL AND HYDROLOGICAL CONSIDERATIONS

The mining of the Moa deposits generally involves the extraction of a very shallow layer of material. An east-west cross-section of the northern Camarioca Sur deposit in Figure 16.1 shows the shallow nature of the orebody.

Figure 16.1: East-West Cross-Section Camarioca Sur



Source: Micon (2023)

The final pit wall slopes and other geotechnical considerations are not considered a significant issue during the mining process. The bench face angle is close to vertical with benches typically 2 m to 3 m high. Haul roads are designed based on the haul trucks used in the specific section of the deposit and are generally between 16 m and 20 m wide.

There are no known hydrological issues at the Moa Project. The shallow deposits require minimal dewatering to allow mining to progress. There is no planned mining through any major water courses.

16.3 PARAMETERS RELEVANT TO MINE DESIGN

16.3.1 Pit Optimisation

The complete list of input parameters used for each orebody in the optimisation runs are detailed in Table 16.1.

The pit optimisation results are detailed in Table 16.2.

Table 16.1: Pit Optimisation Input Parameters

Input	Units	Moa Oriental	Camarioca Norte	Camarioca Sur	Yagrumaje Oeste	Santa Teresita	La Delta	Cantarrana	Playa la Vaca - Zona Septentrional	Zona C	Zona A
Concession	-	1 - MO	2 - CN	3 - CS	4 - YO	5 - ST	6 - LD	7 - CR	8 - VS	9 - ZC	10 - ZA
Product Prices & Recoveries											
Nickel Price	US$/t	15,700									
Cobalt Price	US$/t	47,000									
SPP to MSP Recovery		0.869 * Fe + 50.5%									
SPP to MSP Recovery		0.869 * Fe + 52.8%									
MSP to Product Ni Recovery	%	98.20%									
MSP to Product Co Recovery	%	92.00%									
Ni Selling Costs	US$/t	$2.00 * 2204.62* Ni / 100									
Mining Cost											
Haul Distance to SPP	km	9.30	14.10	21.30	12.40	33.90	24.40	25.80	6.30	4.00	3.80
Ore Hauling Cost (US$ 0.41 t/km)	US$/t mined	3.81	5.78	8.73	5.08	13.90	10.00	10.58	2.58	1.64	1.56
Ore Mining	US$/t mined	8.56	10.53	13.48	9.83	18.65	14.75	15.33	7.33	6.39	6.31
Waste Mining	US$/t mined	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
Fixed & Other Processing Costs	**US$/t**	**69.77**	**69.77**	**69.77**	**69.77**	**69.77**	**69.77**	**69.77**	**69.77**	**69.77**	**69.77**
G&A	US$/t	16.56	16.56	16.56	16.56	16.56	16.56	16.56	16.56	16.56	16.56
Power	US$/t	2.76	2.76	2.76	2.76	2.76	2.76	2.76	2.76	2.76	2.76
Fuel Oil	US$/t	13.34	13.34	13.34	13.34	13.34	13.34	13.34	13.34	13.34	13.34
LPG	US$/t	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96
Sulphur	US$/t	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
Diesel	US$/t	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
Maintenance	US$/t	16.04	16.04	16.04	16.04	16.04	16.04	16.04	16.04	16.04	16.04
Other Process Additives	US$/t	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07
Sustaining Capital	US$/t	11.77	11.77	11.77	11.77	11.77	11.77	11.77	11.77	11.77	11.77
Acid & Limestone Costs											
Acid Consumption	kg acid/t ore	Operational Correlation									
Acid Price	US$/t of Acid	38.37	38.37	38.37	38.37	38.37	38.37	38.37	38.37	38.37	38.37
Acid Cost	US$/t	= Acid Consumption * 38.37/1000									
Limestone Consumption	limestone t/ ore t	Operational Correlation									

Input	Units	Moa Oriental	Camarioca Norte	Camarioca Sur	Yagrumaje Oeste	Santa Teresita	La Delta	Cantarrana	Playa la Vaca - Zona Septentrional	Zona C	Zona A
Limestone Price	US$/t of limestone	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82
Limestone Solids Content	%	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Limestone Reject	%	25.30	25.30	25.30	25.30	25.30	25.30	25.30	25.30	25.30	25.30
Limestone Cost	US$/t	= Limestone consumption * 19.82									
Mining Parameters											
Minimum Mining Width	m	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Dilution Factor	%	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Mining Recovery Factor	%	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
Overall Slope Angles for Optimisation	°	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Discount Rate	%	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Table 16.2: Pit Optimisation Results

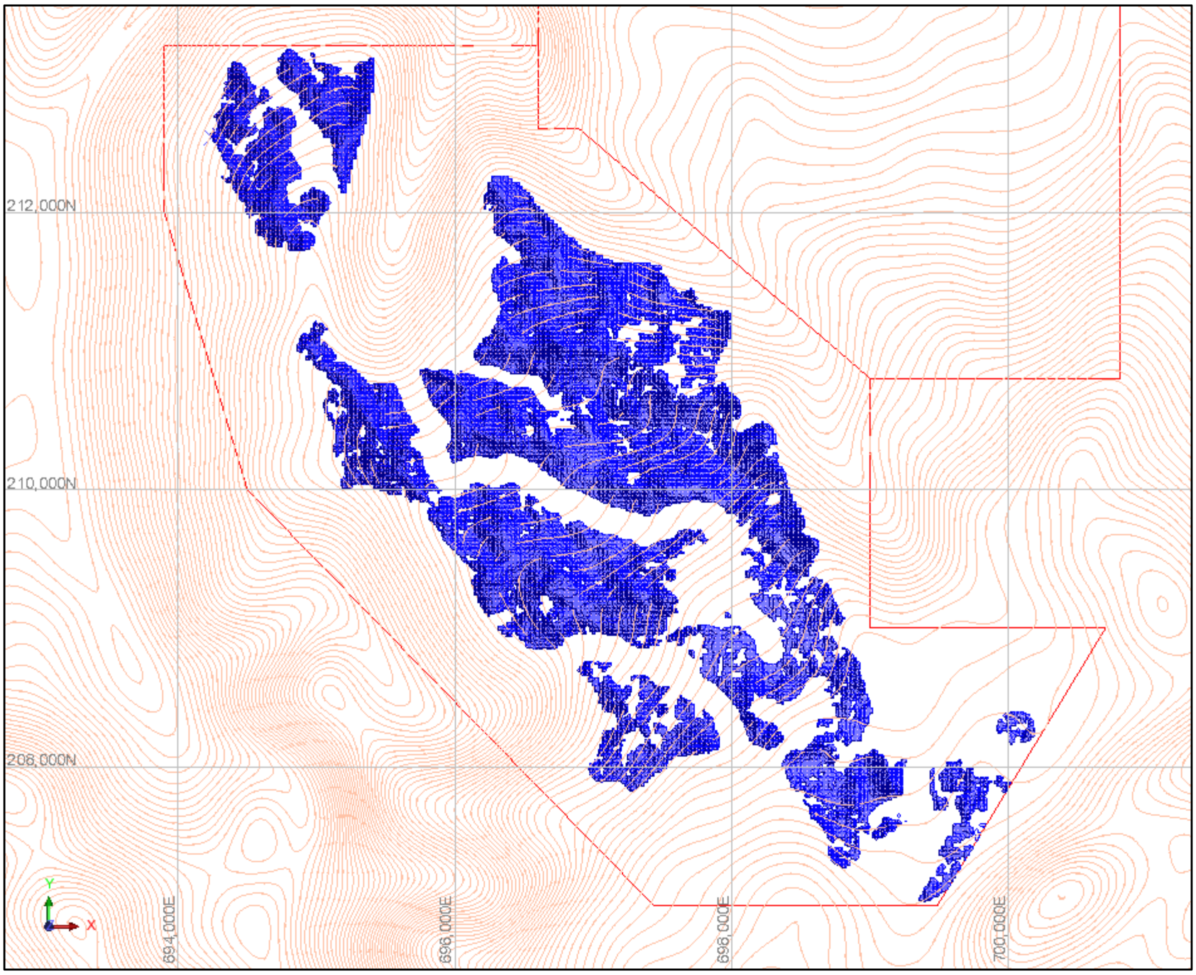
Description	Units	Moa Oriental	Camarioca Norte	Camarioca Sur	Yagrumaje Oeste	Santa Teresita	La Delta	Cantarrana	Playa la Vaca - Zona Septentrional	Zona C	Zona A	Combined
Optimal Pit	Pit No.	Pit 15	Pit 39	Pit 34	Pit 15	Pit 50	Pit 87	Pit 57	Pit 55	Pit 88	Pit 20	-
Proven Mineral Reserves	Mt	4.49	20.19	24.91	10.94	3.50	8.78	14.98	5.61	2.36	0.05	95.81
Probable Mineral Reserves	Mt	2.08	6.81	8.58	1.39	4.16	1.58	2.41	4.48	6.49	1.17	39.15
Total Mineral Reserves Tonnage	**Mt**	**6.57**	**27.00**	**33.49**	**12.33**	**7.66**	**10.36**	**17.39**	**10.10**	**8.85**	**1.22**	**134.96**
Waste Tonnage	Mt	0.74	3.29	3.07	1.64	1.87	3.08	3.08	6.36	6.38	0.51	30.01
Stripping Ratio	tw:to	0.11	0.12	0.09	0.13	0.24	0.30	0.18	0.63	0.72	0.41	0.22
Life of Mine	**Yrs**	1.41	5.79	7.19	2.65	1.64	2.22	3.73	2.17	1.90	0.26	29.34
Mining Cost	US$/t Ore	8.76	10.74	13.64	10.06	19.07	15.27	15.63	8.42	7.64	7.02	12.28
Processing Cost	USS/t Ore	76.87	78.65	80.43	75.43	77.92	78.40	77.17	78.23	76.24	76.91	78.25
Total Cost	**USS/t Ore**	**85.63**	**89.39**	**94.07**	**85.49**	**96.99**	**93.67**	**92.80**	**86.66**	**83.88**	**83.94**	**90.53**
Total Cost	**US$/Ni t**	**8,797**	**8,767**	**8,536**	**9,490**	**9,675**	**8,968**	**9,670**	**6,939**	**9,190**	**7,440**	**8,798**
Nickel Grade	Ni %	0.97	1.02	1.10	0.90	1.00	1.04	0.96	1.25	0.91	1.13	1.03
Cobalt Grade	Co %	0.14	0.13	0.12	0.14	0.13	0.13	0.14	0.12	0.09	0.10	0.13
Iron Grade	Fe %	47.20	44.06	42.65	47.46	0.00	44.04	46.74	44.65	41.53	41.83	41.87
Magnesium Grade	Mg %	0.92	1.26	1.98	0.62	0.00	1.07	0.96	1.21	0.86	1.01	1.21
Aluminium Grade	Al %	4.83	5.43	5.01	4.78	0.00	5.66	4.97	4.51	4.51	4.05	4.74
Silica Grade	SiO_2 %	4.02	5.48	8.53	3.13	0.00	4.55	3.75	8.41	12.61	11.96	6.09
Acid Consumption	kg/t	281.95	321.65	359.33	259.99	0.00	314.88	288.92	295.78	269.97	270.44	294.66

16.3.2 Mine Design

The pit shells define the final pit limits.

Figure 16.2 shows the largest pit, Camarioca Sur, as an example of the pit optimisation result and the areas included within the design.

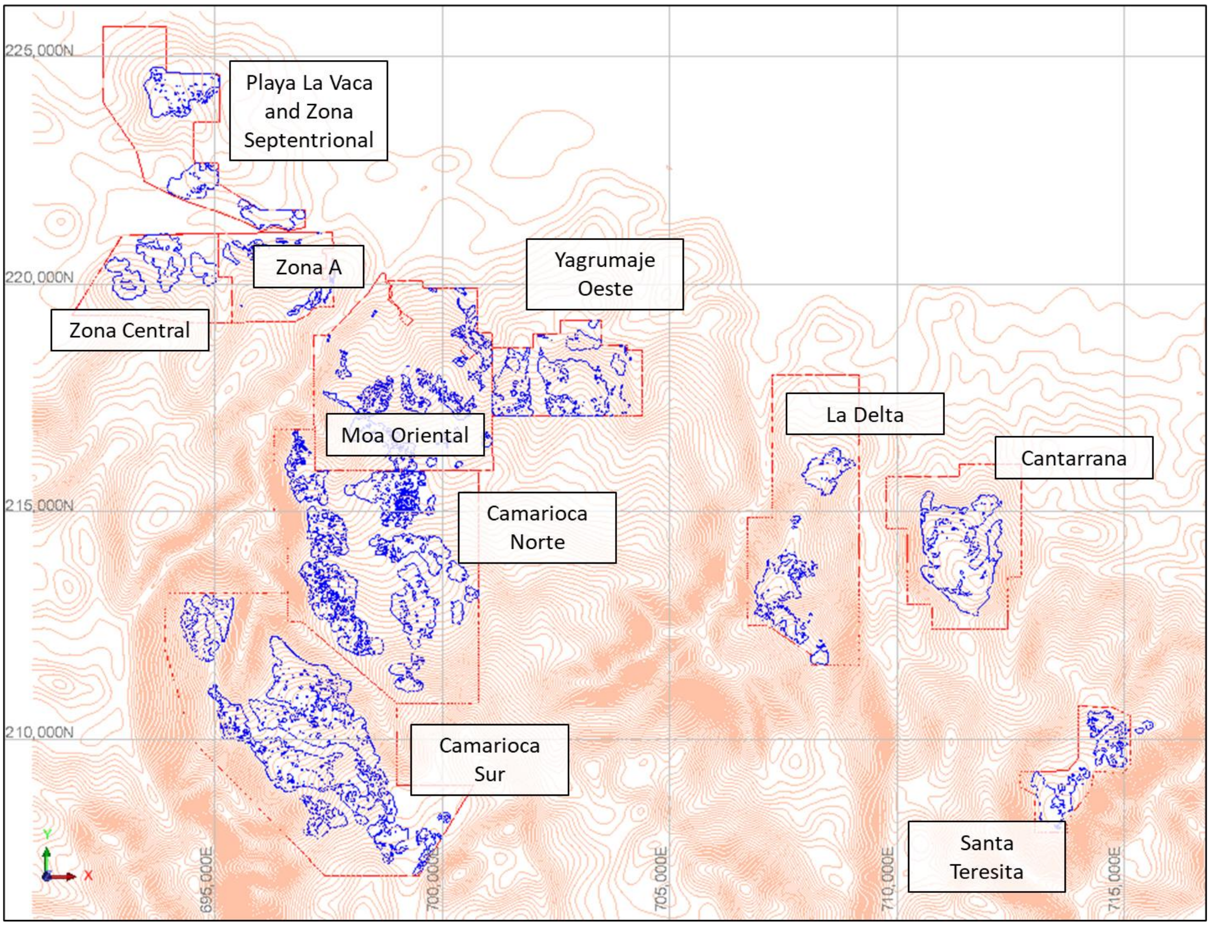
Figure 16.2: Camarioca Sur Pit Outlines



Source: Micon (2023)

Figure 16.3 shows the mining areas included in the LoM planning across all the mining concessions.

Figure 16.3: Mining Areas Included in the LoM Planning Across all the Mining Concessions



Source: Micon (2023)

16.4 LOM MINE PRODUCTION RATE

16.4.1 Production Strategy

The production schedule is based on 4.6 Mt/a run of mine (RoM) feed to the processing plant.

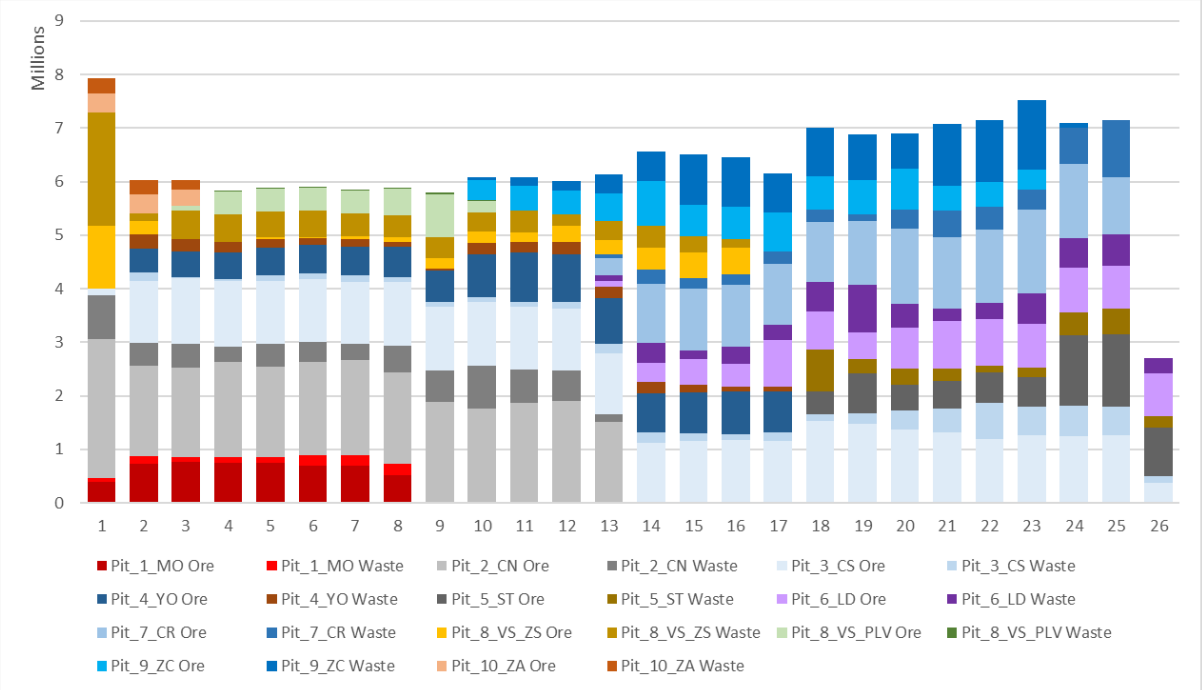
The aim is to mine at a constant volume to reduce the need for adjusting the mining rates and associated mining fleet, which will in turn reduce any fluctuations in production costs per tonne mined.

The production schedule aims to maximise value, honour the blending criteria, and by doing so maximising the HPAL and CRC plants recovery and maximise the LoM. A constant feed rate to the plant is required by maintaining a stockpile level at around 350,000 t.

The mining sequence is aligned to the operational planning to ensure sufficient time is allowed to access the orebodies by road and to develop the required infrastructure.

The annual production detailing the split between ore and waste material is illustrated in Figure 16.3. The average LoM stripping ratio is 0.4 (t_{waste}:t_{ore}).

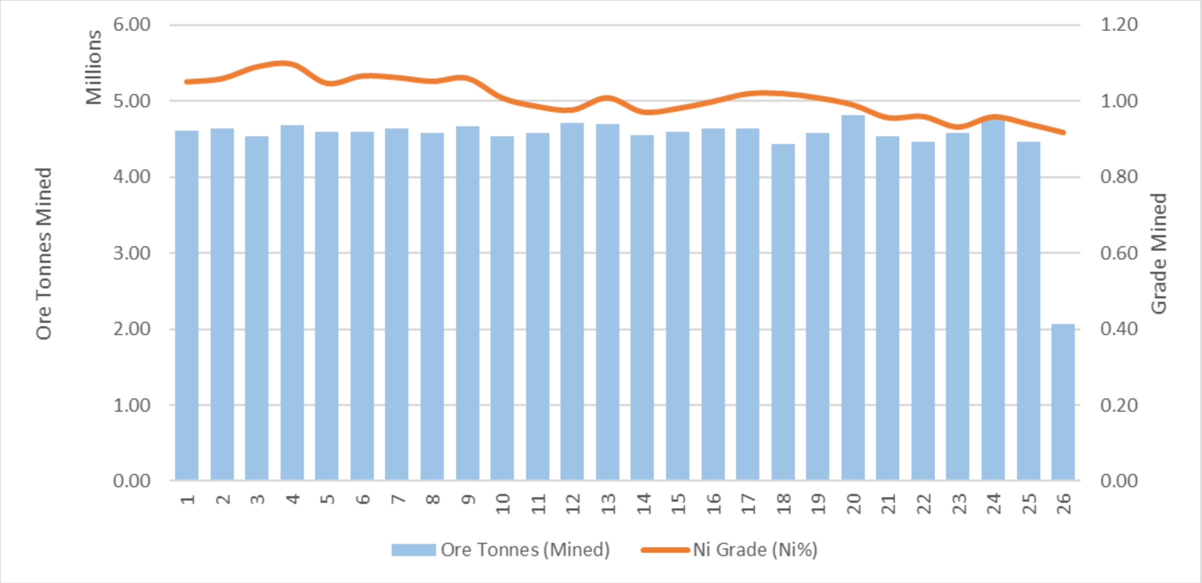
Figure 16.4: Moa Project LoM Production Profile (Per Orebody)



Source: Micon (2023)

The resulting ore production to the SPP and stockpiles is illustrated in Figure 16.5.

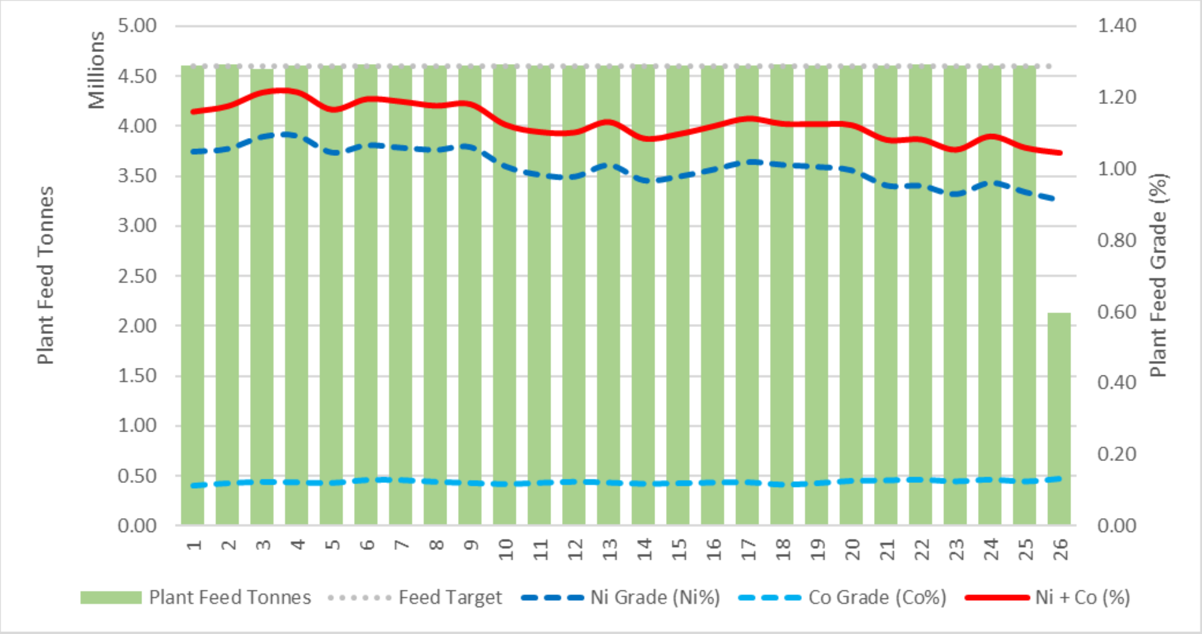
Figure 16.5: Moa Project - Total Ore Production



Source: Micon (2023)

The resulting plant feed tonnage and nickel and cobalt grades are illustrated in Figure 16.6.

Figure 16.6: Moa Project - Total Plant Feed Tonnes and Grade



Source: Micon (2023)

16.5 MINING FLEET

The mining fleet at the Moa Project is crucial to the delivery of plant feed to the SPP so that it can be maintained at full capacity. This will become increasingly important as the haulage distance increases at the Project especially with the inclusion of the Satellites orebodies.

A mixed fleet of trucks and excavators is employed at the Moa Project, comprising several hydraulic excavators (up to 7 m^3 bucket capacity) and a large fleet of articulated haul trucks (ranging from 39-t to 55-t payload) to move all of the ore and waste material. The fleet size is considered to be sufficient for the first fourteen years of the LoM, and there is a capital budgeted for fleet expansion when the Satellites Deposits come into production, based on a fleet calculation study.

The mining fleet is detailed in Table 16.3.

