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PT MANDIRI JAYA NICKEL

NICKEL RESOURCE ESTIMATE

Qualified Persons Report
using
JORC Code, 2012

Nov, 2022

1 EXECUTIVE SUMMARY

1) PT Mandiri Jaya Nickel (MJN) nickel laterite project is located in Morowali Regency of Central Sulawesi, Indonesia
2) This report is the first nickel laterite Resource estimate for PT Mandiri Jaya Nickel using the JORC Code for estimating Mineral Resources
3) The MJN mining license covers 4,871Ha for mining and is valid until 12 November 2034 and can be renewed twice for 10 years if required
4) Since 2021 geophysical surveys totaling 387km using Ultra GPR technology has covered 3,608ha of the MJN license area and more than 1,000,000,000 wet tons of laterite has been interpreted from the results
5) Validated drill data, used in this Resource estimate totals 555 holes with a cumulative total depth of 14,070m.
6) To date, 14,184 XRF analyses have been performed on drill cores to document the grade characteristics throughout the Nickel Resource area at MJN
7) An Inferred Resource of nickel laterite covering 562ha, using a cut-off grade of 0.8% nickel, is as follows:

Inferred Resource of Nickel Laterite

MJN Project Inferred Mineral Resource Statement	Million ton (Dry)	Ni	Co	Fe	MgO	SiO2	Cr2O3	METAL CONTENT EQUIVALENT (Ni)
		%	%	%	%	%	%	
LIMONITE (LIM)	96	1.2	0.11	41.1	1.8	6.6	2.7	1,130,000
SAPROLITE (SAP)	30	1.6	0.04	15.2	17.0	34.7	1.1	470,000
Total Mineral Resource > 0.8% Ni	126	1.3	0.09	35.5	5.1	12.7	2.3	1,600,000

8) Exploration Targets, where additional laterite is known to occur, is summarized below. These have been estimated using the statistical conversion rate of laterite per hectare encountered in the Ultra GPR surveys. Although, at this time, it is uncertain if further exploration will result in a Mineral Resource, the historical mapping and Ultra GPR surveys, within these areas, gives confidence that with further infill drilling and assay results will upgrade at least some of these areas for future estimates.

Exploration Targets for Nickel Laterite

(note: numbers are rounded to reflect accuracy)

AREA(Ha)	Total laterite Volume (million wet tons)	High grade range (million wet tons)	Low grade range (million wet tons)
2,135	850	150	300
	Limonite	106	212
	Saprolite	44	88

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LIST OF ABBREVIATIONS

Al2O3	aluminum oxide
APL	areal penggunaan lain (Forestry status for land with no Forestry restriction)
asl	above sea level
AT	Acceptance Testing
BRK	bedrock
cm	centimeter
Co	cobalt
CoG	cut off grade
COA	certificate of analysis
CRM	certified reference material
DEX	PT Danmar Explorindo
dmt	dry metric tons
DSO	direct shipping ore
Fe	iron
g	gram
GPR	ground penetrating radar
GPS	global positioning system
Ha	hectare
HPAL	high pressure acid leach
IDW2	Inverse distance weighted squared
IMIP	Indonesia Morowali Industrial Park
ISO	international standards organization
IUPOP	Indonesian mining business permit for operation and production
JORC	Joint ore reserve committee
LiDAR	Laser imaging detection and ranging
LIM	Limonite
m	Meters
MC	Moisture content
MgO	Magnesium oxide
MJN	PT Mandiri Jaya Nickel
Ni	nickel
OK	Ordinary Kriging
QA/QC	quality assurance / quality control
RKEF	rotary kiln electric furnace
RTK GPS	Real-Time Kinematic GPS giving high accuracy survey positioning
SAP	saprolite
SED	sediment
SGS	survey and analysis company
SiO2	quartz/silica
t	metric tons
wmt	wet metric tons
wmtpa	wet metric ton per MJNum
XRF	X-ray refraction

2 COMPETENT PERSON'S STATEMENT AND DECLARATION

2.1 AUTHORS AND CONTRIBUTORS

Table 2-1 Authors and contributors

Position	Name	Qualifications	Signature	Date
Competent Person / Author	Daniel Madre	MSc MAusIMM, MAIG, MIAGI	Digital Signature shown	Nov-22
Competent Person / Resource Geologist / Peer Review	Tobias Maya	BSc MAusIMM	Digital Signature shown	Nov-22
Resource Geologist / Geostatistical Analysis	Harman Adhityo	BSc	Digital Signature shown Digital Signature shown	Nov-22

2.2 REPORT OBJECTIVES

This report was prepared for PT Mandiri Jaya Nickel for the purpose of estimating nickel Resource based on exploration results to date. The report utilizes exploration drilling and assay data until 1 October, 2022.

2.3 REPORTING STANDARD

This report is intended to comply with the 2012 Code, of the Joint Ore Reserve Committee (JORC) of Australia for the reporting of Mineral Resources and Reserves (http://www.jorc.org/docs/jorc_code2012.pdf). All the information used in this report was assessed for compliance with the JORC Code and only information that was considered compliant was included in the estimate of a Nickel Resource as specified in the JORC Code of 2012. The competent persons, contributing to this report, have memberships to the Australasian Institute of Mining and Metallurgy that are current and in good standing.

2.4 AUTHORS QUALIFICATION STATEMENTS

The information in this report that relates to Exploration Results and Mineral Resources based on information compiled by Daniel Madre, member no: 100878 and Tobias Maya, member no: 304661.

Daniel Madre has a Master of Science degree majoring in geology and more than 40 years of experience as an exploration geologist of which more than 35 years has been working in Indonesia. Since 2003, Daniel Madre has been involved in numerous nickel laterite exploration and mining projects in Indonesia and has held several senior roles in nickel laterite projects including, Director of PT Telen Paser Prima, which opened the first nickel laterite mine in

Kalimantan in 2005 and President Director of PT Itamatra Nusantara, that discovered nickel laterite in Morowali Regency in Central Sulawesi. Daniel Madre is currently a director of PT Danmar Explorindo and a consultant to PT Mandiri Jaya Nickel for the purpose of this study. PT Danmar Explorindo has also been the exploration contractor to PT Mandiri Jaya Nickel since Novemeber 2021, providing exploration management including geology, drilling, well site monitoring and core sample preparation.

Tobias Maya has a Bachelor of Science degree majoring in Spatial Science from Charles Sturt University, Australia. Tobias Maya is a Mineral Resource modeling specialist with more than 18 years of experience in exploration and modeling lateritic nickel resources in Indonesia. Tobias Maya is currently a director of PT Geo Search and a consultant to PT Danmar Explorindo for the purpose of this study. PT Geo Search has also provided Ultra-GPR (Ground Penetrating Radar) survey services to Hengjaya Mineralindo and PT Mandiri Jaya Nickel.

Daniel Madre and Tobias Maya have sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity that they are undertaking; reporting of Exploration Results and Mineral Resources. Daniel Madre and Tobias Maya consent to the inclusion in the report of the matters based on this information in the form and context in which it appears. Resumes for Daniel Madre and Tobias Maya are attached in Appendix 9.5

2.5 STATEMENT OF INDEPENDENCE

Daniel Madre and Tobias Maya and PT Danmar Explorindo’s partners, directors, substantial shareholders and their associates are independent of PT Mandiri Jaya Nickel, its directors and substantial shareholders, its advisers and their associates.

Neither Daniel Madre, Tobias Maya and or PT Danmar Explorindo nor any of its partners, directors, substantial shareholders, advisor’s and their associates have any interest, direct or indirect in PT Mandiri Jaya Nickel, its subsidiaries, associated companies, or any related entities in Indonesia or elsewhere in the world.

Daniel Madre, Tobias Maya and PT Danmar Explorindo have no potential conflicts of interest that might affect their objectivity in writing this report. PT Danmar Explorindo’s fee for completing this report is based on normal commercial terms and the payment is not contingent upon the outcome and findings of this report.

2.6 DISCLAIMER

PT Danmar Explorindo has used the results of exploration programs provided by PT Mandiri Jaya Nickel as well as the results of exploration drilling done on their behalf for the purpose of writing this report. In making this Mineral Resource estimation PT Danmar Explorindo has assumed as follows:

1) all the relevant data available was provided without prejudice

2) key assumptions are accepted as described in this report

In view of the above assumptions PT Danmar Explorindo has made reasonable enquiries and exercised their judgment on the reasonable use and validity of the data and found no reason to doubt its accuracy and reliability. For this reason, we believe that this report is an objective, accurate and reliable representation of the nickel laterite at the MJN project based on the exploration results until 1st October, 2022. PT Danmar Explorindo makes no warranty to PT Mandiri Jaya Nickel or any third parties with regard to any commercial investment on the basis of this report. The use of this report by PT Mandiri Jaya Nickel or any other parties shall be at their own risk. The report must always be read in its entirety so that all the data and assumptions are fully considered and properly understood.

3 INTRODUCTION

3.1 BACKGROUND

PT Danmar Explorindo (DEX) has been asked to provide an estimate of the Nickel Resources at the PT Mandiri Jaya Nickel (MJN) laterite nickel project.

Since November, 2021, Ultra GPR surveys have been completed in the MJN project area and drilling has started on the Ultra GPR targets. The objective was to delineate sufficient Resources of nickel laterite to support the mining operation into the future.

A haul road design, to link the MJN mine to the IMIP smelter facility, is well advanced. This will allow saprolite and limonite production to be trucked directly to IMIP nickel smelter complex. This greatly enhances the potential for economic extraction of the MJN nickel laterite deposit.

3.2 LEASE DETAILS

The MJN project mining lease (IUP) area covers 4,871Ha for operation and production of nickel and its associated minerals. The permit is valid until 12th November 2034 and can be extented twice for periods of 10 years.

The MJN project is located within 40km, of one of Indonesia's largest nickel smelting and industrial hubs known as Indonesia Morowali Industrial Park (IMIP), where the company's existing Rotary Kiln Electric Furnace (RKEF) and High Pressure Acid Leach (HPAL) operations are located. The MJN Project is also similar distance from the company's HM mine operations and immediately adjacent, to the south, of the Sulawesi Cahaya Minerals ('SCM') project which is 49% owned by the company's largest shareholder Shanghai Decent and has reported resources of 1,139,000,000 dry metric tonnes ('dmt') at 1.22% nickel for 13.9 million tonnes of contained nickel metal, making it one of the world's largest known Nickel Resources.

The concession map for the area is shown in Figure 3-1.

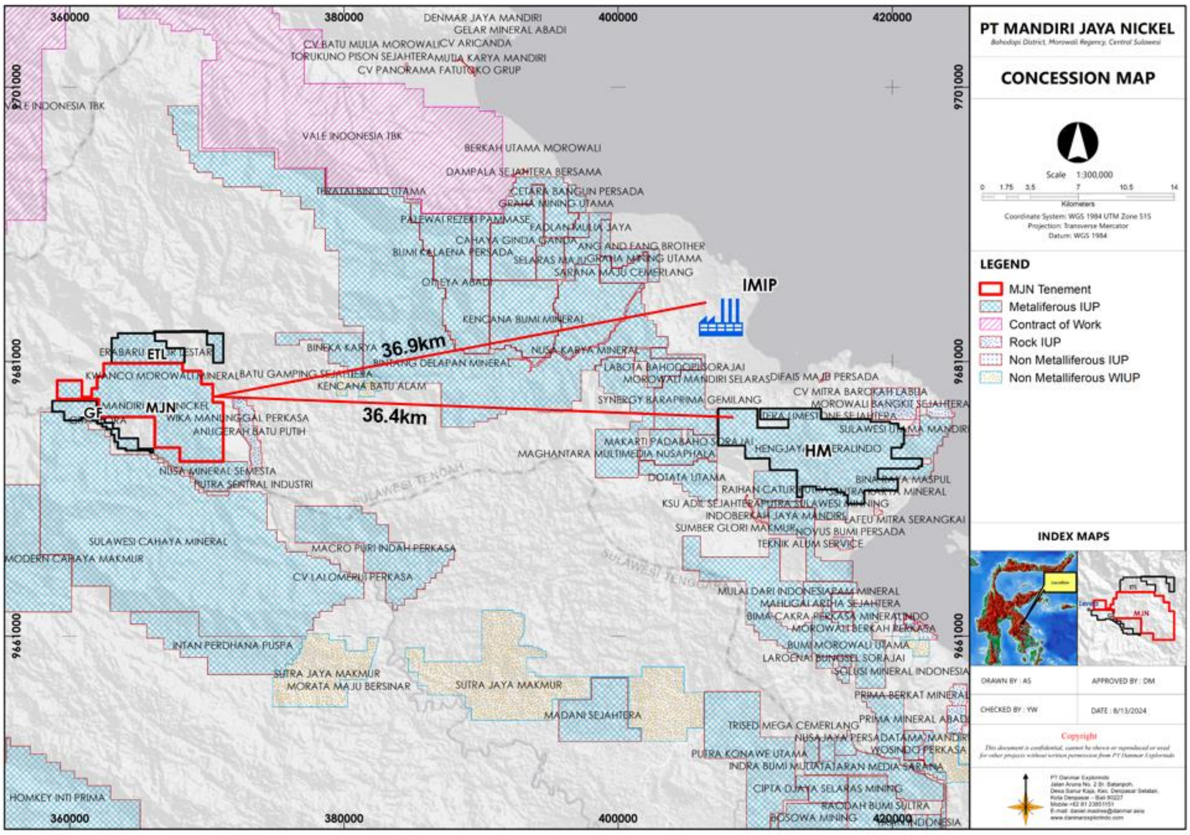


Figure 3-1 PT Mandiri Jaya Nickel concession map

3.3 LOCATION AND ACCESS

The project area is within the village of Bahodopi VI, in the shire of Bahodopi, Regency of Morowali, in the Province of Central Sulawesi. Access to the MJN project location, from the city of Kendari, is shown in Figure 3-2.

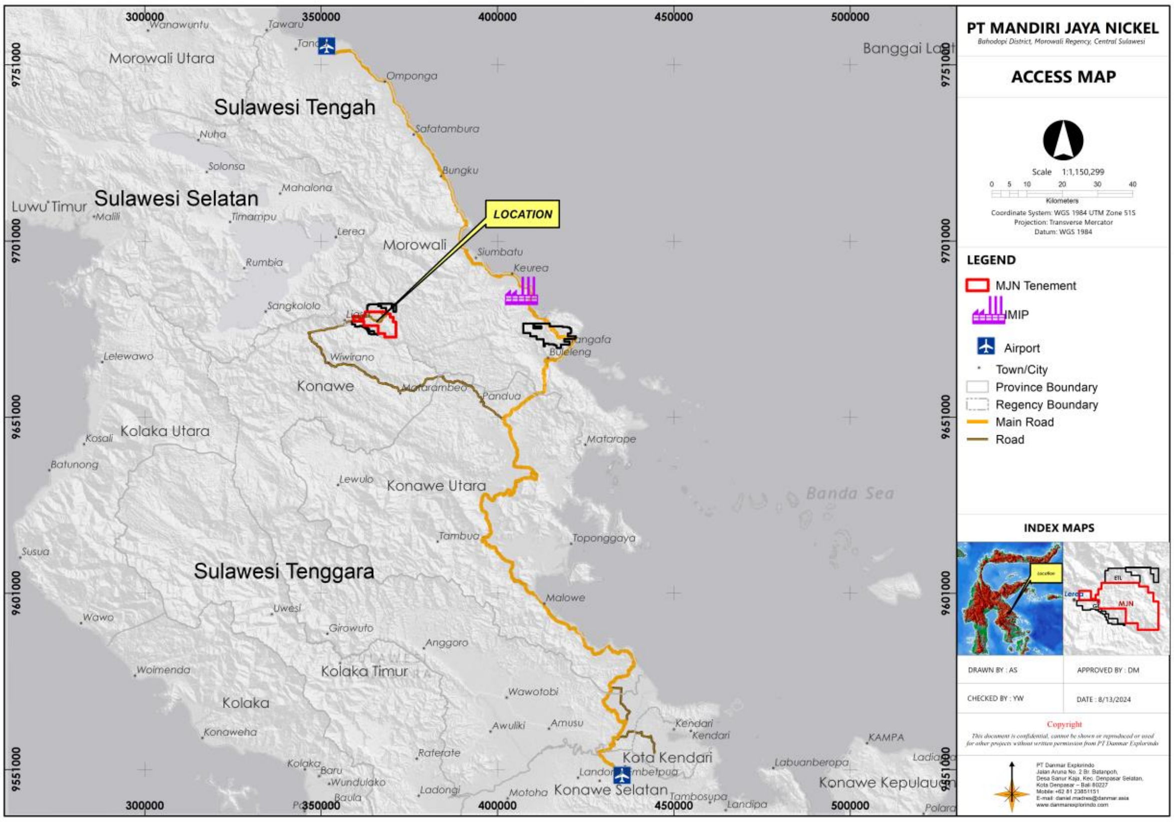


Figure 3-2 MJN project location map

MJN can be reached by vehicle on public road from Tetewati village located on the Kendari - Morowali main provisional road, 84km from MJN. The project is 22 km from the PT Bintan Delapan Mineral (BDM), nickel mine project (IUP) and then a further 34km on existing haul roads to IMIP nickel smelter. The project is also approximately 5 km north of PT Sulawesi Cahaya Mineral IUP (owned by Merdeka Battery Materials).

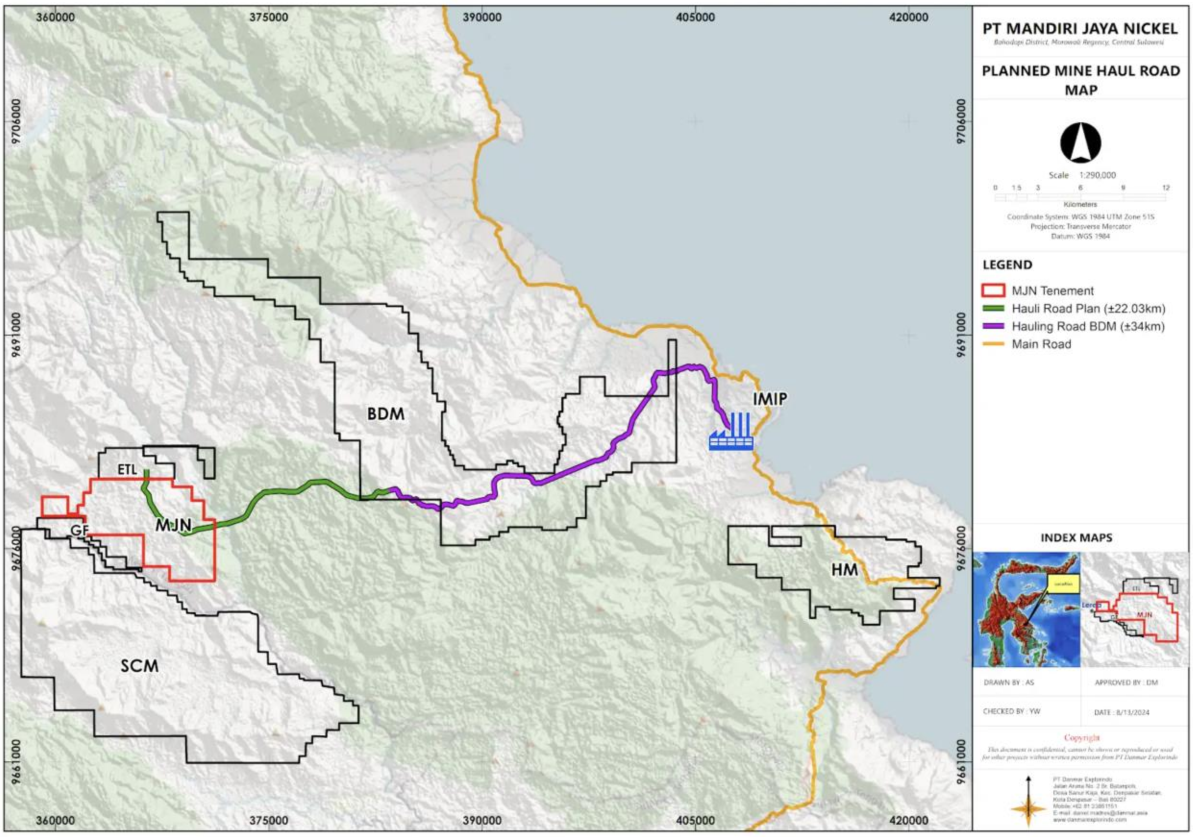


Figure 3-3 Planned haul road access to MJN

3.4 FORESTRY AND LAND USE

The Forestry status of MJN is 100% “area for other uses” (APL) which has no Forestry restrictions for mining (see Figure 3-4).

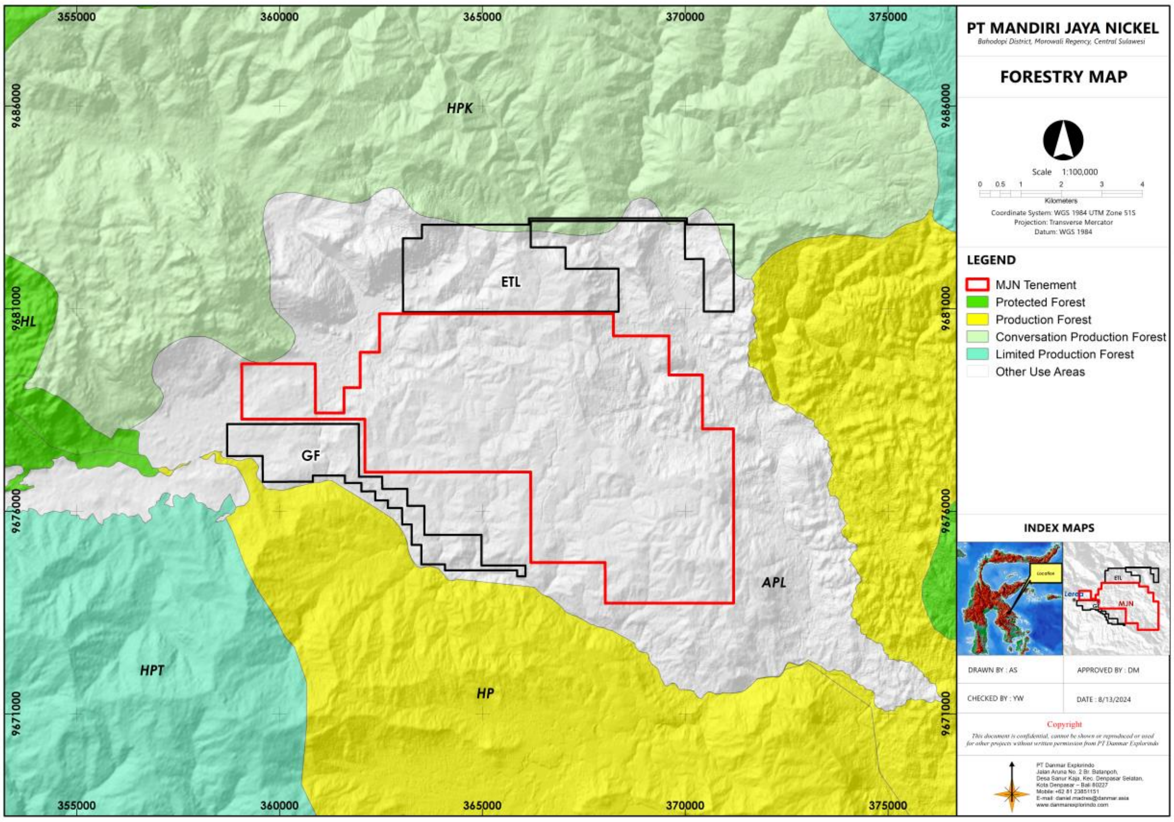


Figure 3-4 Forestry map of MJN

3.5 REGIONAL GEOLOGY

The regional geology map shows that the MJN concession area is part of the Salodik and Tomata Formations. However, on the ground, the surface geology is almost entirely nickel laterite demonstrating that the regional geology, of the area, is dominated by ultrabasic complex geology which is the source rocks for nickel laterite. The geological structure in the area is complex and major faults intersect the MJN area, which may have increased permeability in the ultramafic bedrock and facilitated the development of thick nickel laterite.