Table 16.3: Moa Project Current Mining Fleet

Fleet	Make	Model	Quantity	Fleet Size	Area	Nominal Capacity
Articulated Dump Truck (ADT)	Bell	B50D	2	63	Mining Operations	45 t
	Volvo	A40 FS	1			39 t
		A60H	7			55 t
		A45G FS	13			40 t
		A45G	40			40 t
Production Backhoe	Liebherr	R976	5	11		6.20 m^3
		R980 SME	2			6.80 m^3
		R9100	4			7.0 m^3
Auxiliary Backhoe	Volvo	EC220DLR	1	3		0.46 m^3
	Hyundai	Robex 320	1			1.0 m^3
	Liebherr	R906 WLC	1			1.35 m^3
$CaCO_3$ Crane	Liebherr	LH110	1	2	$CaCO_3$ Operation - material handling	6.0 m^3
		R976	1			
Front Wheel Loader	Liebherr	L580	3	10	$CaCO_3$ Operation	5.0 m^3
	Volvo	L350F	1			12.7 m^3
		L350H	6		Mining Operations	
Bulldozer	Liebherr	PR 744L	15	19	Mining Operations	OW:24,605 kg; Blade:7.2 m^3
		PR 776	1			OW:71,800 kg; Blade:18.5 m^3
		PR 764	1			OW:44,721 kg; Blade: 14 m^3
		PR 734 XL	1		Geological Exploration	OW:17,960 kg; Blade: 3.8 m^3
	Komatsu	D65 EX15 EO	1			OW:21,000 kg; Blade: 3.89 m^3
Multi-Purpose Backhoe	Volvo	EC250DL	1	6	CaCO3 Operation	0.48 m^3
	Volvo/SDLG	EW145B	1			0.58 m^3
Multi-Purpose Wheel Loader		B877F	4			1.0 m^3
Water Truck	Volvo	A40 FS	1	4	Mining Operations	20,000 l
	Volvo	A405G	1			16,000 l
	BELL	B60D	2			25,000 l
Drill Rig	Morooka	MST-800VB	3	3	Exploration	167 - 200 mm
Motor Grader	Volvo	G990	2	4	Mining Operations	27,200 kg
	Komatsu	GD 705-5	2			17,620 kg
Fuel Truck	Volvo	A45G	1	3	Commercial	13,000 LTS
	Mercedes	Cetros	1			10,000 LTS
	Sino Truck	Howe	1			10,000 LTS
Compactor	HAMM	3520 HT	1	3	Mining Operations	19,800 kg, 2,220 mm
	Volvo	ECD160B	2			16,691 kg, 2,134 mm
Lowboy/Prime Mover	ETT	Panther 130T	1	2	Mining Operations	130 t
	Volvo	A45G	1			
Lube/Field Service Truck	Volvo	A40FS	3	7	Mine Workshop	In-house made
		A45G	1			OEM lube module
	Sino Truck	Howe	1			Operational
	Mercedes	Cetros	2			Off-line – no dealer service
Grand Total				**140**		

17.0 RECOVERY METHODS

17.1 INTRODUCTION

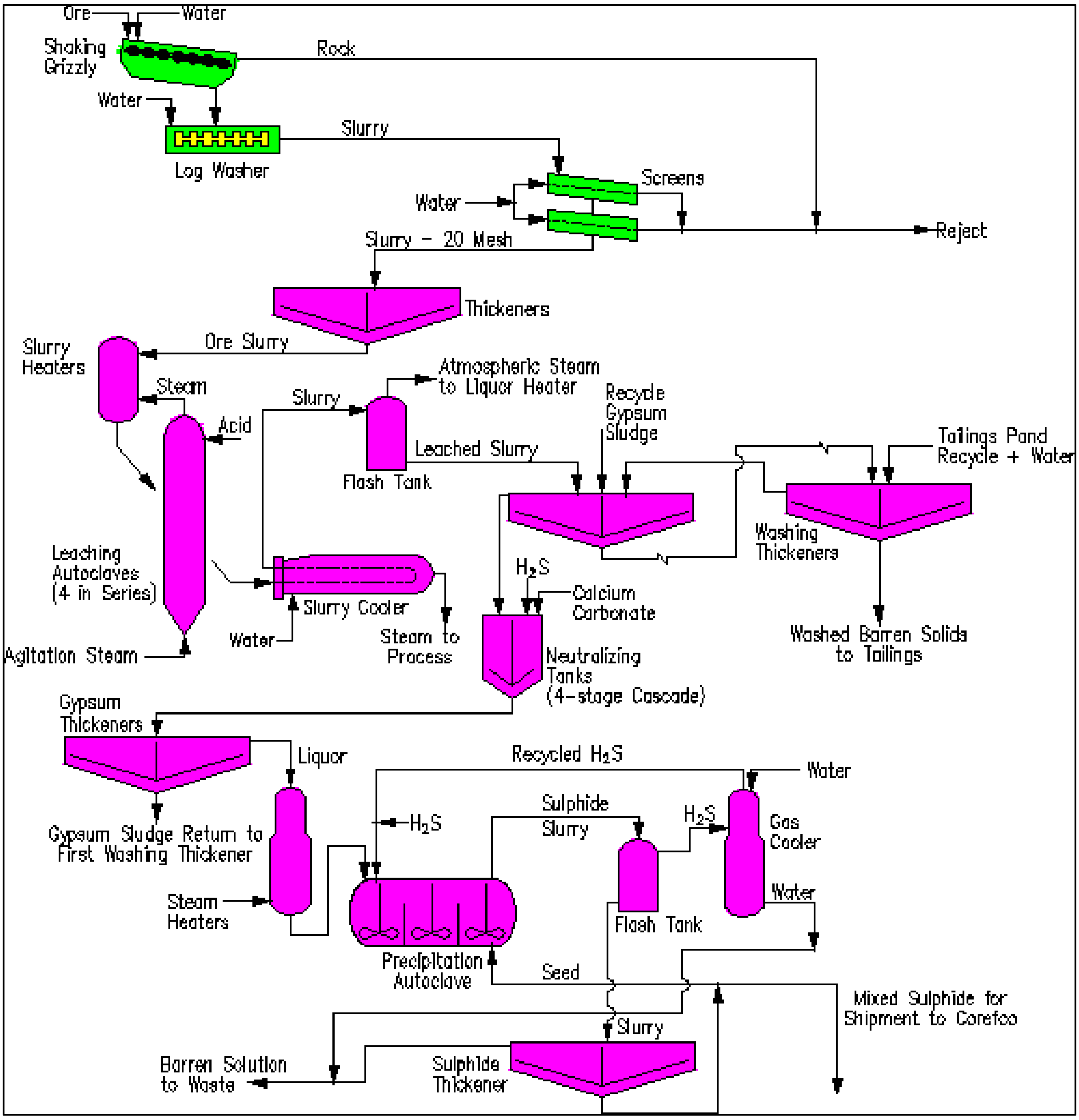
Moa Nickel owns and operates PSA Plant that lies on the southern edge of the residential area of the city of Moa.

Worldwide processing of nickel laterites has fallen into two broad categories: pyrometallurgy and hydrometallurgy. Silica and magnesium-rich saprolite ores are mostly processed pyrometallurgically to produce either ferronickel or nickel matte. Hydrometallurgical processes are limited to treating mostly the limonite fraction of the laterite mineralisation since acid consumption is the highest cost component in these processes. The hydrometallurgical route includes various processing methods such as HPAL, heap leaching, and atmospheric leaching. HPAL is practiced at the Moa Project, and is the most common hydrometallurgical process for the treatment of low magnesium lateritic ores. In excess of 93% of the nickel and cobalt can be extracted in the pressure leaching step at 245°C to 260°C. At this temperature, most of the iron taken into solution re-precipitates as hematite, thus regenerating acid. Silica and magnesium-rich saprolite ores require high acid addition, suggesting that these feeds cannot be processed economically through the hydrometallurgical route.

17.2 MOA NICKEL PROCESS PLANT

The PSA Plant uses the HPAL process to recover nickel and cobalt from the limonitic ore to an intermediate mixed sulphide product. A schematic flowsheet of the PSA Plant is shown in Figure 17.1.

Figure 17.1: Schematic Flowsheet of the HPAL Process used by the Moa Nickel Process Plant



Source: Sherritt Technologies (2023)

17.2.1 Slurry Preparation Plant

The RoM ore is fed to the SPP where the +0.8 mm size fraction is recovered as a slurry of ore and water in log-washers. A size separation occurs using a series of vibrating screens and a cylindrical scrubber to yield an overall limonite recovery in excess of 95%. The product slurry at approximately 25% solids is transported by gravity through a pipeline to the ore thickener plant.

17.2.2 Ore Thickening

The ore thickener plant thickens the slurry in the underflow to approximately 43% to 45% and returns the water from the overflow to the SPP. The ore thickener plant uses five conventional thickeners and one high rate thickener. The conventional thickeners have rake drives that can handle high loading, which allows for significant inventory of ore in the thickener beds. Typically, the ore slurry inventory in the thickener beds is in the range of five to ten days of plant feed.

17.2.3 Pressure Acid Leaching

The underflow slurry is preheated with 15 psig steam to 82°C, and then pumped through a direct contact steam heater to increase the temperature to 245°C. The heated slurry flows into the high pressure, vertical, Pachuca-type reactors where it is contacted with 98% sulphuric acid to extract the nickel and cobalt into solution.

The leached slurry from the reactors is cooled through indirect slurry coolers, to recover 15 psig steam, and then is sent to a flash tank. Leach extraction of nickel and cobalt is now around 94%, which is controlled by acid addition to maximise financial performance rather than metal extraction. The relative prices of nickel and cobalt, and plant throughput and input costs are used to optimise the acid addition rate.

17.2.4 Wash Circuit and Neutralisation

The cooled leached slurry, now consisting of residue and raw liquor, flows by gravity to a CCD wash circuit to separate the raw liquor from the residue. The leach residue is sent to a tailings pond with a water recovery circuit to return water to the CCD plant to act as wash water. The raw liquor is then treated with hydrogen sulphide in a pipeline reactor to reduce Cr^{+6} to Cr^{+3}, Fe^{+3} to Fe^{+2} and precipitate copper and then neutralised with limestone mud to reduce the free acid concentration and increase the solution pH to approximately 2.3, in mechanically stirred atmospheric reactors.

The reaction of the limestone mud and sulphuric acid forms gypsum solids which are removed from the product liquor in thickeners. A portion of the gypsum underflow is recycled back to the neutralisation stage to act as seed while the remaining underflow is pumped to the CCD circuit to recover the valuable metal solution and impound the solids in the tailings pond.

17.2.5 Sulphide Precipitation

The product liquor is preheated with the flashed steam from the Leach Plant flash tanks and then pumped to the sulphide precipitation plant. The preheated product liquor is heated to 125°C using 15 psig steam, recovered by the slurry coolers in the leach plant, and then pumped into mechanically agitated autoclaves. Nickel and cobalt are precipitated as a mixed sulphide product using hydrogen sulphide. The mixed sulphide slurry is cooled through a flash tank and thickened in a thickener. The thickened mixed sulphide slurry is washed, filtered and bagged for shipment to the Cobalt Refinery Company Inc. (CRC) in Fort Saskatchewan, Canada.

17.2.6 Utilities

Auxiliary plants to support the process plant include a Powerhouse, featuring fuel oil fired boilers for steam production, and turbine-generators for power generation. Three sulphur burning acid plants, a hydrogen and a hydrogen sulphide plant are also on site to provide sulphuric acid and hydrogen sulphide, respectfully, for the process plant's consumption. A third acid plant was commissioned in 2018, which eliminated the need to purchase sulphuric acid.

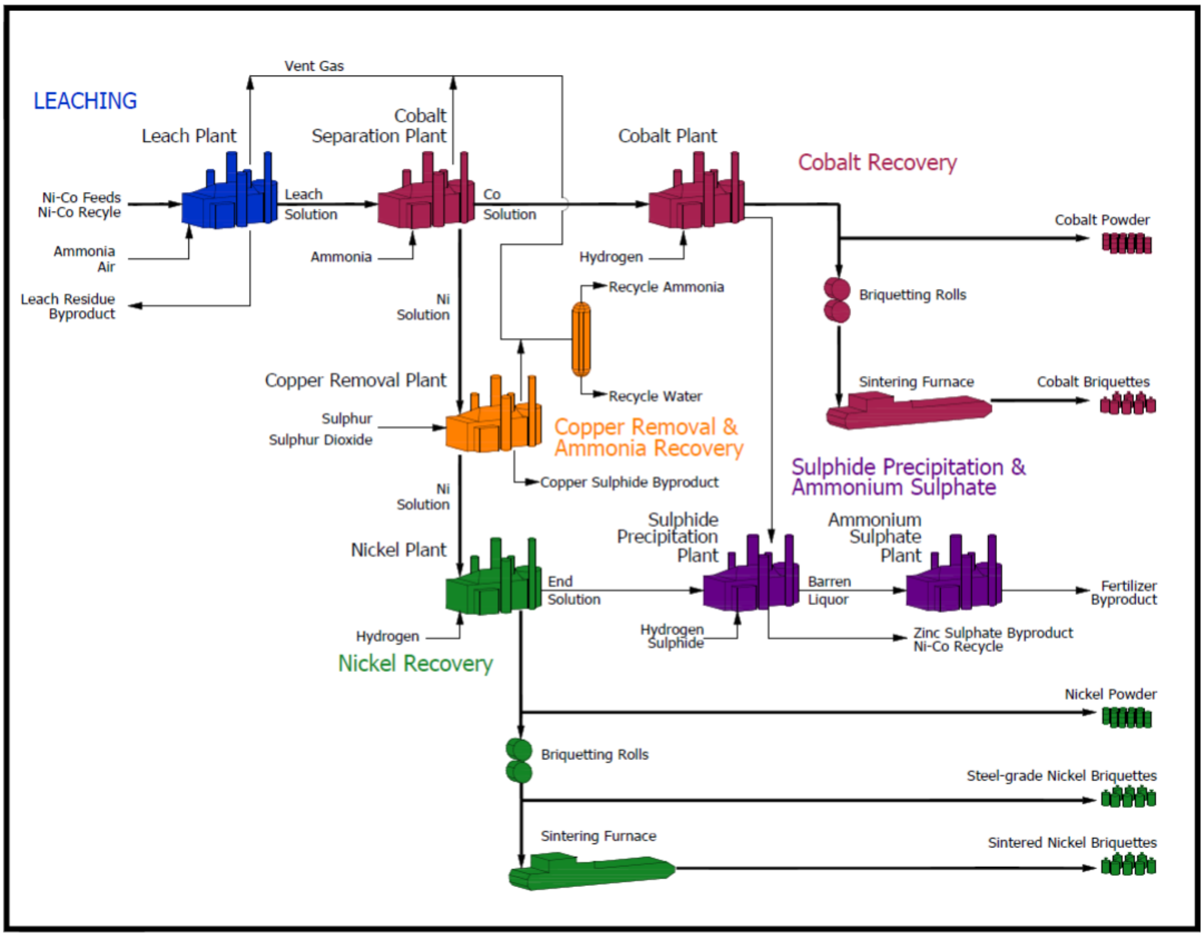
17.2.7 PSA Plant Capacity

Production in 2022 was 32,496 t of nickel and cobalt in mixed sulphides. The production of mixed sulphides is dependent on ore quality and grade. Average PSA Plant metallurgical recoveries for the last three years are given in Table 13.22. Information regarding Sherritt's Expansion Programme is provided in Section 24.0.

17.3 COBALT REFINERY COMPANY INC. (CRC)

Mixed sulphides produced at the PSA Plant are received at CRC in Fort Saskatchewan, where commercially pure nickel and cobalt metal products are produced. Figure 17.2 shows the CRC flow diagram for the plant.

Figure 17.2: CRC Flow Diagram



Source: Sherritt Technologies (2023)

17.3.1 Leaching

The mixed sulphide material is combined with ammonium sulphate liquor and leached under relatively mild oxidising conditions. The majority of the nickel, cobalt and copper dissolves in the leach step. Following the leach step the metal-containing leach solution is separated from the residue. The residue is washed, and the leach solution is directed to a nickel-cobalt separation step.

17.3.2 Nickel Cobalt Separation

The cobalt is separated from the leach solution as a cobalt salt. The nickel rich solution is then directed to copper removal, then ultimately nickel is recovered as a metal product. The cobalt salt is directed to cobalt recovery.

17.3.3 Copper Removal

The dissolved copper is removed by lowering the solution pH and copper is precipitated as a copper sulphide. The copper sulphide is separated from solution, washed and shipped to a custom smelter for the recovery of a pure copper product.

17.3.4 Nickel Recovery

The copper-free solution is sent to the oxydrolysis adjustment step. Following oxydrolysis, nickel metal is precipitated in autoclaves using hydrogen as the reducing agent. In the hydrogen reduction step nickel powder is precipitated batch-wise in repeated cycles until the nickel particles grow to sufficient size. The nickel powder is washed and dried and then either packaged as a powder or compacted into briquettes.

17.3.5 Cobalt Recovery

The cobalt salt is purified in multiple processing steps to remove nickel and then dissolved in a process solution. The solution is then sent to a conversion step to adjust the cobalt chemistry into a suitable form for metal recovery. Following the conversion step, cobalt metal is precipitated in autoclaves using hydrogen as the reducing agent. The cobalt powder is precipitated batch-wise in repeated cycles until the cobalt particles grow to sufficient size. The cobalt powder is washed and dried, and then either packaged as a powder or compacted into briquettes.

17.3.6 Plant Capacity

Production in 2022 was 35,636 t of finished nickel and cobalt, which includes production from third party feeds. Average CRC metallurgical recoveries for the last three years are given in Table 13.22.

18.0 PROJECT INFRASTRUCTURE

The main Moa Project infrastructure elements are described in this Section and can be seen on the map in Figure 18.1.

18.1 MINE

18.1.1 Roads

The PSA Plant lies on the outskirts of the city of Moa and is accessed by a paved road which runs past the plant to the SPP. PSA Plant employees arrive at the plant by a bus service, or company supplied vehicles using this road.

The mining production areas are accessed by dirt roads that are capped with serpentine material from an area close to the SPP. The roads are maintained by the road construction division on a regular basis.

18.1.2 Workshop

The mine workshop is located proximal to the SPP and is where the mobile fleet is serviced and maintained. The mine shop includes multiple bays for routine servicing, troubleshooting and tyre servicing. Located within the workshop is a warehouse for parts and servicing consumables.

There is a small maintenance Unevol workshop near the new SPP.

18.1.3 Mining Camps

A few mining camps can be found on the operating concessions:

- Moa Occidental mining camp, located next to the old SPP;
- One mining camp on Moa Oriental side, close to water plant;
- One mining camp in Camarioca Norte; and;
- Another mining camp is sitting on the tailings pond area.

18.1.4 Slurry Preparation Plant (SPP or OSPP)

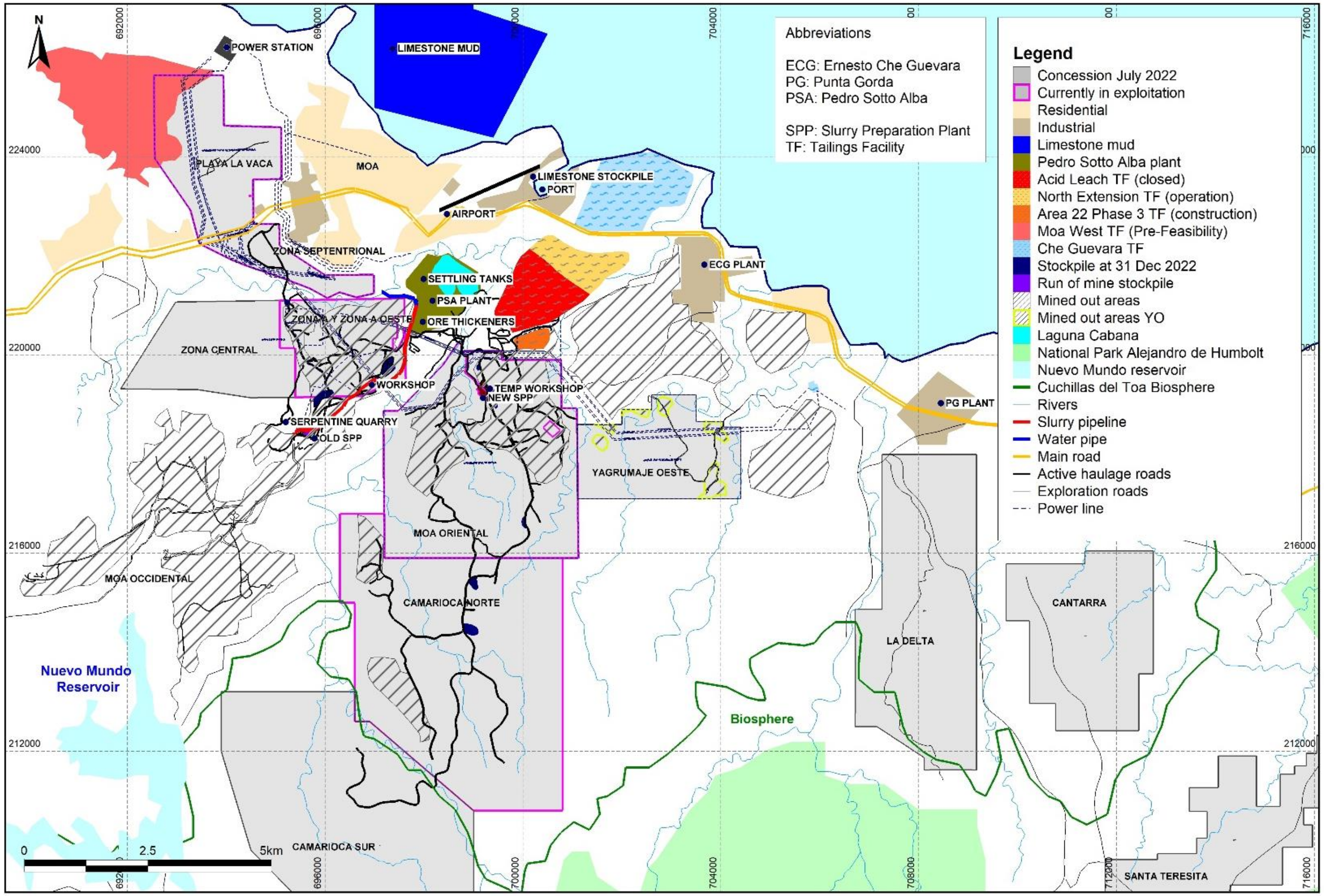
The SPP, or the OSPP for “old” SPP, located south of the Mine shop, processes the mined ore (see Section 17.0 for more details on the SPP). The SPP plant uses a system of log washers and vibrating screens to slurry the mineral and classify to the required particle size.

The mining face and SPP samples are analysed at the main processing laboratory and the results are uploaded to a central control system for mine planning control.

18.1.5 “New” Slurry Preparation Plant (NSPP)

The NSPP, or “new” SPP, will be located in the Northern portion of the Moa Oriental concession. The NSPP plant will have a mineral sizer and will use a system of scrubbers and vibrating screens to recover the mineral and classify to the required particle size. The NSPP is under construction, and is expected to be complete in early 2024.

Figure 18.1: Moa Project Infrastructure Map



Source: Micon (2023)

18.1.6 Stockpiles

There are seven RoM stockpiles located at various sites proximal to the mining faces with a common RoM stockpile close to the old SPP. The stockpiles are for use during the rainy season and are continuously blended and characterised to allow the material to be fed to the process when required.

An improved ore/waste dispatch tracking system is required to enable optimal blending to manage nickel and magnesium grades.

18.1.7 Sedimentation Ponds

Sedimentation ponds are constructed to efficiently control water run-off and allow solids to settle and be captured. There are multiple ponds that vary in size at various locations in the mining areas. Regular maintenance is conducted on all sedimentation ponds.

18.1.8 Power Supply

The power supply to the SPP is by overhead lines that are connected to the National Grid power supply. The connection to the national grid is at Felton (Figure 18.1).

18.1.9 Slurry Pipeline

The slurry pipeline is a concrete line that transports the product from the SPP to the PSA Plant via gravity. The water supply to the SPP is via a steel line from the ore thickener plant.

18.2 MOA NICKEL PROCESS PLANT SITE

18.2.1 Steam and Power

The steam that is required by the PSA Plant is supplied by fuel oil fired boilers and sulphuric acid plants. The majority of the high-pressure steam is used in the HPAL process and power generation. The majority of power for the plant is generated by steam driven turbine generators within the plant's powerhouse. However, the plant is also connected to the National Grid through a 110 kV substation. Approximately 6 MW is imported from the National Grid. Power supply is sufficient for current operation and the LoM.

Emergency power is available at the powerhouse to restart operations and other critical equipment have dedicated diesel generators.

18.2.2 Water

Water supply for the processing plant comes from a man-made reservoir which is supplied by the Moa River. The reservoir is adjacent to the plant. Water supply is sufficient for the current operations and the LoM.