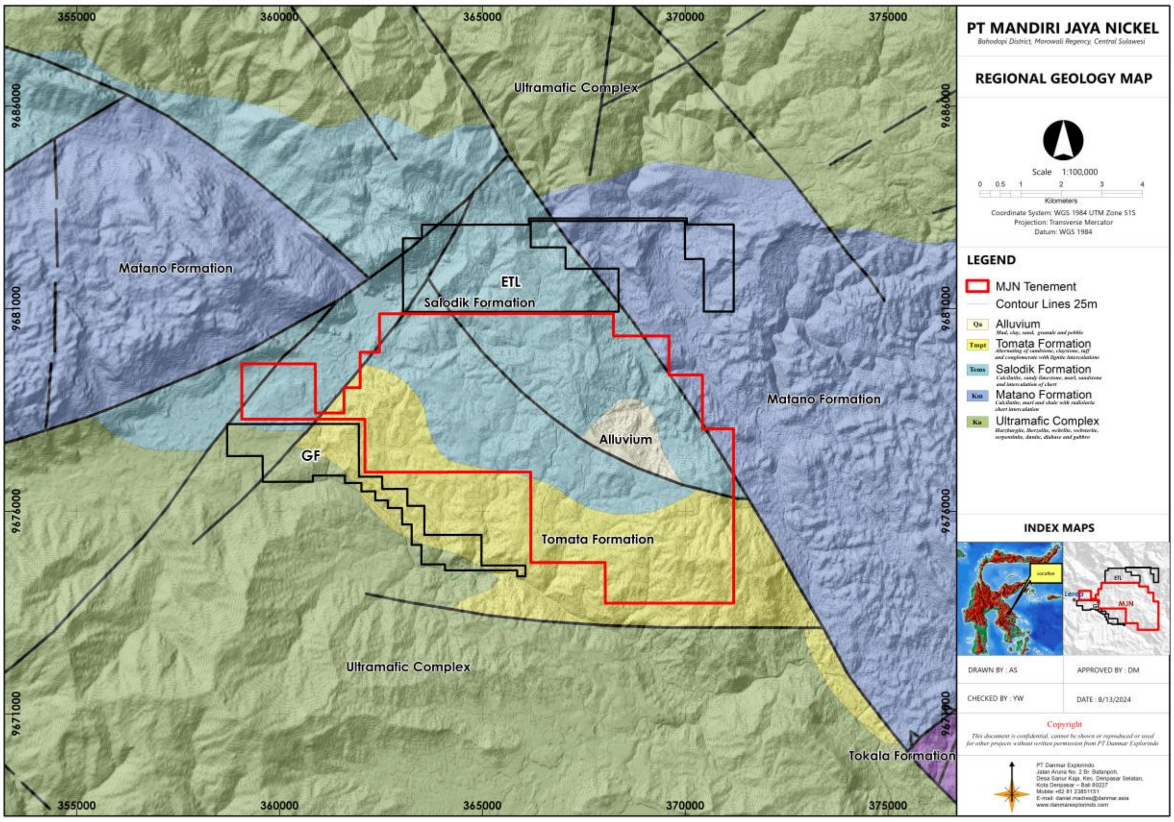


Figure 3-5 Regional geology map of MJN

The regional tectonic setting for Central Sulawesi is the result of a complex collision between 3 of the earth's major crustal plates namely, the Australian plate, the Pacific plate and the Eurasian plate. As a result, three smaller plates have formed in this collision zone known as the Sunda Plate, Philippine Plate and Caroline Plate. The collision between all these tectonic plates is the cause of sections of the seafloor to be obducted on to continental rocks in Sulawesi, North Maluku and Papua. This is the origin of the East Indonesian Ophiolite Belt which is one of the largest ophiolite regions in the world and the source of nickel laterite deposits in East Indonesia. Ophiolites are the result of the process of overthrust of oceanic crust and mantle to a position on top of continental rocks. This intense structural geological setting is also the reason major geological structures such as the Palu, Matano and Lawanopo faults dissect the Central Sulawesi region and control the distribution of rocks in the area.

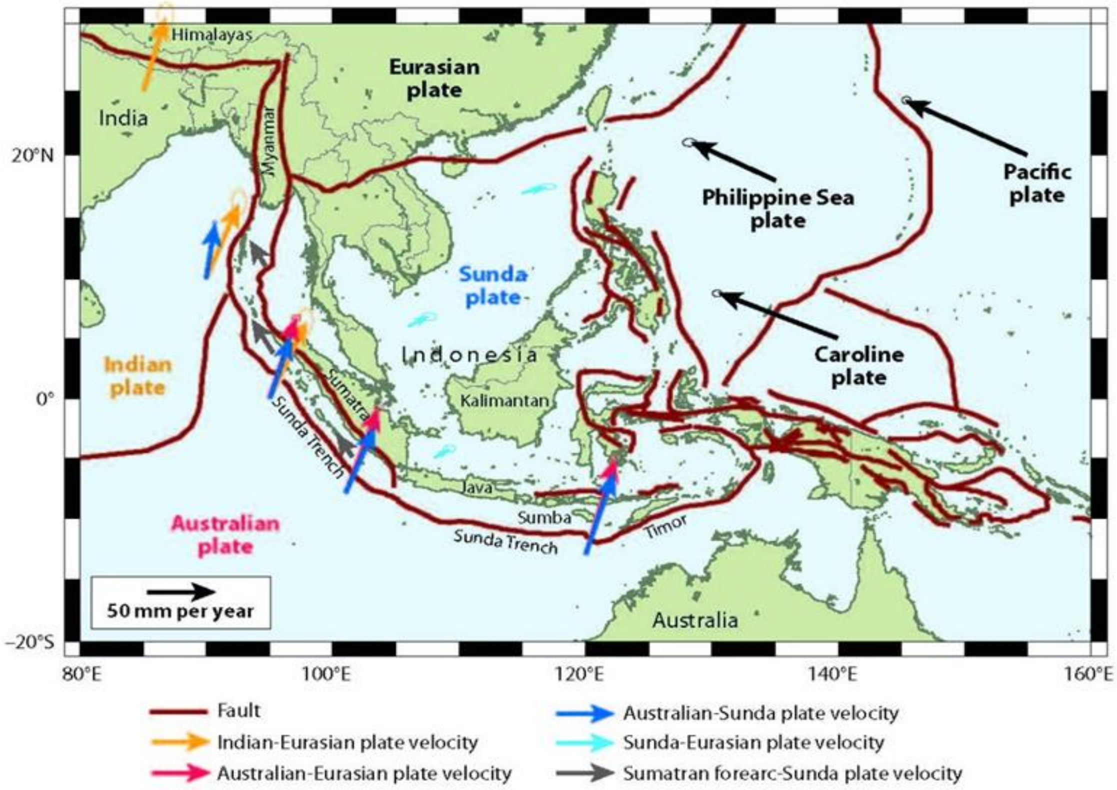


Figure 3-6 Regional tectonic geology map of Sulawesi (R McCaffery 2009)

When ophiolite rocks are exposed to humid, tropical climates over a long period of time laterization can occur as the rocks are weathered. In this process of weathering by rain, soluble minerals are leached away and less soluble minerals such as iron, nickel and cobalt are left behind in the weathering profile. This laterization process is influenced by climate, geological structure, rock type, permeability and topography over long periods of time, to form a soil profile in which minerals containing nickel and other elements can be depleted in some places and concentrated in other areas. Within the ground, the leaching process is enabled by the permeability of the bedrock often as a result of tectonic movement causing fracturing and shearing creating conduits for the flow of mineral rich solutions leached from above.

Figure 3-7 shows the naming and correlation of rock units on the published Regional Geology Map of the MJN project area. According to the 1:250,000 scale Bungku Geology Map Sheet, most of the MJN concession area is covered by the Salodik Formation which is much younger than the Ultramafic Complex of the East Sulawesi Ophiolite Belt (see figure 3-7).

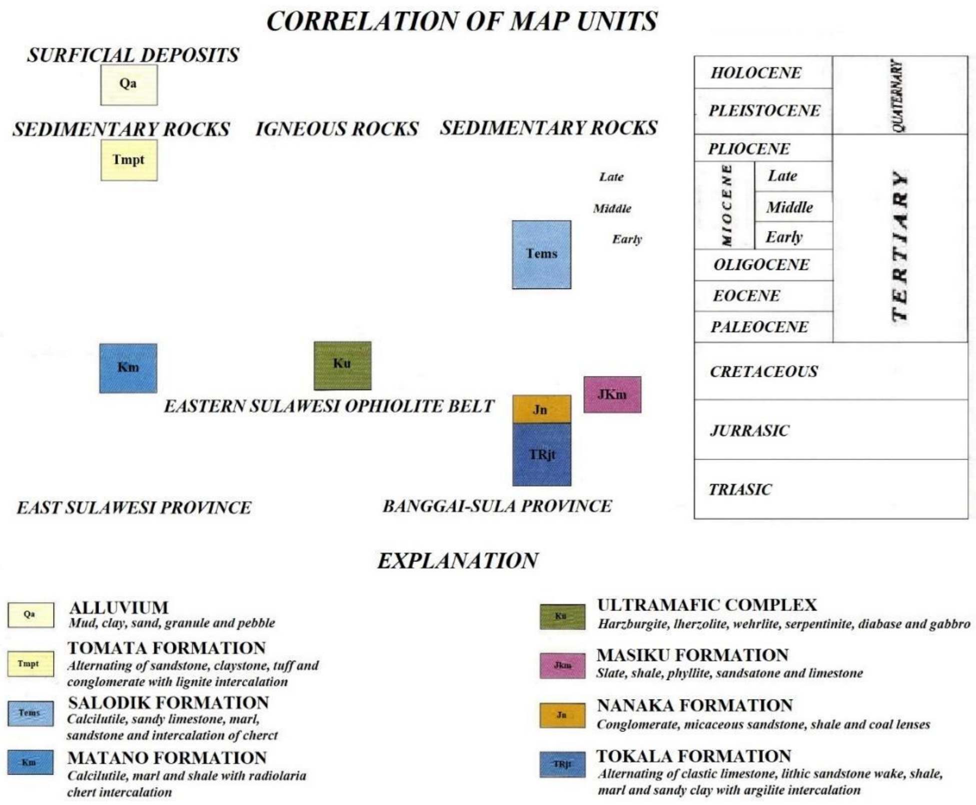


Figure 3-7 Regional stratigraphy published in 1:250,000 scale Bungku Geology Map

3.6 LOCAL GEOLOGY

The local geology, on the ground, within the concession, does not reflect the Regional Geology map. Most of the concession is covered by nickel laterite indicating that the geology within the concession is predominantly ultrabasic rocks. In some parts of the MJN concession sediments overlay the laterite. These rocks consist of coarse sandstone and conglomerates, often containing fragments of ultrabasic rocks as well. A laterite distribution map provided by MJN is shown in Figure 3-8.

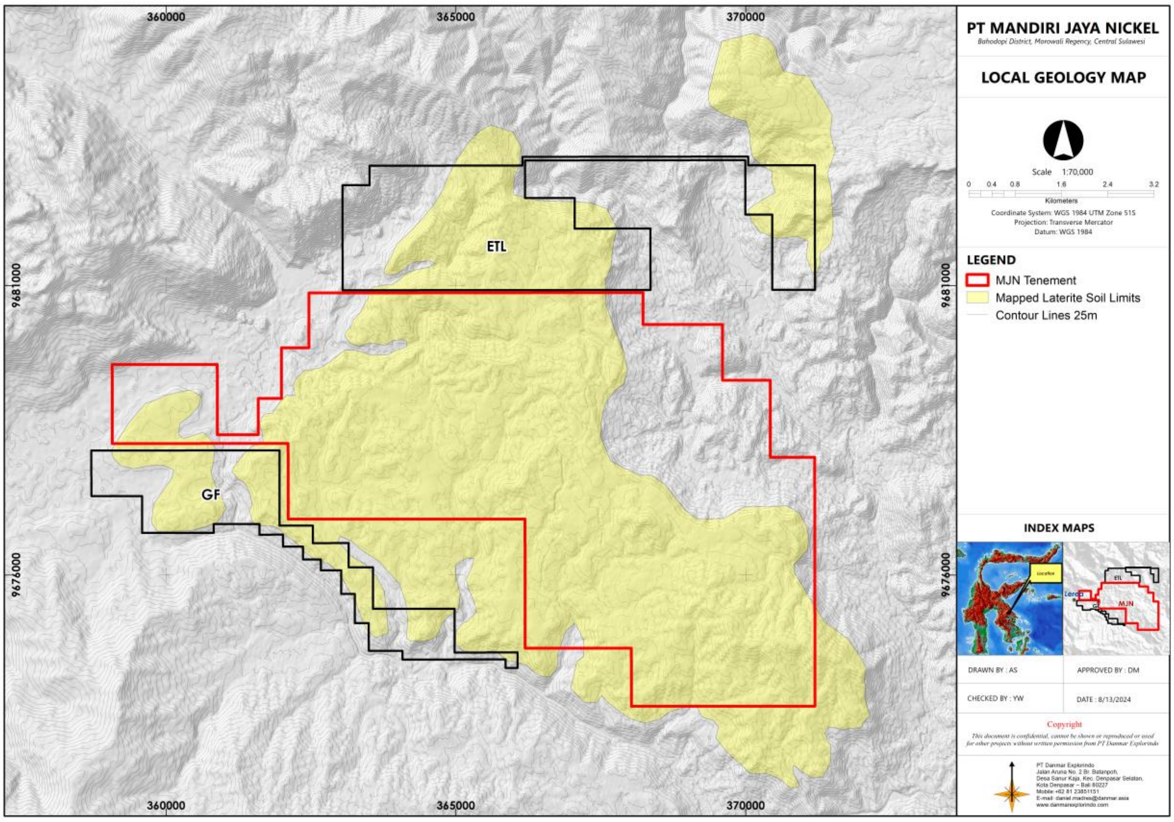


Figure 3-8 Local geology map (source MJN)

3.7 PREVIOUS INVESTIGATIONS

In 1999, Rio Tinto began exploring a large area that covered the northern part of Konawe and the the southern part of Morowali Regencies, which included the MJN area. Mapping, GPR and drilling were carried out in the areas where, PT Bintang Delapan and PT Sulawesi Cahaya Minerals are currently located. From the data available at the time of writing this report it appears that no previous work is documented within the MJN area.

4 CURRENT EXPLORATION PROGRAM METHOD

4.1 ULTRA GROUND PENETRATING RADAR SURVEY

Groundradar's Ultra GPR technology is a geophysical survey technique that can be used to detect subsurface geological layering and structure in nickel laterite. Relatively quick and easy to apply in the field, Ultra GPR enhances the exploration process for laterites by detecting laterite thickness and bedrock morphology. The use of the Ultra GPR survey is designed to increase the confidence of geological interpretation, provide a guide to thickness and depth of the target layers and help to optimize drill programs to focus on the best areas. As with all geophysical methods, Ultra GPR provides supportive data for points of observation provided by drilling for nickel Resource estimation.

Photo 4-1 Ultra GPR survey acquisition (source: Groundradar.com)

At MJN, Ultra GPR has been a useful exploration tool to indicate the lithological contact between limonite (massive clays) and the saprolite (weathered rocks) as well as the bedrock. Results provide indicative volumes of potential limonite and saprolite located within the survey area. Results combined with drilling data can give greater confidence of nickel laterite ore body structure, dimensions and distribution. Figure 4-1 shows the close correlation of the interpreted GPR zones to the commonly named weathering profiles of nickel laterites.

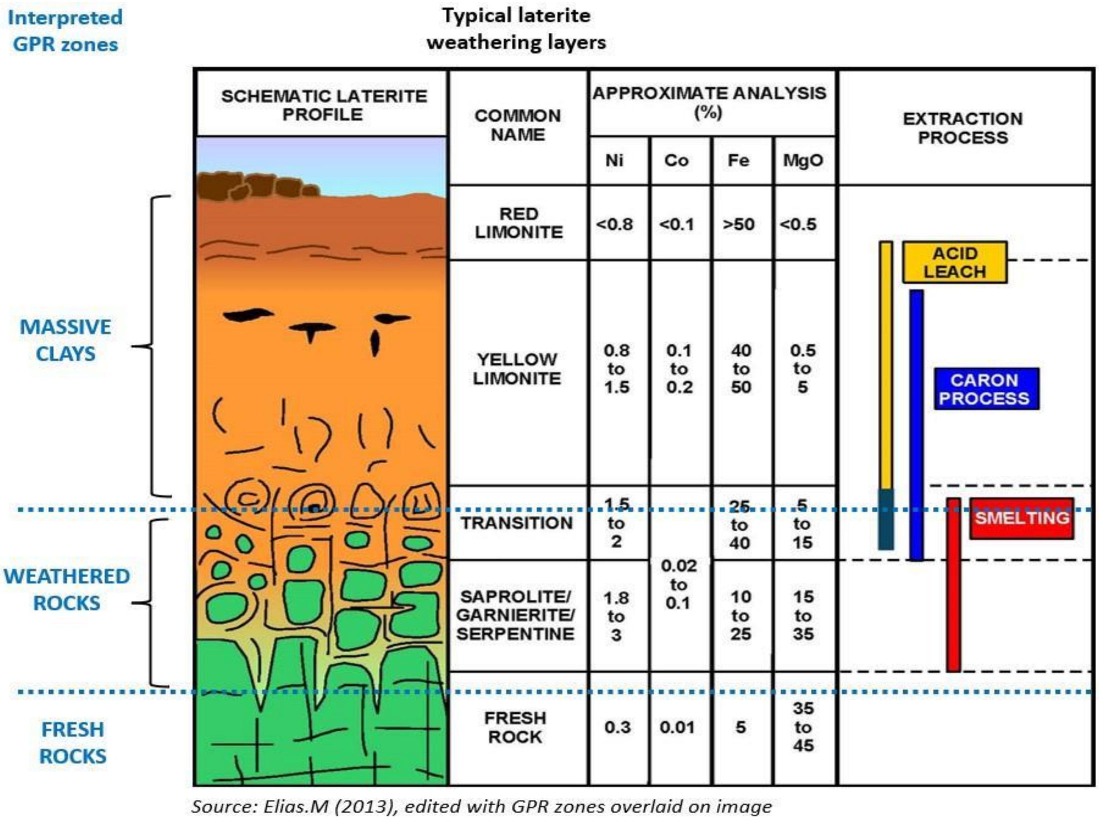


Figure 4-1 Diagrammatic representation of a typical laterite profile in Sulawesi

Highly weathered laterite zones are typically structurally controlled. Geological structure can influence the distribution of where thicker, higher grade limonite and saprolite may be found. Although these structures can often be interpreted from the topographic surface relief, with the help of Ultra GPR, these structures can be delineated with relative confidence providing drill targets to optimize drill programs towards the thickest and most prospective locations. Figure 4-2 shows an example of typical survey results using Ultra GPR technologies on laterite deposits of Sulawesi.

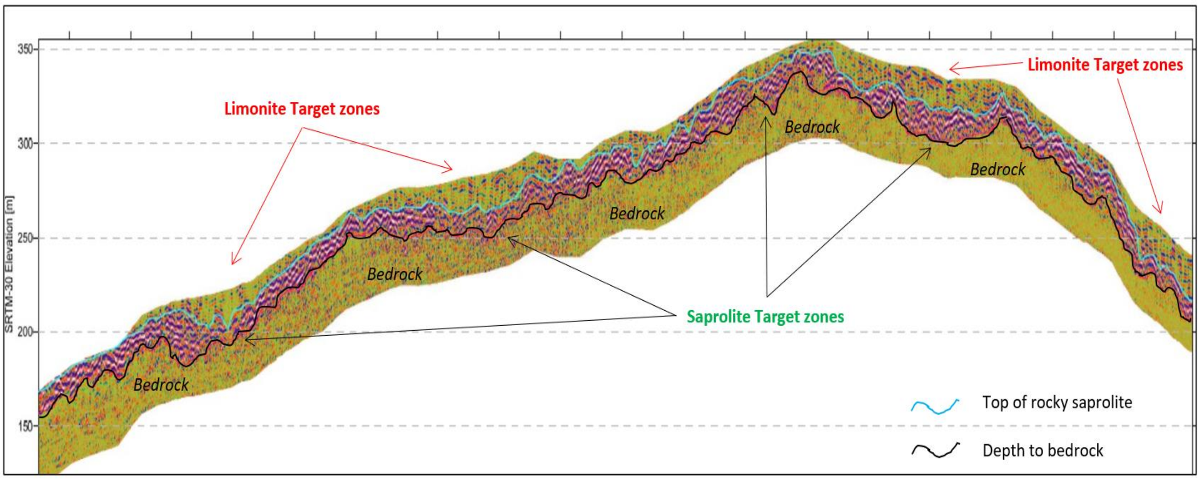


Figure 4-2 Example UltraGPR survey of a typical laterite profile in Sulawesi

4.2 DRILLING

In November, 2021, four units of Dexdrill 200 started to systematically drill the MJN nickel laterite project. The drills are ideally suited to laterite core drilling as they are quick, lightweight and man portable. They have the added advantages of providing local people employment and also have low environmental impact with no need for road access or dozer support. The drills use HQ triple tube core barrels.

Photo 4-2 Dexdrill 200

Drilling was carried out using standard operating procedures designed to ensure drill data complies with the JORC Code to be used as points of observation in this study.