18.2.3 Petroleum Products, Supply and Storage

The processing plant requires fuel oil, liquefied petroleum gas (LPG) and diesel. The fuel oil is delivered to site via a pipeline which is owned and operated by a third party. The diesel fuel is delivered to the plant site and mine on a daily basis. The diesel fuel is distributed from the storage tanks by fuel trucks to the equipment. LPG storage is located at the port facilities and is pumped to the processing plant. Diesel, fuel oil and LPG supplies are sufficient for the current operations and the LoM.

18.3 TAILING MANAGEMENT FACILITIES

Tailings are currently deposited in on-land ponds with surface water reclaimed for processing. There are several TMFs at the Moa Project site.

Sherritt's approach to tailings management and the Moa Project TMFs is publicly disclosed on an annual basis.

Sherritt and the Moa Project site strive to operate and maintain the TMFs in accordance with global best practices for safety.

18.3.1 Moa JV TMF Options

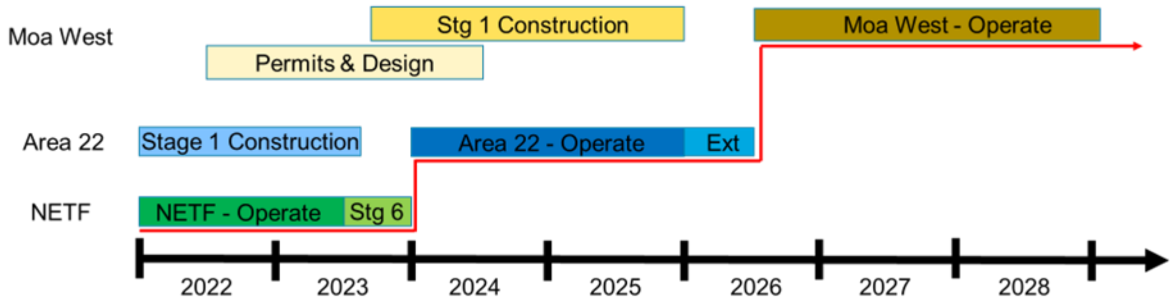
Tailings, in the form of slurry produced from the Moa Nickel Process Plant, are currently stored in the North Extension Tailings Facility (NETF). Water is recovered from tailings and recycled for use in the plant. The Moa JV site has several active and proposed TMFs outlined in Table 18.1.

Table 18.1: Moa JV TMF Options

Facility	Status
Acid Leach Tailings Facility (ALTF)	Closure
North Extension Tailings Facility (NETF)	Operational
Area 22 Phase 3	Under construction
Moa West	Pre-Feasibility underway

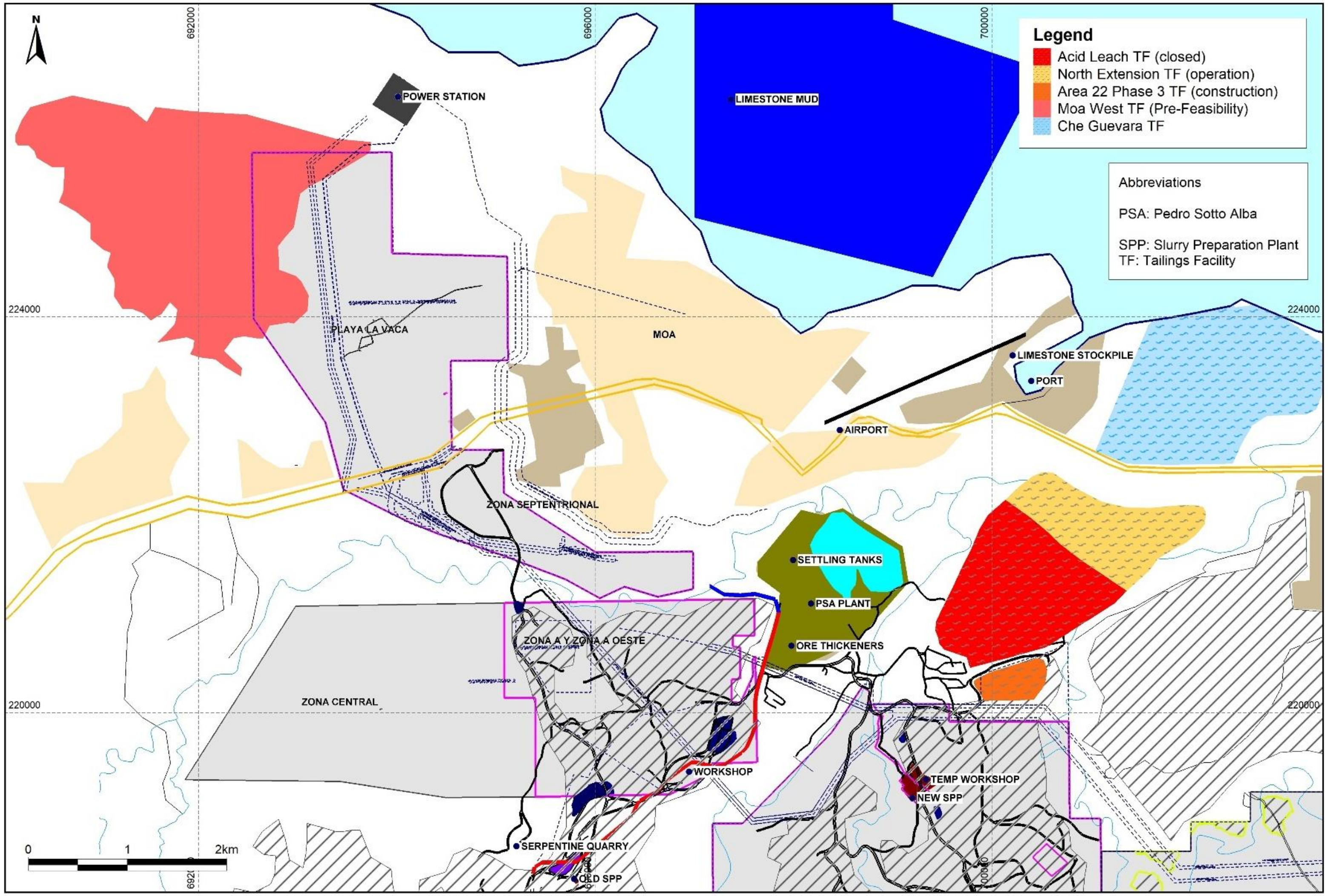
Historically tailings were stored in the Acid Leach Tailings Facility (ALTF), which is now closed. The NETF is predicted to be full by the end of 2023 at which point tailings will be sent to the Area 22 Phase 3 TSF that is currently under construction, is due for completion prior to 2024, and anticipated to have capacity to receive tailings until mid-way through 2026. After this date, all tailings is expected to be sent to the Moa West TSF, which is in the pre-feasibility study phase. The planned tailings management plan is shown in Figure 18.2 and their locations are shown in Figure 18.3.

Figure 18.2: Tailings Management Plan



Source: Sherritt International (2023)

Figure 18.3: Tailings Storage Facility Location Map



Source: Micon (2023)

Moa West was identified as the preferred location for long term tailings storage after a 2022 feasibility study was completed on another possible location known as Los Lirios. The Los Lirios TMF option was not pursued after the feasibility study showed high total construction costs, inefficient construction requirements and a significant volume of mineralisation that has to be mined prior to storage of tailings. Conceptual studies and design work have demonstrated that Moa West is in a location with natural topographical features that create an ideal tailings storage opportunity with efficient construction characteristics.

Moa West is expected to provide tailings storage capacity beyond the current Moa Project LoM. There is a risk that Moa West may not be developed in time to provide tailings storage continuity after Area 22 Phase 3 is filled to capacity. The Moa JV management team are aware of and are monitoring this risk. If Moa West cannot be developed on time, other interim storage options near the existing ALTF, NETF and Area 22 Phase 3 would be considered.

18.3.2 Tailings Risk Management

The TMFs are reviewed regularly, both internally and by third parties. The Independent Tailings Review Board (ITRB) and Engineer of Record (EOR), are responsible for auditing TMF safety and stability and the effectiveness of management systems. Recommendations from these reviews are then analysed by site management and action plans are developed and executed to address them. A geotechnical engineer is employed to provide oversight of design, construction, and operation of the tailings facilities. Independent engineering firms are utilised in the design and monitoring of the tailings facilities. The design and operation of existing facilities meets or exceeds all applicable regulatory requirements.

Upstream and centreline designs have been used throughout the mine life. Stability is monitored in alignment with an operating maintenance and surveillance manual. Based on internal and third-party reviews of structural integrity and management systems, the facilities are operating to design specifications and all facilities are currently stable. As part of the LoM optimisation planning, Moa JV has set out a proposed sequence for the development, operation, and closure of its TMFs.

Sherritt and Moa Nickel's tailings management standards and practices draw from the Mining Association of Canada's Towards Sustainable Mining Tailings Management Protocol and other industry best practices. Sherritt's approach to tailings management and the Moa Nickel TMFs is publicly disclosed on an annual basis.

Dam failure is the greatest risk for the TMFs located at the Moa Project Site. Sherritt has developed six levels of governance to ensure constant monitoring and mitigation of risk at the TMFs as described as follows:

1. **Regular surveillance** – Operations are expected to monitor their TMFs on an ongoing basis using piezometers, inclinometers, pressure gauges, remote sensing and other technologies to monitor tailings dams, abutments, natural slopes and water levels. The results are assessed by the management team of the operation.
2. **Annual dam safety inspections** (DSI) – Formal dam safety inspections are conducted annually by an external Engineer of Record for operating assets. A DSI evaluates and observes potential deficiencies in a TMF's current and past condition, performance and operation. DSI findings are overseen by the operation's management team.

3. **Dam safety audits** – Knight Piésold, one of the world's leading TMF experts, audits the integrity and safety of the Moa Project TMFs. The results of these audits are reported to the Moa Joint Venture management and Board of Directors, Sherritt's senior management and the Reserves Operations and Capital Committee of Sherritt's Board of Directors. Findings are followed up through regular independent verification audits.
4. **Independent tailings review boards** – The Moa JV Project Site has a Tailings Review Board made up of independent experts who conduct annual third-party reviews of design, operation, surveillance and maintenance.
5. **Internal governance reviews** – Sherritt's Senior Vice President Metals conducts internal management reviews of Sherritt's tailings facilities on a regular basis. Summaries are reported to the Reserves Operations and Capital Committee of Sherritt's Board of Directors.
6. **Staff inspections** – Tailings management facilities are inspected by trained operators and expert technical staff as frequently as several times daily, with formal staff inspections at the Moa JV Project Site at least once per month.

18.4 MOA PORT

The port facilities are located approximately 5 km from the Moa Nickel Process Plant and access is by paved road. The port facilities handle numerous consumables used at the plant, including the following:

- Sulphuric acid;
- Fuel oil;
- LPG;
- Sulphur; and,
- Limestone mud.

These consumables arrive via boat and are offloaded for storage at the port. The limestone mud is classified and stored in two thickeners close to the port and is pumped to the Moa Nickel Process Plant. The Moa Port also handles commodities for the neighbouring Punta Gorda operation, a state-operated nickel plant and loads and ships the mixed sulphide product to CRC in Canada.

All commercial purchases including spare parts, and capital assets purchased abroad are also received at the Port of Moa and unloaded. Depending on the source, the Port of Santiago de Cuba and the Port of Havana have been used to unload commercial items. These are then transported by truck to the Moa Nickel Process Plant.

19.0 MARKET STUDIES AND CONTRACTS

19.1 MARKET OVERVIEW

19.1.1 Nickel

Nickel is a heavy silver-coloured metal whose principal economic value lies in its resistance to corrosion and oxidation, with excellent strength and toughness at high temperatures. The properties of nickel also facilitate the deployment of the entire spectrum of clean energy technologies (geothermal, batteries for electric vehicles and energy storage, hydrogen, hydro, wind and concentrating solar power) making nickel one of the elements that plays a critical enabling role in the energy transition required to reduce carbon emissions. Most significantly, nickel has emerged as a key metal in the cathode active material for lithium-ion batteries, since nickel ensures higher cell voltage and a continuous voltage profile, contributing to higher energy density and good rate capability.

Nickel demand is strongly influenced by world macro-economic conditions, which in turn influence the state of the world stainless steel industry, the single largest consumer of nickel, accounting for 64% of primary nickel consumption worldwide in 2022. After stainless steel, the lithium ion rechargeable battery market is an important driver of future nickel demand. For 2022, Wood Mackenzie reported primary nickel demand for batteries at approximately 15% of total demand growing to approximately 31% over the next 10 years. Nickel is also used in the production of industrial materials, including non-ferrous steels, alloy steels, plated goods, catalysts and chemicals. Last year, China was responsible for over 58% of the world consumption of primary nickel production.

In 2022, the Moa Joint Venture (Moa JV) produced 32,268 t or approximately 1.0% of the annual world refined nickel production. The 2022 world supply of refined nickel was estimated to be approximately 3.12 Mt/a. World nickel supply is broadly classified into primary and secondary nickel. Primary nickel is further subdivided into refined nickel (Class I) having a minimum nickel content of 99.8%, and charge nickel (Class II) having a nickel content of less than 99.8%. The main physical forms of Class I nickel are electrolytic nickel (cathode and rounds), pellets, briquettes, granules and powder. Class II nickel includes ferronickel, nickel pig iron (NPI), nickel oxide sinter, matte and mixed hydroxide precipitate (MHP). Secondary nickel is the nickel contained in scrap metal, principally stainless-steel scrap. World nickel supply has also most recently been strongly impacted by the expansive growth of NPI, matte and MHP, in particular, the rapid capacity expansion in Indonesia. NPI is the lowest purity of what is considered refined nickel (as low as 2% nickel content) and is primarily used in China and Indonesia to make stainless steel. Total worldwide NPI production was estimated to be approximately 1.56 Mt of nickel equivalent in 2022, making it a new record year for world NPI production, with NPI production representing almost 50% of total nickel production.

Most major refined nickel producers supply nickel at grades ranging from 98.4% to 99.9% purity. The Moa JV's sintered nickel briquettes, produced at a minimum of 99.8% purity, are well suited for stainless steel, alloy steel production and battery chemical applications, and are expected to continue to be sold to such industries. The Moa JV's "steel grade" (unsintered) nickel briquettes having a typical purity of 99.5% nickel are well suited for stainless steel production and foundry use. In 2017, the Moa JV introduced a "dissolving grade" nickel powder having a typical purity of 99.8% nickel suitable for battery chemical applications.

In February 2022, the significant and unpredictable event of the Russian invasion of Ukraine, which together with resulting economic sanctions, export bans and other consequences, resulted in further upward pressure on nickel prices reaching a high of US$11.84/lb on 24th February 2022. In March 2022, unprecedented trading and pricing activity led the London Metals Exchange (LME) to halt nickel trading on 8th March 2022 until 16th March 2022, with the settlement price on 7th March 2022 of US$19.50/lb. Upon recommencement of trading, newly implemented restrictions on maximum daily price movements prevented an official settlement price from occurring until 22nd March 2022, with the settlement price of US$13.97/lb. Nickel prices remained robust through to the end of 2022 with the price ending the year on 30th December 2022 at US$13.80/lb.

Stainless steel production in 2022 for Europe, North America and China was lower than 2021 levels. The Russia Ukraine war, high inflation, high energy prices and increase in interest rates all played a role in reducing demand both regionally and globally, with consumer confidence flagging as recessionary fears took hold, especially in Europe due to Europe's dependence on Russia for energy. In the battery electric vehicle (BEV) sector, 60% sales growth over 2021 is estimated for 2022 at 11 million units. China continues to lead the world in the number of battery electric and plug-in electric vehicles sold, accounting for 63% of sales globally. Notably, lithium iron phosphate (LFP) cathode batteries are in 50% of Chinese battery electric vehicles, while western original equipment manufacturers (OEMs) generally use high nickel battery chemistries for increased driving range. It is anticipated that automakers may increasingly use the less expensive LFP battery chemistry for lower range and entry level models, potentially capping the market share of nickel-containing batteries.

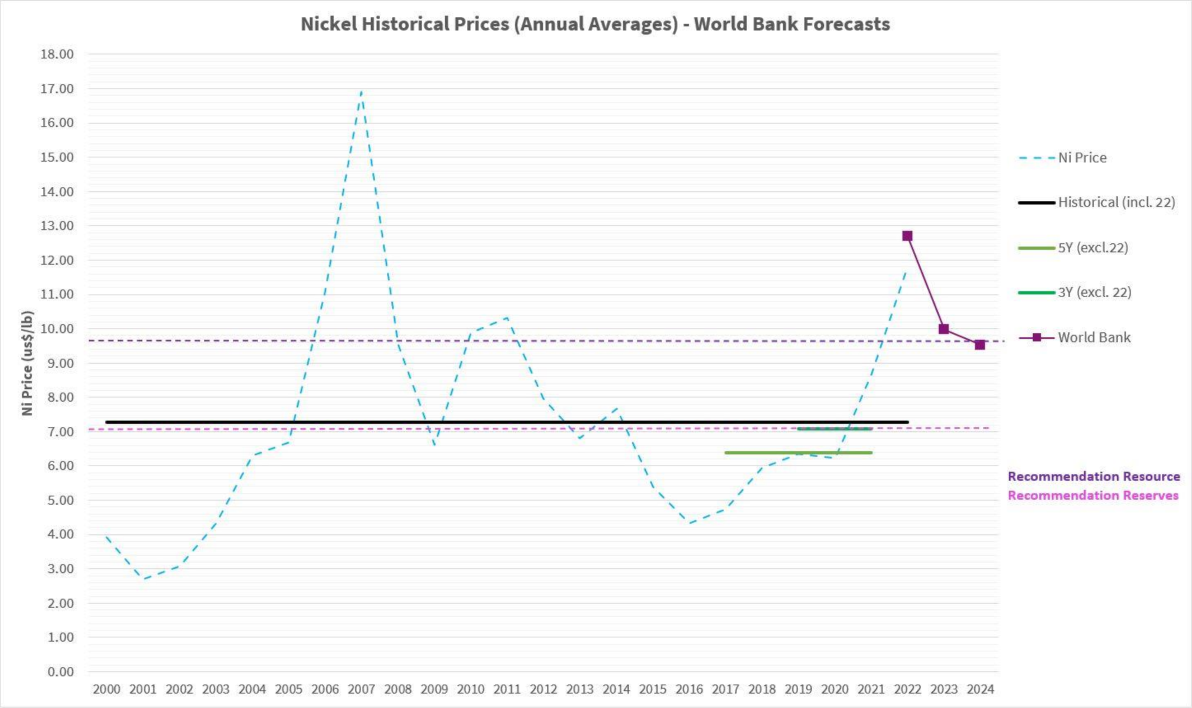
In 2022, there was a marked difference in nickel prices between the LME and the Shanghai Futures Exchange (SHFE). While Class I material generally traded at LME prices adjusted for taxes and duties in China, NPI and ferronickel traded at significant discounts throughout the year. The average Shanghai Metals Market (SMM) nickel equivalent in high grade NPI for 2022 was approximately US$9.56/lb, a 20% discount to the average LME price of US$11.91/lb, and a 15% discount to the annual average SHFE price of US$11.23/lb. Industry analysts estimate a supply surplus for 2022 on the order of 100,000 t in a market of 3,120,000 t, and this marginally oversupplied market is anticipated to continue at this magnitude until 2027, albeit in an increasingly expanding demand market. Much of the excess is Class II material, especially NPI.

Visibility of market fundamentals in the mid-term, including inventory levels, is uncertain, with slowing of global economic growth, uncertainty caused by the pandemic, and the impacts of the Russian invasion of Ukraine being key factors. The long-term outlook for nickel, however, remains bullish on account of the strong demand expected from the stainless-steel sector, the largest market for nickel, and the electric vehicle battery market. Some market observers, such as Wood Mackenzie, have forecast a prolonged nickel supply deficit beginning in 2027 due to developments in the electric vehicle market and insufficient nickel production coming on stream in the near term. Over the past year, multiple automakers and governments have announced plans for significant investments to expand electric vehicle production capacity to meet growing demand as well as more aggressive timelines to phase out the sale of internal combustion engines. The CRU Group (CRU) has forecast that electric vehicles sales will grow to 32.8 million units by 2027. As a result of its unique properties, high-nickel cathode formulations remain the dominant choice for long-range electric vehicles manufactured by automakers with Class 1 nickel being an important feedstock in the battery supply chain. Sherritt is particularly well positioned given the company's Class 1 production capabilities and the fact that Cuba possesses the world's fourth largest nickel reserves.

The nickel price forecast for Mineral Resource estimation assumes a long-term price of US$9.7/lb for nickel. The nickel price forecast for Mineral Reserves estimation assumes a long-term price of US$7.1/lb for nickel. The rationale for these long-term prices is detailed in Section 14.11.2, The economic analysis detailed in Section 22.0 is based on a US$7.1/lb for nickel in the base case, and a US$9.00/lb in the alternative scenario.

Figure 19.1 presents a graph of nickel annual average historical prices. The selection of nickel price used in Mineral Resource estimation is based on a global analysis as outlined in Section 14.11.2.

Figure 19.1: Nickel Historical Prices, Averages and Forecasts



19.1.2 Cobalt

Cobalt is a hard, lustrous, grey metal that is used in the production of high temperature, wear-resistant super alloys, catalysts, paint dryers, cemented carbides, magnetic alloys, pigments, rechargeable batteries and chemicals. The cobalt market is smaller and more specialised than the nickel market.

The relative importance of the different uses of cobalt has changed over the years, with demand for older, more established uses, such as pigments and carbides showing modest, if any, growth. Many of these traditional uses are strongly reliant on industrial growth for demand increases, so demand for these uses tends to rise and fall with global economic performance. According to CRU, of the world supply of refined cobalt in 2022, only 17% was produced as finished metal. Although the demand from the superalloy sector continues to consume significant cobalt metal, growth in the chemical sector, primarily in battery chemicals, has been the driving force behind recent demand for cobalt, forecast to increase from 67% market share in 2022 to 77% by 2027. For the foreseeable future, the driving force for cobalt demand will be via consumption in lithium-ion batteries in electric vehicles to enable the electrification of transport, and in energy storage systems for renewable energy generation.

In 2022, more than 72% of the world's mined cobalt production came from the "copper belt" located in the Democratic Republic of the Congo (DRC). Indonesia, Australia, Canada, Cuba, Russia and the Philippines accounted for 16% of the world's mined supply. In the longer term, significant increases in supply are possible from new large-scale international projects targeting copper and nickel production. DRC mined supply is expected to grow at a compounded annual growth rate (CAGR) of 10%. In 2022, Indonesia will likely account for 6% of world production and is projected to grow at a CAGR of 38%, In five years, Indonesia will account for 16% of world cobalt production as a result of the build out of HPAL and MHP operations and, in less significant volumes, via matte from NPI projects.

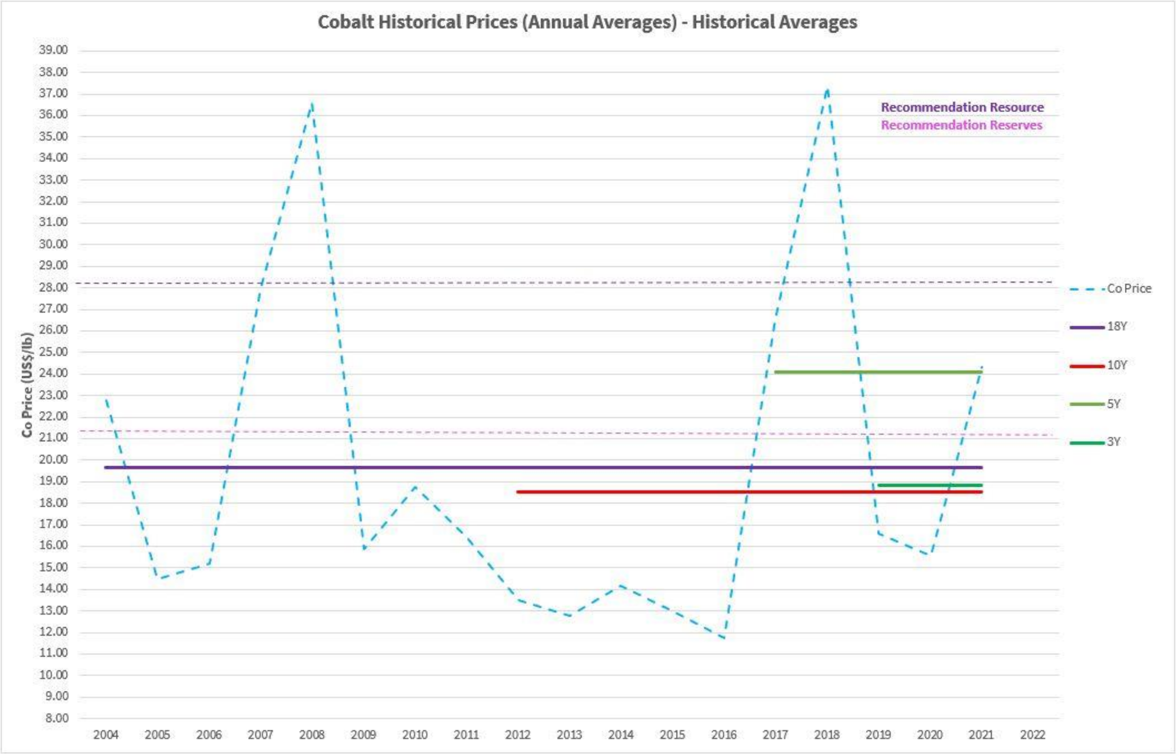
The Moa JV produces finished cobalt metal (briquettes and powder) at 99.9% purity, which exceeds the current LME cobalt specification. The Moa JV is among the leading suppliers of metallic cobalt to world markets, supplying 3,367 t or approximately 1.7% of world mined primary cobalt in 2022 and approximately 10% of the total global supply of metallic cobalt.