4.2.1 CORE RECOVERIES

In the current drill program core runs are restricted to a maximum of 1meter intervals to optimize core recoveries. Core is extracted from the inner tube and directly transferred to the core box core based on the core run. The core is then immediately measured for length to determine core recovery and or swelling. Core is arranged in maximum 1 meter runs inside the core box with each run filling a new row in the core box. Consecutive core runs are also arranged in new rows starting on the left side of the core box, to avoid any mixing or contamination from other core samples. The bottom of each core interval is labeled for its depth so that it is clearly displayed. Core boxes that are partially filled at the wellsite, and not yet completed, are carefully covered so that the samples are kept free from contamination and damage while drilling of the hole is completed.

4.2.2 DRILL COLLAR SURVEY

The topography of the MJN IUP has been surveyed using LiDAR to produce a digital terrain model of the ground surface in the area. The accuracy of the LiDAR is within 15cm vertical and 40cm in the horizontal plain which is appropriate to support Resource estimates. Ground survey using E-Survey RTK GPS equipment is used to survey the drill hole collar locations.

Photo 4-3 Drill collar survey using E-survey RTK GPS

4.2.3 GEOLOGICAL LOGGING OF CORES

Once drilling the hole is complete, wherever possible, the full core boxes are positioned in a level place in consecutive order. In this way the full hole section can be viewed for ease of describing each run and determining the geological boundaries. The description starts at the surface and follows each 1meter core run until the total depth is reached. Core that contains more than 20cm of solid rock is recorded as a geological boundary. The core length is checked against the actual depth recorded in the core box. The detailed description is completed as required in the logging form. The well site geologists follow a standard operating procedure for the core logging process so that all geological logs are standardized.

4.2.4 CORE PHOTOGRAPHY

With the core boxes in position, in a level place, with no cover, in consecutive order, core photos can take place. Checks are carried out to make sure that the depth labels are clearly visible and in position at the bottom of each core run. Cores with swelling or core loss are clearly marked as well as labels showing where density samples have been removed or will be taken. The well site geologist checks to make sure the core box label shows the correct Hole Identification, sequential arrangement, depth interval, date of start and finish drilling, EOH (end of hole), initials of the wellsite geologist and the rig identification number. When this is ready photos are taken in good light conditions making sure to minimize shadows and reflections.

Photo 4-4 Core photo example from MJN

4.2.5 DRILL CORE SAMPLE HANDLING

Plastic sample bags are always double layered to protect the integrity of the samples against accidental contamination, damage or loss. Samples are bagged according to the geological horizon from which they belong and or in 1meter intervals, if there is no geological boundary and the plastic identity label placed inside. After each core box is emptied the outer layer sample bag is tied with string in a bow so that it can easily be undone at the camp for rechecking and final labeling. During the sampling process, the sample form is continuously filled out so that as samples are bagged every sample is recorded. Checks are made to ensure the sample intervals and labels are correct. Rechecks are done so that the sample intervals can be reconciled and there are no gaps in the depth intervals. Samples are then packed in sacks and tied with flagging tape showing the hole identification. If stored in the field the sacks are covered for protection from the weather. Samples are delivered to HM core store at the MJN site.

Photo 4-5 Sample packing at the well site

4.3 LABORATORY SAMPLE AND ANALYSIS PROCEDURES

Full cores were bagged, labelled and sent to laboratories for testing. Most of the samples, from MJN, were sent to PT Geoservices laboratory for certified XRF assay analysis. Some of the samples were tested in an internal laboratory operated by PT Hengjaya Mineralindo according to strict QA/QC protocols (see Appendix 9.4).

5 RESULTS

5.1 GPR SURVEY

Since November 2021, 387km of UltraGPR survey has been completed at the MJN project covering 3,608Ha within the MJN IUP permit.

The survey are lines shown in Figure 5-1 below. The UltraGPR survey data from all areas were of good quality and were easily interpretable. Maps were created showing the interpreted thickness of limonite and saprolite layer horizons and depth to bedrock (base of the weathering zone). Also observed, in several areas, an overalying thick sediment, possibly transported clays and rock materials are above the laterite soils. The total area surveyed was approximately 3,608Ha. The nominal spacing between radar lines was approximately 200m. The UltraGPR survey grid, where possible, is in the same location as the drill lines. Table 5-1 shows the resulting interpretation for laterite volumes using the UltraGPR data.

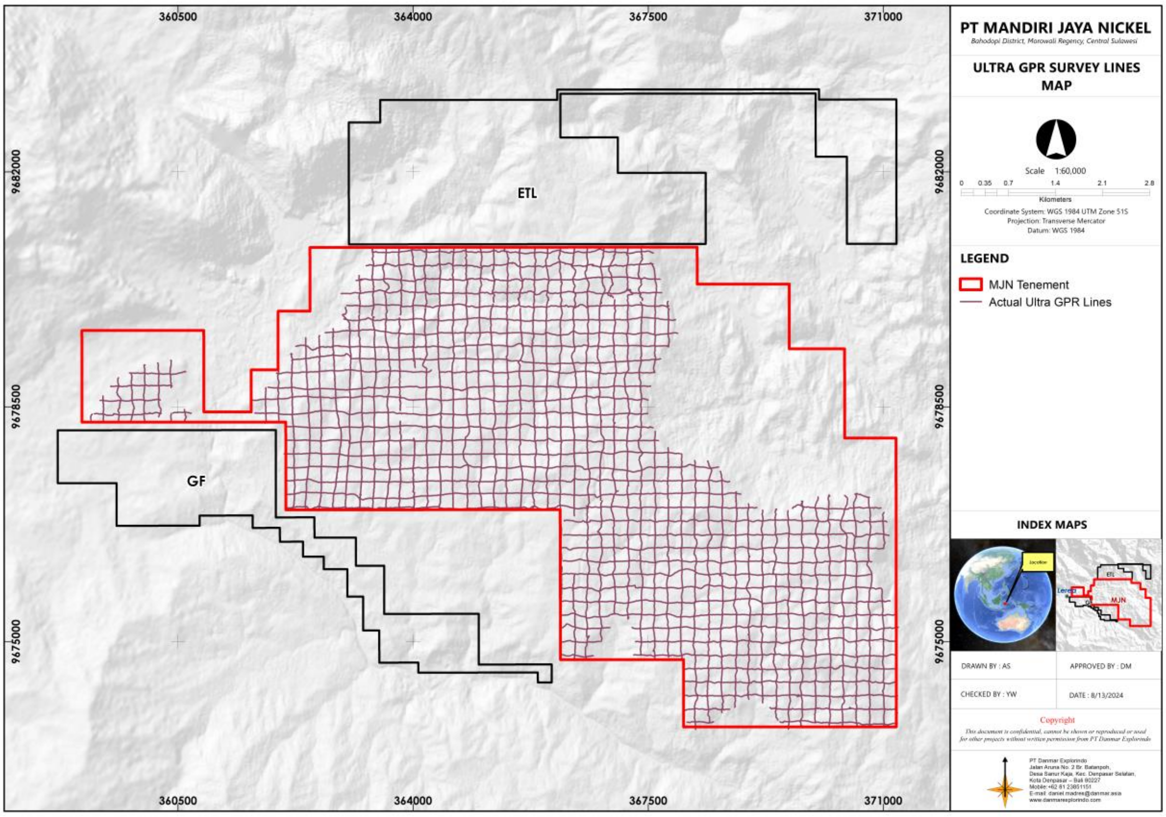


Figure 5-1 Ultra GPR survey lines on topographic map

Table 5-1 Ultra GPR survey results interpretation

Exploration target Laterite soils (interpreted from UltraGPR volumes)				
Soil Layer Material	**Area (Ha)**	**Wet Tons***	**High**	**Low**
Sediments	1100	200,000,000	n/a	n/a
Massive Clays (Limonite)	3608	720,000,000	200,000,000	400,000,000
Weathered (Saprolite)Rocks		720,000,000	75,000,000	150,000,000
Total	**3608**	**1,440,000,000**	**275,000,000**	**550,000,000**

**Wet ton conversion RD 1.8sg sediments & massive clays (Limonite) RD 1.6sg weathered rocks (saprolite)*

Based on simple statistical assumptions 275,000,000 –550,000,000ton (wet) of higher nickel grade laterite might be targeted by next phases of exploration, including core drilling with Lab assay sampling will be required to confirm the grades of the laterite ores distributed within the target zones

Limonite range based on 30 – 60% of the total Massive Clay volume could be converted into low grade ores suitable for HPAL markets

Saprolite range based on 10 – 20% of the total Weathered rocks volume could be converted into higher grade ores suitable for RKEF markets

An example of two Ultra-GPR section interpretations in the Block A area is shown in Figure 5-2.

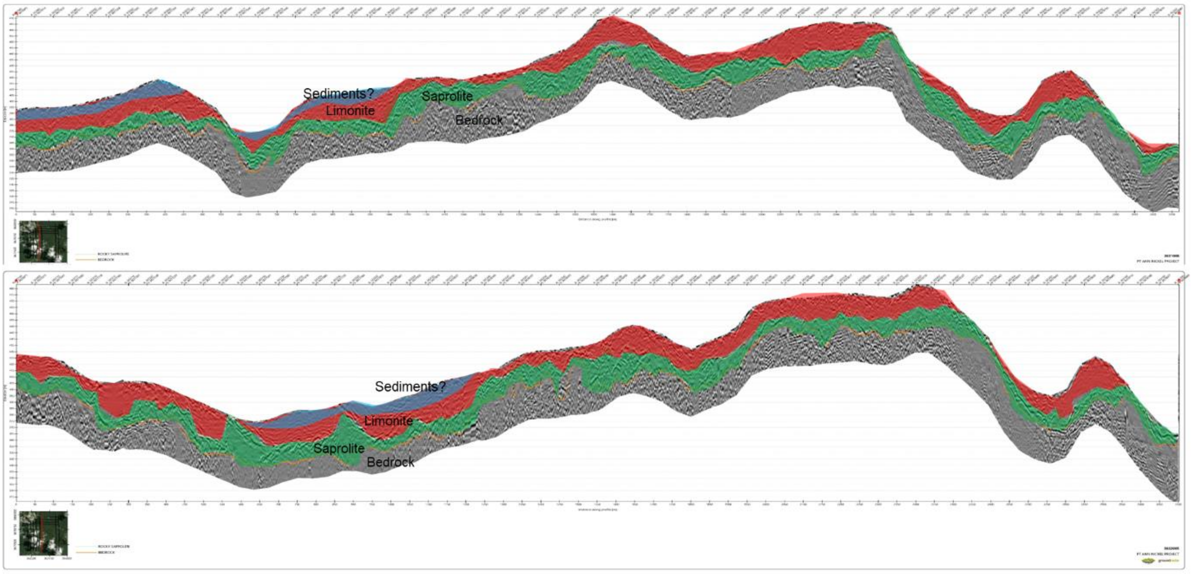


Figure 5-2 Ultra GPR section line interpretation example from MJN Block A

Figure 5-3 shows the limonite thickness interpreted from the UltraGPR survey data. Figure 5-4, 5-5 and 5-6 shows the saprolite thickness, depth to bedrock and thickness of sediments on top of the laterite, interpreted from the UltraGPR survey data.

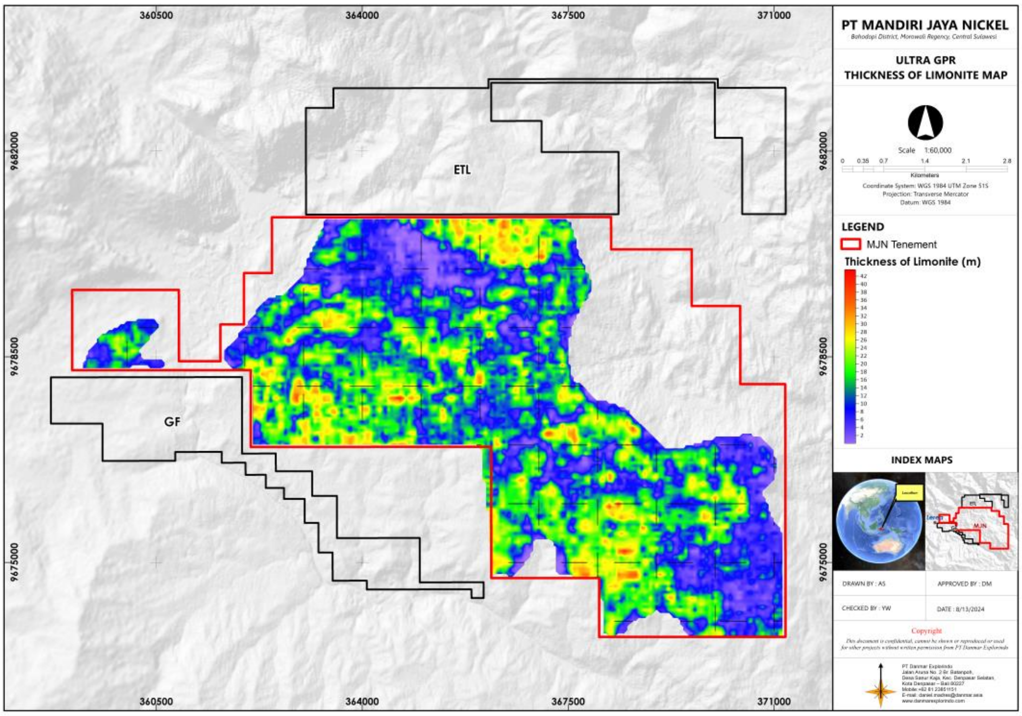


Figure 5-3 Limonite thickness interpreted from the Ultra-GPR survey

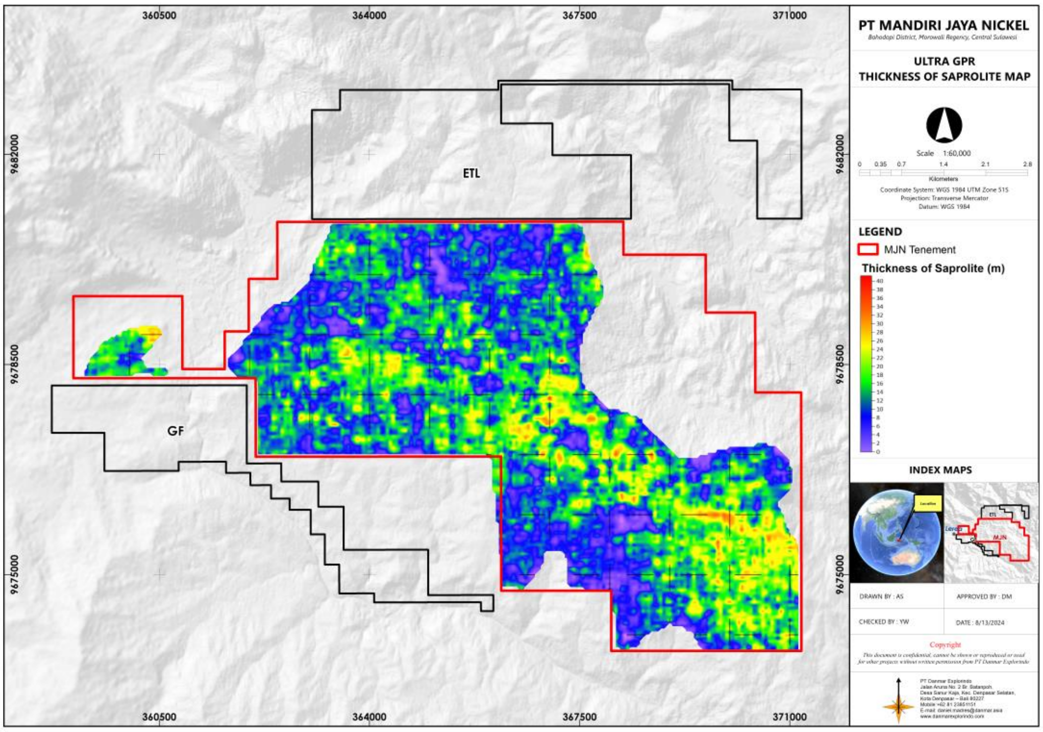


Figure 5-4 Saprolite thickness interpreted from the Ultra-GPR survey

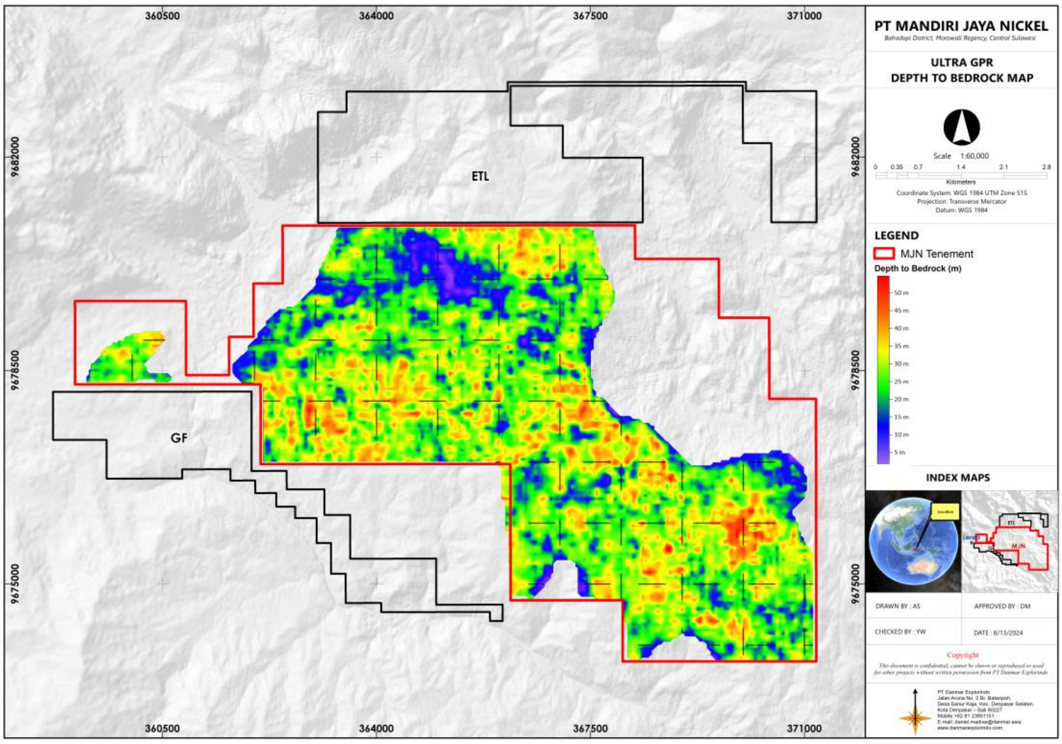


Figure 5-5 Depth to bedrock interpreted from Ultra-GPR

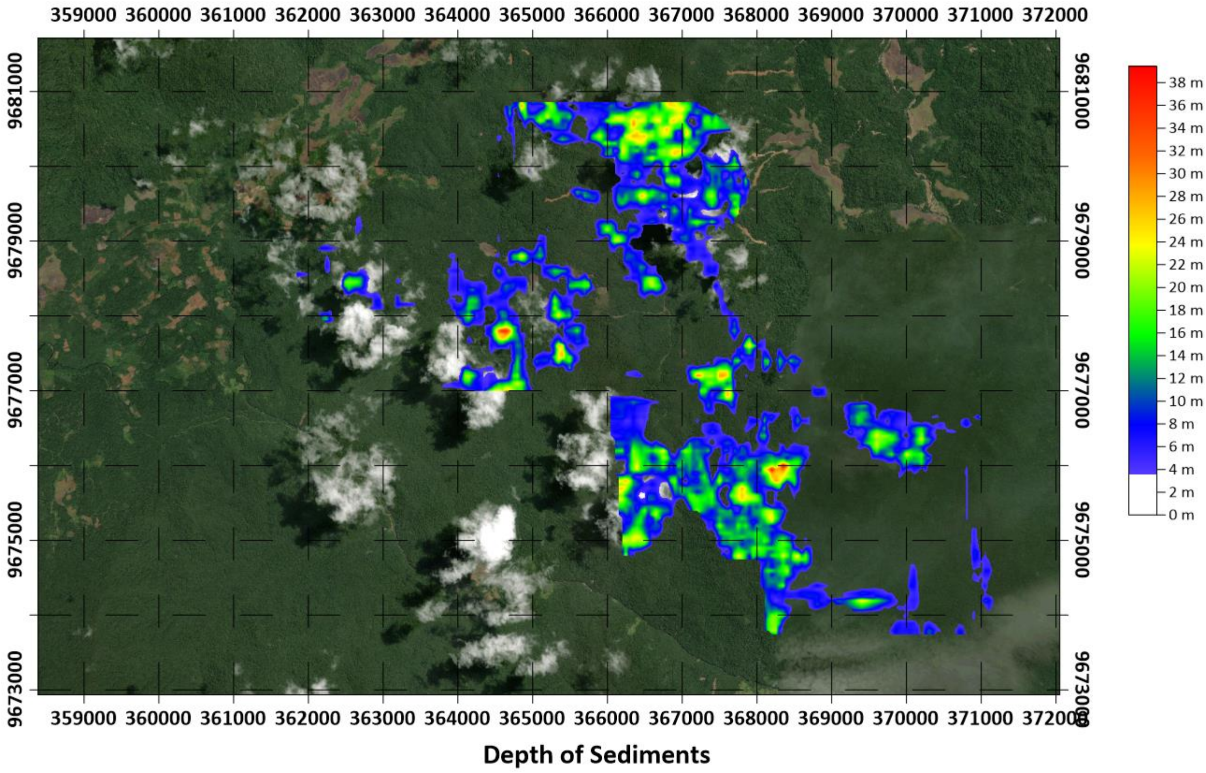


Figure 5-6 Thickness of sediments on top of the laterite

5.2 DRILL RESULTS

Validated drill data used in this study is summarized below in Table 5-2.

Table 5-2 Drilling results

Project	Area (Ha)	Drilling Used in Resource		
		Drillholes	Cumulative Meters	Sample Assay Completed
MJN	562	555	14,070	14,184

For the purpose of this Resource estimate, a database of validated drilling data including 555 drill holes with a cumulative total depth of 14,070m and 14,184 analyses results, has been constructed. Until now, all of the drilling is on a systematic grid of 100 X 100m providing a regular spread of drill data over a portion of the laterite area in Block A only. The drilling has been focused on Ultra-GPR targets with the objective of Resource definition in these areas. The drilling locations, used in this study, are displayed in Figure 5-7.