The Argus 99.8% Chemical Grade cobalt price in 2022 averaged US$30.87/lb, 27% higher than the average price for 2021 at US$24.40/lb and ranging between US$20.90/lb and US$39.90/lb throughout 2022. Cobalt prices rose steadily from the beginning of 2022, reaching a peak price in May, partly due to good demand and supply-related fears stemming from the war between Russia and Ukraine, sanctions/self-sanctions of Russian commodities and ongoing logistic issues in the port of Durban in South Africa. Beginning in Q2 2022, the lock down of major cities in China under the Zero Covid Policy contributed to lower manufacturing and purchasing activity, marking the beginning of the decrease in the cobalt price, which generally continued for the remainder of the year. Additionally, weakness in demand for cobalt in the consumer electronic sector compounded throughout the year, decreasing demand and increasing availability for cobalt feedstocks even after China partially lifted lockdown measures in June 2022. The availability of stocks leading up to events in April 2022 and the healthy supply of MHP from newly-commissioned plants in Indonesia continued to put downward pressure on cobalt prices, even with reports that a major mine in the DRC was not authorised to export their refined cobalt hydroxide material, resulting in a reported 6,000 t of cobalt in cobalt hydroxide remaining on site. Industry observers, such as CRU, expect the cobalt market to be in surplus until 2027, after which a deficit is expected if no major production is brought online. Although there is an expectation that the outlook to 2027 will be of an oversupplied market, it is not due to poor demand fundamentals, as the cobalt market is expected to grow to approximately 336,000 t by 2027, representing a compound annual growth rate of 11.3% according to CRU.

The cobalt price forecast for Mineral Resources estimation assumes a long-term price of US$28.1/lb cobalt. The cobalt price forecast for Mineral Reserves estimation assumes a long-term price of US$21.3/lb for cobalt. The rationale for these long-term prices is detailed in Section 14.11.1. The economic analysis detailed in Section 22.0 is based on a US$21.3/lb for cobalt in the base case, and a US$23.50/lb in the alternative scenario.

Figure 19.2 presents a graph of cobalt annual average historical prices. The selection of cobalt price used in Mineral Resource estimation is based on a global analysis as outlined in Section 14.11.2.

Figure 19.2: Cobalt Historical Prices, Averages and Forecasts



19.2 CONTRACTS

The CRC refines the nickel-cobalt mixed sulphide product produced by Moa Nickel. CRC owns and operates the metals refinery located at Fort Saskatchewan, Alberta, and is one of the three companies belonging to the Moa JV.

The Moa JV company, the ICCI, acquires mixed sulphide from Moa Nickel and third parties, contracts with CRC for the refining of such purchased materials and then markets finished nickel and cobalt products worldwide, excluding the United States. The majority of the finished nickel and cobalt products are contracted annually to set volume commitments and a premium or discount to the relevant market reference price.

In addition to the contracts described above, the Moa JV has entered into several contracts on arm's length terms with third parties in relation to transportation, handling, sales, materials and other services of this nature in accordance with industry norms.

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 INTRODUCTION

Sherritt's Mineral Resources and Mineral Reserves are located at the Moa Project site and are a part of the Moa Joint Venture (Moa JV). For the purposes of demonstrating sustainability and corporate social responsibility, the Moa JV and the Moa Project rely on Sherritt, Moa JV and the Moa Project level policies, management systems, and standards. Sherritt publicly discloses information on behalf of these entities on an annual basis.

20.2 ENVIRONMENTAL MANAGEMENT

Sherritt's and the Moa JV's sustainability and corporate social responsibility commitments and updates are publicly disclosed on an annual basis.

Environmental studies were performed in the development stage of the mine. No significant environmental constraints that materially affect mine development or permitting requirements were identified. All relevant environmental factors and management considerations were incorporated into the Operating Licence of the mine by local regulatory authorities.

20.2.1 Water Management

Sherritt and the Moa Project recognise that water is an important shared resource, integral to the well-being of communities, essential for ecosystems and a vital input for the business. Based on high-level risk assessments, it has been determined that the Moa Project site is not located in identified high water risk areas. The Moa Nickel site is implementing the Mining Association of Canada's Towards Sustainable Mining (TSM) Water Stewardship Protocol.

20.2.2 Erosion and Sedimentation Control

The Moa Project maintains an Erosion and Sedimentation Control Plan that sets forth standard operating procedures and guidance to ensure environmental protection, infrastructure stability, and a minimal project disturbance at the site.

When Mineral Resources and Mineral Reserves are estimated, no material in environmentally sensitive areas is included in the planned production. These environmentally sensitive areas include encumbrances and buffer zones around streams and rivers, with the width of the zone determined from the crest of the ravine through which the stream or river runs. Avoiding mining in these buffer zones limits the sediment load into rivers, preserving water quality for aquatic species and maintaining its usability as a source of drinking water.

Sediment catchment basins are also used to minimise the effect of erosion by surface run-off from the mines into nearby streams.

20.2.3 Tailings

Tailings are currently deposited in on-land ponds with surface water reclaimed for the process. The storage and management of tailings is discussed in Section 18.3.

20.3 CLOSURE AND RECLAMATION PLANNING

All costs related to progressive reclamation, final closure, and post-closure monitoring requirements have been identified and included in the economic models. Closure and rehabilitation expenses are shown in Figure 21.1. All costs related to on-going monitoring and compliance with requirements set out in the various permits issued have been accounted for.

20.3.1 Reclamation and Rehabilitation

Historically, areas exploited by the Moa Project in the first years of the Moa JV were left un-rehabilitated if the exposed underlying saprolite was deemed by the ONRM to be a resource of value, whereby mining rights might subsequently be granted to other companies. In all other areas, overburden is deposited in mined-out areas, groomed, sloped and contoured by bulldozers for drainage. Topsoil and manure, if available, is spread on the final surface and the surface is planted with re-vegetation species. The Moa Project has rehabilitated 870 ha since the start of the Moa JV as compared to 913 ha disturbed from mining activities. It should be highlighted that the equilibrium between exhausted areas and rehabilitation has been reached. Therefore, at this phase of the Moa Project, specific mining areas can only be rehabilitated following completion of operational mining activities. It is anticipated that as areas become mined-out they will be rehabilitated reducing the requirement for large capital works to remediate the complete site at the time of closure.

20.4 ENVIRONMENTAL ASSESSMENTS AND REGULATORY PERMITTING

All environmental laws and regulations applicable to the local jurisdiction where the Moa Project site operates have been identified. The Moa Project site is in material compliance with all local laws and regulations. All costs related to permitting and, where applicable, monitoring and compliance activities have been identified and included in the economic models for the Project.

The Moa Project's mining operations are subject to three sets of Cuban legislation with respect to environmental requirements: *Decree Law 194* (monitored by the ONRM), *Environmental Law 81* (monitored by the Centro de Inspección y Control Ambiental (CICA)), and the Operating Standard, which was granted by *Resolution 192/2018* from the Ministerio Ciencia, Tecnología y Medio Ambiente (CITMA). The Operating Standard "regulates the conditions and environmental requirements for the performance of the activity of Moa Nickel S.A." and became effective on 12th September 2018. The Operating Standard is also monitored by the CICA. All permits and licences are current and valid, their conditions and requirements are being met, and all financial obligations are satisfied. Representatives of ONRM and CICA conduct regular inspections to monitor compliance with regulatory requirements.

Under *Decree Law 194*, the Moa Project has agreed to establish an environmental monetary reserve fund for mine reclamation and reforestation consistent with their asset retirement obligations. By *Agreement 7694* from 16th February 2015 of the Executive Committee of the Council of Ministers, the methodology for estimating the reserve fund for mine reclamation and reforestation was changed. Subsequently, it was determined that the Moa JV is not responsible for the reforestation of areas mined prior to 30th November 1994.

20.5 SOCIAL CONSIDERATIONS

A social impact assessment was completed at the early development stage and applicable requirements have been incorporated into the Moa Project's operating licence. No restrictions have been placed on the mine design or operation as a result of social factors, cultural, Indigenous, or archaeological issues or agreements.

Sherritt and the Moa Project maintain active engagement with local stakeholders for the betterment of the operations, employees, and the communities in which they operate. Sherritt and the Moa Project are firmly committed to providing a safe and respectful work environment and to upholding human rights throughout their supply chain.

Sherritt and the Moa Project are committed to addressing environmental, social and governance (ESG) risks, including human rights risks and the rights of children. Although human rights issues do not currently present a risk at the Moa Project, the site has ensured that management systems are preventative in nature, and align with international best practices and expectations regarding human rights such as the Universal Declaration of Human Rights.

Sherritt regularly assesses human rights risks in its mineral supply chain, and to date, no risks of human rights abuses, artisanal or small-scale mining, forced labour, or modern slavery have been identified. Effective local laws and systems are in place at the Moa Project site to prevent these risks. The Moa Project site produces minerals that are not sourced from conflict-affected or high-risk areas. Sherritt and the Moa Project policies and management systems align with the Organization for Economic Co-operation and Development (OECD) Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.

The Moa Project is committed to ensuring the health and safety of everyone at the site. This commitment is embodied in several key mechanisms to prevent fatalities and minimise risks. Occupational health and safety programmes ensure that leaders are coaching in work areas regularly and that personnel at every level of the operations are involved to improve safety behaviours and to identify continual improvement opportunities. Sherritt and the Moa Project's health and safety standards draw from the *Mining Association of Canada's Towards Sustainable Mining Safety and Health Protocol, ISO 450001*, and other industry best practices for injury and fatality prevention.

Sherritt and the Moa Project recognise that a significant part of their role is to help build human and institutional capacity wherever they operate and to support local communities in achieving their development goals. Sherritt's goal is to align 100% of its community investment and donations programme with needs and priorities as identified by local communities. Some recent examples of local in-kind donations in the area of the Moa Project include the refurbishment of two teaching medical clinics, the provision of road-side lights, IT equipment, and air conditioning units and laboratory equipment for the local hospital. In addition, Sherritt has active partnerships with organisations like UNICEF, Cowater, the Government of Canada, and the Cuban Ministry of Energy and Mines to support larger-scale community development.

21.0 CAPITAL AND OPERATING COSTS

21.1 GENERAL INFORMATION

Estimates of the capital and operating costs used in the economic assessment of the Moa Project are described in this Section.

The estimates are expressed in first quarter 2023 United States dollars, without provision for escalation. Where appropriate, an exchange rate of US$0.76/CAD has been applied, being the average rate over the period 2019-2021 on which historical unit costs are based.

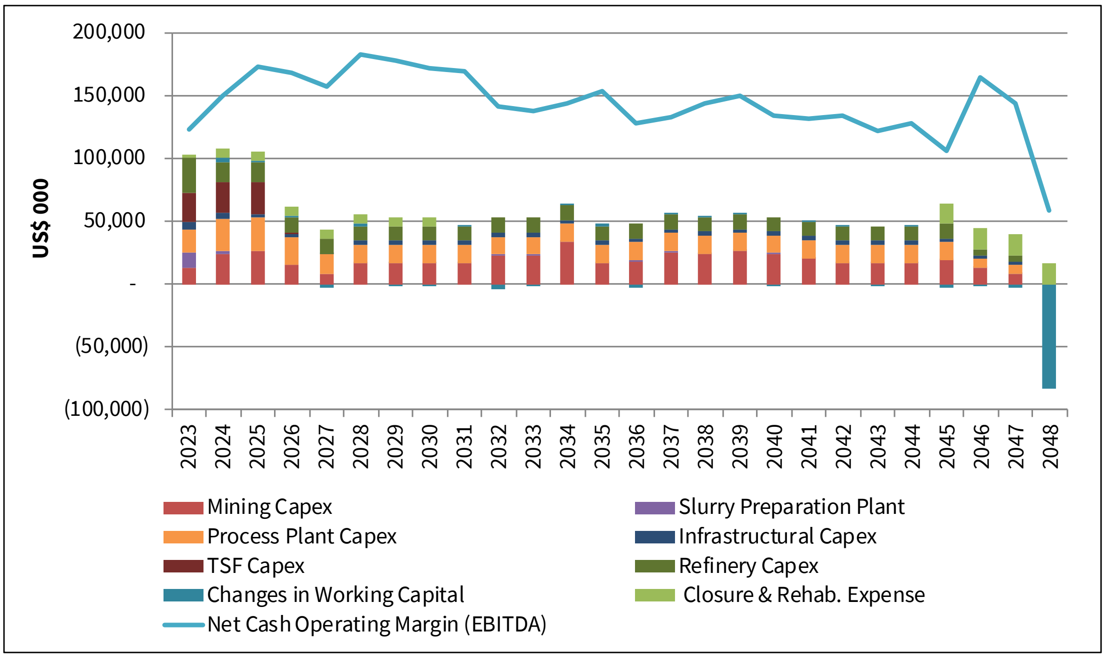
21.2 CAPITAL COSTS

Table 21.1 summarises the estimated LoM capital expenditures for the Moa Project. Annual expenditures are shown graphically in Figure 21.1.

Table 21.1: Capital Expenditure Summary

Item	Annual Avg. Yrs 1-5 (US$'000)	Annual Avg. Yrs 6-20 (US$'000)	Annual Avg. LoM (US$'000)	LoM Total (US$'000)
Mining	17,305	18,826	18,534	481,879
Slurry Preparation	3,126	228	785	20,420
Processing Plant	21,619	13,143	14,773	384,101
Infrastructure and TSF	18,253	2,943	5,887	153,072
Sub-Total Moa Project Capital	**60,303**	**35,141**	**39,980**	**1,039,472**
CRC Capital	16,441	10,830	11,952	298,805
Grand Total Capital	**76,744**	**45,455**	**51,472**	**1,338,277**
Mine Closure and Rehabilitation	6,100	4,198	4,563	118,648

Figure 21.1: LoM Capital Expenditures



Source: Micon (2023)

21.2.1 Moa Project Site Capital Costs

21.2.1.1 Mining Capital Costs

Mining capital expenditures mainly comprise the following:

- Haul road and drainage construction;
- Mining fleet replacement and expansion;
- Maintenance workshops and service equipment; and,
- Service vehicles and exploration equipment.

21.2.1.2 Moa Slurry Preparation and Processing Plant Capital Costs

Sustaining capital for the Moa Processing Plant includes the following process-related areas:

- Slurry preparation and thickeners;
- Acid, leaching and tailings disposal;
- Carbonate and neutralisation;
- Sulphide precipitation and product drying; and,
- Maintenance and laboratory facilities.

The Moa slurry preparation and processing plant average annual capital expenditures for Yrs 1-5 are notably higher than the LoM average due to the construction of a NSPP and intensive refurbishment of other process areas in the first few years of the mine plan and includes capital expenditures deferred in prior years as a result of the low commodity price environment.

21.2.1.3 Infrastructure and TSF Capital Costs

Provision has been made in the first few years of the LoM plan for the expansion of the Area 22 TSF as well as the construction of a new TSF (Moa West) to provide the required storage capacity. From 2026, following initial construction of the facility, ongoing TSF costs are treated as operating expenses.

21.2.1.4 Cobalt Refinery Company (CRC) Capital Costs

The CRC capital expenditure forecast includes and ongoing refurbishment and replacement programme for equipment and vehicles, improvements to materials handling systems and other infrastructure, and implementation of technological improvements.

The CRC average annual capital expenditures for Yrs 1-5 are notably higher than the LoM average due to the construction of a new ammonium sulphate handling facility in the first few years of the LoM plan, in addition to a refurbishment programme for the process plant, equipment and buildings, and includes capital deferred in prior years as a result of the low commodity price environment.

21.3 OPERATING COSTS

Table 21.2 summarises the LoM cash operating costs for the Moa Project.

Table 21.2: LoM Cash Operating Costs

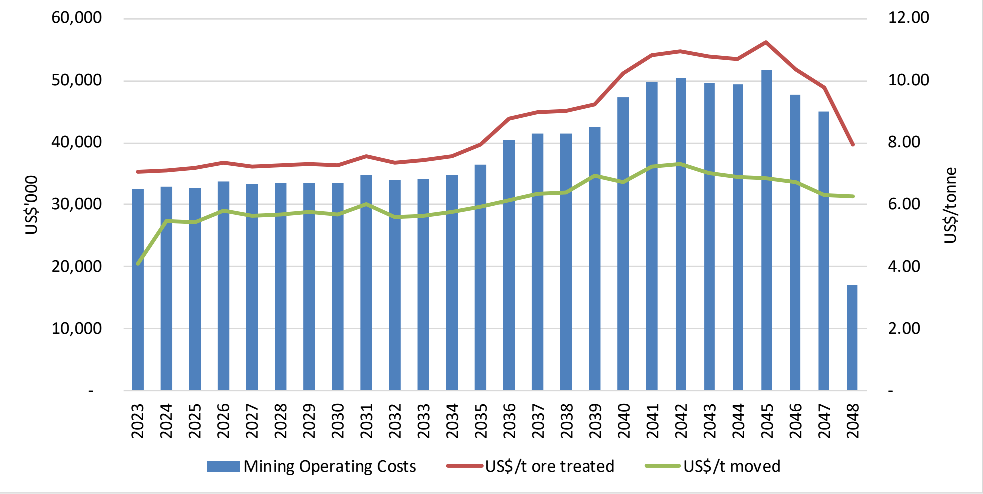
Parameters	LoM Total (US$'000)	Treated (US$/t)	Nickel (US$/lb)
Mining Costs	1,013,553	8.65	0.64
Processing Costs	5,694,540	48.60	3.57
Refining Costs	3,408,605	29.09	2.14
Sub-Total Cash Operating Costs	**10,116,698**	**86.33**	**6.34**
Cobalt Credits	(3,630,763)	(30.98)	(2.28)
Other Net By-Product Credits	(200,906)	(1.71)	(0.13)
Selling Expenses	272,207	2.32	0.17
General & Administrative Costs	197,014	1.68	0.12
Royalty and Territorial Contribution	640,026	5.46	0.40
Total Cash Cost	**7,394,275**	**63.10**	**4.64**

21.3.1 Mine Operating Costs

Mining costs reflect the mostly owner-operated mining fleet, taking into consideration the volumes of ore and waste to be moved in order to meet ore grade and quality constraints, as well as the haulage distance from each open pit to the closest process preparation plant.

Figure 21.2 shows the mining costs are expected to remain steady over the first twelve years of the production schedule, increasing thereafter as haulage distance increases before falling again near the end of the LoM.

Figure 21.2: LoM Mining Operating Costs

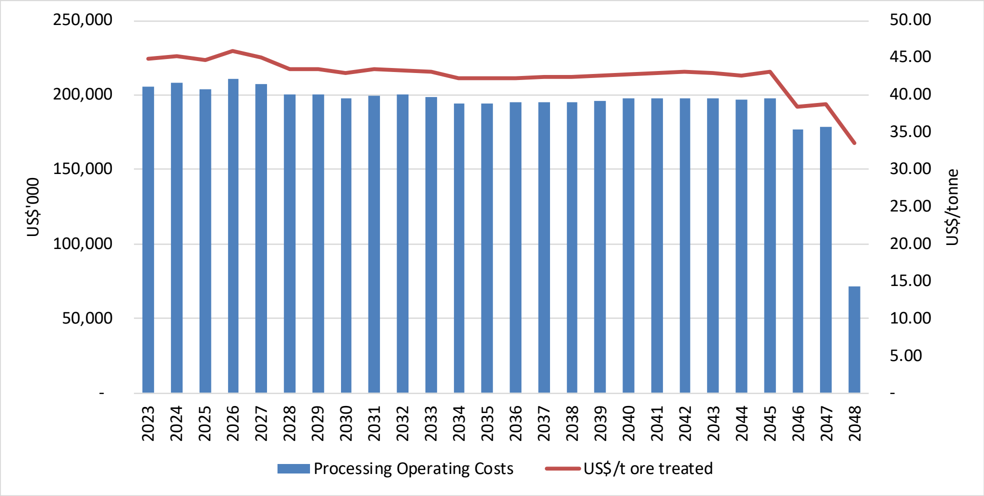


Source: Micon (2023)

21.3.2 Processing Operating Costs

The process operating costs for the production of MSP are based primarily on the PSA Plant's historical (2019-2021) cost parameters applied to the quantity and composition of the process feed as set out in the LoM production schedule, adjusted for forecast labour and maintenance costs. Figure 21.3 shows the annual costs remain steady over the LoM.

Figure 21.3: LoM Process Operating Costs (MSP Production)

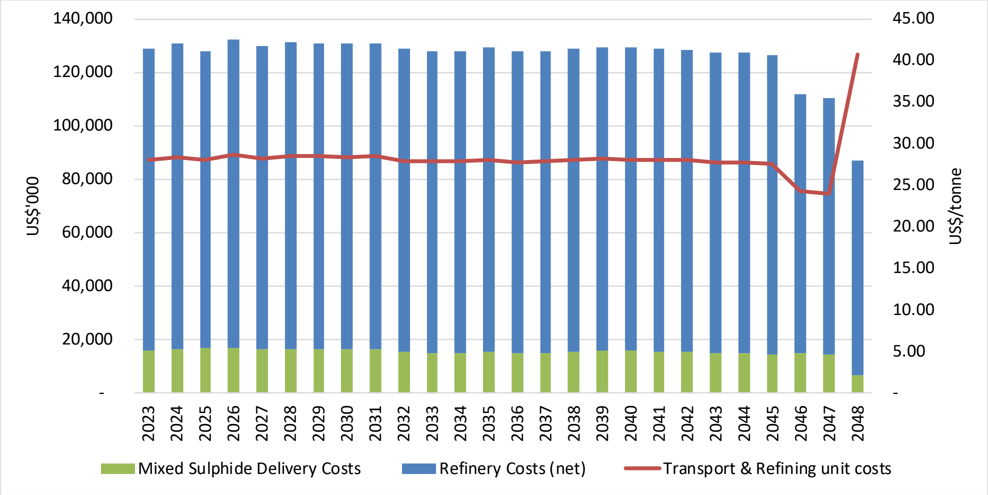


Source: Micon (2023)

21.3.2.1 Refining

Figure 21.4 shows the annual costs for refining of MSP at the CRC refinery in Fort Saskatchewan, based primarily on average actual costs incurred in the period 2019-2021, adjusted for forecast labour and maintenance costs. Refining costs are shown inclusive of MSP transport costs.

Figure 21.4: LoM MSP Transport and Refining Costs



Source: Micon (2023)

21.3.2.2 General and Administrative

The general and administrative (G&A) cost estimate includes all indirect cash costs at both the Moa and CRC sites. Selling expenses (shown separately in Table 21.2) reflect expected costs for marketing and sales of final products.

22.0 ECONOMIC ANALYSIS

22.1 CAUTIONARY STATEMENT

The results of the economic analyses discussed in this section represent forward-looking information as defined under Canadian securities law. 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 and Mineral Reserve estimates;
- Assumed commodity prices and exchange rates;
- The proposed mine production plan;
- Projected mining and process recovery rates;
- Assumptions as to mining dilution;
- Capital and operating cost estimates and working capital requirements;
- Assumptions as to closure costs and closure requirements; and,
- Assumptions as to environmental, permitting and social considerations and 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 differing from what was assumed;
- Failure of mining methods to operate as anticipated;
- Failure of plant, equipment or processes to operate as anticipated;
- Changes to assumptions as to the availability and cost of electrical power and process reagents;
- Ability to maintain the social licence to operate;
- Accidents, labour disputes and other risks of the mining industry;
- Changes to interest rates; and,
- Changes to tax rates and availability of allowances for depreciation and amortisation.