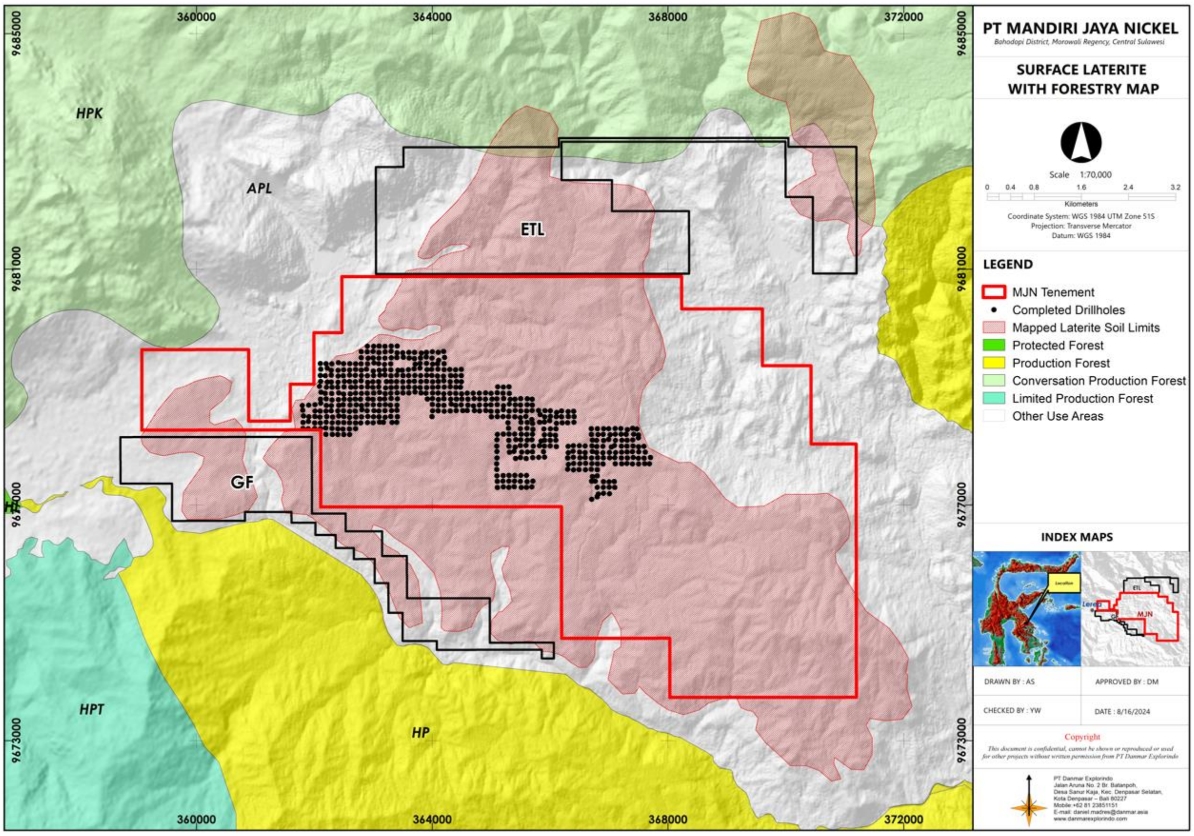


Figure 5-7 Drillhole location map (100 meter spacing)

Data from this drilling program was systematically recorded and includes core recovery measurements supported by core photography. Core recovery data for composites for each lithology is summarized in Table 5-3.

Table 5-3 Core recoveries

DATA SOURCE	Lithology	Samples	Recorded Core Recovery				Not Recorded
			≥ 95%	95%-90%	90%-85%	< 85%	
DANMAR EXPLORINDO	SED	35	100.0%	-	-	-	
	LIM	10,089	99.8%	-	-	0.1%	
	SAP	2,769	98.5%	0.2%	0.3%	1.1%	
	BRK	1,291	89.7%	0.2%	0.5%	1.6%	
	AVERAGE	14,184	98.6%	0.2%	0.4%	0.9%	

5.3 SURVEY RESULTS

LiDAR topography survey covering the MJN IUP was completed in 2022. All of drillhole collars, which were surveyed by RTK GPS (Table 5-4), were included in the validated database as they very closely matched the LiDAR surface and correlated well to the topography for the geological modeling process. Figure 5-8 shows the location of the LiDAR survey extents which covers the enitre Mineral Resource area.

Table 5-4 Collar survey mis-close with LiDAR

Survey Method	Total Collar	Collar resurvey RTK	Collar Survey Mis-close With LiDAR Topography					
			Minimum (m)	Maximum (m)	Average (m)	Std	(-2) Std	(+2) Std
RTK GPS	555	100%	-0.45	0.65	0.00	0.10	0.09	0.10

The data is considered sufficiently accurate and appropriate for use in this Resource estimation.

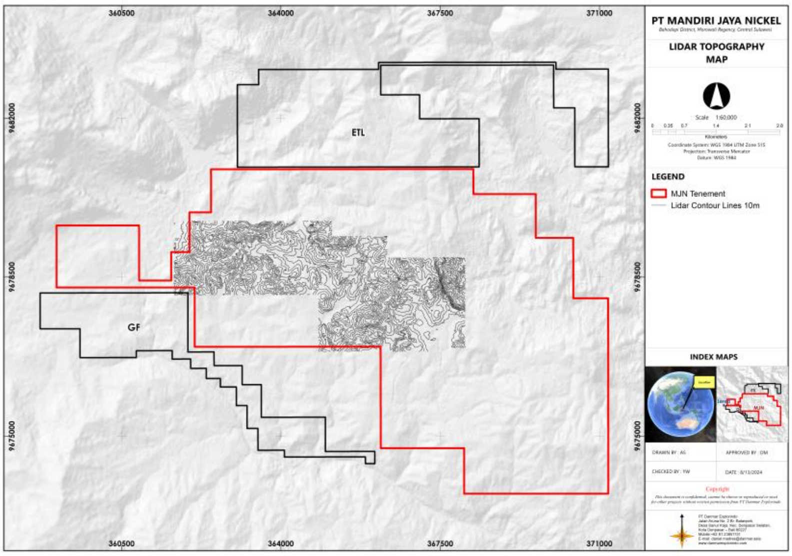


Figure 5-8 LiDAR topography map of part of the MJN Block A drill area

5.4 ASSAY ANALYSIS RESULTS

14,184 XRF sample analyses have been performed on drill core samples to document the grade characteristics throughout the Block A, Nickel Resource area at MJN. Sample interval has been predominantly 1m as per each core run. 98.5% of sample intervals were taken from drilling cores at 1m intervals while the remaining 1.5% of samples where placed in separate samples where geological boundaries were intersected. Where the sample interval is less than 1m the analysis result has been weighted for the interval that it represents. Table 5-5 displays the sample interval data and statistics.

Table 5-5 Sample interval statistics

Parameter	Core sample
Mean Thick (m)	0.99
Median Thick (m)	1.00
Mode	1.00
Standard Deviation	0.07
Sample Variance	0.00
Kurtosis	81.26
Skewness	-8.86
Range	0.86
Minimum (m)	0.14
Maximum (m)	1.00
Sum of total cores taken	14,070
Count assay	14,184
Confidence Level (95.0%)	0.0011

5.5 DATA COMPILATION

5.5.1 DATABASE

The MJN database compilation, validation and correlation uses Surpac® mining software with Microsoft® Access Relational Database Management System (RDBMS) providing the storage of collar, downhole survey, lithology and assays.

5.5.2 DATA VALIDATION PROCESS

The collar survey, assay and geology tables of the dataset was validated to correct data error issues such as:

- missing or duplicate collar records
- overlapping intervals in the assay records
- collar elevation errors compared to current LiDAR topography
- downhole survey accuracy issues, total depths, from/to intervals
- core recoveries and swelling
- lithology description from wellsite geologists
- reconciliation of lithology with laboratory assay results
- moisture records from core lab analysis
- downhole statistical analysis

All of the drill data met the accuracy standards during the validation process.

5.5.3 RECONCILIATION OF LITHOLOGY AND ASSAY RESULTS

During the database validation process, the downhole lithological description provided by the wellsite geologists was reconciled once the lab assay results were available. These corrections were then applied to lithology and composite code to be used in the modeling process.

Limonite (LIM) zones were relatively homogenous, due to the highly weathered laterite layer consisting mostly of massive clay formations, with only minimal boulders of bedrock. This layer was divided further for the extraction of composites into Topsoil and Limonite as several different characteristics can be identified in assay, density and moisture content. It is generally assumed in the mining process that the Soil layer is waste (overburden) due to the nickel grade cut-offs used. The Limonite layer is designed to meet the specifications for supply to a HPAL(high pressure acid leach) facility at the IMIP smelter.

The underlying Rocky Saprolite (SAP) zone is in a less homogeneous geological environment. Compared to the Limonite it is only moderately weathered. The Saprolite layer often includes a transition zone, from the overlying Limonite, fresh rock boulders and weathered bedrock which are all composited into the Saprolite (SAP) code to provide an unbroken composite within the modeled laterite horizon.

Bedrock (BRK) definition was given to intersections of the fresh ultramafic rock zone intersected at the bottom of drill holes, defining the lower boundary to the total extent of the laterization process. Some nickel grades were encountered in the bedrock but at this time it was not included in the current Resource.

5.5.4 DOWNHOLE STATISTICAL ANALYSIS

Downhole descriptive statistical analysis was conducted on the validated database used in the Mineral Resource, in order to check the distribution and ranges of the analyzed elements and identify any anomalous or outlying data before the interpreted lithological surface horizons were correlated into the final model.

These simple statistical checks were completed for Ni, Co, Fe, MgO, SiO2, Al2O3, CaO, Cr2O3, MnO which comprise the main elements for the mining extraction and smelting processes already being applied at the MJN site (see Table 5-6).

Table 5-6 Descriptive statistical analysis results

Variable	Profile	Samples	Mean	Median	StDev	Variance	CoefVar	Minimum	Maximum	Skewness	Kurtosis
Ni	SED	35	0.40	0.39	0.10	0.01	24.27	0.22	0.57	-0.02	-0.74
	LIM	10,089	1.15	1.15	0.34	0.11	29.11	0.06	3.28	0.48	2.05
	SAP	2,769	1.55	1.48	0.63	0.40	40.70	0.09	4.81	0.63	0.72
	BRK	1,291	0.45	0.38	0.25	0.06	54.35	0.02	1.85	1.59	3.73
Co	SED	35	0.07	0.06	0.02	0.00	22.62	0.04	0.11	0.84	0.47
	LIM	10,089	0.10	0.10	0.06	0.00	63.41	0.00	0.80	1.68	9.77
	SAP	2,769	0.04	0.03	0.03	0.00	77.14	0.00	0.26	2.06	6.36
	BRK	1,291	0.02	0.01	0.01	0.00	72.03	0.00	0.12	3.52	17.88
Fe	SED	35	29.90	28.78	5.94	35.28	19.87	16.68	43.09	0.20	0.13
	LIM	10,089	40.94	42.16	6.30	39.66	15.38	2.11	56.99	-1.91	5.97
	SAP	2,769	15.10	13.59	6.91	47.79	45.76	1.31	45.67	1.11	1.39
	BRK	1,291	7.26	6.65	2.75	7.56	37.86	0.79	42.94	5.10	42.78
MgO	SED	35	1.35	1.40	0.28	0.08	20.40	0.85	2.10	0.81	1.23
	LIM	10,089	1.81	1.14	2.55	6.52	141.15	0.01	38.04	6.58	57.68
	SAP	2,769	17.10	17.60	7.86	61.85	46.00	0.17	38.34	-0.12	-0.72
	BRK	1,291	26.95	28.40	7.16	51.32	26.58	0.55	41.42	-1.69	3.49
SiO2	SED	35	1.19	1.00	0.78	0.61	65.79	0.43	4.60	3.05	11.14
	LIM	10,089	6.70	2.90	8.68	75.41	129.69	0.02	97.54	3.22	16.29
	SAP	2,769	34.85	34.80	7.79	60.72	22.36	1.29	92.00	0.27	5.72
	BRK	1,291	38.02	36.60	7.81	61.03	20.55	1.62	94.33	2.58	12.76

Histograms assay data subsets were created for nickel split by Limonite, Saprolite and Bedrock zones to assess the distribution of assay results. Most histograms show some skewness of the population due to outliers. These are likely due to the compositing process of the assay reconciliation and transition between the assigned lithology zones. In many cases outliers were accepted due to the geological zoning, with most identified as bedrock boulders inside the Limonite and Saprolite layers.

The histogram plots, for nickel grade values, show positively skewed data. This suggests outliers could cause possible overestimation to the Mineral Resource grade due to bias caused by the extreme grades, which is commonly known as the nugget effect. To reduce the impact of these outliers, top cuts are calculated by estimating the range from 2 standard deviations from the mean, which assumes that 95% of the values are within this adjusted range. This top cut strategy is considered adequate for this project since the frequency of the outliers are considered relatively low.

The application of these top cuts to normalize the distribution of the statistical percentage, nickel grades were reviewed. From these recommendations, a top cut for each domain was applied to nickel composites and used in the model grade interpolations to limit the influence of statistical outliers within each of the grade domains. Bottom cuts of 0.25% nickel were also applied to all domains.

Figure 5-9 shows the histogram of raw nickel grade values without any statistcal topcut applied indicating the positive skew of the dataset. Figure 5-10 shows the application of the top cut on the distribution of the nickel grade values used in the model.

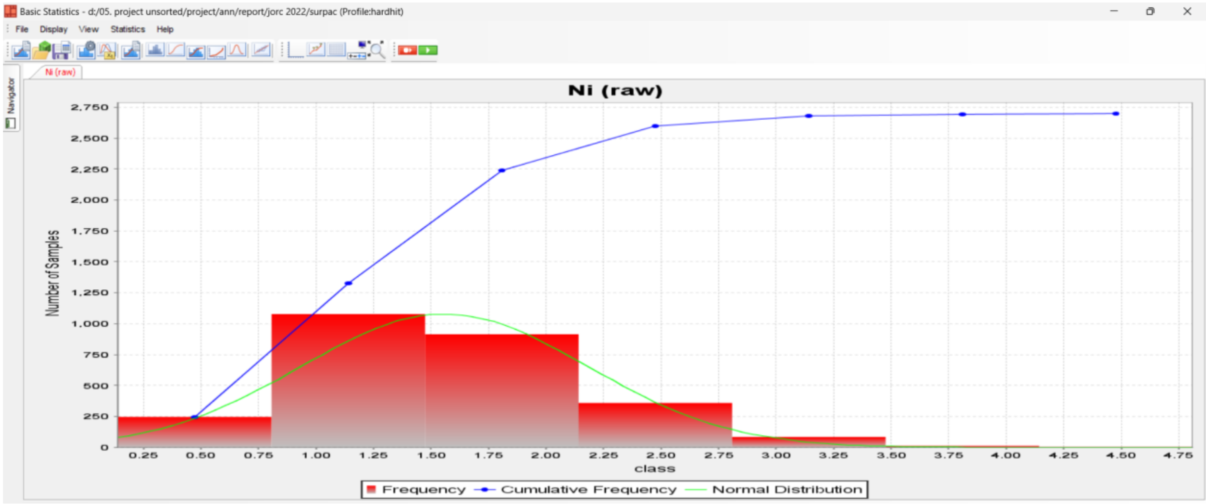


Figure 5-9 Histogram of saprolite Ni Grade without top cut applied

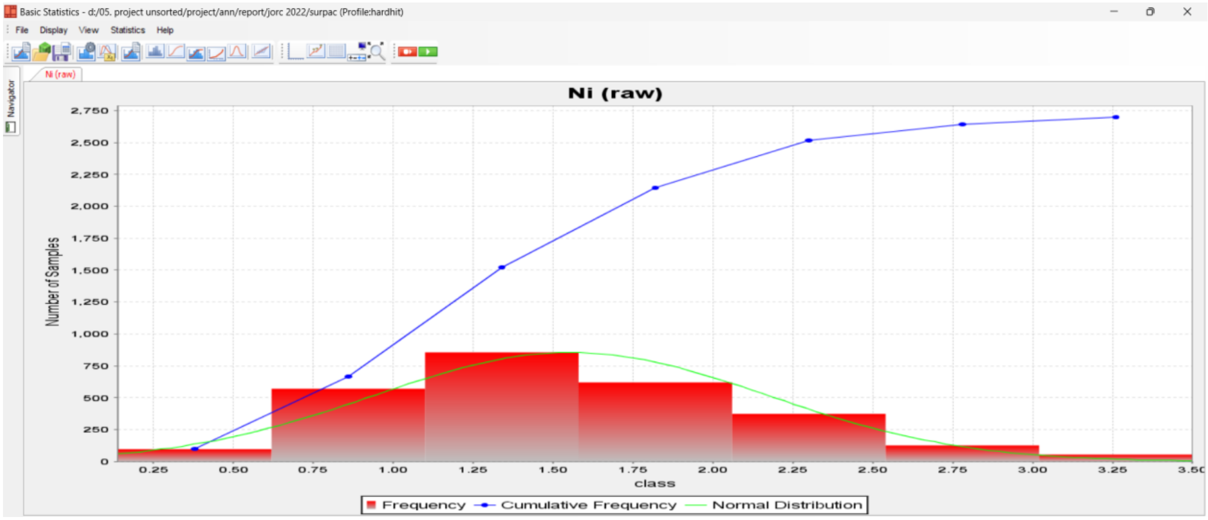


Figure 5-10 Histogram of saprolite Ni Grade with top cut 3.5% applied

Composited, down hole statistics extracted by zone thickness and average nickel grades for Limonite and Saprolite were plotted on a map to identify the spatial distribution of each zone respectively as shown in figures 5-11 and 5-12 for Limonite and figures 5-13 and 5-14 for Saprolite.

For further details on downhole statistical analysis and geostatistical information please see Appendix 9.3.

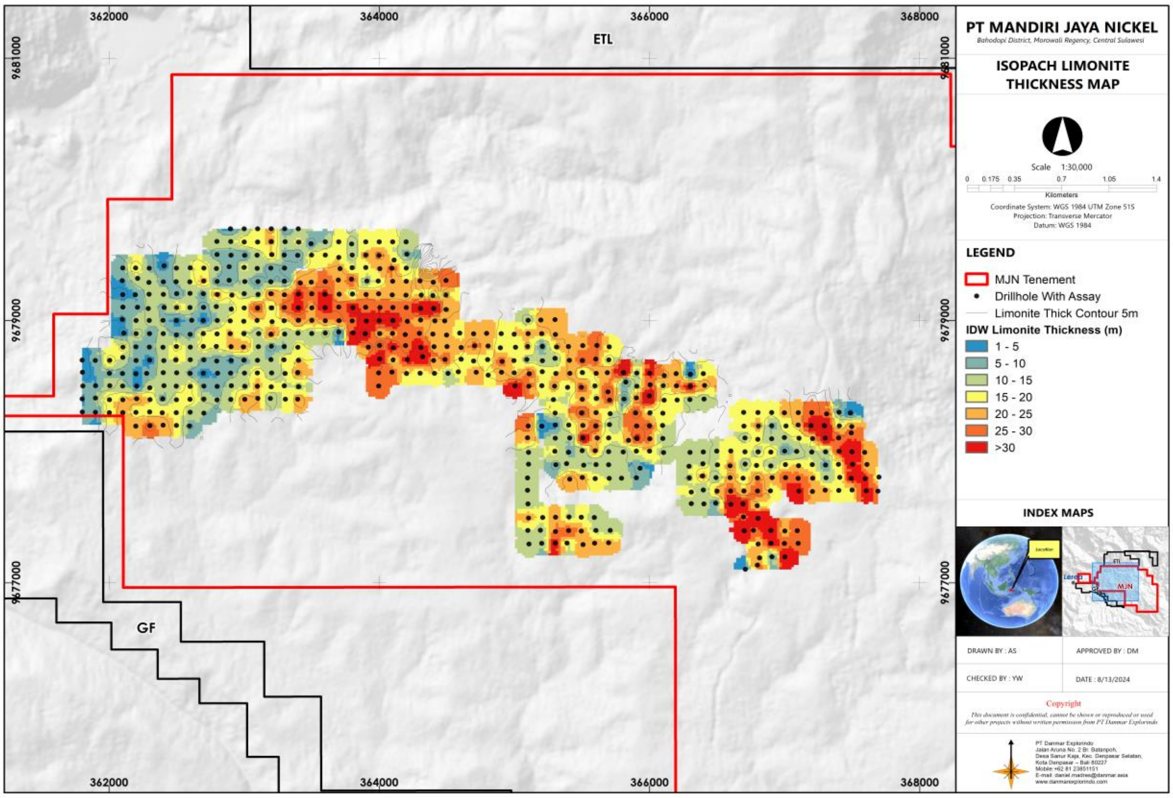


Figure 5-11 Composite thickness for the Limonite zone based on drilling

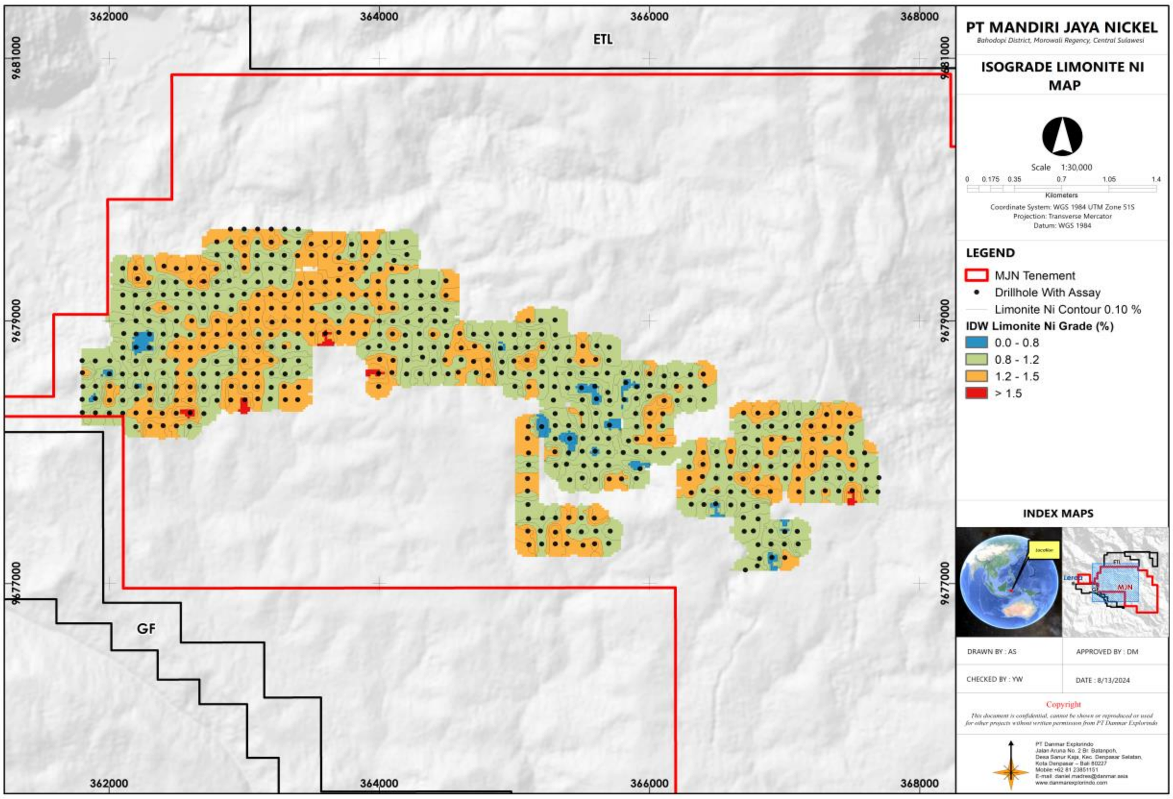


Figure 5-12 Composite nickel grade for the Limonite zone based on drill sample assays

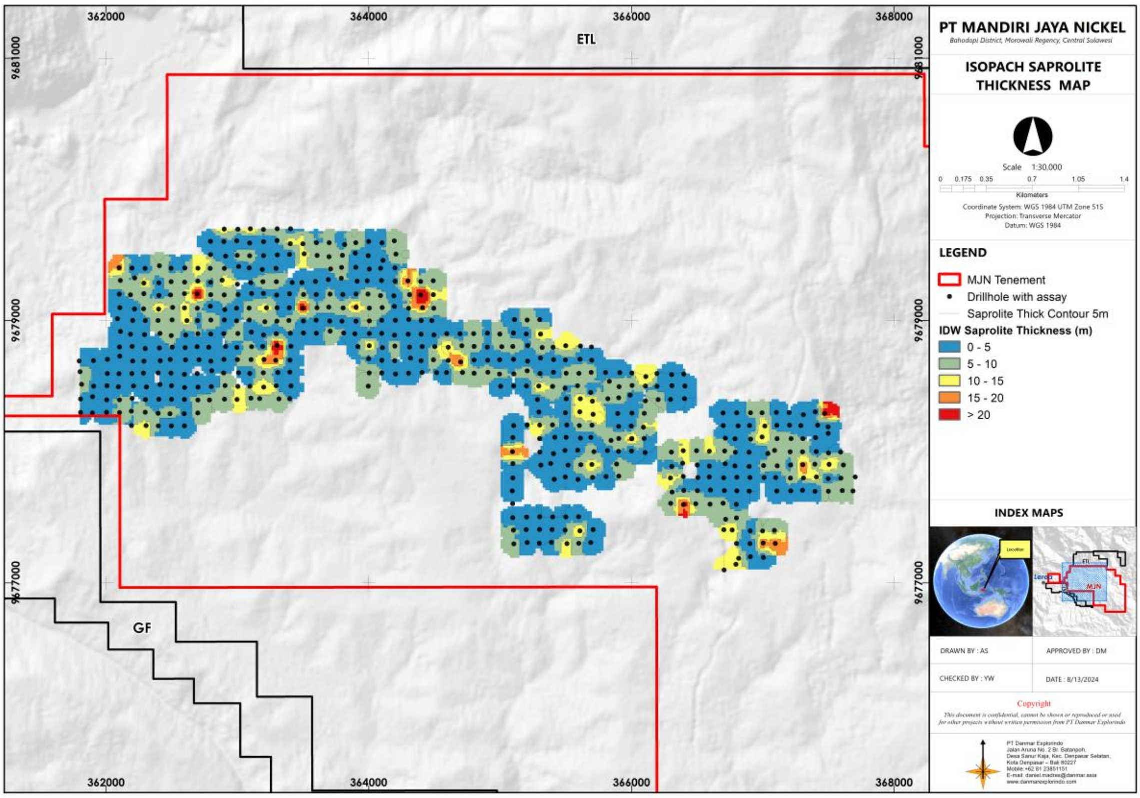


Figure 5-13 Composite thickness for the Saprolite zone based on drilling

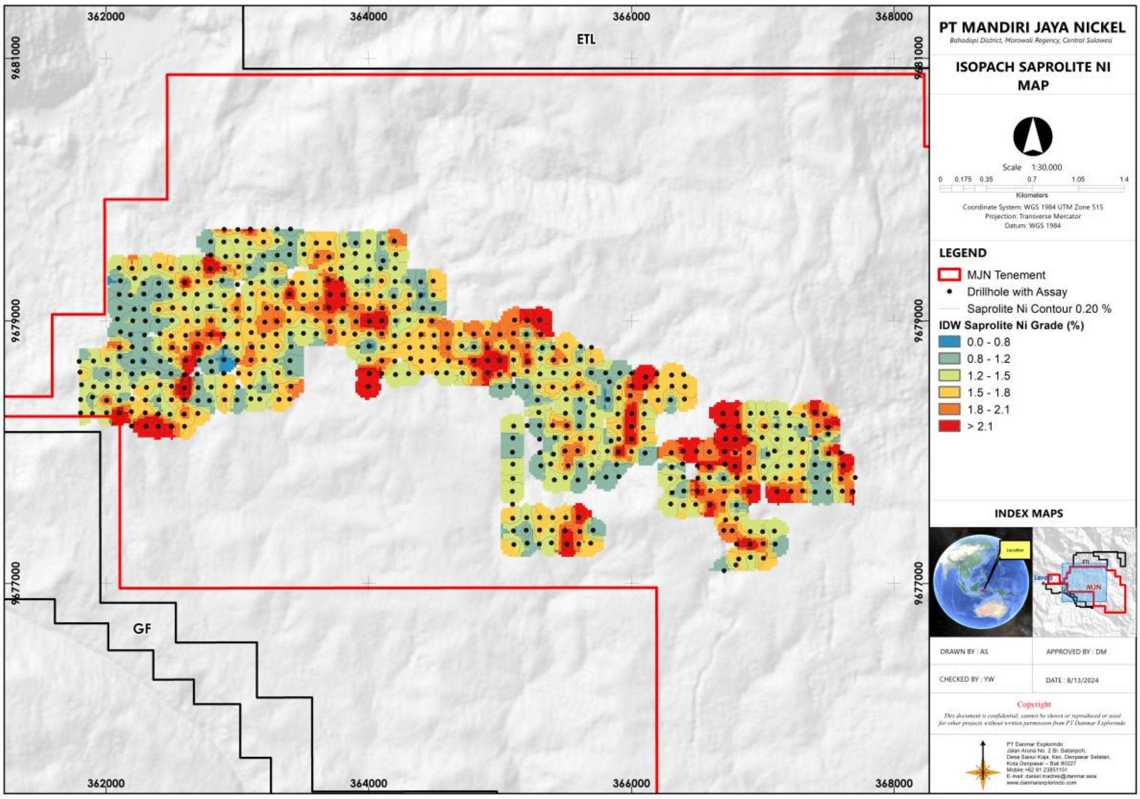


Figure 5-14 Composite nickel grade for the Saprolite zone based on drill saple assays

6 MINERAL RESOURCE ESTIMATE

This report is a maiden Mineral Resource estimate using data until 1st October 2022. The data set includes 555 drill holes with a total cumulative depth of 14,070m.

6.1 SOFTWARE

Geological modeling and Mineral Resource estimates were completed using GEMCOM Surpac® mining software (version 6.1). compilation, validation and correlation using Surpac® mining software with Microsoft® Access Relational Database Management System (RDBMS) providing the storage of collar, downhole survey, lithology and assay.

6.2 SURFACE GRIDDING & WIREFRAMING

Wireframing was set up starting on each drill line in both east-west & north-south directions to eventually create a 10X10m grid over the entire database area. First digitized, the lines were then draped onto the LiDAR surface to develop a morphology wireframe. This was done to assess any aspect and slope angle, weathering patterns obvious from the topography.

The wireframe sections were then generated into gridded surfaces from the drilling/assay database (points of observation). From this process 2 dominate horizons were interpreted;

- top of rocky Saprolite – contact zone between Limonite clay and rocky Saprolite
- top of Bedrock – contact zone between rocky Saprolite and fresh bedrock

A third gridded surface was extracted from the top of the bedrock by dropping the elevation by 10m to represent the floor of bedrock in the model.

The gridded surfaces were produced to represent the roof and floor limits of limonite, saprolite and bedrock zones. 10m grids were set up and interpolation of the gridded points were done using Inverse Distance Weighted Squared (IDW^2) methods.

These final gridded surfaces were then checked visually using sections to the contact of the drilling database to correct any over-smoothing with the process. This visual check provided some small corrections to ensure the drilling intersected the surfaces with no interpretational errors.

6.3 ASSAY DATA AND COMPOSITING

Only assay data from the validated database from included holes were extracted for use in the compositing process. Composite lengths of 1m were used, which correlates with the majority of the sample length records and within statistical ranges suggested by the descriptive statistics. Composites were split into 4 distinct zones:

- SEDIMENTS (SED)
- LIMONITE (LIM)
- ROCKY SAPROLITE (SAP)
- BEDROCK (BRK)

For each of the zones the following elements were composited from the assay results in the database as follows;

- Ni (%) – Nickel content
- Co (%) – Cobalt content
- Fe (%) – Iron content
- MgO (%) – Magnesium Oxide content
- SiO2 (%) – Silica Oxide content
- Al2O3 (%) – Aluminum Oxide content
- CaO (%) – Calcium Oxide content
- Cr2O3 (%) – Chromite Oxide content
- MnO (%) – Manganese Oxide content
- Moisture Content (%)

Based on analysis of the downhole statistical data additional top cut constraints were applied to Ni% content to avoid over-estimation of nickel content due to possible nugget effect. For this reason, all core sample measurements over statistical cuts (Ni) were assigned a default value.

Table 6-1 shows the influence of the applied Ni top cuts to final composites for each model.

Table 6-1 Ni % top cut applied to composites by Model,

Model interploation method	Top Cut Applied	Lithology	Nickel top cut (Ni%)			total assay
			Cut applied	No. assay	No. cut %	
MJN MODEL 1 - Ordinary Kriging (OK)	Ni% Top Cuts by Danmar analysis of geostatistical Study	LIM	2.30	46	0.46%	10,089
		RSAP	3.50	49	1.77%	2,769

Weighted average moisture content measurements were applied to the corresponding composite zone. Table 6-2 summarizes the number of samples that were used to estimate the domain weighted moisture content.

Table 6-2 Moisture Content records averages applied to models

Lithology	Moisture Content	No. of samples
Sediment	29.6%	35
Limonite	40.9%	10,089
Saprolite	31.8%	2,769
Bedrock	7.9%	1,291

6.4 BULK DENSITY

An assumed relative density was manually added to the model based on density used in nickel mining projects with similar type laterite soils nearby as follows;

- Limonite – 1.80sg (wet)
- Rocky Saprolite – 1.65sg (wet)
- Bedrock – 2.40sg (wet)

6.5 BLOCK MODELING

A 3D block model was created covering the Mineral Resource area constrained by using the final gridded surface models from the wireframing process as the base of volume estimation of the laterite zones of limonite, saprolite and bedrock. Table 6-3 and 6-4 summarize the Block model dimensions and attributes.

Table 6-3 Block model dimensions

Type	Y	X	Z
Minimum Coordinates	9676859.64	361529.13	300
Maximum Coordinates	9679959.64	367979.13	600
User Block Size	50	50	1
Min. Block Size	25	25	1
Rotation	-	-	-
Axis Length (m)	3100	6450	300
Total Blocks	430089		
Storage Efficiency %	95.51		

Table 6-4 Block model attributes

Attribute Name	Type	Decimal	Background	Description
density	Real	2	-99	Insitu density measurement (wet SG)
geology	Character	-	UNDEF	LATERITE=LIMONITE/SAPROLITE
grade	Real	2	0	1=LIM/RSAP/BRK
idw_al2o3	Real	2	-99	IDW Interpolated grades for Aluminium Oxide (Al2O3%)
idw_cao	Real	2	-99	IDW Interpolated grades for Calcium Oxide (CaO%)
idw_co	Real	2	-99	IDW Interpolated grades for Cobalt (Co%)
idw_cr2o3	Real	2	-99	IDW Interpolated grades for Chromium Oxide (Cr2O3%)
idw_fe	Real	2	-99	IDW Interpolated grades for Iron (Fe%)
idw_mgo	Real	2	-99	IDW Interpolated grades for Magnesium Oxide (MgO%)
idw_mno	Real	2	-99	IDW Interpolated grades for Manganese Oxide (MnO%)
idw_ni	Real	2	-99	IDW Interpolated grades for Nickel (Ni%)
idw_pass	Integer	-	0	Phase 1: 1, Phase 2: 2, Phase 3: 3
idw_sio2	Real	2	-99	IDW Interpolated grades for Silica (SiO2%)
lith_type	Character	-	UNDEF	SED=Sediment, LIM=Limonite, SAP=Saprolite, BRK=Bedrock
material_class	Character	-	WASTE	WASTE and ORE
moisture_content	Real	2	-99	Moisture content (%) of core sample
ni_keff	Real	2	-99	Kriging Efficiency
ni_kvar	Real	2	-99	Kriging Variance
ni_ok	Real	2	-99	Estimated Ni
ni_ok_pass	Integer	-	0	Phase 1: 1, Phase 2: 2, Phase 3: 3
res_class	Character	-	UNDEF	MEASURED, INDICATED, INFERRED

Constraints applied are all below the LiDAR topography surface and within the Resource boundary polygon limited to the edge of the domains and extent of the included drilling data. Constraints to the distinct laterite zones are;

- Limonite – below the soil cover / above top of rocky saprolite
- Saprolite – below top of saprolite / above top of bedrock
- Bedrock – above floor of bedrock / below top of bedrock

6.6 GRADE INTERPOLATION

For the purpose of this report, an Ordinary Kriging (OK) algorithm was used in the grade interpolation for nickel in limonite and saprolite zones. These surface constraints were applied as hard surface boundaries when estimating nickel in each domain.

In the absence of geostatistical analysis for other elements, Inverse Distance Weighted Squared (IDW^2) methods were used to estimate the model grade interpolation for other elements including: Ni, Co, Fe, MgO, SiO2, Al2O3, CaO, Cr2O3, MnO. The population of the model used the same search ellipsoids and constrained passes as the OK modeling for nickel.

The subsequent model validation process showed a similar Ni to volume ratio between OK and IDW^2 results, so for this reason, it is not expected that the other elements interpolated are biased combining the 2 methods together.

Based on recommendations from the geo-statiscal analysis a total of three main passes were applied to both the OK and IDW^2 methods when interpolating the model grades, with increasing search ellipsoid distances between the drilling. A fourth pass was completed to ensure all blocks within the model are given a grade within the Mineral Resource area but had little influence on the Inferred Resource. Table 6-5 shows the summary of the final model search ellipsoids applied to the Mineral Resource.

Table 6-5 Summary search ellipsoids applied to the model

Lithology zone by Domain	Limonite			Saprolite		
Search Type	Ellipsoid			Ellipsoid		
Bearing	36			22.5		
Plunge	0			0		
Dip	0			0		
Major-Semi Major Ratio	1.311			1.17		
Major-Minor Ratio	18.36			11.809		
Search Pass	Pass 1	Pass 2	Pass 3	Pass 1	Pass 2	Pass 3
Max Search Radius (m)	85	170	340	92.5	185	370
Max Vertical Search Distance (m)	2	4	8	2	4	8
Minimum Samples	3	2	1	3	2	1
Maximum Samples	15	15	15	15	15	15
Max. Samples per Hole	3	3	3	3	3	3
Block Discretization	3 X by 3 Y by 3 Z			3 X by 3 Y by 3 Z		

Each of the domain search ellipsoids applied to Limonite and Saprolite layers, both bearing and anisotropy factors were applied as recommended by the geostatistical study for the Kriging interpolation of nickel grades. Based on the review of the suggested ranges and assessment of the regular drilling grid pattern, the geostatistical results are considered appropriate for Inferred Mineral Resource estimates representing the extrapolation distances between drilling grids of 100 meters respectively. These passes were considered with reasonable tolerances and rechecked during the model validation process (see Table 6-5). Then they were used as a guide to the Resource categorization.

6.7 RESOURCE CLASSIFICATION STRATEGY

Determination of the Resource categories were applied to the Mineral Resource with a digitized polygon boundary based on the spatial continuity of each geological domain around the regular spaced drilling grid of 100 meters from points of observation in the final validated database. Also taken into account was the Ultra GPR data on the same grid lines between the drilling locations increasing confidence in interpretation of the laterization contact surface between the points of observation in the model. Resources were classified as follows;

INFERRED - Areas of 100m of drilling spacing on a continuous grid pattern, where significant influence from Pass 1 and 2 dominate the search ellipsoids, with 50m extrapolation from the last line of drilling

MEASURED and INDICATED Resource was not classified because the drill spacing was at 100m intervals giving a relatively low confidence in the extrapolation of nickel grades between holes. Figure 6-1 shows the location of the Inferred Resource within the MJN lease.

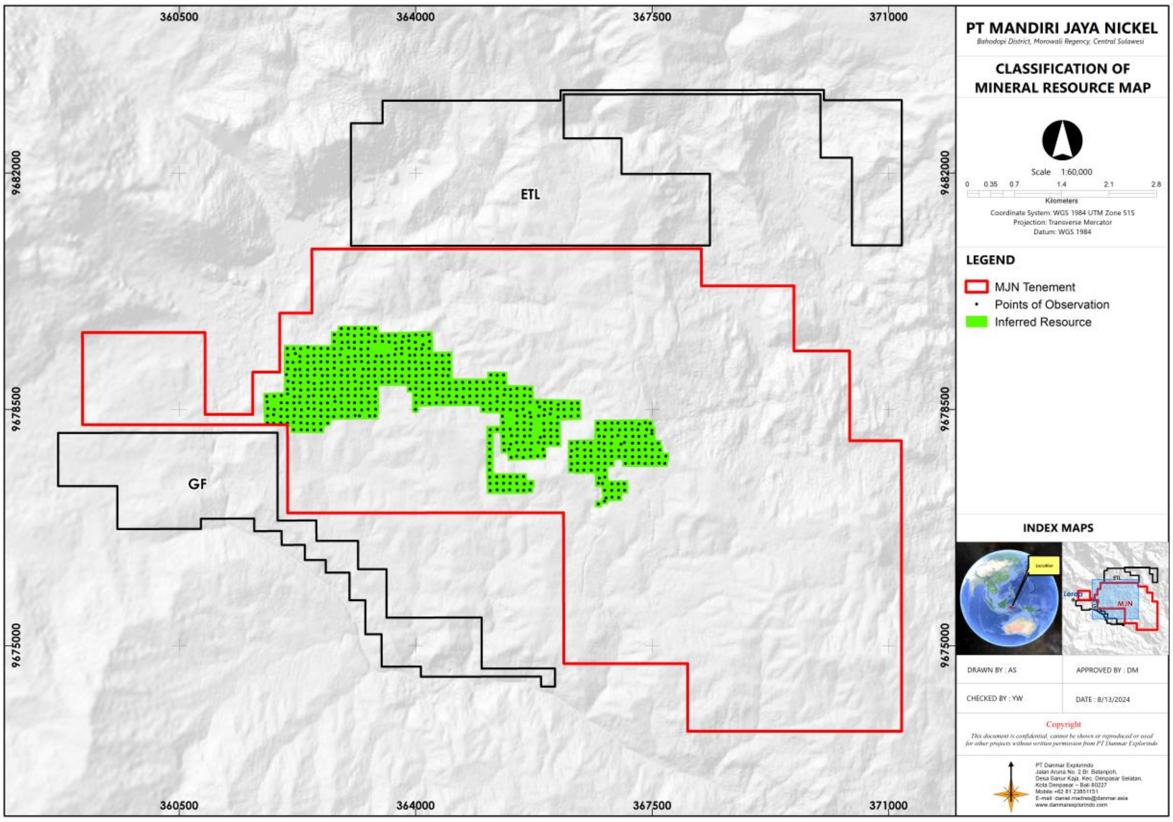


Figure 6-1 Inferred Resource classification boundary

Another factor in selection of Resource polygon limits, used for the Mineral Resource, was a review of the geostatistical inputs and the weighting on each category. This was done by comparing the influence of each pass within the polygon boundaries. Table 6-6 shows the results of this validation process.

The results show that 96% of the blocks in the INFERRED class are interpolated by Pass 1 & 2. These results give sufficient confidence in the polygon strategy respectively. Figure 6-2 shows the Resource classification boundaries overlay with the pass map.

Table 6-6 Interpolation pass influence on Resource classification

Resource class	Interpolation pass	Ton (Dry)	Influence (%)	Ni (%)	Co (%)	Fe (%)
INFERRED	PASS 1	91	72%	1.3	0.10	37.7
	PASS 2	30	24%	1.3	0.08	29.7
	PASS 3	5	4%	1.4	0.07	24.4
total Mineral Resource >0.80% Ni		**126**	**Million Ton (Dry)**	**1.3**	**0.09**	**35.3**

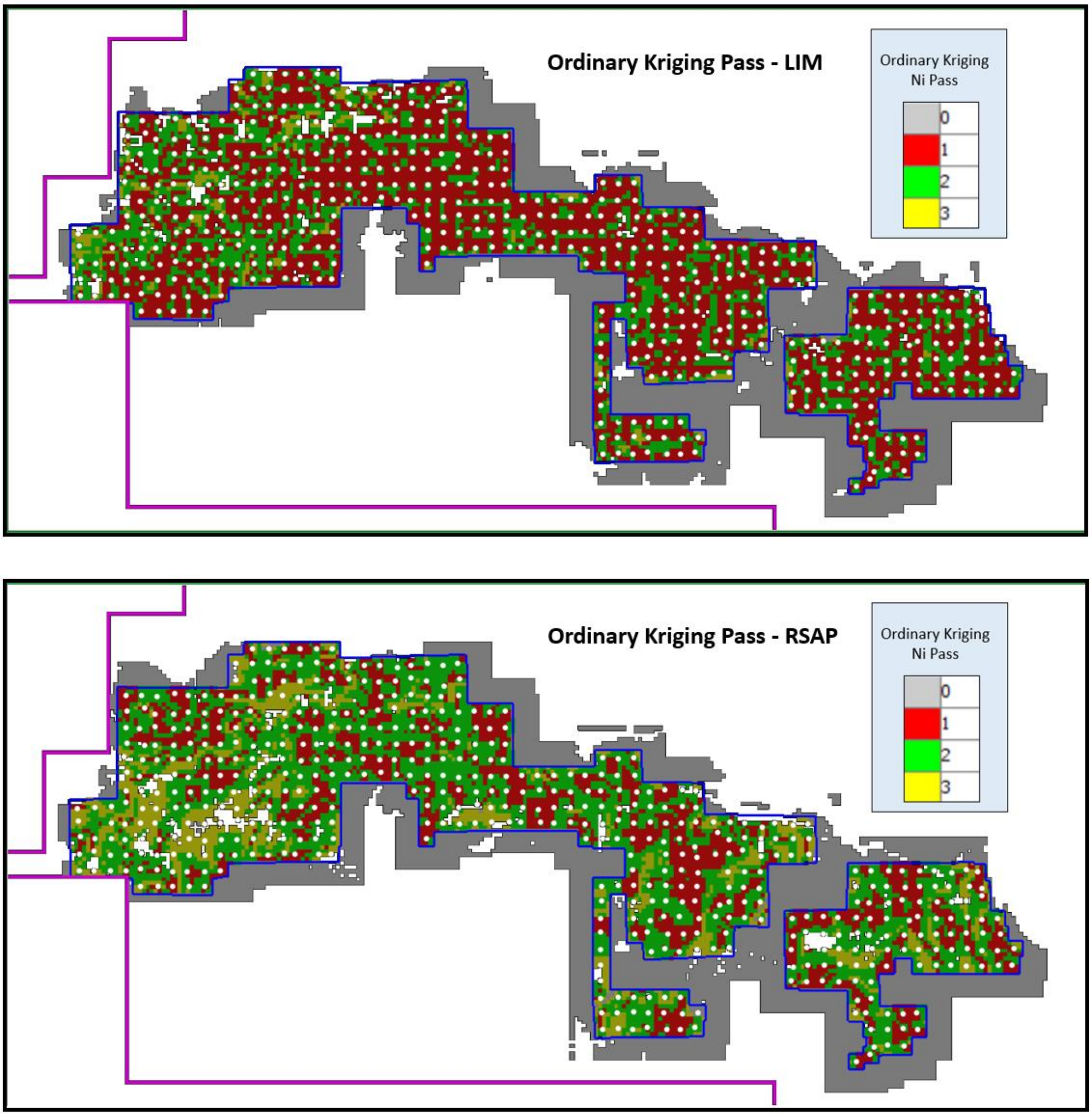


Figure 6-2 Resource classification boundaries overlay with Ordinary Kriging pass map

6.8 MODEL VALIDATION

Final block model and interpolated grades were validated using several visual and statistical techniques to gain further confidence in the Mineral Resource estimates stated in this report.