22.2 BASIS OF EVALUATION

Micon’s QP has prepared this economic assessment of the Moa Project on the basis of a discounted cash flow model, from which the Net Present Value (NPV) can be determined. Assessments of NPV are generally accepted within the mining industry as representing the economic value of a project, after allowing for the cost of capital invested.

The objective of the study was to determine the viability of the proposed LoM production plan and schedule at the base case market prices for nickel and cobalt. In order to do this, the cash flow arising from the base case has been forecast. The sensitivity of Project NPV to changes in base case assumptions is then examined. As an ongoing operation, there is no initial investment (negative cash flow) that would allow an internal rate of return (IRR) or pay-back period to be calculated.

The economic assessment excludes Sherritt's 100% owned fertilizer business, potential third-party feed opportunities at CRC, and the expected impact of the Moa JV expansion programme outlined in Section 24.1.

22.3 MACRO-ECONOMIC ASSUMPTIONS

22.3.1 Exchange Rate and Inflation

All results are expressed in United States dollars, except where otherwise stated. Cost estimates and other inputs to the cash flow model for the Moa Project have been prepared using constant, first quarter 2023 money terms, without provision for escalation or inflation. Where appropriate, an exchange rate of US$0.76/CAD has been applied, being the average rate over the period 2019-2021 on which historical unit costs are based.

22.3.2 Weighted Average Cost of Capital

In order to calculate the NPV of the cash flows forecast for the Moa Project, an appropriate discount factor must be applied which represents the weighted average cost of capital (WACC) imposed on base metal producers by the capital markets.

NPV in the base case was calculated using an 8% discount rate. This rate is considered appropriate for the economic assessment as the Moa Project is a well-established mine and refinery operating in the base metal sector of the industry.

Micon's QP has also tested the sensitivity of the Moa Project NPV to changes above and below this rate.

22.3.3 Expected Metal Prices

The Moa Project revenues will be generated primarily from the sale of nickel and cobalt, with minor by-product revenue from the sale of ammonium sulphate fertilizer.

Using the long-term average price rationale described in Section 14.11.2 and Section 19, Micon has used forecast reference prices of US$15,700/t (US$7.12/lb) for nickel and US$47,000/t (US$21.32/lb) for cobalt for the base case in this analysis reflecting historical averages over a period of at least three years. Nickel and cobalt realisation rates were then applied to the reference prices, using long-term assumptions in line with historical rates.

In Section 22.5 of this Report, the sensitivity of the Moa Project NPV to changes in these assumptions is tested over a 25% range above and below these values.

22.3.4 Expected Input Commodity Prices

The Moa Project operating costs for the production and the refining of MSP at the CRC refinery in Fort Saskatchewan are based on historical cost parameters (2019-2021) applied to the quantity and composition of the process feed as set out in the LoM production schedule, as noted throughout Section 21.3. Three key inputs reflected in these historical costs are delivered prices of US$161/t for sulphur, US$0.64/l for diesel, and US$320/t for fuel oil.

The sensitivity of the base case NPV to those cost assumptions is discussed further in Section 22.5 of this analysis.

22.3.5 Taxation and Royalty Regime

The cash flows arising from the Moa Project are presented before and after tax. Taxes included in this economic analysis are Cuban corporate income taxes at a rate of 22.5%, as well as Canadian provincial and federal taxes arising from the CRC refinery operation in Fort Saskatchewan, Alberta at a composite rate of 23%.

In addition, Moa Nickel pays the Cuban state a 5% royalty and the municipality of Moa a 1% territorial contribution of the net sales value (free on board Moa port, Cuba) of the nickel and cobalt contained in mixed sulphides delivered to the CRC refinery in Fort Saskatchewan (on a 100% basis) as determined by a number of factors including recovery rates and prevailing reference prices.

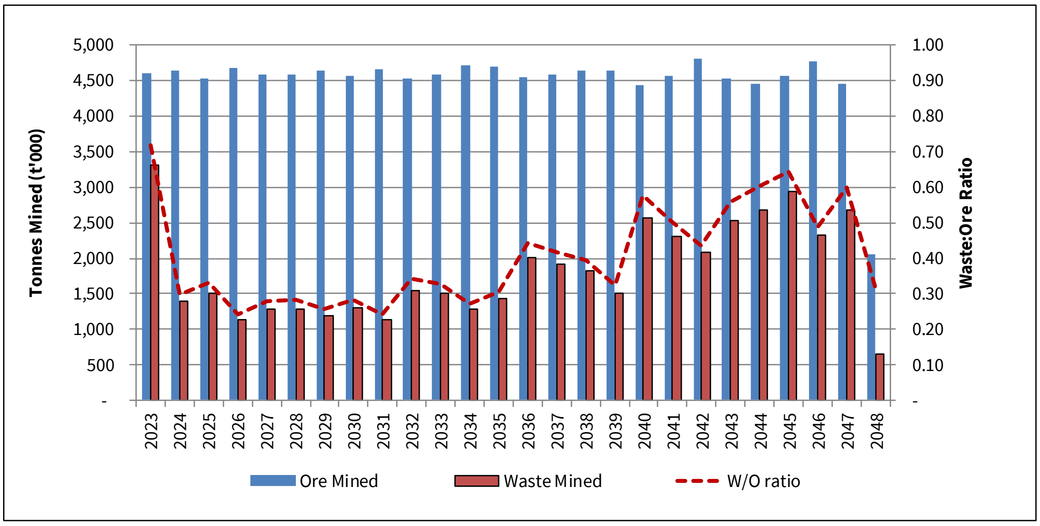
22.4 TECHNICAL ASSUMPTIONS

The technical parameters, production forecasts and estimates described earlier in this Report are reflected in the base case cash flow model. These inputs to the model are summarised in this Section.

22.4.1 Mine Production Schedule

Figure 22.1 shows the annual tonnages of ore delivered to the process plant, annual waste tonnage mined and the annual average stripping (waste/ore) ratio.

Figure 22.1: Annual Mine Production Schedule

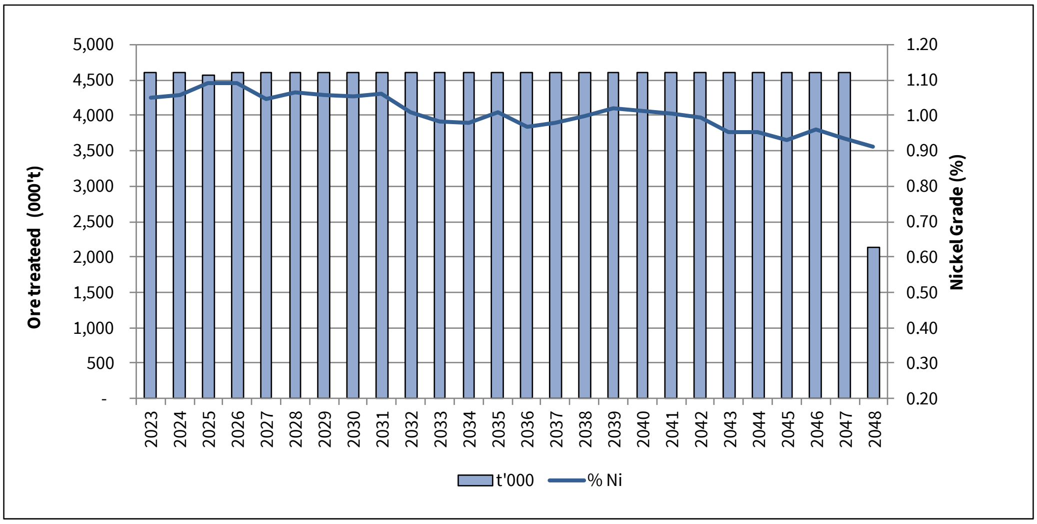


Source: Micon (2023)

22.4.2 Ore Production

Figure 22.2 shows the annual tonnage and nickel grade of ore delivered to the PSA Plant.

Figure 22.2: Annual Ore Production Schedule

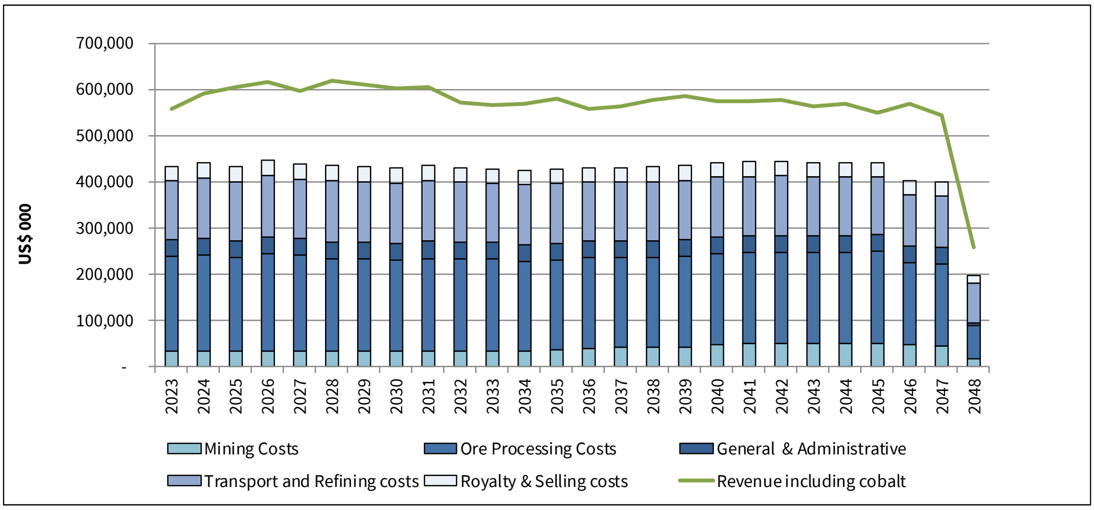


Source: Micon (2023)

22.4.3 Operating Margin

Figure 22.3 shows the annual sales revenues (including cobalt) compared to cash operating costs. The Moa Project is forecast to generate an average operating margin of 25% over the LoM period, measured against total sales of nickel, cobalt and other by-products, or an average operating margin of 34% over the LoM period, measured against only total sales of nickel.

Figure 22.3: Annual Sales Revenue and Operating Costs

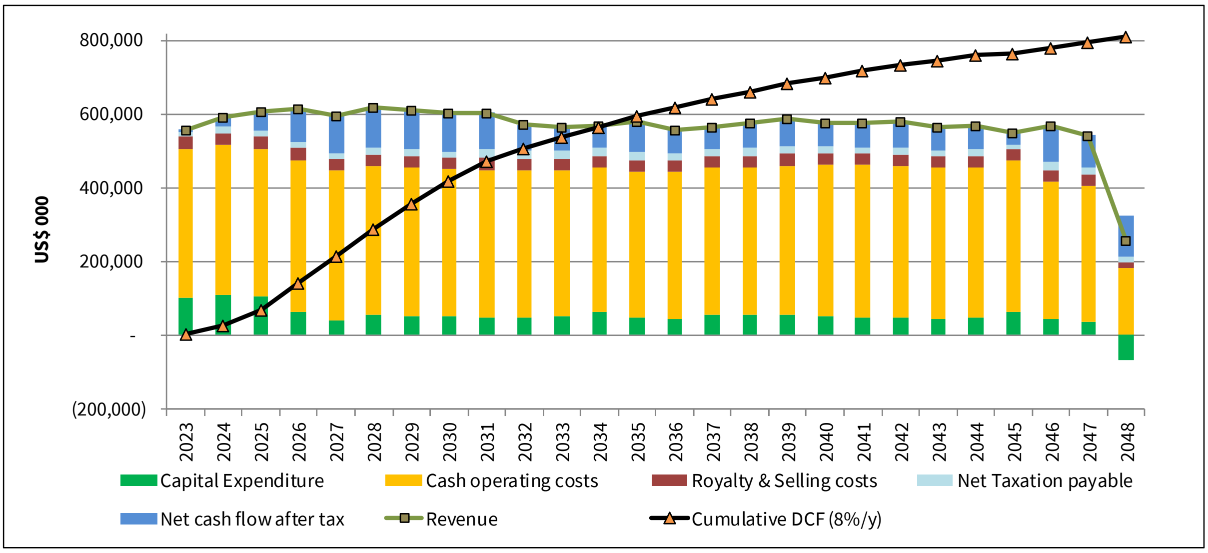


Note: Indirect Costs include Selling Costs, General & Administrative, Royalties and Territorial Contribution.
Source: Micon (2023)

22.4.4 Project Cash Flow

The Moa Project LoM base case cash flow is summarised in Figure 22.4 and in Table 22.1. Figure 22.5 shows the distribution of revenue across operating and capital costs, taxation and net cash flow.

Figure 22.4: LoM Annual Cash Flows



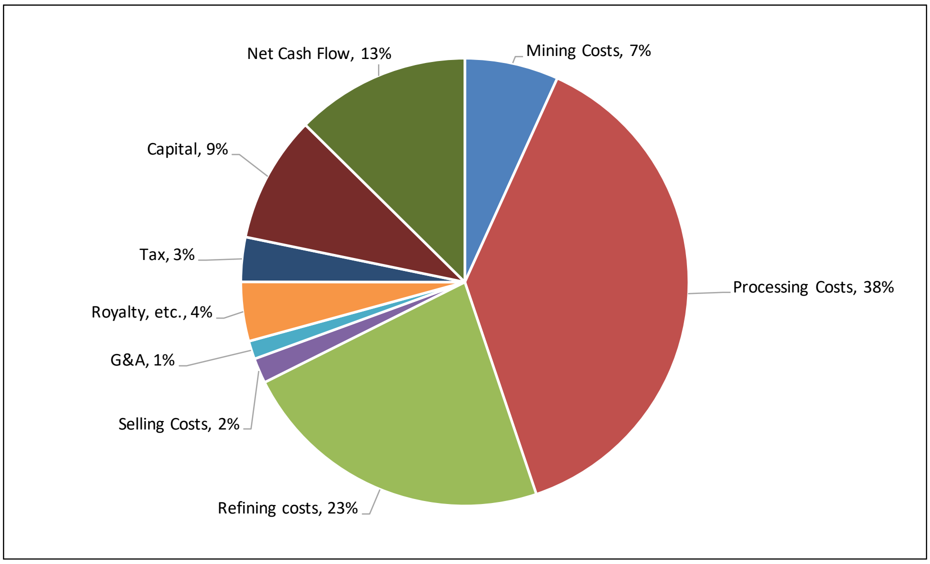
Source: Micon (2023)

Table 22.1: LoM Cash Flow Summary

Parameter	LoM Total (US$'000)	Processed (US$/t)	Nickel (US$/lb)
Gross Revenue (Nickel)	**11,132,570**	**95.00**	**6.98***
Mining Costs	1,013,553	8.65	0.64
Processing Costs	5,694,540	48.60	3.57
Refining	3,408,605	29.09	2.14
Sub-Total Cash Operating Costs	**10,116,698**	**86.33**	**6.34**
Cobalt Credits	(3,630,763)	(30.98)	(2.28)
Other Net By-Product Credits	(200,906)	(1.71)	(0.13)
Selling Expenses	272,207	2.32	0.17
General & Administrative Costs	197,014	1.68	0.12
Royalty & Territorial Contribution	640,026	5.46	0.40
Total Cash Cost	**7,394,275**	**63.10**	**4.64**
Net Cash Operating Margin	**3,738,295**	**31.90**	**2.34**
Sustaining Capital	1,338,277	11.42	0.84
Closure Provision	118,648	1.01	0.07
Change in Working Capital	(86,456)	(0.74)	(0.05)
Net Cash Flow before Tax	**2,367,826**	**20.21**	**1.48**
Taxation	481,038	4.11	0.30
Net Cash Flow after Tax	**1,866,788**	**16.10**	**1.18**

*Note: A reference price of US$7.12/lb Ni is used in the evaluation. The realised value for the Moa JV is US$6.98/lb Ni.

Figure 22.5: Revenue Distribution



Note: Royalty, etc. includes territorial contribution
Source: Micon (2023)

Pre-tax cash flow, when discounted at the rate of 8% per year, provides a pre-tax NPV_8 of US$1,026 million. After-tax, NPV_8 is US$812 million. As an ongoing operation, there is no initial investment (negative cash flow) that would allow an IRR or pay-back period to be calculated.

Annual cash flows are set out in Table 22.2.

Table 22.2: LoM Production and Annual Cash Flows

Calendar Yr.		LOM	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
Ore Mined	t'000	117,180	4,613	4,636	4,531	4,677	4,589	4,597	4,643	4,574	4,666	4,533	4,582	4,715	4,701	4,554	4,595	4,638	4,640	4,437	4,579	4,808	4,536	4,460	4,575	4,770	4,465	2,064
Waste Mined	t'000	47,381	3,314	1,389	1,504	1,138	1,281	1,292	1,193	1,300	1,130	1,547	1,506	1,289	1,437	2,012	1,919	1,823	1,506	2,566	2,307	2,094	2,536	2,688	2,950	2,333	2,681	645
Mass Moved	t'000	164,560	7,927	6,025	6,035	5,815	5,870	5,889	5,836	5,875	5,796	6,080	6,088	6,004	6,138	6,566	6,515	6,462	6,146	7,002	6,886	6,901	7,072	7,148	7,526	7,102	7,146	2,710
W/O ratio	t:t	0.40	0.72	0.30	0.33	0.24	0.28	0.28	0.26	0.28	0.24	0.34	0.33	0.27	0.31	0.44	0.42	0.39	0.32	0.58	0.50	0.44	0.56	0.60	0.64	0.49	0.60	0.31
Ore treated tonnage	t'000	117,180	4,600	4,613	4,567	4,600	4,600	4,613	4,600	4,600	4,600	4,613	4,600	4,600	4,600	4,613	4,600	4,600	4,600	4,613	4,600	4,600	4,600	4,613	4,600	4,600	4,600	2,137
Ore treated grade	% Ni	1.01	1.05	1.06	1.09	1.09	1.05	1.07	1.06	1.05	1.06	1.01	0.98	0.98	1.01	0.97	0.98	1.00	1.02	1.01	1.01	1.00	0.95	0.95	0.93	0.96	0.94	0.91
Ore treated grade	% Co	0.12	0.11	0.12	0.12	0.12	0.12	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Ore treated grade	% Mg	1.27	1.55	1.40	1.36	1.37	1.28	1.29	1.28	1.29	1.19	1.16	1.10	1.07	1.01	1.09	1.14	1.15	1.13	1.22	1.28	1.32	1.34	1.21	1.37	1.43	1.57	1.39
Ore treated grade	% Al	5.16	5.33	5.12	5.02	5.13	5.07	5.07	5.22	5.23	5.22	5.27	5.16	4.99	5.06	4.87	4.89	4.83	5.11	5.29	5.31	5.31	5.30	5.17	5.32	5.34	5.50	4.76
Ore treated grade	% Fe	44.33	42.19	43.85	44.38	44.66	44.87	44.83	44.58	44.67	45.08	43.94	44.08	44.22	44.66	44.21	44.56	44.75	44.65	44.59	44.39	44.15	44.44	44.79	44.32	44.17	42.87	44.85
		-																										
Nickel recovered from Mixed Sulphide	tonnes	723,552	28,908	29,691	30,496	30,869	29,612	30,249	29,907	29,761	30,099	28,341	27,623	27,518	28,550	27,301	27,613	28,224	28,788	28,635	28,341	27,994	26,881	27,017	26,164	27,023	25,953	11,994
Cobalt recovered from Mixed Sulphide	tonnes	84,679	2,965	3,228	3,326	3,319	3,273	3,530	3,507	3,359	3,275	3,156	3,257	3,358	3,289	3,195	3,238	3,305	3,320	3,133	3,241	3,430	3,480	3,556	3,388	3,533	3,335	1,686
Nickel recovered from Mixed Sulphide	lb'000	1,595,159	63,731	65,458	67,233	68,055	65,284	66,687	65,933	65,611	66,357	62,480	60,899	60,667	62,943	60,189	60,877	62,223	63,466	63,128	62,481	61,716	59,263	59,562	57,681	59,575	57,216	26,443
Cobalt recovered from Mixed Sulphide	lb'000	186,686	6,537	7,116	7,333	7,316	7,216	7,782	7,731	7,405	7,219	6,958	7,180	7,403	7,251	7,045	7,137	7,286	7,318	6,906	7,145	7,561	7,671	7,841	7,469	7,789	7,353	3,718
Cash Flow Projection		**US$ 000**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**
Revenue	Gross Sales - Nickel	11,132,570	444,778	456,827	469,217	474,957	455,616	465,410	460,143	457,900	463,102	436,047	425,013	423,392	439,277	420,057	424,861	434,255	442,926	440,571	436,054	430,712	413,596	415,681	402,552	415,775	399,309	184,542
Cash op. costs	Mining Costs	1,013,553	32,557	32,851	32,756	33,798	33,217	33,441	33,538	33,475	34,764	33,992	34,226	34,720	36,525	40,413	41,385	41,430	42,547	47,247	49,843	50,434	49,643	49,423	51,622	47,703	45,065	16,935
	Ore Processing Costs	5,694,540	233,230	235,806	230,682	238,072	234,712	227,789	227,452	225,067	227,098	227,392	225,617	221,678	221,512	222,135	222,092	222,065	222,891	224,970	224,940	225,273	225,128	224,091	225,332	203,657	205,395	70,463
	Refining costs	3,408,605	134,046	135,700	132,814	137,202	135,107	136,378	135,971	135,700	136,025	133,936	133,191	133,143	134,270	132,780	133,166	133,909	134,562	134,255	133,997	133,736	132,504	132,713	131,620	116,743	115,383	89,754
	Cash operating costs	10,116,698	399,833	404,358	396,251	409,072	403,036	397,607	396,962	394,242	397,887	395,320	393,034	389,541	392,308	395,328	396,642	397,405	400,001	406,472	408,781	409,443	407,275	406,228	408,574	368,103	365,842	177,152
	Cobalt credits	(3,630,763)	(112,876)	(133,492)	(137,568)	(140,379)	(141,522)	(152,636)	(151,627)	(145,245)	(141,590)	(136,460)	(140,829)	(145,204)	(142,209)	(138,169)	(139,990)	(142,896)	(143,537)	(135,459)	(140,141)	(148,304)	(150,461)	(153,779)	(146,488)	(152,767)	(144,218)	(72,917)
	Other Net By-Product Credits	(200,906)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(7,879)	(3,939)
	Selling Costs	272,207	10,567	10,720	10,847	10,897	10,717	10,848	10,797	10,752	10,783	10,522	10,441	10,444	10,574	10,387	10,437	10,532	10,612	10,559	10,537	10,522	10,378	10,409	10,264	10,406	10,226	8,032
	General & Administrative	197,014	7,435	7,543	7,625	7,582	7,485	7,693	7,589	7,491	7,990	7,749	7,737	7,786	7,856	7,601	7,632	7,725	7,764	7,587	7,563	7,604	7,492	7,557	7,322	7,880	7,733	5,992
	Royalty & Territorial Contributions	640,026	24,758	25,783	26,504	26,734	25,819	26,737	26,467	26,084	26,142	24,756	24,481	24,609	25,153	24,150	24,437	24,969	25,368	24,904	24,922	25,061	24,427	24,665	23,777	24,624	23,536	11,159
	Total cash costs	7,394,275	321,839	307,032	295,780	306,028	297,656	282,371	282,308	285,446	293,333	294,008	286,986	279,298	285,802	291,418	291,280	289,856	292,329	306,184	303,783	296,448	291,232	287,201	295,570	250,367	255,241	125,479
Net Cash Operating Margin (EBITDA)		3,738,295	122,939	149,794	173,436	168,929	157,960	183,039	177,835	172,455	169,769	142,039	138,027	144,094	153,475	128,639	133,581	144,400	150,597	134,387	132,271	134,264	122,364	128,479	106,982	165,408	144,068	59,063
Capital Expenditure	Sustaining capital	1,338,277	100,837	96,783	96,989	53,073	36,039	46,406	46,406	46,406	46,406	52,706	52,706	62,806	46,406	47,906	55,172	53,572	55,522	53,906	49,606	46,406	46,406	46,406	48,006	28,203	23,203	-
	Closure Provision	118,648	2,500	7,000	7,000	7,000	7,000	7,000	7,000	7,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,787	16,787	16,787	16,787
	Changes in Working Capital	(86,456)	-	4,149	1,495	1,734	(2,458)	2,143	(764)	(1,176)	384	(3,926)	(894)	129	1,660	(2,560)	861	1,487	1,239	(870)	169	382	(1,869)	569	(2,256)	(38)	(3,069)	(82,977)
Net cash flow before tax		2,367,826	19,601	41,862	67,953	107,122	117,378	127,491	125,194	120,225	122,979	93,260	86,216	81,160	105,409	83,294	77,548	89,341	93,836	81,351	82,496	87,476	77,828	81,505	44,446	120,456	107,147	125,253
Net Taxation payable		481,038	14,973	16,883	18,348	17,577	15,850	19,561	17,702	15,970	24,826	20,542	20,330	21,214	22,454	17,921	18,470	20,118	20,823	17,669	17,246	17,979	15,981	17,131	13,480	22,876	20,272	14,840
Net cash flow after tax		1,886,788	4,628	24,979	49,605	89,544	101,528	107,929	107,492	104,255	98,153	72,718	65,886	59,946	82,955	65,373	59,077	69,222	73,013	63,682	65,250	69,496	61,847	64,374	30,966	97,580	86,875	110,413
Cumulative cash flow			4,628	29,607	79,211	168,756	270,284	378,214	485,706	589,961	688,114	760,831	826,717	886,663	969,618	1,034,991	1,094,068	1,163,291	1,236,304	1,299,986	1,365,236	1,434,733	1,496,579	1,560,954	1,591,920	1,689,500	1,776,375	1,886,788
Discounted Cash Flow (8%/y)		811,718	4,628	23,128	42,528	71,083	74,626	73,455	67,738	60,832	53,029	36,377	30,518	25,710	32,943	24,037	20,114	21,822	21,312	17,211	16,329	16,103	13,269	12,788	5,696	16,619	13,700	16,122
Cumulative DCF (8%/y)			4,628	27,756	70,284	141,368	215,994	289,449	357,187	418,019	471,048	507,425	537,943	563,653	596,595	620,633	640,746	662,568	683,880	701,091	717,420	733,523	746,792	759,581	765,277	781,896	795,596	811,718
Avg. Revenue per tonne treated		95.00	96.69	99.04	102.74	103.25	99.05	100.90	100.03	99.54	100.67	94.53	92.39	92.04	95.50	91.07	92.36	94.40	96.29	95.51	94.79	93.63	89.91	90.12	87.51	90.39	86.81	86.35
Avg. Cost per tonne treated		63.10	69.97	66.56	64.77	66.53	64.71	61.22	61.37	62.05	63.77	63.74	62.39	60.72	62.13	63.18	63.32	63.01	63.55	66.38	66.04	64.45	63.31	62.26	64.25	54.43	55.49	58.71
Avg. Cost per pound Nickel sold		4.64	5.05	4.69	4.40	4.50	4.56	4.23	4.28	4.35	4.42	4.71	4.71	4.60	4.54	4.84	4.78	4.66	4.61	4.85	4.86	4.80	4.91	4.82	5.12	4.20	4.46	4.75
Operating Margin over all nickel, cobalt and other by-product sales		25.0%	21.7%	25.0%	28.2%	27.1%	26.1%	29.2%	28.7%	28.2%	27.7%	24.5%	24.1%	25.0%	26.0%	22.7%	23.3%	24.7%	25.3%	23.0%	22.6%	22.9%	21.4%	22.3%	19.2%	28.7%	26.1%	22.6%

Note : The economic assessment excludes the operating results of Sherritt’s 100% owned fertilizer business, potential third-party feed opportunities, and the expected impact of the Moa JV expansion programme outlined in Section 24.1.