Firstly, visual inspection of the block models, in plan and sectional views to assess the grade interpolations performed, conform with the lithological wireframes, surface models and drilling database. For each domain several sections were reviewed, along drilling grid lines, both in north-south and east-west directions. Additional sections at an approximately 45 degree angle to these directions were also viewed. Figure 6-3 shows section examples used for visual validation of the model. Figure 6-4 shows plan views also used for visual validation of the model for each lithological layer.

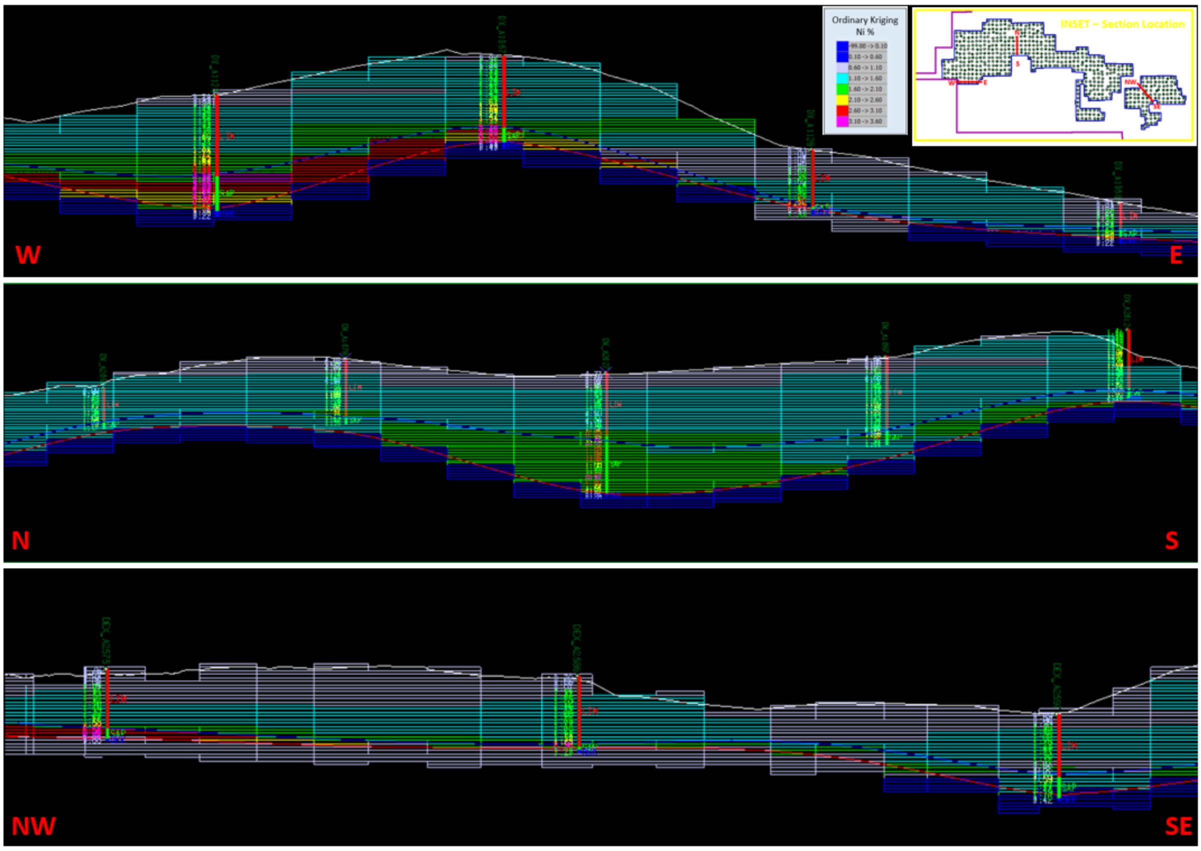
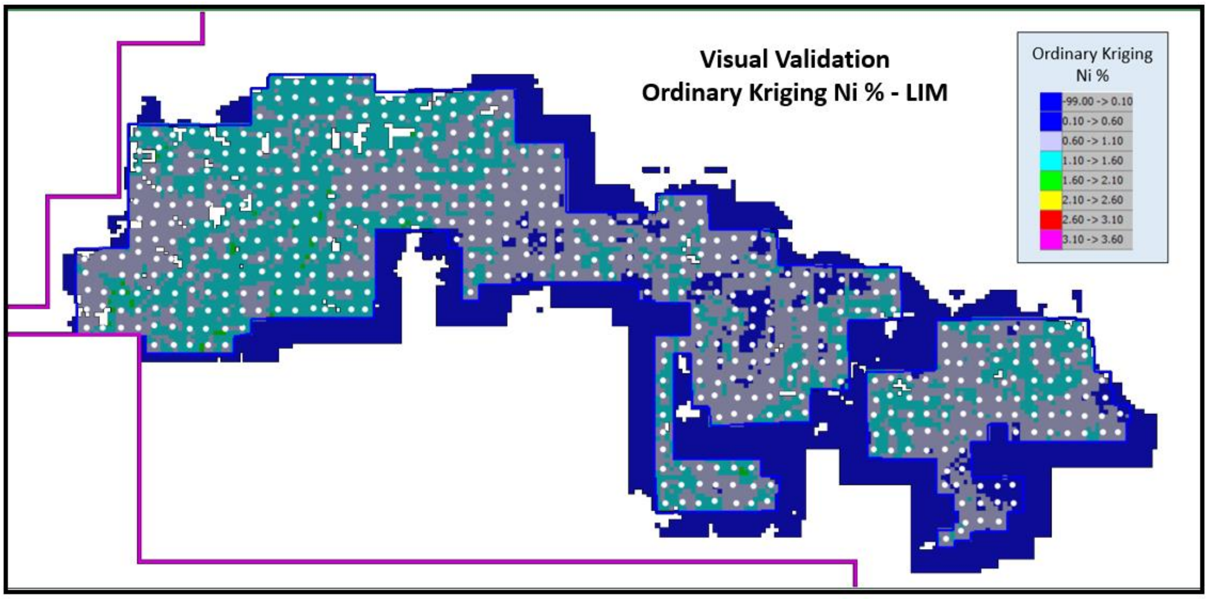


Figure 6-3 Section examples used for visual validation of the model



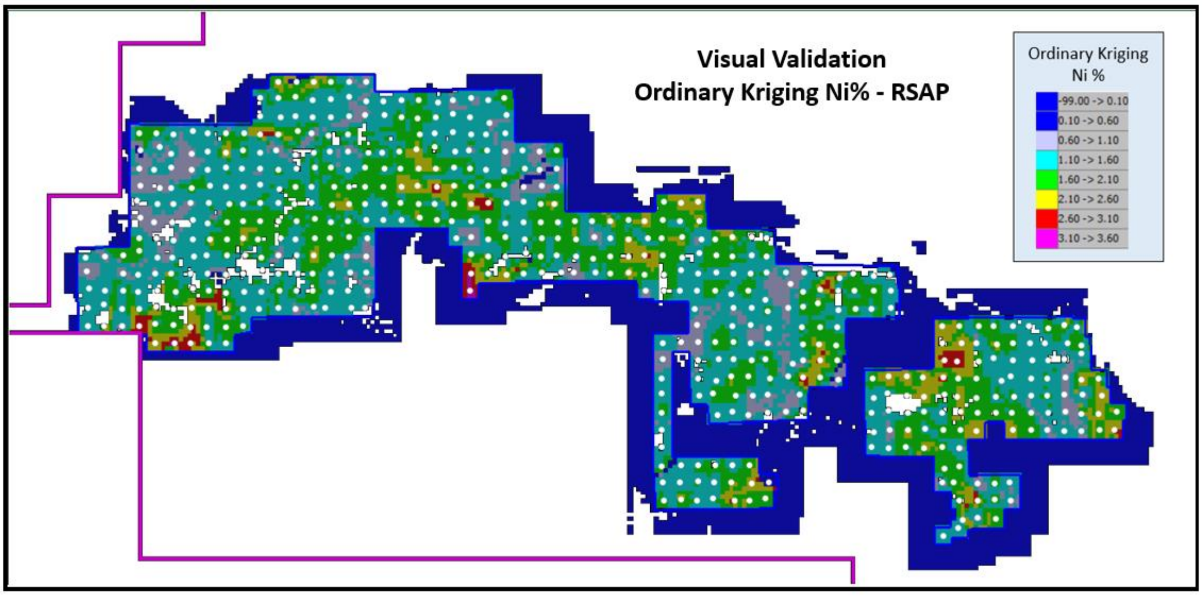


Figure 6-4 Plan view of the results of the Ordinary Kriging Ni grade model

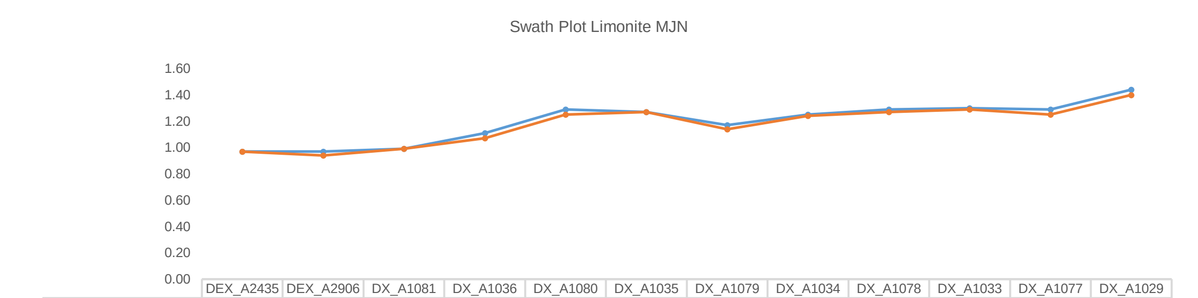
Further statistical validation of the Nickel Resource estimate was completed by comparing global averages of the sample composites against the block model global averages. Both sample sets show very little difference between average grade values for nickel, cobalt and iron and within the standard deviation of the mean. Table 6-7 shows the sample populations for composites and assigned blocks within the model and average grades for nickel, cobalt and iron.

Table 6-7 Composite model against block model statistical validation

DOMAIN	LITHOLOGY TYPE	MEAN GRADE COMPOSITE				MEAN BLOCK MODEL			
		sample	Ni (%)	Co (%)	Fe (%)	sample	Ni (%)	Co (%)	Fe (%)
BLOCK A	SEDIMENT	35	0.40	0.07	29.90	252	0.40	0.07	30.64
	LIMONITE	10,089	1.15	0.10	40.94	156,585	1.15	0.10	41.11
	SAPROLITE	2,769	1.55	0.04	15.10	43,911	1.54	0.04	15.16
	BEDROCK	1,291	0.45	0.02	7.26	44,572	0.46	0.02	7.16
TOTAL ALL		14,184	1.16	0.08	32.81	245,320	1.09	0.08	30.28

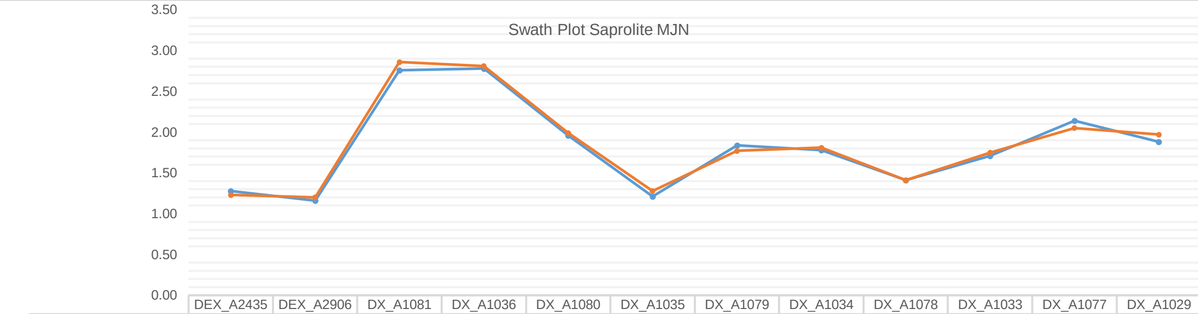
Swath plots were used as a final model validation tool to provide comparisons between sample composites and estimated block model values. This process identifies any bias towards under-estimation or overestimation or any smoothing in the results.

Figure 6-5 and 6-6 show the Swath plots created. The review of these plots show good correlation of the 1m down hole drilling composites selected for the interpolation process against the assigned block grades in the model.



	DEX_A2435	DEX_A2906	DX_A1081	DX_A1036	DX_A1080	DX_A1035	DX_A1079	DX_A1034	DX_A1078	DX_A1033	DX_A1077	DX_A1029
DH Composite	0.97	0.97	0.99	1.11	1.29	1.27	1.17	1.25	1.29	1.30	1.29	1.44
BM Composite	0.97	0.94	0.99	1.07	1.25	1.27	1.14	1.24	1.27	1.29	1.25	1.40

Figure 6-5 Swath plots of limonite



	DEX_A2435	DEX_A2906	DX_A1081	DX_A1036	DX_A1080	DX_A1035	DX_A1079	DX_A1034	DX_A1078	DX_A1033	DX_A1077	DX_A1029
DH Composite	1.28	1.16	2.76	2.78	1.96	1.21	1.84	1.78	1.41	1.71	2.14	1.88
BM Composite	1.23	1.20	2.86	2.81	1.99	1.28	1.77	1.81	1.41	1.75	2.05	1.97

Figure 6-6 Swath plots of saprolite

6.9 MINERAL RESOURCE STATEMENT

The Nickel Resource estimate for MJN has been produced using all the available data.

It is considered, by the Competent Persons, that data and methodologies applied in the estimation process are appropriate for this type of deposit.

All results are represented as remaining volumes presented as millions of dry tons up to 1st October 2022. A rounding of the Resource estimate numbers has been applied to reflect the level of accuracy of the Mineral Resource estimate.

Table 6-8 below shows the Nickel Resource estimate with a cut-off >0.80% Ni content. Table 6-9 shows the global Mineral Resource shown at various Ni cutoffs. Figure 6-7 shows the global Mineral Resource tonnage and Ni% grade relationship. Figure 6-8 shows the Inferred Mineral Resource location map.

Table 6-8 Inferred Nickel Resource Estimate

INFERRED Mineral Resource Statement	Million ton (Dry)	XRF (DRY ANALYSIS)						Si/Mg Ratio
		Ni (%)	Co (%)	Fe (%)	Mg0 (%)	Si02 (%)	Cr203 (%)	
LIMONITE	96.2	1.19	0.11	41.13	1.77	6.61	2.67	3.74
SAPROLITE	30.3	1.55	0.04	15.16	17.03	34.75	1.11	2.04
Total INFERRED Mineral Resource > 0.8% Ni	**126.5**	**1.27**	**0.09**	**35.53**	**5.06**	**12.69**	**2.33**	**2.51**

Table 6-9 Mineral Resource shown at various cutoffs

LIMONITE - GLOBAL MINERAL RESOURCE ESTIMATE (OK 3 pass)

GRADE CUT-OFF RANGE	MINERAL RESOURCE		XRF (DRY ANALYSIS)									Moisture Content (%)	Relative Density (sg Wet)	METAL CONTENT EQUIVALENT (Ni)
	MILLION TONNES (Wet)	MILLION TONNES (DRY)	Ni %	Co %	Fe %	Mg0 %	Si02 %	SM Ratio	Al203 %	Ca0 %	Cr203 %			
>0.8	161	96	1.19	0.11	41.13	1.77	6.62	3.74	10.59	0.10	2.67	40.52	1.80	1,130,000
>0.9	151	90	1.21	0.11	41.12	1.79	6.72	3.75	10.47	0.10	2.68	40.52	1.80	1,080,000
>1.0	132	79	1.25	0.11	41.09	1.83	6.88	3.75	10.28	0.10	2.69	40.52	1.80	980,000
>1.1	105	63	1.30	0.12	40.97	1.91	7.10	3.72	10.08	0.10	2.71	40.52	1.80	810,000
>1.2	74	44	1.36	0.12	40.81	2.00	7.38	3.69	9.85	0.11	2.73	40.52	1.80	600,000
>1.3	45	26	1.44	0.12	40.34	2.16	8.02	3.71	9.66	0.11	2.73	40.52	1.80	380,000
>1.4	23	14	1.52	0.13	39.71	2.43	8.85	3.65	9.50	0.12	2.71	40.52	1.80	210,000
>1.5	11	6	1.62	0.12	38.55	2.86	10.25	3.58	9.36	0.15	2.64	40.52	1.80	100,000
>1.6	5	3	1.72	0.12	37.06	3.46	12.33	3.56	9.14	0.18	2.54	40.52	1.80	50,000
>1.7	2	1	1.82	0.12	35.95	3.86	13.71	3.55	9.02	0.19	2.44	40.52	1.80	25,000
>1.8	1	1	1.90	0.11	34.60	4.49	15.12	3.36	8.91	0.21	2.35	40.52	1.80	10,000
>1.9	0.4	0.3	1.98	0.11	33.67	5.16	15.88	3.08	8.79	0.20	2.23	40.52	1.80	5,000
>2.0	0.1	0.1	2.06	0.11	31.95	6.39	17.41	2.73	8.45	0.23	2.16	40.52	1.80	2,000

SAPROLITE - GLOBAL MINERAL RESOURCE ESTIMATE (OK 3 pass)

GRADE CUT-OFF RANGE	MINERAL RESOURCE		XRF (DRY ANALYSIS)									Moisture Content (%)	Relative Density (sg Wet)	METAL CONTENT EQUIVALENT (Ni)
	MILLION TONNES (Wet)	MILLION TONNES (DRY)	Ni %	Co %	Fe %	Mg0 %	Si02 %	SM Ratio	Al203 %	Ca0 %	Cr203 %			
>0.8	44	30	1.55	0.04	15.16	17.02	34.75	2.04	4.53	1.17	1.09	31.09	1.67	470,000
>0.9	44	30	1.56	0.04	15.18	17.02	34.69	2.04	4.49	1.13	1.08	30.93	1.63	470,000
>1.0	42	29	1.58	0.04	15.16	17.06	34.60	2.03	4.57	1.14	1.11	31.75	1.65	460,000
>1.1	40	27	1.62	0.04	15.10	17.17	34.50	2.01	4.52	1.13	1.11	31.79	1.65	440,000
>1.2	36	25	1.67	0.04	15.04	17.31	34.31	1.98	4.48	1.11	1.11	31.81	1.65	410,000
>1.3	32	22	1.72	0.04	15.03	17.44	34.09	1.96	4.43	1.07	1.10	31.82	1.65	375,000
>1.4	27	19	1.78	0.04	15.03	17.56	33.85	1.93	4.39	1.02	1.10	31.83	1.65	330,000
>1.5	23	15	1.85	0.04	14.99	17.68	33.65	1.90	4.34	0.98	1.09	31.83	1.65	285,000
>1.6	18	12	1.93	0.04	14.99	17.75	33.49	1.89	4.32	0.94	1.09	31.83	1.65	235,000
>1.7	14	10	2.01	0.04	14.91	17.88	33.43	1.87	4.26	0.89	1.08	31.83	1.65	190,000
>1.8	11	7	2.09	0.05	14.76	18.02	33.41	1.85	4.18	0.85	1.06	31.83	1.65	150,000
>1.9	8	5	2.18	0.05	14.43	18.37	33.56	1.83	4.04	0.81	1.02	31.83	1.65	115,000
>2.0	6	4	2.27	0.05	14.16	18.59	33.70	1.81	3.94	0.76	0.99	31.83	1.65	85,000

LIMONITE & SAPROLITE - COMBINED GLOBAL MINERAL RESOURCE ESTIMATE (OK 3 pass)

GRADE CUT-OFF RANGE	MINERAL RESOURCE		XRF (DRY ANALYSIS)									Moisture Content (%)	Relative Density (sg Wet)	METAL CONTENT EQUIVALENT (Ni)
	MILLION TONNES (Wet)	MILLION TONNES (DRY)	Ni %	Co %	Fe %	Mg0 %	Si02 %	SM Ratio	Al203 %	Ca0 %	Cr203 %			
>0.8	206	126	1.27	0.09	35.51	5.07	12.70	2.51	9.28	0.33	2.33	38.48	1.77	1,600,000
>0.9	194	119	1.29	0.09	35.27	5.23	13.03	2.49	9.12	0.33	2.32	38.36	1.76	1,550,000
>1.0	174	107	1.33	0.10	34.79	5.53	13.61	2.46	8.90	0.35	2.30	38.39	1.76	1,440,000
>1.1	145	90	1.39	0.10	33.89	6.09	14.60	2.40	8.56	0.39	2.27	38.13	1.76	1,250,000
>1.2	110	69	1.46	0.09	32.41	6.99	16.16	2.31	8.10	0.43	2.20	37.68	1.75	1,010,000
>1.3	76	48	1.56	0.09	29.77	8.54	18.90	2.21	7.48	0.51	2.05	36.89	1.74	755,000
>1.4	51	33	1.66	0.08	26.36	10.61	22.37	2.11	6.73	0.61	1.84	35.82	1.72	540,000
>1.5	33	22	1.78	0.07	22.53	12.94	26.16	2.02	5.95	0.71	1.59	34.61	1.70	385,000
>1.6	23	15	1.89	0.06	19.70	14.70	28.97	1.97	5.35	0.78	1.40	33.68	1.68	285,000
>1.7	16	11	1.98	0.05	17.92	15.87	30.60	1.93	4.94	0.79	1.27	33.07	1.67	215,000
>1.8	12	8	2.07	0.05	16.49	16.84	31.82	1.89	4.59	0.80	1.17	32.59	1.66	160,000
>1.9	8	6	2.17	0.05	15.43	17.69	32.65	1.85	4.29	0.77	1.09	32.28	1.66	120,000
>2.0	6	4	2.26	0.05	14.58	18.30	33.31	1.82	4.05	0.75	1.02	32.04	1.65	87,000

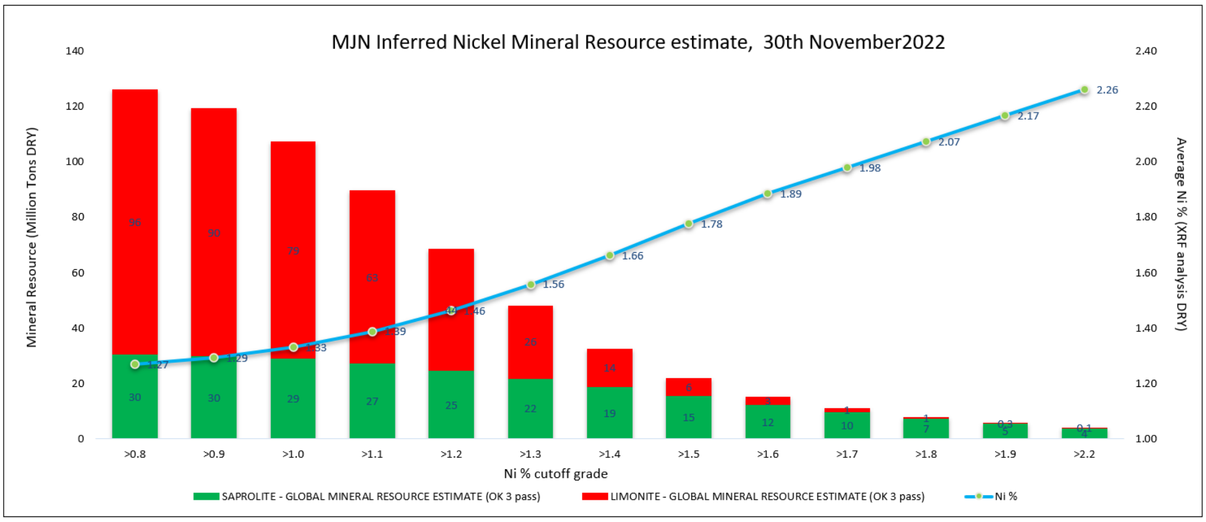


Figure 6-7 Nickel Resource tonnage and grade relationship

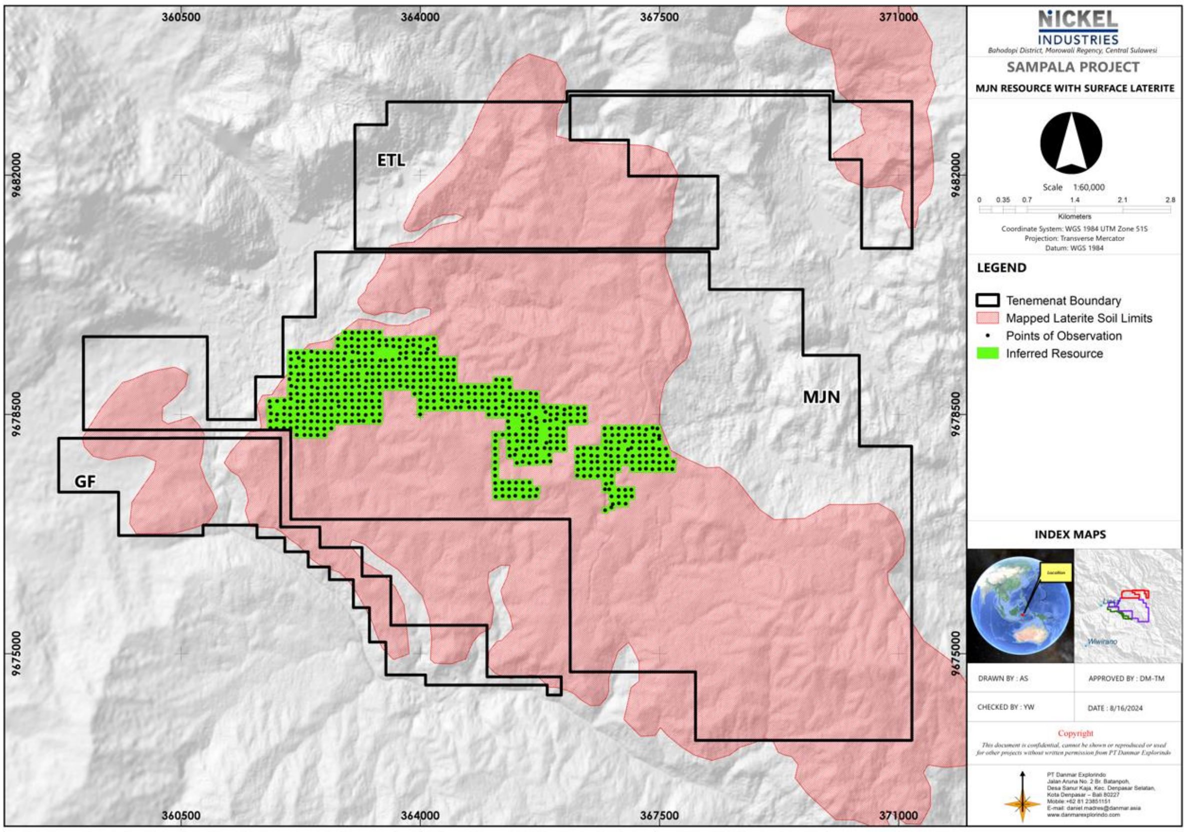


Figure 6-8 Resource Location Map,

6.10 RESOURCE ESTIMATE VALIDATION CHECK

No previous Mineral Resource estimate have been completed at the MJN nickel project.

Table 6-10 shows the global Mineral Resource comparisons from the 3 models to test the variabliity of the geological modelling and grade interpolation techniques applied. The 3 models used for comparison are;

1) Ordinary Kriging model (OK)
2) Ordinary Kriging with 2 Standard Deviations and Top Cuts (OK-2SD-TC)
3) Inverse Distance Weighted Squared and Top Cuts (IDW2-TC)

Overall, the alternative model estimates show very simliar tonnage above the 0.8% Nickel cut off.

Table 6-10 Global Nickel Resource comparison

GRADE CUT-OFF RANGE	MINERAL RESOURCE COMPARISONS GLOBAL ESTIMATES Ni > 0.80%							
	DANMAR 1 ,2022 (OK)		DANMAR 2,2022 (OK-2STDV-TC)		DANMAR 2, 2022 VARIANCE (%)	DANMAR 3 ,2022 (IDW2-TC)		DANMAR 3, 2022 VARIANCE (%)
	MILLION TONNES (DRY)	Ni %	MILLION TONNES (DRY)	Ni %		MILLION TONNES (DRY)	Ni %	
>0.8	**127**	1.27	**125**	1.27	-1.4%	**127**	1.26	0.7%
>0.9	**119**	1.29	**117**	1.30	-2.2%	**120**	1.29	0.6%
>1.0	**107**	1.33	**105**	1.35	-2.7%	**108**	1.33	1.0%
>1.1	**90**	1.39	**88**	1.40	-1.9%	**90**	1.38	0.5%
>1.2	**69**	1.46	**69**	1.47	0.2%	**68**	1.46	-0.4%
>1.3	**48**	1.56	**49**	1.57	1.7%	**47**	1.56	-2.6%
>1.4	**33**	1.66	**34**	1.67	2.9%	**31**	1.67	-5.1%
>1.5	**22**	1.78	**23**	1.79	3.4%	**21**	1.80	-6.0%
>1.6	**15**	1.89	**15**	1.91	2.0%	**15**	1.91	-3.3%
>1.7	**11**	1.98	**11**	2.02	0.5%	**11**	2.00	-0.3%
>1.8	**8**	2.07	**8**	2.12	2.1%	**8**	2.09	1.5%
>1.9	**5**	2.18	**6**	2.21	14.5%	**6**	2.19	5.1%
>2.0	**4**	2.27	**5**	2.28	24.5%	**4**	2.28	6.4%

6.11 RISKS AND OPPORTUNITIES

Systematic drilling on a 100m grid and the supportive data provided by Ultra GPR surveys, on the same drilling grid, has greatly enhanced the confidence in the geological interpretation and resulting geological model at MJN Block A.

The database has been validated and rechecked for errors. Drill hole collar coordinates, used in the geological model, have been surveyed with high accuracy giving relatively high confidence to the current Nickel Resource estimate.

The final geological models for Limonite, Saprolite and Bedrock have been interpreted separately using lithological logs and analysis results so that all blocks in the geological model are correctly coded according to their occurrence in the laterite profile. For this reason, it is considered unlikely that any misallocation of lithology will have significant influence on the Nickel Resource.

High confidence in the laboratory analysis results is supported by rigorous quality assurance and quality control protocols. Good corelation between PT Geoservices external laboratory and the PT Hengjaya Mineralindo internal laboratory gives further confidence to the MJN assay database.

The planned haul road to IMIP smelter provides a direct road transportation opportunity for ore from MJN to the market. This greatly enhances the economic potential of the MJN nickel project area and potential for production of saprolite and liminite ore for processing at IMIP.

6.12 EXPLORATION TARGETS

Exploration Targets, where nickel laterite has been identified by GIS studies, surface mapping and Ultra GPR surveys, are located in the remaining area; outside the drilled Resource area in Block A, B and C in the MJN area. Figure 6-9 below shows the Exploration Targets areas which are outside the green coloured Resource area. These Exploration Targets are in addition to the current Inferred Nickel Resource. Nickel laterite mineralization with 0.8% nickel cut-off grade (CoG) targets of between 150 - 300 million tons (wet) are postulated. These have been estimated using the Ultra GPR intepretations for laterite/hectare. Although, it must be stated that, at this time, the potential quantity and grade is conceptual in nature and that there has been insufficient exploration to estimate a Mineral Resource. Although it is not certain if further exploration will result in a Mineral Resource, the historical mapping and Ultra GPR surveys within these Exploration Target areas provides greater confidence that with further drilling and assay results will upgrade these areas for future Resource estimates. Table 6-11 shows the details of the Exploration Target areas.

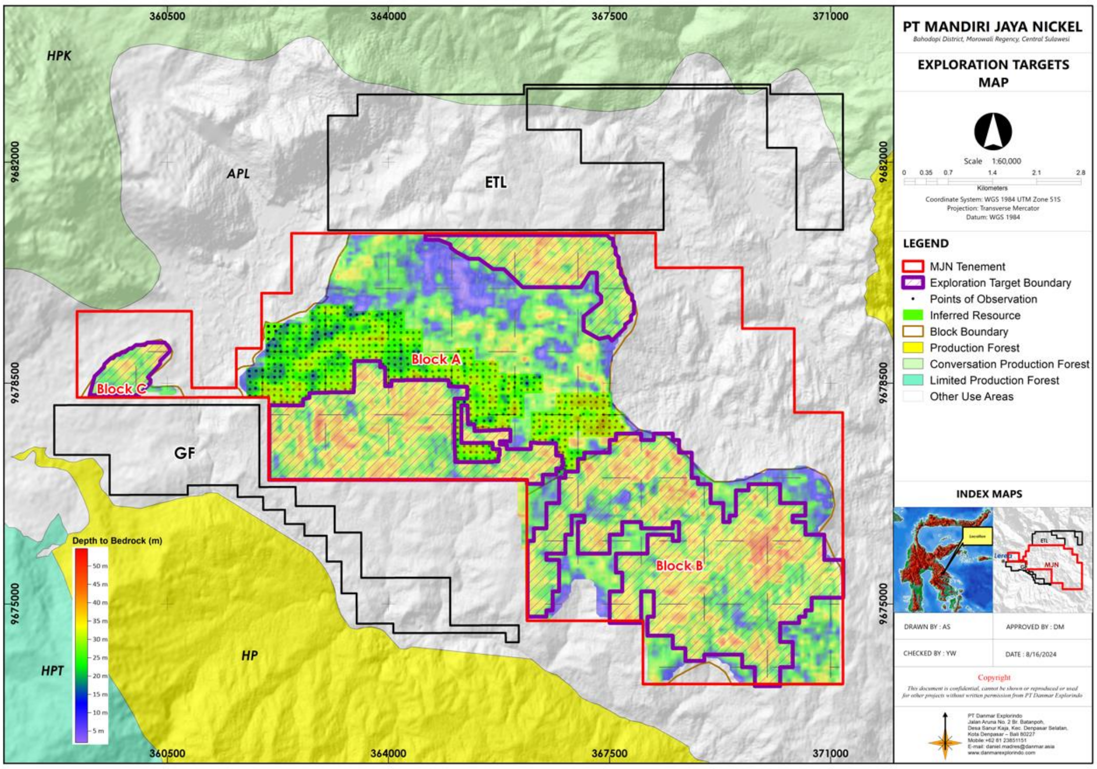


Figure 6-9 Exploration Target areas outside the Resource areas,

Table 6-11 Exploration Targets in addition to the MJN Nickel Resource (Block A)

Exploration Target	Lithology	AREA(Ha)	Laterite /Ha (wet tons) from Ultra GPR	Total laterite Volume (million wet tons)	High grade range (million wet tons)	Low grade range (million wet tons)
BLOCK A outside Resource	Limonite	553	200,000	110	25	50
	Saprolite		200,000	110	13	25
BLOCK B	Limonite	1,492	200,000	300	75	150
	Saprolite		200,000	300	30	60
BLOCK C	Limonite	90	200,000	15	6	12
	Saprolite		200,000	15	2	3
Total		**2,135**	**Laterite volumes**	**850**	**150**	**300**
**Wet ton conversion RD 1.8sg sediments & massive clays (Limonite) RD 1.6sg weathered rocks (saprolite)*				**total limonite**	**106**	**212**
				total saprolite	**44**	**88**

Based on simple statistical assumptions 150,000,000 –300,000,000ton (wet) of higher nickel grade laterite might be targeted by next phases of exploration, including core drilling with Lab assay sampling will be required to confirm the grades of the laterite ores distributed within the target zones

Limonite range based on 50,000 –100,000 / Ha of the total Massive Clay volume could be converted into low grade ores suitable for HPAL markets

Saprolite range based on 20,000 –40,000 / Ha of the total Weathered rocks volume could be converted into higher grade ores suitable for RKEF markets

7 CONCLUSIONS AND RECOMMENDATIONS

This Inferred Nickel Resource, covering 562ha, has been reported in compliance with the JORC Code of 2012.

The geology at the PT Mandiri Jaya Nickel project is ideal for the formation of thick and relatively high grade nickel laterite.

Drilling, Points of Observation are systematically and relatively evenly spread across current Resource areas. At this stage 100% of the drilling is spaced 100m apart. Drill data is well documented, all drill collars accurately surveyed and checked. For this reason, the drill data used in this report, is considered to be of high quality and reliability and appropriate for use in this Mineral Resource estimation.

Quality Assurance and Quality Control of assay results are within the precision and accuracy limits that is suitable for inclusion in this estimation of Mineral Resources for PT Mandiri Jaya Nickel using the JORC Code 2012.

The planned haul road covering 22km to the existing haul road at PT Bintan Delapan Mineral, provides the potential for direct trucking of MJN nickel products to the IMIP nickel smelter. This ensures economic extraction of nickel ore into the foreseeable future from the project area.

Exploration Targets covering more than 2,000ha have potential for 150-300 million wet metric tons of additional laterite product in a similar geological environment. Although it is uncertain if further exploration will result in a Mineral Resource, the historical mapping and Ultra GPR surveys in these areas gives confidence that future exploration will upgrade at least some of these areas for future estimates.

To maximize the nickel resource potential of the PT Mandiri Jaya Nickel project a combination of Ultra GPR surveys followed by systematic drilling, optimized to focus on the GPR targets, is recommended to cover the entire nickel laterite deposit in the area.

8 REFERENCES

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SILVER AND McCAFFERY , 1981 OPHIOLITE EMPLACEMENT BY COLLISION BETWEEN THE SULA PLATFORM AND THE SULAWESI ISLAND ARC, INDONESIA

UBISINOV & ELIAS, 2015, MINERAL RESOURCE ESTIMATE, SORAWOLIO NICKEL PROJECT, BUTON ISLAND, SE SULAWESI

9 APPENDIX

9.1 TABLE 1 OF THE JORC COMMITTEE

9.2 PT MANDIRI JAYA NICKEL LEGAL DOCUMENTATION

9.3 MJN STATISTICAL ANALYSIS

9.4 INTERNAL LABORATORY REPORTS; PROCEDURES & QA/QC

9.5 RESUME: DANIEL MADRE, TOBIAS MAYA

APPENDIX 1

TABLE 1 OF THE JORC CODE 2012, REPORT TEMPLATE

JORC Code, 2012 Edition – Table 1 report template

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• HQ core samples taken in 1m intervals and all core photographed and filed as a reference • All drilling to date is on a systematic 100 X 100m grid over GPR targets. For this reason the estimate has been classified as an Inferred Resource at this time. Future infill drilling will be required to raise confidence to estimate Indicated and Measured Resources status. • All core photographed and described by well site geologists. Sample preparation and moisture determination follow the Japanese Industrial Standard (JIS), Method for Sampling and the Determination of Moisture Content of Garnieritic Nickel Ore, 1996 • High confidence in the laboratory analyses results are supported by rigorous quality assurance and quality control protocols including; sample blanks, sample standards, duplicate samples and interlaboratory checking.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• HQ wireline triple tube coring in 1m runs to ensure accurate measurement of core expansion (swelling) and recovery • Vertical drilling, core orientation not required
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Full coring used and core recovery data collected for all runs (555 holes). Core recoveries also documented by photography • Minimum 95% recovery maintained for all holes • If 3 consecutive runs are less than 95% the hole was re-drilled • Some lower recoveries in silica boxwork zones were tolerated due to geological conditions but overall drilling conditions are relatively good and recoveries remain consistently high
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or*	• 100% of laterite layers drilled have been logged and photographed in drilling to date • Logging includes core recoveries and core swelling measurements • Every meter of the core is logged and sampled separately for lab analysis

Criteria	JORC Code explanation	Commentary
	costean, channel, etc) photography. • *The total length and percentage of the relevant intersections logged.*	
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Full drill core was submitted to the lab for analysis • Industry standard laboratory sample preparation methods suitable for nickel laterite mineralization style and involve drying, crushing, incremental splitting and pulverizing to -75um pulps for assay. • Approximately half of the samples were analyzed at PT Geoservices an external and certified commercial laboratory. The remaining samples were analyzed at PT Hengjaya Mineralindo's internal laboratory following JIS M-8109-1996 SOP to maintain accuracy and precision at all sub-sampling stages eg coarse blanks, coarse replicates and 200# pulp sieve tests, whilst reducing sample particle size and volume. • Sample sizes are according to JIS M-8109-1996 Industry Standard and have shown to be effective re accuracy and precision during life of project to date and show good correlation with samples analyzed at PT Geoservices (external lab) adding confidence to the accuracy of the results
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	• Industry standard laboratory sample preparation methods suitable for nickel laterite mineralization style and involve drying, crushing, incremental splitting and pulverizing to -75um pulps for assay. • Representivity, at sub-sampling stages at the sample prep lab was maintained by following JIS M-8109-1996 • SOP to maintain accuracy and precision at all sub-sampling stages eg coarse blanks, coarse replicates and 200# pulp sieve tests, whilst reducing sample particle size and volume. • External lab assay results don't show any variance to internal lab results
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Geological logs of the drill core are reconciled against assay results to verify lithology for any misallocation. • Database checked and rechecked for errors and anomalies. • Based on analysis of the downhole statistical data additional top and bottom cut constraints were applied to Ni% content to impose a domain limit, to avoid over-estimation of nickel content due to possible nugget effect. The top-cuts applied are based on the geostatistical recommendations and to avoid over estimation of grade

Criteria	JORC Code explanation	Commentary
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• All recent drilling located by ground RTK GPS survey methods • UTM (Universal Traverse Mercator) Projection; WGS 1984 UTM Zone 51S grid is being applied in the Resource estimation. • LiDAR topographic surface was used. • Average mis-close between the LiDAR and drill collar survey is -0.01m which is sufficient for use in this Mineral Resource
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Ultra GPR targets and geological surface mapping were used for Exploration Targets recognition only. • 100m grid drilling used for Inferred Resource, for more detailed Resource definition closer spaced drilling will be required to define Indicated and Measured Resources • Geostatistical analysis of Ni mineralization was used to confirm the direction and distances to be applied to the Nickel Resource model • Sample compositing into 4 distinct lithologies namely, Sediment, Limonite, Saprolite and Bedrock. was applied to the raw data. Histograms of these 4 data lithology subsets were created which showed some skewness of the population most likely due to nickel grade outliers occurring as a result of the compositing process. To reduce the impact of these outliers, Nickel top cuts were applied to reduce the potential of overestimation of the nickel grade in the Resource. This top-cut strategy is considered adequate for this Resource as the frequency of anomalous grade outliers is relatively low.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• Vertical drilling is appropriate for nickel laterite as the laterite is relatively horizontal, so the drilling intersects a true thickness of each lithological horizon. • No bias, is considered to be introduced, as a result of the drilling orientation.
Sample security	• *The measures taken to ensure sample security.*	• Samples left in the field are properly stored, covered and guarded by night security at each drill rig. • Sample stores are locked and continuously guarded.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• Comparisons between Geoservices and internal lab results shows close correlation between results suggesting relative accuracy acceptable for use in Resource estimation

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• Valid IUP license covering 4,871Ha for operation and production valid until 12 November, 2034. The License can be extended twice for 10 years if required. • Nickel Industries Ltd has a Conditional Share Purchase Agreement (CSPA) signed for the acquisition of 60% of the control and economic rights of MJN
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• The exploration work has been carried out over various stages since 2010 by Rio Tinto, Sherrit and other groups. Historic data records from this work are sparce and incomplete and cannot be used for Resource estimation.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• Laterization of Ophiolite bedrocks, formed in a tropical climate environment through a process of surface leaching over time, two distinct enriched zones of Limonite and Saprolite clays and weathered rocks are typically found in this type of geological setting where concentrations of Ni, Co, Fe and other associated minerals are characteristic and diagnostic
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• The drill database at MJN contains 555 holes with a cumulative total depth of 14,070m. Assays total 14,184 samples. • It is not practical or relevant to include these individual results to understand this report because Ni laterite deposits are at relatively low concentrations (1.2% Ni average) and the Resource can only be represented by a compilation of large numbers of points of observation. For this reason, the report has described the deposit using maps of borehole locations, Ni grade isopacs and thickness isopacs, descriptive statistical analyses of assay results, variograms and swath plots of the data to understand the data and check its validity and variability
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade*	• Only assay data from the validated database were extracted for use in the compositing process. Composite lengths of 1m were used, which correlates with the majority (99%) of the sample length records and within statistical ranges suggested by the variography modeling.