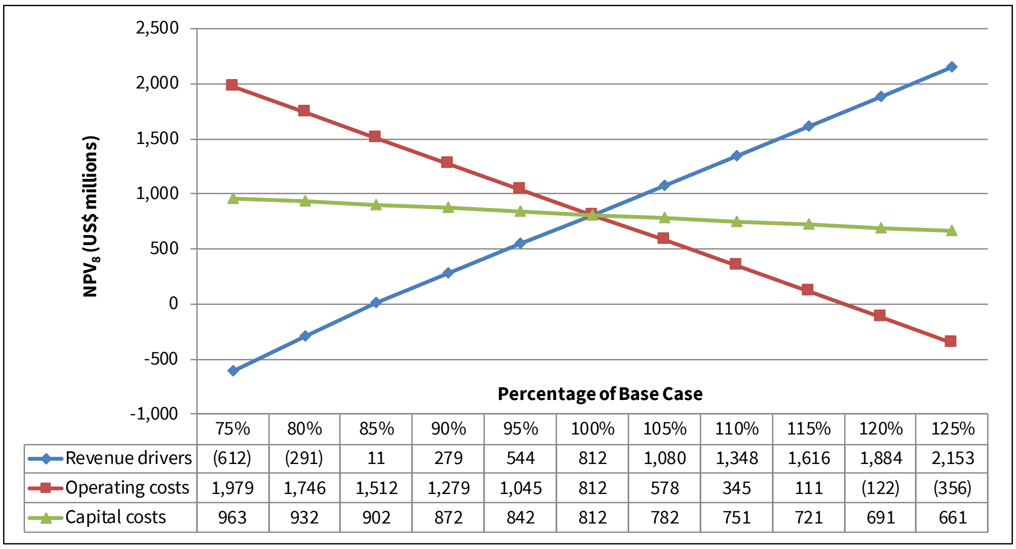
22.5 SENSITIVITY ANALYSIS

22.5.1 Base Case Sensitivity

Micon's QP tested the sensitivity of the base case after-tax NPV$_8$ to changes in metal price, operating costs and capital investment for a range of 25% above and below the base case values. The impact on NPV$_8$ to changes in other revenue drivers such as grade of material treated and the percentage recovery of metals from processing is equivalent to price changes of the same magnitude, so these factors can be considered as equivalent to the price sensitivity.

Figure 22.6 shows the results of changes in each factor separately.

Figure 22.6: Sensitivity of Base Case NPV$_8$ to Capital, Operating Costs and Metal Prices



	75%	80%	85%	90%	95%	100%	105%	110%	115%	120%	125%
◆ Revenue drivers	(612)	(291)	11	279	544	812	1,080	1,348	1,616	1,884	2,153
■ Operating costs	1,979	1,746	1,512	1,279	1,045	812	578	345	111	(122)	(356)
▲ Capital costs	963	932	902	872	842	812	782	751	721	691	661

Source: Micon (2023)

NPV is most sensitive to revenue factors: with a 15% reduction in metal prices (i.e., a reduction to approximately US$6.05/lb for nickel and US$18.12/lb for cobalt), the NPV$_8$ falls close to zero. The Moa Project is slightly less sensitive to changes in operating costs, with an increase of 17% reducing NPV$_8$ to near-zero. The least sensitive parameter tested is capital costs, with a 25% increase in capital costs reducing NPV$_8$ by about 19% to US$661 million.

The sensitivity of NPV$_8$ to specific nickel prices between US$12,000/t and US$21,000/t (US$5.44/lb and US$9.53/lb, respectively) was also tested with all other assumptions held constant. The results are shown in Table 22.3.

Table 22.3: Nickel Price Sensitivity

Nickel Price (US$/t)	Nickel Price (US$/lb)	NPV_8 (US$ million)
12,000	5.44	(165)
13,000	5.90	114
14,000	6.35	372
15,000	6.80	630
15,700	**7.12**	**812**
16,000	7.26	890
17,000	7.71	1,150
18,000	8.16	1,410
19,000	8.62	1,671
20,000	9.07	1,931
21,000	9.53	2,192

The Moa Project's economic break-even nickel price, i.e., that price which results in an after-tax NPV_8 of zero, with all other assumptions held constant, is determined to be US$12,572/t (US$5.70/lb).

Micon's QP tested the sensitivity of the Moa Project NPV to changes in the discount rate above and below the base-case rate of 8%. The results are presented in Table 22.4.

Table 22.4: Sensitivity NPV to Discount Rate

Discount Rate (%/Yr)	NPV (US$ million)
6%	971
7%	886
8%	**812**
9%	747
10%	690
11%	640
12%	595

22.5.2 Alternative Scenario

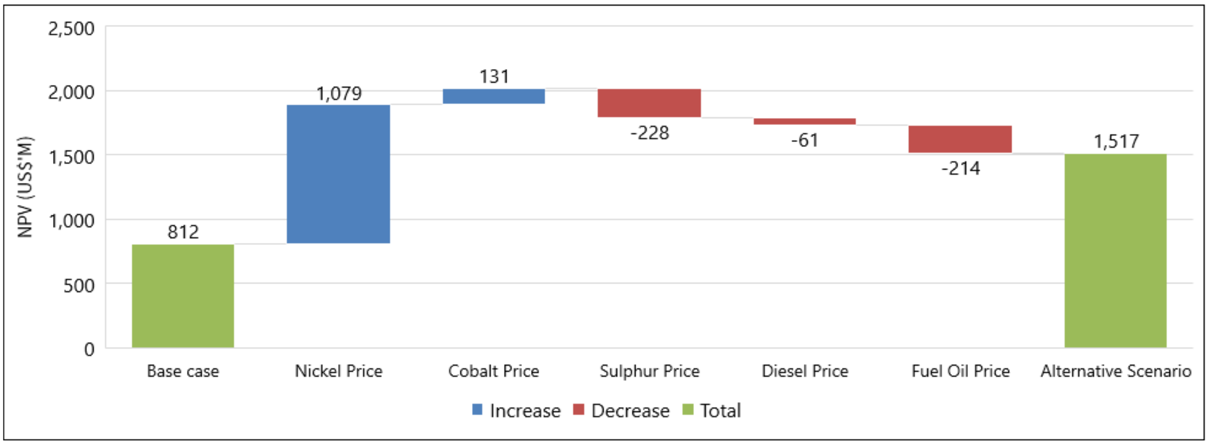
The Moa Project base case is intended to provide a robust basis for mine planning in order to demonstrate viability of the Mineral Reserves using conservative forecast prices. Micon's QP has investigated the sensitivity of the base case production schedule to five key value drivers in the operation to determine their impact on the Moa Project NPV when adjusted to reflect an alternative scenario using forecast of average prices over the LoM period based on recent analyst commodity price forecasts.

Table 22.5 shows the five variables and the base case and alternative scenario values for each of these value drivers. The incremental impact to Moa Project NPV_8 of changing each of these variables in turn is presented in Figure 22.7 which shows a cumulative positive impact on NPV_8 of US$705 million. Table 22.6 presents the LoM cash flow summary for the alternative scenario.

Table 22.5: Alternative Scenario Variables

Value Driver	Units	Base Case Price	Alternative Scenario Price
Nickel Reference Price	US$/lb	7.12	9.00
Cobalt Reference Price	US$/lb	21.32	23.50
Sulphur Delivered Price	US$/t	161	230
Diesel Delivered Price	US$/l	0.64	1.00
Fuel Oil Delivered Price	US$/t	320	500

Figure 22.7: Cumulative Impact of Key Value Drivers on NPV_8 (Waterfall Chart)



Note: NPV figures are rounded to nearest US$1 million and may not sum to total.
Source: Micon (2023)

Table 22.6: LoM Cash Flow Summary – Alternative Scenario

Parameter	LoM Total (US$'000)	Processed (US$/t)	Ni (US$/lb)
Gross Revenue (Nickel)	**14,069,286**	**120.07**	**8.82***
Mining Costs	1,122,158	9.58	0.70
Processing Costs	7,040,928	60.09	4.41
Refining Costs	3,409,660	29.10	2.14
Sub-Total Cash Operating Costs	**11,572,746**	**98.76**	**7.25**
Cobalt Credits	(4,002,227)	(34.15)	(2.51)
Other Net By-Product Credits	(200,906)	(1.71)	(0.13)
Selling Expenses	272,207	2.32	0.17
General & Administrative costs	208,179	1.78	0.13
Royalty & Territorial Contribution	789,764	6.74	0.50
Total Cash Cost	**8,639,762**	**73.73**	**5.42**
Net Cash Operating Margin	**5,429,523**	**46.34**	**3.40**
Sustaining Capital	1,338,277	11.42	0.84
Closure Provision	118,648	1.01	0.07
Change in Working Capital	(105,043)	(0.90)	(0.07)
Net Cash Flow Before Tax	**4,077,640**	**34.80**	**2.56**
Taxation	678,978	5.79	0.43
Net Cash Flow After Tax	**3,398,663**	**29.00**	**2.13**

*Note: A reference price of US$9.00/lb Ni is used in the alternative scenario.
The realised value for the Moa JV is US$8.82/lb Ni.

In the alternative scenario, the Moa Project's economic break-even nickel price, i.e., that price which results in an after-tax NPV_8 of zero, with all other assumptions held constant, is determined to be US$14,093/t (US$6.39/lb).

Compared to the base case, in the alternative scenario the LoM average operating margin increases almost 5% to 30% when measured against total sales of nickel, cobalt and other by-products, or almost 5% to 39% measured against only total sales of nickel, and project NPV_8 rises by US$705 million to US$1,517 million.

22.6 CONCLUSION

The QP concludes that, based on the forecast production, capital and operating cost estimates presented in this study, the Moa Project base case demonstrates economic viability of the Mineral Reserves to a level of confidence equivalent to a Feasibility Study at a nickel price of US$7.12/lb and a cobalt price of US$21.32/lb, yielding NPV_8 of US$812 million.

All else being equal, the Moa Project base case NPV remains positive for nickel prices above US$5.70/lb, or a 15% reduction in base case prices for both nickel and cobalt together. Sensitivity to changes in operating costs are similar, with NPV_8 remaining positive for operating cost increases of up to 17%. Capital cost sensitivity is lower, with NPV_8 remaining positive across the range tested.

The alternative scenario demonstrates a significant upside to the Moa Project at a nickel price of US$9.00/lb and a cobalt price of US$23.50/lb and input commodity prices as noted in Table 22.5, yielding an NPV_8 of US$1,517 million, an increase of US$705 million over the base case.

The LoM Project summary is presented in Table 22.7.

Table 22.7: LoM Project Summary

Parameter	Units	Base Case Value	Alternative Scenario
Proven and Probable Reserve	kt	117,180	same
	Ni %	1.01	same
	Co %	0.12	same
	Mg %	1.27	same
	Al %	5.16	same
	Fe %	44.33	same
LoM Waste to be Mined	kt	47,381	same
Stripping Ratio	W:O	0.40	same
Nominal Ore Mining and Processing Rate	kt/a	4,600	same
LoM Period	Years	26	same
Refined Nickel Production	t	723,552	same
Refined Cobalt Production	t	84,679	same
Nickel Price	US$/lb	7.12	9.00
Cobalt Price	US$/lb	21.32	23.50
Gross Revenue - Nickel	US$ million	11,133	14,069
Gross Revenue - Cobalt	US$ million	3,631	4,002
Royalties & Territorial Contribution Payable	US$ million	640	790
Nickel Revenue per tonne Processed	US$/t	95.00	120.07
Operating Cost avg. (after cobalt credits)	US$/t	63.10	73.73
Net Operating Margin	US$/t	31.90	46.34
Net Operating Margin (EBITDA)	US$ million	3,738	5,429
LoM Capital Expenditures (excl. Working Cap.)	US$ million	1,457	same
LoM Undiscounted Cash Flow Before Tax	US$ million	2,368	4,078
Taxation Payable	US$ million	481	679
LoM Undiscounted Cash Flow After Tax	US$ million	1,887	3,399
NPV After Tax at 6% discount	US$ million	971	1,798
NPV After Tax at 8% discount (Base Case)	US$ million	812	1,517
NPV After Tax at 10% discount	US$ million	690	1,303

23.0 ADJACENT PROPERTIES

The Punta Gorda Plant lies east of the city of Moa and is operated by the Ernesto Che Guevarra company, which is completely owned by the Cuban State (see Figure 4.1). The Punta Gorda deposit that has provided ore for this plant borders the east side of the north part of the Moa Oriental Concession. The Punta Gorda Plant also owns the mining rights to Camarioca Este, immediately to the east of Moa Oriental and Camarioca Norte.

The Punta Gorda Plant uses the Caron process and the compositional constraints for its ore are different from the PSA Plant Nickel HPAL process. The Caron process uses ores with a slightly higher percentage of saprolite than those used in the PSA Plant Nickel HPAL process.

Moa JV concessions returned to ONRM usually have saprolite available for mining by other companies. These areas are currently being explored by Ferroníquel Minera S.A. This company holds the rights to mine the saprolite of Moa Occidental III.

The Cuban State holds other nickel and cobalt laterites on the island. There are two larger deposits on the island, these are Pinares de Mayarí, located approximately 80 km to the west of Moa; and San Felipe, located 20 km to the north of the city of Camaguey and 400 km to the west of Moa.

24.0 OTHER RELEVANT DATA AND INFORMATION

24.1 MOA JV EXPANSION PROGRAMME

24.1.1 Expansion Programme

In 2021, the Moa JV embarked on a low capital intensity expansion programme to capitalise on the growing demand for high purity nickel and cobalt being driven by the accelerated adoption of electric vehicles (EV). The scope of the expansion programme was narrowed during 2022 to better reflect the evolving intermediate market for nickel and cobalt and to focus on the most critical components of growth in light of supply chain challenges and inflationary price pressures on capital. The current programme is aimed at increasing annual mixed sulphide precipitate (MSP) production by 20% or 6,500 t of contained nickel and cobalt (100% basis).

The expansion programme consists of two phases with phase one focused on the construction of the new SPP at Moa, and phase two focused on the expansion of the PSA Plant including the leach plant sixth train and fifth sulphide precipitation train as well as construction of additional acid storage capacity at the plant. The total capital cost is expected to be US$77.0 million (100% basis) or approximately US$13,200 per additional annual tonne of contained nickel for the full expansion. Growth spending on capital for the expansion programme is expected to be self-funded by the Moa JV primarily using operating cash flows.

Phase one was approved by Sherritt and the Moa JV Board in November 2021 with an expected cost of US$27.0 million (100% basis). In phase one of the programme, the completion of the new SPP is expected to be completed in early 2024 and is anticipated to deliver several benefits including reduced ore haulage distances and lower carbon intensity from mining. Upon completion it is expected to increase MSP production by approximately 1,700 t of contained nickel and cobalt annually.

Phase two was approved in November 2022 with an expected cost of US$50.0 million (100% basis). The second phase of the programme, the completion of the Moa Processing Plant improvements is scheduled at the end of 2024, and is expected to increase annual MSP production by approximately an additional 4,800 t of contained metals annually and reduce Net Direct Cash Costs (NDCC) of the operation by approximately US$0.20/lb.

The economic analysis for the Moa Project already includes the remaining capital for the construction of the NSPP and the related ore haulage distance and mining fleet benefits; however, does not include any of the incremental MSP production associated with that phase. Therefore, Sherritt's estimates US$50 million of additional capital would be required within the Moa Project to complete the expansion programme and realise the increased annual production of MSP by 6,500 t of nickel and cobalt and associated economic benefits.

With substantial growth in demand stemming from EV batteries, Sherritt sees an opportunity to focus its strategy on increasing production of intermediary products that will enable it to fully utilise existing capacity at the refinery and also consider direct sales of intermediate product into the EV battery supply chain.

Upon completion of the expansion programme in 2024, Sherritt estimates that approximately two thirds of the increased MSP production will be processed into finished nickel and cobalt at the CRC refinery using existing capacity and the remaining MSP could be available for sale as an intermediary product. To accommodate the increased MSP feed at the refinery, some current lower margin third-party processing would be displaced. The Moa Project excludes the economic benefits of the treatment of third-party feeds at the CRC refinery, and thus any incremental MSP production from the expansion programme would have an even greater positive economic impact to the Moa Project.

Sherritt believes there is an active intermediate market, and given developing market conditions, expects to be able to have the option to sell the MSP into the market. The Moa JV does still retain the option to expand the refinery at a later date in order to treat all of the MSP production from the PSA Plant.

24.1.2 Impact on Moa JV LoM

The LoM shown in this Report is based on the processing capacity at the PSA Plant at the effective date of the Report (31st August 2022) and does not include the incremental production and related economic benefits of the Moa JV expansion.

As noted above, the full benefit of the expansion programme is expected to increase annual MSP production by 20% or 6,500 t of contained nickel and cobalt (100% basis) by 2025. On the assumption, that the Moa Project could simply accelerate the mining sequence in order to meet the expected increased production of the expansion programme, the LoM would likely be reduced by three to five years, resulting in a LoM of approximately 21 to 23 years. This increased production would still be expected to increase cashflows and the NPV of the Moa Project.

24.2 RISKS RELATED TO U.S. GOVERNMENT POLICY TOWARDS CUBA

The United States of America has maintained a general embargo against Cuba since the early 1960s, and the enactment in 1996 of the Cuban Liberty and Democratic Solidarity (libertad) Act (commonly known as the “Helms-Burton Act”) extended the reach of the U.S. embargo.

24.2.1 The U.S Embargo

In its current form, apart from the Helms-Burton Act, the embargo applies to most transactions directly or indirectly involving Cuba, Cuban enterprises, Cuban-origin goods, and Cuban nationals and it bars all persons “subject to the jurisdiction of the United States” from participating in such transactions unless such persons have general or specific licenses from the U.S. Department of the Treasury (“U.S. Treasury”) authorising their participation in the transactions. Persons “subject to the jurisdiction of the United States” include U.S. citizens, U.S. residents, individuals or enterprises located in the United States, enterprises organised under U.S. laws and enterprises owned or controlled by any of the foregoing. Subsidiaries of U.S. enterprises are subject to the embargo’s prohibitions. The embargo also targets dealings directly or indirectly involving entities deemed to be owned or controlled by Cuba and listed as specially designated nationals (“SDNs”). The three entities constituting the Moa JV in which Sherritt holds an indirect 50% interest have been deemed SDNs by U.S. Treasury. Sherritt, however, is not an SDN. The U.S. embargo generally prohibits persons “subject to the jurisdiction of the United States” from engaging in transactions involving the Cuban-related businesses of the Corporation. Furthermore, generally U.S.-origin technology, U.S.-origin goods, and many goods produced from U.S.-origin components or with U.S.-origin technology cannot under U.S. law be transferred to Cuba or used in the Corporation’s operations in

Cuba. Additionally, the embargo also prohibits imports into the United States of Cuban-origin goods, of goods located in or transported from or through Cuba, or of foreign goods made or derived, in whole or in part, of Cuban-origin goods, including Cuban nickel. In 1992, Canada issued an order pursuant to the Foreign Extraterritorial Measures Act (Canada) to block the application of the U.S. embargo under Canadian law to Canadian subsidiaries of U.S. enterprises. However, the general embargo limits Sherritt's access to U.S. capital, financing sources, customers, and suppliers.

24.2.2 The Helms-Burton Act

Separately from the general provisions of the embargo summarised above, The Helms-Burton Act authorises sanctions on U.S. or non-U.S individuals or entities that "traffic" in Cuban property that was confiscated by the Cuban Government from U.S. nationals or from persons who have come U.S. nationals. The term "traffic" includes various forms of use of Cuba property as well as "profiting from" or "participating in" the trafficking of others. The Corporation has received letters in the past from U.S. nationals claiming ownership of certain Cuban properties or rights in which the Corporation has an indirect interest, including in relation to the processing facilities used to process the ore from the Camarioca deposits. However, Sherritt has not been subjected to any lawsuits in this regard. In the event that any such lawsuits were to be filed, Sherritt does not believe that its operations would be materially affected because Sherritt's minimal contacts with the United States would likely deprive any U.S. court of personal jurisdiction over Sherritt. Furthermore, even if personal jurisdiction were exercised, any successful U.S. claimant would have to seek enforcement of the U.S. court judgment outside the U.S. in order to reach material Sherritt assets. The Corporation believes it unlikely that a court in any country in which Sherritt has material assets would enforce a Helms-Burton Act judgment against it.

24.3 ONRM REPORTING

One goal of the 2022 MRE was to align the Mineral Resource reports in Cuba and in Canada, using the ECOG methodology.

24.3.1 Reporting History with ONRM

The first limonite resource estimates for Moa Nickel were based on *Decree Law No. 194* dated 30th November 1994. This decree considered a cut-off grade of 35 Fe% and 1 Ni%. In February 2001, after several discussions between ONRM and Moa Nickel, it was agreed to use the nickel equivalent approach for future mineral resource estimates. This approach was applied to the Moa Oriental and Zona A deposits. In 2013, ONRM issued exploitation rights regarding saprolite ores with nickel contents greater than or equal to 1 Ni%, and an iron content greater than or equal to 25 Fe% and less than 35 Fe%. Exploitation rights for saprolite were granted for Camarioca Norte, Camarioca Sur, Moa Occidental Sector I, Moa Oriental and Yagrumaje Oeste. As of 2015, new MRE were generated for limonite ores which considered a variable nickel cut-offs, with nickel contents greater than or equal to 0.83 Ni%, 0.85 Ni% and 0.90 Ni%, in accordance with the specific characteristics of each deposit, maintaining a minimum 35 Fe%.

The fixed cut-off grades used by the Moa JV for Mineral Resource estimates are approved by the Cuban government.

24.3.2 ECOG Approach and Presentation to the ONRM

Following the publication of the 2019 NI 43-101 Technical Report, reporting Mineral Resources for the first time with an ECOG for the limonites (above 35 Fe%), the ONRM was presented with the methodology and the results. The 2022 MRE was presented to the ONRM in November 2022 and summarised in a Mineral Resource Alignment Technical Report with depletion of the resource model to the base of mining at the end of 2021.The report was well received, and a list of agreements were reviewed and accepted by the ONRM in November 2022. The dataset and final report were sent to the ONRM at the end of 2022, and the Moa JV is waiting for the formal validation of the ECOG methodology and the Mineral Resource Table based on the ECOG.

Considering the positive outcome of the November 2022 meetings, as of the Date of this Report, the assumption is made that the ECOG methodology will be approved by the ONRM and that the material defined as Mineral Resources, can be mined and considered Mineral Reserves under the Cuban jurisdiction, after application of adequate modifying factors. The official approval from the ONRM is expected in 2023.

25.0 INTERPRETATIONS AND CONCLUSIONS

25.1 GEOLOGY AND MINERAL RESOURCES

Nickel laterites in the Moa Project area are formed on top of the Moa-Baracoa ophiolite massif, and are composed of partially serpentinised harzburgites (an olivine + orthopyroxene and +/- chromite rock) and lesser dunites. There are also some scattered gabbroic dykes, and ultramafic recrystallised rocks with abundant antigorite that produce barren laterites.

The process referred to as "lateritisation" is essentially chemical weathering taking place in seasonally humid climates over long periods of time in conditions of relative tectonic stability, allowing the formation of a thick regolith with distinctive characteristics.

The laterite profile overlying the bedrock consists of four principal horizons. From bottom to top these are: (1) serpentinised peridotite, (2) saprolite, (3) limonite and (4) ferricrete. Nickel, manganese and cobalt are leached from the limonite zone and re-precipitated in the intermediate, partially leached saprolite.

The exploration, drilling and sampling work metallurgical testwork described in this Report, together with more than two decades of operational experience, permit the estimation of Mineral Resources as shown in Table 25.1.

Table 25.1: Mineral Resource Statement for the Moa Project (per Metallurgical Category - Magnesium) effective date 31st August 2022

Category	Tonnage (Mt)	Grade						Contained Metal	
		Ni (%)	Co (%)	Fe (%)	Mg (%)	Al (%)	SiO_2 (%)	Ni (kt)	Co (kt)
Magnesium (0 Mg% - 3 Mg%)									
Measured	91.28	1.07	0.13	46.6	1.12	5.28	5.28	977.0	121.6
Indicated	36.68	1.01	0.12	43.9	1.22	5.06	7.98	369.0	44.3
Measured + Indicated	**127.96**	**1.05**	**0.13**	**45.8**	**1.15**	**5.22**	**6.05**	**1346.0**	**165.9**
Inferred	32.2	1.0	0.1	43.8	1.4	5.2	7.5	314.5	39.3
Magnesium (>=3 Mg%)									
Measured	6.83	1.12	0.11	39.6	3.83	4.29	13.05	76.6	7.7
Indicated	21.74	1.17	0.09	31.4	6.51	3.83	21.45	254.6	18.6
Measured + Indicated	**28.57**	**1.16**	**0.09**	**33.4**	**5.87**	**3.94**	**19.44**	**331.2**	**26.3**
Inferred	10.0	1.1	0.1	35.6	5.0	4.3	17.1	104.8	9.9
All Magnesium Categories									
Measured	98.11	1.07	0.13	46.1	1.31	5.21	38.36	1053.7	129.2
Indicated	58.43	1.07	0.11	39.3	3.19	4.60	54.09	623.6	62.9
Measured + Indicated	**156.54**	**1.07**	**0.12**	**43.6**	**2.01**	**4.98**	**48.10**	**1677.2**	**192.1**
Inferred	42.2	1.0	0.1	41.9	2.3	5.0	47.2	419.3	49.2

Notes:

1. Mineral Resources are reported in situ, with an effective date of 31st August 2022, using the 2014 CIM Definition Standards.
2. The Qualified Person for the estimate is Ms Beatrice Foret, MAusIMM (CP), a Micon employee.
3. Mineral Resources are reported inclusive of those Mineral Resources converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

4. Mineral Resources are reported on a 100% basis. Sherritt and GNC are equal (50:50) partners in the Moa JV Moa Project.
5. The reporting cut-off is calculated as a Net Value = Revenue from Ni + Revenue from Co – Cost >0, and Ni>=0.7% and Fe>=25%. The costs are equal to the sum of mining costs, processing costs and nickel selling cost of US$2.00/lb, including Moa port and loading, freight and insurance, CRC refining and royalties. The processing cost has a fixed component of US$69.76/t and a variable cost related to Fe, Mg and Al content. Revenue was calculated at the market price of US$9.7/lb for nickel and US$28.1/lb for cobalt, with nickel and cobalt Mixed Sulphide Product to Product recovery of 98.2% and 92%, respectively. SPP to MSP nickel and cobalt recovery is variable and depends on iron content. The cut-off grade for the estimated Mineral Resource is based on similar mining operations in other countries and reasonable assumptions on mining and processing.
6. No stockpiled material is included in the Mineral Resources.
7. The block model grades were estimated using the ordinary kriging method.
8. The Mineral Resources volumes and tonnages have been rounded to reflect the accuracy of the estimate, and numbers may not add up due to rounding.

25.2 MINING AND MINERAL RESERVES

The Moa Project has been in production since the late 1960's and extracts nickel and cobalt ore material using conventional open cut mining techniques using hydraulic excavators and articulated haul trucks as primary mining equipment. Due to the shallow nature of the orebody and the composition of the limonite, there is no requirement for blasting on site. Stockpiling and blending of ore is necessary to ensure that the process feed criteria are stable on a weekly basis.

Through a process of pit optimisation, design and scheduling in accordance with blending criteria and other constraints as described in this Report, a Mineral Reserve has been estimated as shown in Table 25.2.

Table 25.2: Moa Project Mineral Reserves as at 31st August 2022

Category	Tonnage (Mt)	Grades						Contained Metal	
		Ni (%)	Co (%)	Fe (%)	Mg (%)	Al (%)	SiO_2 (%)	Ni (kt)	Co (kt)
Magnesium 0-3 Mg %									
Proven	79.41	1.02	0.13	45.12	1.08	5.23	5.10	806.3	100.3
Probable	30.45	0.97	0.12	43.58	1.22	5.13	7.79	295.6	35.6
Proven + Probable	**109.86**	**1.00**	**0.12**	**44.70**	**1.12**	**5.20**	**5.85**	**1,101.9**	**136.0**
Magnesium ≥3 Mg %									
Proven	4.08	1.11	0.11	39.57	3.47	4.38	12.23	45.4	4.6
Probable	3.24	1.08	0.11	37.73	3.50	4.57	14.87	35.0	3.4
Proven + Probable	**7.32**	**1.10**	**0.11**	**38.76**	**3.48**	**4.46**	**13.40**	**80.5**	**8.0**
All Magnesium Categories									
Proven	83.49	1.02	0.13	44.85	1.20	5.19	5.45	851.8	104.9
Probable	33.69	0.98	0.12	43.02	1.44	5.08	8.47	330.6	39.1
Proven + Probable	**117.18**	**1.01**	**0.12**	**44.33**	**1.27**	**5.16**	**6.32**	**1182.4**	**144.0**

Notes:

1. Mineral Reserves are reported with an effective date of 31st August 2022, using the 2014 CIM Definition Standards.
2. The Qualified Person for the estimate is Michiel Breed, a Micon employee.
3. Mineral Reserves are reported on a 100% basis. Sherritt and GNC are equal (50:50) partners in the Moa JV Moa Project.
4. The reporting cut-off is calculated as a Net Value = Revenue from Ni + Revenue from Co – Cost >0, and Ni>=0.7% and Fe>=25%. The costs are equal to the sum of mining costs, processing costs and nickel selling cost of US$2.00/lb, including Moa port and loading, freight and insurance, CRC refining and royalties. The processing

cost has a fixed component of US$69.76/t and a variable cost related to Fe, Mg and Al content. Revenue was calculated at the market price of US$7.1/lb for nickel and US$21.3/lb for cobalt, with nickel and cobalt MSP to Product recovery of 98.2% and 92%, respectively. SPP to MSP nickel and cobalt recovery is variable and depends on iron content. Mineral Reserves include a 15% allocation for ore loss and a 5% dilution factor.

5. An additional process blending criteria of Mg<4% was used to define the Mineral Reserves.
6. The Mineral Reserves volume and tonnage have been rounded to reflect the accuracy of the estimate, and numbers may not add up due to rounding.

25.3 PROCESSING

Moa Nickel owns and operates the PSA Plant that lies on the southern edge of the residential area of the city of Moa. A slurry preparation plant uses a system of log washers and vibrating screens to slurry the process feed and classify to the required particle size. The PSA Plant uses the HPAL process to recover nickel and cobalt from the limonitic ore to an intermediate mixed sulphide product.

Mixed sulphides produced at the PSA Plant are received at the CRC refinery in Fort Saskatchewan, where commercially pure nickel and cobalt metal products are produced.

25.4 INFRASTRUCTURE

Tailings, in the form of slurry produced from the PSA Plant, are currently stored in the North Extension Tailings Facility (NETF). Water is recovered from tailings and recycled for use in the plant.

Area 22 Phase 3 TSF is currently under construction due for completion prior to 2024, and anticipated to have capacity to receive tailings until mid-way through 2026. After this, all tailings is expected to be sent to the Moa West TSF, which is in the pre-feasibility study phase of design. Moa West is expected to provide tailings storage capacity beyond the current Moa Project LoM.

25.5 CAPITAL AND OPERATING COSTS

Based on a review of mining and processing plants, tailings storage facilities and other infrastructure as described in this Report, estimates of the forecast LoM capital and operating costs for the Moa Project base case have been made as shown in Table 25.3 and Table 25.4, respectively.

Table 25.3: Capital Expenditure Summary

Item	Annual Avg. Yrs 1-5 (US$'000)	Annual Avg. Yrs 6-20 (US$'000)	Annual Avg. LoM (US$'000)	LoM Total (US$'000)
Mining	17,305	18,826	18,534	481,879
Slurry Preparation	3,126	228	785	20,420
Processing Plant	21,619	13,143	14,773	384,101
Infrastructure and TSF	18,253	2,943	5,887	153,072
Sub-Total Moa Project Capital	**60,303**	**35,141**	**39,980**	**1,039,472**
CRC Capital	16,441	10,830	11,952	298,805
Grand Total Capital	**76,744**	**45,455**	**51,472**	**1,338,277**
Mine Closure and Rehabilitation	6,100	4,198	4,563	118,648

Table 25.4: LoM Cash Operating Costs

Parameters	LoM Total (US$'000)	Treated (US$/t)	Nickel (US$/lb)
Mining Costs	1,013,553	8.65	0.64
Processing Costs	5,694,540	48.60	3.57
Refining Costs	3,408,605	29.09	2.14
Sub-Total Cash Operating Costs	**10,116,698**	**86.33**	**6.34**
Cobalt Credits	(3,630,763)	(30.98)	(2.28)
Other Net By-Product Credits	(200,906)	(1.71)	(0.13)
Selling Expenses	272,207	2.32	0.17
General & Administrative Costs	197,014	1.68	0.12
Royalty and Territorial Contribution	640,026	5.46	0.40
Total Cash Cost	**7,394,275**	**63.10**	**4.64**

25.6 ECONOMIC EVALUATION

Based on the estimated Mineral Reserves as given above, together with the forecast capital and operating costs for the Moa Project, an annual cash flow projection has been made for evaluation of the base case, and for an alternative scenario that applies higher projected prices for nickel, cobalt, sulphur, diesel fuel and fuel oil. The results are summarised in Table 25.5.

It is concluded that, based on the forecast production, capital and operating cost estimates presented in this study, the Moa Project base case demonstrates economic viability of the Mineral Reserves to a level of confidence equivalent to a Feasibility Study at a nickel price of US$7.12/lb and a cobalt price of US$21.32/lb, yielding NPV_8 of US$812 million.

All else being equal, the Moa Project base case NPV_8 remains positive for nickel prices above US$5.70/lb, or a 15% reduction in base case prices for both nickel and cobalt together. Sensitivity to changes in operating costs are similar, with NPV_8 remaining positive for operating cost increases of up to 17%. Capital cost sensitivity is lower, with NPV_8 remaining positive across the range tested.

The alternative scenario demonstrates significant potential upside to the Moa Project at a nickel price of US$9.00/lb and a cobalt price of US$23.50/lb and input commodity prices as noted in Table 22.5, yielding NPV_8 of US$1,517 million, an increase of $705 million over the base case.

Table 25.5: LoM Project Summary

Parameter	Units	Base Case Value	Alternative Scenario
Proven and Probable Reserve	kt	117,180	same
	Ni %	1.01	same
	Co %	0.12	same
	Mg %	1.27	same
	Al %	5.16	same
	Fe %	44.33	same
LoM Waste to be Mined	kt	47,381	same
Stripping Ratio	W:O	0.40	same
Nominal Ore Mining and Processing Rate	kt/a	4,600	same
LoM Period	Years	26	same
Refined Nickel Production	t	723,552	same
Refined Cobalt Production	t	84,679	same
Nickel Reference Price	US$/lb	7.12	9.00
Cobalt Reference Price	US$/lb	21.32	23.50
Gross Revenue - Nickel	US$ million	11,133	14,069
Gross Revenue - Cobalt	US$ million	3,631	4,002
Royalties & Territorial Contribution Payable	US$ million	640	790
Nickel Revenue per tonne Processed	US$/t	95.00	120.07
Operating Cost avg. (after cobalt credits)	US$/t	63.10	73.73
Net Operating Margin	US$/t	31.90	46.34
Net Operating Margin (EBITDA)	US$ million	3,738	5,429
LoM Capital Expenditures (excl. Working Cap.)	US$ million	1,457	same
LoM Undiscounted Cash Flow Before Tax	US$ million	2,368	4,078
Taxation Payable	US$ million	481	679
LoM Undiscounted Cash Flow After Tax	US$ million	1,887	3,399
NPV After Tax at 6% discount	US$ million	971	1,798
NPV After Tax at 8% discount (Base Case)	US$ million	812	1,517
NPV After Tax at 10% discount	US$ million	690	1,303

25.7 RISKS AND UNCERTAINTIES

As with most mining ventures, there are risks that can affect the outcome of the Moa Project. The major risk areas identified in this study are:

25.7.1 Legal

- Not getting approval from the Cuban regulators of the ECOG methodology for both resources and reserves.

25.7.2 Economic External Parameters

- Lack of control over external drivers such as nickel and cobalt prices and exchange rates.

25.7.3 Mineral Resource and Mineral Reserves

- Resource models for Moa Oriental and Zona A have a lower level of confidence due to the lack of surveying of waste dumps and back-fill areas over the many years of exploitation, and inexistence of any archived surveying before 2018. This could lead to potential downgrade of the resource classification in some areas when more data become available (GPR or new drilling); and,
- The lower category of the saprolites, their natural greater variability and their sparsely populated exploration dataset leads to more uncertainty of this material concerning its mining and processing;

25.7.4 Operations

- Poor control of mining dilution and loss during excavation activities;
- Not achieving the operating costs, productivities and other assumptions made in this study;
- Delays in getting the tools necessary to implement the ECOG methodology in practice (mainly survey (laser radar or drone), improvement to dispatch system and staff training associated);
- Not following or delays in following new mining practises such as blending, stockpiling and reclaiming according to the mining schedule; and,
- Not implementing or delays in the implementation of the month-end survey of the waste dumps and stockpiles as recommended (risk for resource estimation and reserve calculation, for depletion, for implementing the ECOG strategy on site (stockpile strategy and blending), for making reconciliations between the mine and the plant.

25.7.5 Tailings

- Tailings storage facilities to support the Mineral Reserves for the LoM need to be constructed as current capacity is only sufficient for approximately three years. Capital has been allocated, but the construction has not yet commenced. Alternative interim storage options are possible near the existing TMFs but would require additional capital not currently factored into the Moa Project.

Recommended actions to mitigate some of these risks are detailed in Section 26.0.

25.8 UPSIDE POTENTIAL

A major opportunity to the Moa Project is demonstrated in the upside potential of the alternative scenario subject to the prices forecast in that scenario being achieved. Opportunities in the resource estimated include the possibility for conversion of inferred resources. Operational opportunities include increased recoveries with improved blending of feed into the PSA Plant.

26.0 RECOMMENDATIONS

26.1 SHORT-TERM RECOMMENDATIONS (1ST PHASE)

26.1.1 Geology and Resource Estimation

It is recommended that the topography of open pits, ore bins, stockpiles, dumps, and backfill areas should be updated monthly using high-resolution methods such as light detection and ranging (LiDAR) or a similar technology, perhaps using drones. This will allow reconciliation of mined volumes with the resource and mine planning/reserve models, with depletion of mined material performed using 3D solids, discounted from a master topography.

Certified Reference Material (CRM) and blanks should be obtained for insertion into sample batches prior to submission to laboratories, as are recommended in CIM Best Practices for Estimation of Mineral Resources and Mineral Reserves.

A centralised database should be developed for secure storage and off-site accessibility of exploration drill hole survey, sampling and analytical data. A thorough review of the data is recommended to assign dates to all drill holes and, where possible, cross-check data with laboratory records.

26.1.2 Mining

Implement an enhanced dispatch system that will allow improved utilisation of mobile equipment and provide detailed information for mine planning and reconciliation. Such a system would also facilitate short-term mine planning based on the proposed blending and stockpiling strategy and process plant constraints.

26.1.3 Geometallurgical Model

Development of an integrated geological and metallurgical domain model based on testwork (continuous metallurgical testwork, granulometry testwork, screen analysis and measurement of rejects at the slurry preparation plant). Since weathering drives both density and chemistry in a laterite, chemistry may be used to predict the degree of weathering and (indirectly) the reject rate at the slurry preparation plant. Better density prediction will result in improved resource tonnage estimation.

26.1.4 Tailings Storage

Complete the PFS on the Moa West Tailing storage facility. The development of Moa West tailings storage facility will be carefully monitored by the management team at the Moa Project to ensure tailings storage continuity after Area 22 Phase 3 is filled to capacity. If Moa West cannot be developed on time, other storage options near the existing ALTF, NETF and Area 22 Phase 3 would be considered.

26.2 MEDIUM-TERM RECOMMENDATIONS (2ND PHASE)

26.2.1 Geology

Implement routine open pit optimisation alongside geological modelling to provide assurance of "reasonable prospects for eventual economic extraction" as required by mineral resource definition standards.

Build a multi-phase strategic resource development plan to:

- Explore further the Inferred material, to potentially increase the resource category. Build a mine plan including the Inferred to identify the priorities (Inferred material that is likely to come in the mine plan first);
- Collect more data on the saprolitic horizons, to increase their resource category, and potentially identify more saprolitic areas below limonite. Increased knowledge of the saprolites will reduce mining and processing risk and allow deposits to be better evaluated; and,
- Drill the old waste dumps, searching for lower-grade material that could now be processed.

26.3 BUDGET

Table 26.1 provides a provisional budget for implementation of the foregoing recommendations. The individual components of each Phase do not depend on successful completion of other components or Phases.

Table 26.1: Budgeted Recommendations

Parameters		Phase 1 (US$'000)	Phase 2 (US$'000)
LiDAR / Drone Survey Equipment and Software		300	-
Certified Reference Material (Annual cost x 3)		80	-
Database Consolidation and QAQC		100	-
Dispatch System for Haulage Fleet		1,480	-
Geometallurgical Testwork and Modelling		1,110	-
Moa West TSF Design Study		1,200	-
Resource Estimation 'Reasonable Prospects' Protocol		-	100
Strategic Mineral Resource Development Plan	Yr 1	-	5,000
Strategic Mineral Resource Development Plan	Yr 2	-	5,000
Strategic Mineral Resource Development Plan	Yr 3	-	5,000
Total		**4,270**	**15,100**

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28.0 CERTIFICATES OF QUALIFIED PERSONS

CERTIFICATE OF CO-AUTHOR BEATRICE FORET

As a co-author of the "NI 43-101 Technical Report on the Mineral Resource and Mineral Reserves Estimates for the Moa Joint Venture Project, Province of Holguin, Cuba", with effective date 31st August 2022, I, Béatrice Foret, hereby certify that:

1. I am employed by, and conducted this assignment for, Micon International Co Limited, Suite 10, Keswick Hall, Norwich, United Kingdom. tel. 0044(1603) 501 501, e-mail: bforet@micon-international.co.uk .
2. I hold the following academic qualifications:

M.Sc. in Geology and Mining	ENSG, Nancy, France, 2003;
Advanced M.Sc. in Geostatistics	Mines ParisTech (Paris School of Mines), 2015.

3. I am a member Australasian Institute of Mining and Metallurgy (AusIMM) and a Chartered Professional (CP), Membership No. 327759;
4. I have worked as a geologist in the minerals industry for 19 years in the mining industry in New Caledonia, Europe, Russia and the United Kingdom;
5. I do, by reason of education, experience and professional qualifications fulfil the requirements of a Qualified Person (QP) as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects ("NI 43-101"). My work experience encompasses a range of commodities including nickel laterites, uranium, diamonds, gold, copper and other base metals. I have extensive experience in Mineral Resource Estimation.
6. I am responsible for the preparation of Sections 1-12, 14 and 23 of this Report;
7. I visited the property that is the subject of this Technical Report from 1st to 17th February 2022;
8. I am independent of Sherritt International Corporation, the Moa Joint Venture and its subsidiaries, its directors, senior management, and its other advisers, and I have had no prior involvement in the Moa Joint Venture Project;
9. I have read NI 43-101 and the Technical Report and confirm that this Report has been prepared in compliance with this instrument; and,
10. As of the date of this certificate, to the best of my knowledge, information and belief, the "NI 43-101 Technical Report on the Mineral Resource and Mineral Reserves Estimates for the Moa Joint Venture Project, Province of Holguin, Cuba", with effective date 31st August 2022, contains all scientific and technical information that is required to be disclosed to make this Report not misleading.

Béatrice Foret

Béatrice Foret, M.Sc., AUSIMM(CP), (No. 327759)
Associate Mineral Resource Geologist,
Micon International Co Limited
Effective Date: 31st August 2022
Signed Date: 31st March 2023

CERTIFICATE OF CO-AUTHOR MICHIEL FREDERIK BREED

As a co-author of the “NI 43-101 Technical Report on the Mineral Resource and Mineral Reserves Estimates for the Moa Joint Venture Project, Province of Holguin, Cuba”, with effective date 31st August 2022, I, Michiel Frederik Breed, hereby certify that:

1. I am employed by, and conducted this assignment for, Micon International Co Limited, Suite 10, Keswick Hall, Norwich, United Kingdom. tel. 0044(1603) 501 501, e-mail: mbreed@micon-international.co.uk.
2. I hold the following academic qualifications:

   M.Eng. University of Pretoria, 2012;

   B. Eng. University of Pretoria, 2004.
3. I am a fellow of the South African Institute of Mining and Metallurgy (SAIMM), Member No. 702556 and a Professional Engineer with Engineering Council of South Africa, Registration No. 20130531;
4. I have worked as a mining engineer in the minerals industry for 18 years in the mining industry in Africa, Europe, and the United Kingdom;
5. I do, by reason of education, experience and professional qualifications fulfil the requirements of a Qualified Person (QP) as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (“NI 43-101”). My work experience encompasses a range of commodities including industrial minerals, gold, copper and other base metals.
6. I am responsible for the preparation of Sections 15 and 16 of this Report;
7. I am independent of Sherritt International Corporation, the Moa Joint Venture and its subsidiaries, its directors, senior management, and its other advisers, and I have had no prior involvement in the Moa Joint Venture Project;
8. I have read NI 43-101 and the Technical Report and confirm that this Report has been prepared in compliance with this instrument; and,
9. As of the date of this certificate, to the best of my knowledge, information and belief, the “NI 43-101 Technical Report on the Mineral Resource and Mineral Reserves Estimates for the Moa Joint Venture Project, Province of Holguin, Cuba”, with effective date 31st August 2022, contains all scientific and technical information that is required to be disclosed to make this Report not misleading.

Michiel Frederik Breed

Michiel Frederik Breed, M.Eng., Pr.Eng., (No. 20130531) FSAIMM (No. 702556)
Associate Senior Mining Engineer,
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Effective Date: 31st August 2022
Signed Date: 31st March 2023

CERTIFICATE OF CO-AUTHOR CHRISTOPHER JACOBS

As a co-author of the “NI 43-101 Technical Report on the Mineral Resource and Mineral Reserves Estimates for the Moa Joint Venture Project, Province of Holguin, Cuba”, with effective date 31st August 2022, I, Christopher Jacobs, hereby certify that:

1. I am employed by, and conducted this assignment for, Micon International Limited, 601 – 90 Eglinton Avenue East, Toronto, Ontario, Canada M4P 2Y3. tel. 001 416 362 5135, e-mail: cjacobs@micon-international.com
2. I hold the following academic qualifications:

B.Sc., (Hons) Geochemistry	University of Reading, England, 1980;
MBA	University of Pretoria, RSA, 2004.

3. I am a Chartered Engineer registered with the Engineering Council of the U.K, (Registration No. 369178);
4. I am a professional member in good standing of: The Institute of Materials, Minerals and Mining IMMM) and The Canadian Institute of Mining, Metallurgy and Petroleum (CIM).
5. I have worked as a geologist and mineral economist in the minerals industry for over 40 years including projects in North America, South America, Southern Africa, Europe, Asia and the United Kingdom;
6. I do, by reason of education, experience and professional qualifications fulfil the requirements of a Qualified Person (QP) as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (“NI 43-101”). My work experience includes 10 years as an exploration and mining geologist on gold, platinum, copper/nickel and chromite deposits; 10 years as a technical/operations manager in both open-pit and underground mines; three years as strategic (mine) planning manager and the remainder as an independent consultant when I have worked on a variety of deposits including gold and base metals.
7. I am responsible for the preparation of Section 22 of this Report;
8. I am independent of Sherritt International Corporation, the Moa Joint Venture and its subsidiaries, its directors, senior management, and its other advisers, and I have had no prior involvement in the Moa Joint Venture Project;
9. I have read NI 43-101 and the Technical Report and confirm that this Report has been prepared in compliance with this instrument; and,
10. As of the date of this certificate, to the best of my knowledge, information and belief, the “NI 43-101 Technical Report on the Mineral Resource and Mineral Reserves Estimates for the Moa Joint Venture Project, Province of Holguin, Cuba”, with effective date 31st August 2022, contains all scientific and technical information that is required to be disclosed to make this Report not misleading.

Chris Jacobs

Christopher Jacobs, CEng., MBA, MIMMM
Mining Economist and President of Micon
Micon International Limited
Effective Date: 31st August 2022
Signed Date: 31st March 2023

CERTIFICATE OF CO-AUTHOR BRYCE REID

As a co-author of the "NI 43-101 Technical Report on the Mineral Resource and Mineral Reserves Estimates for the Moa Joint Venture Project, Province of Holguin, Cuba", with effective date 31st August 2022, I, Bryce Reid, hereby certify that:

1. I am employed by, and conducted this assignment for, Sherritt International Corporation, Bay Adelaide Centre, East Tower 22 Adelaide Street West, Suite 4220 Toronto, Ontario, Canada M5H 4E3. tel. 001 1 800 704 6698, fax 1 416 924 5015 e-mail: Bryce.Reid@sherritt.com
2. I hold the following academic qualifications:

   B.Sc., Chemical Engineering University of Alberta, Canada, 2008;
3. I am licensed as a Professional Engineer with the Association of Professional Engineers and Geoscientists of Alberta (No. M82017);
4. I have worked as a chemical engineer in the mining and minerals industry for 14 years in the mining industry in North America and Africa;
5. I do, by reason of education, experience and professional qualifications fulfil the requirements of a Qualified Person (QP) as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects ("NI 43-101"). My work experience encompasses operations and engineering experience in multiple nickel laterite processing facilities and base metals engineering design;
6. I am responsible for the preparation of Sections 13, 17-21, 24 of this Report;
7. I visited the property that is the subject of this Technical Report from 23rd January to 17th February 2022, 20th May to 27th May 2022, 15th July to 22nd July 2022 and 12th February to 23rd February 2023;
8. As an employee of Sherritt, I am not independent of the issuer, as defined in Section 1.5 of National Instrument 43-101;
9. I am Head of Resource Development and Moa JV Support at Sherritt and my previous experience with the properties of the Moa JV includes roles in the central engineering and production departments at the Fort Saskatchewan plant site. In my current role I provide support to the Moa Project operations and help coordinate engineering, testwork and operational support. Since 2019, I have been responsible for coordinating reporting on the resources and reserves on behalf of Sherritt.
10. I have read NI 43-101 and the Technical Report and confirm that this Report has been prepared in compliance with this instrument; and,
11. As of the date of this certificate, to the best of my knowledge, information and belief, the "NI 43-101 Technical Report on the Mineral Resource and Mineral Reserves Estimates for the Moa Joint Venture Project, Province of Holguin, Cuba", with effective date 31st August 2022, contains all scientific and technical information that is required to be disclosed to make this Report not misleading.

Bryce Reid

Bryce Reid, P.Eng., (No. M82017)
Senior Chemical Engineer,
Sherritt International Corporation
Effective Date: 31st August 2022
Signed Date: 31st March 2023

29.0 GLOSSARY AND ABBREVIATIONS

29.1 MINERAL RESOURCES AND RESERVES DEFINITIONS

Mineral resource and mineral reserve definitions, according to the "CIM Standards on Mineral Resources and Reserves – Definitions and Guidelines", are given as follows.

29.1.1 Mineral Resource

A 'Mineral Resource' is 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. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

An 'Inferred Mineral Resource' is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity.

An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

An 'Indicated Mineral Resource' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit.

Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation.

An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

A 'Measured Mineral Resource' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit.

Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation.

A Measured Mineral Resource has a higher level of confidence than that applying to either and Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.

Modifying Factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors.

29.1.2 Mineral Reserve

A ‘Mineral Reserve’ is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

The reference point at which Mineral Reserves are defined, usually the point where the ore is delivered to the processing plant, must be stated. It is important that, in all situations where the reference point is different, such as for a saleable product, a clarifying statement is included to ensure that the reader is fully informed as to what is being reported.

The public disclosure of a Mineral Reserve must be demonstrated by a Pre-Feasibility Study or Feasibility Study.

A ‘Probable Mineral Reserve’ is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proven Mineral Reserve.

A ‘Proven Mineral Reserve’ is the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the Modifying Factors.

29.2 GLOSSARY

Asbolane $(Co,Ni)_{1-y}(MnO_2)_{2-x}(OH)_{2-2y}+2x.n(H_2O)$: A poorly defined material, often defined as cobalt or nickel-bearing "wad". The chemical composition is highly variable and can contain large amounts of Ni, Co, Cu, Mg and other metals. It is a mixed-layer mineral with layers of Mn-O octahedra and of other metals mostly in separate layers. It should be defined as a group. Often found in residual deposits on weathered peridotite.

Bauxite: The principal ore for aluminium, consists primarily of hydrous aluminium oxides with silica, iron and other impurities. Bauxite is often formed by intense weathering of existing rocks rich in aluminium silicates in tropical regions with high rainfall.

Block Models: Three-dimensional representations of mineralisation created using regular-sized blocks and sub-blocks to represent volumes of rock and mineral types and topographic features.

Chalcedony: Microcrystalline variety of silica usually occurs in mammillary or botryoidal masses. This mineral forms in cavities in rocks of different types, especially lavas. Chalcedony often forms at low temperatures as a precipitate from silica-rich solutions. It can also form from dehydrated opal.

Chlorite $(Mg,Fe)_3(Si,Al)_4O_{10}(OH)_2.(Mg,Fe)_3(OH)_6$: Sheet silicate mineral primarily found in weakly metamorphosed rocks from the alteration of either clays in sedimentary rocks or pyroxenes, amphiboles and micas in igneous rocks.

Clay: is a finely-grained sedimentary rock or soil material (particles <4 µm) that consists of one or more clay minerals.

Core: A cylindrical rock monolith obtained by circular disruption of a drill hole bottom during drilling. Core is extracted onto the surface and is used as the principal material for studying the geological structure of the drill hole section.

Cut-Off: An assay cut-off is the break-even economic value of the ore; the block cut-off is the economic value that optimises the net present value of the operating assets.

Cut-off criteria: A set of requirements for the quality and quantity of a mineral in subsoil, for mining and other conditions of the deposit development that define the commercial value of the deposit. The cut-off criteria are used to calculate mineral resources and mineral reserves.

Cut-off grade: The minimum concentration of a valuable component in a marginal sample of the mineral. The cut-off grade is used to delineate parts of the deposit to be mined.

Deposit: An informal term for an accumulation of mineralisation or other valuable Earth material of any origin.

Dunite: A peridotite consisting almost wholly of olivine and containing accessory pyroxene and chromite.

Dyke: An intrusive geological body with transversal contacts. The length of a dyke many times exceeds its width, whereas the planes are nearly parallel. As such, a dyke is a fracture that has been filled with magmatic melt.

Enstatite $Mg_2Si_2O_6$: This mineral is the magnesium endmember of the pyroxene mineral group. Commonly occurs in basic and ultrabasic igneous rocks such as gabbro, dolerite and peridotite.

Exploration: Prospecting, sampling, mapping, diamond drilling and other work involved in searching for ore.

Ferricrete: Type of weathering crust also known as iron crust. These are ferruginous duricrusts, a hard mineral cemented crust, occurring in weathered material or the soil zone that is rich in iron oxides. Often formed in deep weathering profiles in humid tropical or sub-tropical conditions.

Gabbro: A plutonic rock consisting of calcic plagioclase (commonly labradorite) and clinopyroxene, with or without orthopyroxene and olivine; loosely used for any coarse-grained dark igneous rock.

Garnierite $(Ni,Mg)_6Si_4O_{10}(OH)_8$: Nickel magnesium silicate mineral. Generic name for a green nickel ore which has formed as a result of lateritic weathering of ultramafic rocks (serpentinite, dunite, peridotite).

Gibbsite $Al(OH)_3$: Aluminium hydroxide mineral. An alteration product of many aluminous and alumino-silicate minerals under intense weathering conditions and as such, is commonly found in lateritic formations, highly-weathered soils and clay deposits.

Goethite (αFeO.OH): Hydrated iron oxide, rust like in appearance.

Hard rock deposit: Primary accumulation of a mineral substance in subsoil that has not been altered or destroyed near the ground surface. Hard rock deposits are opposed to placer deposits formed by the result of disintegration of hard rock deposits and mineralised rock.

Harzburgite: Coarse crystalline ultramafic igneous rock with a silica content of <45% SiO_2. Composed essentially of olivine and orthopyroxene with additional clinopyroxene, plus accessory minerals (such as spinel, garnet). Harzburgite is from the peridotite group of rocks which exist abundantly in the mantle, but appear rarely at the surface.

Hematite (Fe_2O_3): Iron oxide common in igneous, metamorphic and sedimentary rocks.

Igneous rock: A rock formed by the solidification of magma.

Inhomogeneous: Not homogeneous or uniform in character.

Intrusion: A body of igneous rock that invades older rock. The invading rock may be a plastic solid or magma that pushes its way into the older rock.

Kaolinite ($Al_2Si_2O_5(OH)_4$): A common clay mineral.

Laterite: A residual deposit of iron and aluminium hydroxides formed by weathering of rocks in humid, tropical conditions.

Limonite ($FeO.OH\cdot nH_2O$): Hydrated iron oxide mineral.

Lithiophorite $Al,Li,MnO_2(OH)_2$: Aluminium lithium manganese oxide hydroxide. Secondary manganese mineral typically occurring in the oxidised zone of hydrothermal ore deposits and secondary manganese deposits. Lithiophorite is also a common constituent of some lateritic soils.

Mafic: Subsilicic, basic. Pertaining to or composed dominantly of the magnesian rock-forming silicates; said of some igneous rocks and their constituent minerals. In general, synonymous with ‘dark minerals’.

Maghemite Fe_2O_3: Ferromagnetic iron oxide mineral, commonly confused with magnetite. Formed by weathering or low-temperature oxidation of spinels containing ferrous iron, commonly magnetite or titanomagnetite. It is a widespread yellow pigment in continental sediments, rocks, and soils.

Magmatic: Consisting of, relating to or of magma origin.

Magmatism: Emplacement of magma within and/or on the surface of crustal rocks by igneous activity. Volcanism is the surface expression of magmatism.

Magnetite (Fe_3O_4): Iron oxide common in igneous, metamorphic and sedimentary rocks, strongly magnetic and an important source of iron.

Mine: A mineral mining enterprise. The term is often used to refer to an underground mine.

Mineral Deposit: A body of mineralisation that represents a concentration of valuable metals. The limits can be defined by geological contacts or assay cut-off grade criteria.

Mineral Resource: The CIM defines a mineral resource as “a concentration or occurrence of material of intrinsic economic interest in or on the earth's crust in such form and quantity that there are reasonable prospects for eventual economic extraction”. Subdivided into Measured, Indicated and Inferred categories depending on how well they are defined.

Montmorillonite $(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot n(H_2O)$: A common clay phyllosilicate mineral it is commonly formed as a hydrothermal alteration product of volcanic tuffs and ash.

Moho: The boundary between the Earth's crust and the mantle, the underlying layer of denser rocks of the Earth's interior. It is named after Croatian seismologist Andrija Mohorovicic, who first detected it in 1909 by examining seismic waves moving through the Earth.

NI 43-101: Standards of Disclosure for Mineral Projects as dictated by the Canadian Institute of Mining (CIM).

Nontronite $Na_{0.3}Fe_2(Si,Al)_4O_{10}(OH)_2 \cdot n(H_2O)$: An iron-rich clay phyllosilicate mineral, formed by the weathering of biotite and basalts.

Olivine ($(Fe,Mg)_2SiO_4$): An iron and magnesium series of orthosilicate minerals with end members of forsterite (Mg_2SiO_4) and fayalite(Fe_2SiO_4). Forsterite is commonly found in basic and ultrabasic igneous rocks (basalt, gabbro, peridotite) and in high-grade magnesian marble. Fayalite can be found in igneous rocks which have typically cooled rapidly such as komatiites, picrite basalts, picrite sills, and other mafic and ultramafic lavas.

Open pit: A mine that is entirely on surface; also referred to as open-cut or open-cast mine.

Ophiolite: Ophiolites are pieces of oceanic plate that have been thrusted (obducted) onto the edge of continental plates. They consist of an assemblage of mafic and ultramafic lavas and hypabyssal rocks found in association with sedimentary rocks like greywackes and cherts.

Ore: Natural mineral formation that contains valuable components in such compounds and concentrations that make the mining technically and economically feasible.

Orebody: A natural accumulation of ore confined to a certain structural and geological element or a combination of such elements that either has been, or demonstrates a reasonable probability of being mined profitably.

Overburden: Waste rock overlying and hosting mineral deposits that is subject to excavation in the course of open-pit mining. The process of overburden removal to access and mine the mineral is called stripping.

Pisolite: A sedimentary rock made of pisoids, which are approximately spherical, concretionary grains, commonly consisting calcium carbonate, iron oxides, clays, etc. They are between 2 mm to 10 mm in diameter.

Plagioclase ($NaAlSi_3O_8 – CaAl_2Si_2O_8$): Aluminium silicate, this type of feldspar mineral forms a solid solution series between end members.

Processing: A combination of processes for primary treatment of solid minerals in order to extract the products amenable to further technically and economically feasible chemical or metallurgical treatment or use.

Protolith: A protolith is the original, unmetamorphosed rock from which a given metamorphic rock is formed, e.g. the protolith of a slate is a shale or mudstone.

Pseudomorph: A mineral formed by chemical or structural change of another substance, though retaining its original external shape.

Quartz (SiO_2): One of the most common minerals on the Earth and is the important constituent of many rocks. Quartz is composed of silica and exists in several different forms, habits and colours. Quartz is commonly found in igneous, metamorphic and sedimentary rocks and frequently found in veins with metal ores.

Run of Mine (RoM): A term used loosely to describe ore of average grade as produced from the mine.

Saprolite: A highly to completely weathered rock which has been altered and decomposed by chemical processes, but retains textural and structural features of the parent material. A soft, earthy, typically clay-rich, thoroughly decomposed rock, formed in place by chemical weathering of igneous, sedimentary, and metamorphic rocks. It often forms a layer or cover as much as 100 m thick, esp. in humid and tropical or subtropical climates; the colour is commonly some shade of red or brown, but it may be white or grey. Saprolites are characterised by preservation of structures that were present in the unweathered rock.

Sampling: The process of studying the qualitative and quantitative composition and properties of natural formations comprising a deposit.

Serpentine $(Mg\ Fe,Ni)_3Si_2O_5(OH)_4$: A metamorphic product of the hydration of ultramafic rocks. Includes the minerals antigorite and chrysolite.

Sill: A sill is a sheet intrusion emplaced parallel to the structures present within its host rocks. Its primary feature is to be concordant and never cross-cut. Foliation or bedding planes in the host rock are exploited by magma as planes of weakness to move underground.

Spinel ($MgAl_2O_4$): A crystalline magnesium aluminium silicate mineral is often an accessory mineral in igneous rocks, principally basalts, peridotites and kimberlites but can also be found within pegmatites.

Stockpile: Broken ore heaped on surface, pending treatment or shipment.

Stripping ratio: The relation of overburden volume to a mineral volume. A stripping ratio largely defines the economic feasibility of open-pit mining.

Syenite: A plutonic rock containing alkali feldspar (usually orthoclase, microcline, or perthite), a small amount of plagioclase, one or more mafic minerals (especially hornblende), and possibly accessory quartz.

Talc ($Mg_3Si_4O_{10}(OH)_2$): A hydrous magnesium silicate clay mineral, commonly formed through the hydrothermal alteration of mafic rocks or low-temperature metamorphism of siliceous dolomites.

Tailings: Liquid wastes of mineral processing with valuable component grade lower than that of the initial material.

Tailings facility: A complex of special structures and equipment used for storage of liquid wastes of mineral processing (tailings).

Tailings Management Facility (TMF): The engineered area for storage of material rejected from the process plant after most of the recoverable valuable minerals have been extracted.

Trevorite $NiFe_2O_4$: A rare nickel iron oxide mineral typically found as a contact deposit along the junction of quartzite and an ultramafic intrusive.

Ultramafic: A rock comprising >90% ferromagnesian minerals, composed of olivine, orthopyroxene and clinopyroxene +/- amphibole.

Vein: Tabular geological body formed as a result of mineral substance filling a fracture or due to metasomatic replacement of rock with mineral(s) along a fracture. Unlike dykes formed primarily by magmatic rock, a vein is composed of vein and ore minerals (quartz, carbonated, sulphides etc.).

Volcanic: Consists of all extrusive rocks, and these are rocks which are formed by the cooling of magma or molten rock on the Earth's surface.

Waste dump: An artificial dump formed as a result of disposing of overburden (waste rock) at specially designated sites.

Willemseite $(Ni,Mg)_3Si_4O_{10}(OH)_2$: An uncommon nickel, silicate hydroxide phyllosilicate mineral, which is light green in colour. Found as a secondary mineral in nickel-bearing igneous rocks.

29.3 ABBREVIATIONS

°	degree (angle)
°C	degree Centigrade
AAS	atomic absorption spectroscopy
AC	Acid Consumption
Al	Aluminium
ALTF	Acid Leach Tailings Facility
ALOS	Advanced Land Observing Satellite
BEV	battery electric vehicle
Biosphere	Humboldt Park and the Cuchillas del Toa Biosphere
CAD	Canadian dollars
CAGR	compounded average growth rate
CCD	counter current decantation
CICA	Centro de Inspección y Control Ambiental
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
CIPIMM	Centro de Investigaciones para la Industria Minero Metalúrgica
CITMA	Ministerio Ciencia, Tecnología y Medio Ambiente

Co	Cobalt
CRC	Cobalt Refinery Company Inc.
CRM	certified reference material
CRU	CRU Group
Cu	copper
DELABEL	Geominera Oriente’s Elio Trincado Laboratory
Dmt	dry metric tonnes
DRC	Democratic Republic of the Congo
DSI	Dam safety inspections
DX	discharge solution
ECOG	Economic Cut-Off Grade
EHS	environment, health and safety
EOR	Engineer of Record
ESIA	Environment and Social Impact Assessment
EOR	Engineer of Record
ESG	environmental, social and governance
EV	electric vehicles
Fe	Iron
FCOG	Fixed Cut-Off Grade
FOB	Free on Board
g	gramme(s)
g/t	gramme/tonne
G&A	general and administration
GCOS	global change of support
GEOCUBA	GEOCUBA Oriente Sur
Geominera	Empresa Geominera Oriente of Santiago de Cuba
GNC	General Nickel Company S.A. of Cuba
GPR	ground penetrating radar
Groundprobe	GroundProbe Pty Ltd
h	Hour(s)
His	high silicon
HPAL	high pressure acid leach
ICCI	International Cobalt Company Inc.
ICGC	Instituto Cubano de Geodesia y Cartografía
ICP-AES	Inductively coupled plasma atomic emission spectroscopy
ICP-OES	Inductively coupled plasma optical emission spectroscopy
ICGC	Instituto Cubano de Geodesia y Cartografía
IRR	internal rate of return
ISMM	Instituto Superior Minero Metalúrgico
ITAK	Tecnologia August Kekulé Ltda
ITRB	Independent Tailings Review Board
JAXA	Japanese Space Agency
kg	kilogramme
km	kilometre
km^2	square kilometre
$k\ m^3$	thousand cubic metres
kt	thousand tonnes
kV	kilovolt
kW	Kilowatt(s)

kWh	Kilowatt hour(s)
l	Litre(s)
LB	limonite
LACEMI	Laboratorio Central de Minerales “José Isaac del Corral”
LF	low grade limonite
LFP	lithium iron phosphate
LG	Lerchs-Grossmann
LiDAR	light detection and ranging
LIM-SAP	limonite-saprolite boundary
LOI	Loss on ignition
LoM	Life of Mine
LME	London Metals Exchange
LPG	liquefied petroleum gas
LSi	low silicon
µm	micron
mm	millimetre
m	metre
m^2	square metre
m^3	cubic metre
Ma	Millions of years ago
Mg	Magnesium
MHP	mixed hydroxide precipitates
Micon	Micon International Co Limited
MINBAS	Ministerio de la Industria Basica (Cuban Ministry of Basic Industry)
MHP	mixed hydroxide precipitate
Moa Project	Moa Joint Venture Project
Moa JV	Moa Joint Venture
MOAPT	Minimum Of All Previous Topographies
Mn	Manganese
MRA	Mineral Resource Alignment
MRE	Mineral Resource Estimate
Mt	million tonnes
Mt/a	million tonnes per year
MW	megawatt
MRA	Mineral Resource Alignment
NDCC	Net Direct Cash Costs
NETF	North Extension Tailings Facility
NetV	Net Value
Ni	Nickel
NPI	nickel pig iron
NPV	Net Present Value
NSPP	new slurry preparation plant
nss	not sufficient sample
OECD	Organization for Economic Co-operation and Development
OEM	original equipment manufacturer
ONARC	National Accreditation Body for the Republica de Cuba
ONRM	Oficina Nacional de Recursos Minerales
OREAS	Ore Research & Exploration Assay Standards
ORP	Oxidation-Reduction Potential.

OSPP	old slurry preparation plant
Ox	oxidising
PSD	Particle Size Distribution
PSA Plant	Pedro Sotto Alba processing plant
psig	pounds per square inch gauge
QAQC	Quality assurance/quality control
QP	Qualified Person
QAQC	quality assurance and quality control
RedDot3D	RedDot3D Inc.
Red	reducing
Report	technical report
RoM	run-of-mine
RPEEE	Reasonable Prospects for Eventual Economic Extraction
s	Second
SB	saprolite
SGS	SGS Minerals Services
Si	Silicon
SiO_2	Silica
Sherritt	Sherritt International Corporation
SHFE	Shanghai Futures Exchange
SMM	Shanghai Metals Market
SOP	Standard Operating Procedure
SPP	slurry preparation plant
t	tonne
t/a	tonnes/year
t/d	tonnes/day
t/h	tonnes/hour
TMF	Tailings Management Facility
TOC	Total Organic Carbon
TSF	Tailings storage facility
TSM	Towards Sustainable Mining
US$	United States dollar
V	Volt(s)
VAT	Value Added Tax
WACC	weighted average cost of capital
Wt%	Weight percent
XRD	X-ray diffraction
Yr	Year(s)
Zn	Zinc