Criteria	JORC Code explanation	Commentary
	results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail. • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	Composites were split into 4 lithologies namely; sediment, limonite, saprolite and bedrock • Based on analysis of the downhole statistical data and to to ensure grades were not over estimated additional top and bottom cut constraints were applied to Ni% content • metal equivalents for Nickel content were shown in the Resource table with ore grades as wet and dry tons.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	• Vertical drilling provides good representation of the deposit geometry and depth and reasonably assumed to represent true thickness, 1m core and assay sampling procedures were sufficient to provide accurate wellsite observations and reconciliation of logs. • Mineralization is basically horizontally aligned. • Total depths of drilling were guided by the interpretation of the Ultra GPR surfaces and at least 2-3m of bedrock was intersected at the end of each hole to ensure the full laterite profile was intersected.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• Diagrams, maps, sections are all included in the body of the report
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• All reliable(validated) data included without prejudice. • Thickness established through drilling intercepts supported with Ground Penetrating Radar (UltraGPR) geophysics, reliable assays and core photos
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• 387km of ground penetrating radar (UltraGPR) survey lines were completed, providing excellent section profiles views of limonite, saprolite and bedrock layers. Global volumes and thickness grids were used for exploration planning and understanding of the weathering patterns of the nickel laterites to best optimize the drilling patterns by domains and target the thickest and best looking areas
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Plans for infill drilling in the Inferred Resource area will increase confidence in the Resource in the future. • Exploration Targets at MJN have already been surveyed using Ultra GPR and are planned to be drilled to delineate additional Resource area if successful. Exploration Target areas map is provided

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section.)

Criteria	JORC Code explanation	Commentary

Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.*
	• *Data validation procedures used.*
		• The collar survey, assay and geology data sets were validated to correct data error issues such as:
		  • missing or duplicate collar records
		  • overlapping intervals in the assay records
		  • collar elevation errors compared to current LiDAR topography
		  • downhole accuracy issues, total depths, from/to intervals
		  • core recoveries and swelling
		  • lithology description from wellsite geologists
		  • reconciliation of lithology with laboratory assay results
		  • moisture records from core lab analysis
		  • downhole statistical analysis
		• Only data that was validated and included in the Resource estimate

Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• Two site visits by the CP (Daniel Madre) were completed to review exploration progress; including drilling, and sampling procedures, review sample handling, preparation and analyses. Site inspection of Exploration Target areas were also carried out
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• Due to a systematic drill program on the same grid as more then 387km of UltraGPR survey, allows for a relatively high confidence in geological interpretation of the MJN nickel laterite deposit. Historical records for surface mapping, combined with the more recent UltraGPR survey traverse over 100% of the Resource area provides good correlation and understanding if the laterization distribution, bulk volumes and mineralization. Considered sufficient for this statement of Mineral Resources • All data included into the geological interpretation was validated to be free of errors and downhole wellsite logging reconciled with photos and assay results into composited zones of Limonite, Saprolite & Bedrock • Use of Ground Penetrating Radar (UltraGPR) interpretative data in combination with points of observations from the validated database assisted interpretation in extrapolating between holes. • Geological structure and bedrock topology, which are often displayed on Ultra-GPR interpretations, helped to identify thick, high grade laterite areas

Criteria	JORC Code explanation	Commentary
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• Resource dimensions defined by the drilled area, at this stage, is approximately 6200m in length, 2800m in width and covering 564ha laterization thickness for up to 40m to bedrock in some places • Limonite thickness average in the Mineral Resource area is approximately 18m and saprolite thickness is averaging 6m.

Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.*
	• *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.*
	• *The assumptions made regarding recovery of by-products.*
	• *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).*
	• *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.*
	• *Any assumptions behind modelling of selective mining units.*
	• *Any assumptions about correlation between variables.*
	• *Description of how the geological interpretation was used to control the resource estimates.*
	• *Discussion of basis for using or not using grade cutting or capping.*
	• *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*
		• Modelling techniques & assumptions applied were considered appropriate for estimation of Mineral Resource for this style of nickel laterite deposit based on the CP's experience. Key assumption's include;
		  • Domaining by elevation, laterite thickness and Ni grade, mineralogical, characteristics, distinct statistical population and geological environment
		  • Downhole and spatial geo-statistical analysis of the data and domain sub-sets of data providing search ellipsoid ranges for grade interpolation and maximum extrapolation distances for Ni between data points
		• Geological modelling and Mineral Resource estimates were completed using GEOVIA Surpac® mining software (version 6.1). Ordinary Kriging (OK) algorithm was used in the grade interpolation for nickel grades for limonite and saprolite zones. In the absence of detailed geostatistical analysis for other elements Inverse Distance Weighted Squared (IDW^2) methods were used to estimate the model grade interpolation for other elements including; Co, Fe, Mg0, Si02, Al203, Ca0. Moisture content was assigned values for each layer based on average of composites.
		• A comparison against previous Mineral Resource could not be made as this is the first nickel Resource estimate in this location.
		• Deleterious elements or acid drainage of the mineral resource was not considered in the model at this time of Mineral Resource estimation as pits are likely to be relatively shallow and are planned to be backfilled and rehabilitated progressively.
		• Block size selected 50m x 50m x 1m (sub-block 25m x 25 x 1m) were considered appropriate for the data set and the style of mineralization reported.
		• Wireframing was set up on each drill line in both east-west and north-south directions to create a 10X10m grid over the entire database to develop a morphology wireframe. From these wireframes, gridded surfaces were produced to represent the roof and floor limits of limonite, saprolite and bedrock zones. 10m grids were set up and interpolation of the gridded points was conducted using Inverse

Criteria	JORC Code explanation	Commentary
		Distance Weighted (IDW²) methods. • Based on analysis of the downhole statistical data additional constraints were applied to Ni% content to impose top cuts to avoid over-estimation of nickel content due to possible nugget effect. For this reason, all core sample measurements were subjected to a top cut for (Ni) estimated for each domain using downhole statistics. • Final block model and interpolated grades were validated using several visual and geostatistical techniques to gain further confidence in the Mineral Resource estimates stated in this report. Visual inspection of the block models in plan and sectional views to assess the grade interpolations performed conform with the lithological wireframes, surface models and drilling database. Further statistical validation, including swath plots of the Nickel Resource estimate was completed by comparing global averages of the sample composites against the block model global averages.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• Moisture measurements were performed on most 1m drill core samples • In areas where Moisture content measurements were not available the domain default weighted average moisture content was applied to the corresponding lithological zone • Moisture content was used to adjust Wet to Dry tonnage for mineral Resource estimates
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• Based on statistical analysis of the domain databases and ongoing ore mining operations at nearby mining projects a 0.80% cutoff grade for nickel was applied to both Limonite and Saprolite to best represent the global Mineral Resource estimate. A range of Ni cut-off grades up to 2.0%, split by laterite type, to better understand the distribution of the other elements such as (Co, Fe, MgO, SiO2, Al2O3, CaO, was also provided. Density and Moisture of samples was also carried out but at this time weighted average default values were applied to the corresponding composite zones.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions*	• no mining or modifying factors were applied to the Mineral Resource statement that would result in a conversion to Ore Reserve at this time. • assumptions for open cut mining operation similar to current production at the Hengjaya Project nearby and supply agreements with nearby IMIP smelter provide sufficient evidence for determination of reasonable prospects of eventual economic extraction of the ANN Mineral Resource

Criteria	JORC Code explanation	Commentary
	made.	• proximity to the smelter and the prospect of direct haul road access indicates excellent prospects for eventual economic extraction
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• Metallurgical factors and assumption based on ongoing supply requirement to the smelters, (majority owned by NIC) at the IMIP smelter facility. were considered when selecting the cutoff ranges for the Mineral Resource and by product splits between Limonite & Saprolite
Environmen-tal factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• Environmental Impact studies will be completed as part of the mine planning and operation permit process, • Sediment including Top soil composites were extracted separately and considered as overburden waste for future mine planning & rehabilitation of ex-opencast pit areas. This material usually occurs in the first 1-4meters from the surface and is usually below grade cutoff ranges and was not included in the Mineral Resource
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• An assumed density for each lithological layer based on density values used in nearby mining operations for this reason we don't believe there will be any significant impact using an assumed density at this time. • This assumed density was also checked against the actual insitu density measurements that were occasionally taken to confirm it is representative.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• Determination of the Resource classes, at this stage, was applied to the Mineral Resource with a digitized polygon boundary based on the spatial continuity of each geological domain around a regular spaced drilling grid 100m from included points of observation in the final validated database. Also taken into account, was the Ultra GPR grid lines between the drilling locations increasing confidence in interpretation of the laterization contact surface between the points of observation in the model. Resources were classified as Inferred at this time as drill spacing was all at 100m intervals.

Criteria	JORC Code explanation	Commentary
		• INFERRED - Areas of 100m of drilling spacing on a continuous grid pattern, where significant influence from Pass 1, 2 and 3 dominate the search ellipsoids, with 100m extrapolation from the last line of drilling. • Another factor in selection of Resource polygon limits used for the Mineral Resource was a review of the geostatistical inputs and the weighting on each category. This was done by comparing the influence of each pass within the polygon boundaries. The results show that 96% of the blocks in Inferred class are interpolated by Pass 1 & 2. These results give sufficient confidence in the polygon strategy respectively.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• Internal audit was carried out by comparisons between 3 modeling methods namely; Ordinary Kriging model, Ordinary Kriging model with 2 standard deviations top cuts to nickel grade and an Inverse Distance Weighted Squared and top cuts to nickel grade model
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• Sufficient exploration has been carried out at the MJN project to delineate a significant deposit of laterite nickel. The drilling used for the Mineral Resource estimate is based on a systematic drill grid of 100X100m. The Resource classification is all Inferred at this time based on this spacing of points of observation. According to the geostatistical analysis, the data provides sufficient detail for the purpose of the Inferred Mineral Resource stated in this report. • It is likely with further infill and exploration drilling in all domains the Mineral Resources, estimated in this report, will increase confidence in the Resource in the future. • Long term supply contracts to refining facilities already in operation nearby significantly increase the potential for eventual economic extraction of the MJN nickel laterite Mineral Resource

Section 4 Estimation and Reporting of Ore Reserves (Not Required)

(Criteria listed in section 1, and where relevant in sections 2 and 3, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* • *Clear statement as to whether the Mineral Resources are reported*	• Insert your commentary here…

Criteria	JORC Code explanation	Commentary
conversion to Ore Reserves	*additional to, or inclusive of, the Ore Reserves.*	
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	•
Study status	• *The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.* • *The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.*	•
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	•
Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).* • *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* • *The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.* • *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* • *The mining dilution factors used.* • *The mining recovery factors used.* • *Any minimum mining widths used.* • *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* • *The infrastructure requirements of the selected mining methods.*	•
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.*	•

Criteria	JORC Code explanation	Commentary
	• *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	
Environmen-tal	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	•
Infrastructure	• *The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	•
Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.* • *The methodology used to estimate operating costs.* • *Allowances made for the content of deleterious elements.* • *The source of exchange rates used in the study.* • *Derivation of transportation charges.* • *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* • *The allowances made for royalties payable, both Government and private.*	•
Revenue factors	• *The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* • *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	•
Market assessment	• *The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* • *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	•
Economic	• *The inputs to the economic analysis to produce the net present value*	•

Criteria	JORC Code explanation	Commentary
	(NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc. • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	
Social	• *The status of agreements with key stakeholders and matters leading to social licence to operate.*	•
Other	• *To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:* • *Any identified material naturally occurring risks.* • *The status of material legal agreements and marketing arrangements.* • *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	•
Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.* • *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	•
Audits or reviews	• *The results of any audits or reviews of Ore Reserve estimates.*	•

Criteria	JORC Code explanation	Commentary
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* • *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	•

APPENDIX 2

PT MANDIRI JAYA NICKEL LEGAL DOCUMENTATION

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NOMOR : 540.3/SK.017/DESDM/XI/2014

TENTANG

PERSETUJUAN PENINGKATAN IZIN USAHA PERTAMBANGAN EKSPLORASI MENJADI IZIN USAHA PERTAMBANGAN OPERASI PRODUKSI KEPADA PT. MANDIRI JAYA NICKEL

BUPATI MOROWALI,

Membaca : Surat Direktur PT. MANDIRI JAYA NICKEL Nomor 010/MJN/XI/2014 tanggal 03 November 2014 perihal Permohonan Izin Usaha Pertambangan (IUP) Operasi Produksi Bahan Galian Nikel dan Mineral Pengikutnya.

Menimbang : bahwa berdasarkan hasil evaluasi kegiatan IUP Pertambangan Eksplorasi PT. MANDIRI JAYA NICKEL telah memenuhi syarat untuk diberikan Peningkatan IUP Eksplorasi menjadi IUP Operasi Produksi;

Mengingat :

1. Undang-Undang Nomor 13 Tahun 2000 tentang Ketenagakerjaan (Lembaran Negara RI Tahun 2000 Nomor 39, Tambahan Lembaran Negara RI Nomor 3817);
2. Undang-Undang Nomor 32 Tahun 2004 tentang Pemerintahan Daerah (Lembaran Negara RI Tahun 2004 Nomor 125, Tambahan Lembaran Negara RI Nomor 4437) sebagaimana telah diubah dengan Undang-Undang Nomor 8 Tahun 2005 tentang Penetapan Peraturan Pemerintah Pengganti Undang-Undang Nomor 3 Tahun 2005 tentang Perubahan atas Undang-Undang Nomor 32 Tahun 2004 tentang Pemerintahan Daerah (Lembaran Negara RI Tahun 2005 Nomor 108, Tambahan Lembaran Negara RI Nomor 4548);
3. Undang-Undang Nomor 25 Tahun 2007 tentang Penanaman Modal (Lembaran Negara RI Tahun 2007 Nomor 67, Tambahan Lembaran Negara RI Nomor 4724);
4. Undang-Undang Nomor 26 Tahun 2007 tentang Penataan Ruang (Lembaran Negara RI Tahun 2007 Nomor 68, Tambahan Lembaran Negara RI Nomor 4725);
5. Undang-Undang Nomor 20 Tahun 2008 tentang Usaha Mikro, Kecil dan Menengah (Lembaran Negara RI Tahun 2008 Nomor 93, Tambahan Lembaran Negara RI Nomor 4866);
6. Undang-Undang Nomor 4 Tahun 2009 tentang Pertambangan Mineral dan Batubara (Lembaran Negara RI Tahun 2009 Nomor 4, Tambahan Lembaran Negara RI Nomor 4959);

7. Undang-Undang Nomor 28 Tahun 2009 tentang Pajak Daerah dan Retribusi Daerah (Lembaran Negara RI Tahun 2009 Nomor 130, Tambahan Lembaran Negara RI Nomor 5049);
8. Undang-Undang Nomor 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup (Lembaran Negara RI Tahun 2009 Nomor 140, Tambahan Lembaran Negara RI Nomor 5059);
9. Peraturan Pemerintah Nomor 27 Tahun 1999 tentang Analisis Mengenai Dampak Lingkungan Hidup (Lembaran Negara RI Tahun 1999 Nomor 59, Tambahan Lembaran Negara RI Nomor 3838);
10. Peraturan Pemerintah Nomor 38 Tahun 2007 tentang Pembagian Urusan Pemerintahan antara Pemerintah Pusat, Pemerintahan Daerah Provinsi, Pemerintahan Daerah Kabupaten/Kota (Lembaran Negara RI Tahun 2007 Nomor 82, Tambahan Lembaran Negara RI Nomor 4737);
11. Peraturan Pemerintah Nomor 26 Tahun 2008 tentang Rencana Tata Ruang Wilayah Nasional (Lembaran Negara RI Tahun 2008 Nomor 48, Tambahan Lembaran Negara RI Nomor 4833);
12. Peraturan Pemerintah Nomor 22 Tahun 2010 tentang Wilayah Pertambangan (Lembaran Negara RI Tahun 2010 Nomor 28, Tambahan Lembaran Negara RI Nomor 5110);
13. Peraturan Pemerintah Nomor 23 Tahun 2010 tentang Pelaksanaan Kegiatan Usaha Pertambangan Mineral dan Batubara (Lembaran Negara RI Tahun 2010 Nomor 29, Tambahan Lembaran Negara RI Nomor 5111);
14. Peraturan Menteri Energi dan Sumber Daya Mineral Nomor 28 Tahun 2009 tentang Penyelenggaraan Usaha Jasa Pertambangan Mineral dan Batubara (Berita Negara RI Tahun 2009 Nomor 341);
15. Peraturan Daerah Kabupaten Morowali Nomor 20 Tahun 2003 tentang Penyelenggaraan Pengelolaan Usaha Pertambangan Umum (Lembaran Daerah Tahun 2003 Nomor 41);
16. Peraturan Bupati Morowali Nomor 16 Tahun 2008 tentang Tugas Pokok dan Fungsi Masing-Masing Jabatan dan Organisasi Dinas Energi dan Sumber Daya Mineral Kabupaten Morowali;
17. Keputusan Bupati Morowali Nomor 540.2/SK.005/DESDM/VI/2014 tanggal 30 Juni 2014 tentang Persetujuan Revisi Perpanjangan Izin Usaha Pertambangan Eksplorasi kepada PT. MANDIRI JAYA NICKEL.
18. Keputusan Bupati Morowali Nomor : 660.1/137/BLHD/VIII/2014 tanggal 18 Agustus 2014 tentang Kelayakan Lingkungan Kegiatan Penambangan Bijih Nikel di Desa Bahomoahi, Kecamatan Bungku Timur oleh PT. MANDIRI JAYA NICKEL.

MEMUTUSKAN:

Menetapkan : KEPUTUSAN BUPATI MOROWALI TENTANG PERSETUJUAN PENINGKATAN IUP EKSPLORASI MENJADI IUP OPERASI PRODUKSI KEPADA PT. MANDIRI JAYA NICKEL

KESATU : Memberikan Izin Usaha Pertambangan Operasi Produksi kepada :

Nama Perusahaan	:	PT. MANDIRI JAYA NICKEL
Nama Direktur	:	Adi Wijoyo
Nilai Saham	:	5.000 Saham

Pemegang Saham :

1. Nama	:	Adi Wijoyo
Nilai saham	:	250 Saham
Pekerjaan	:	Swasta
Alamat	:	Kondominium Taman Anggrek 8/41 D
Kewarganegaraan	:	Indonesia
2. Nama	:	Inggrid Hentiana
Nilai saham	:	250 Saham
Pekerjaan	:	Swasta
Alamat	:	Kondominium Taman Anggrek 8/41 D ,
Kewarganegaraan	:	Indonesia
3. Nama	:	Marthen Hentiana
Nilai Saham	:	1.000 Saham
Pekerjaan	:	Swasta
Alamat	:	Kondominium Taman Anggrek 8/41 D
Kewarganegaraan	:	Indonesia
4. Nama	:	Ningsih Wijaya Kusuma
Nilai Saham	:	250 Saham
Pekerjaan	:	Swasta
Alamat	:	Kondominium Taman Anggrek 8/41 D
Kewarganegaraan	:	Indonesia
5. Nama	:	Heng Leo Saputra Hidayat
Nilai Saham	:	1.000 Saham
Pekerjaan	:	Swasta
Alamat	:	Apartemen Mangga Dua Court, Mangga Dua Selatan
Kewarganegaraan	:	Indonesia
6. Nama	:	Martin Unsulangi Heng
Nilai Saham	:	1.000 Saham
Pekerjaan	:	Swasta
Alamat	:	Jl. Albasia I Blok F/21 Kedoya Jakarta Barat
Kewarganegaraan	:	Indonesia
7. Nama	:	Tan Liem Kwi
Nilai Saham	:	1.000 Saham
Pekerjaan	:	Swasta
Alamat	:	Kondominium Taman Anggrek 8/41 D
Kewarganegaraan	:	Indonesia
8. Nama	:	Jessica Kusuma
Nilai Saham	:	250 Saham
Pekerjaan	:	Swasta
Alamat	:	Kondominium Taman Anggrek 8/41 D
Kewarganegaraan	:	Indonesia
Alamat Perusahaan	:	Rukan Garden House Blok B No. 23 Pantai Indah Kapuk, Jakarta Utara Telp (021) 29033135 Fax. (021) 29033134

Komoditas : Nikel DMP

Lokasi penambangan :

Desa	:	Bahomoahi
Kecamatan	:	Bungku Timur
Kabupaten	:	Morowali
Propinsi	:	Sulawesi Tengah
Kode wilayah	:	MW030
Luas	:	4.871 Ha

Peta dan daftar koordinat WIUP yang diterbitkan oleh Bupati Morowali sebagaimana tercantum dalam Lampiran I dan Lampiran II Keputusan ini.

Lokasi Pengolahan dan Pemurnian : Bahomoahi
Pengangkutan dan Penjualan : Bahomoahi

Jangka waktu berlaku IUP : 20 Tahun

Jangka waktu Tahap Kegiatan :
a. Konstruksi selama 3 Tahun
b. Produksi selama 17 Tahun

KEDUA : Pemegang IUP Operasi Produksi mempunyai hak untuk melakukan kegiatan konstruksi, produksi, pengangkutan dan penjualan serta pengolahan dan pemurnian dalam WIUP untuk jangka waktu 20 tahun dan dapat diperpanjang 2 (dua) kali masing-masing 10 tahun. Terhitung mulai tanggal ditetapkannya Keputusan ini sampai dengan tanggal 12 November 2034 dan ***apabila dalam WIUP terdapat Kawasan Hutan (Hutan Lindung, Hutan Produksi Terbatas, Hutan Produksi Tetap dan Hutan Produksi yang dapat di Konversi dan areal Izin Usaha Pengelolaan Hasil Hutan Kayu (IUPHHK), dilarang melakukan kegiatan apapun sebelum mendapat izin dari pejabat yang berwenang.***

KETIGA : IUP Operasi Produksi ini dilarang dipindahtangankan kepada pihak lain tanpa persetujuan Bupati Morowali.

KEEMPAT : PT. MANDIRI JAYA NICKEL sebagai Pemegang IUP Operasi Produksi dalam melaksanakan kegiatannya mempunyai hak dan kewajiban sebagaimana tercantum dalam Lampiran III keputusan ini.

KELIMA : Selambat-lambatnya 60 (enam puluh) hari kerja setelah diterbitkannya Keputusan ini Pemegang IUP Operasi Produksi sudah harus menyampaikan RKAB kepada Bupati Morowali untuk mendapat persetujuan.

KEENAM : Terhitung sejak 90 (sembilan puluh) hari kerja sejak persetujuan RKAB sebagaimana dimaksud dalam diktum Kelima Pemegang IUP Operasi Produksi sudah harus memulai aktifitas di lapangan.

KETUJUH : Tanpa mengurangi ketentuan peraturan perudang-undangan maka IUP Operasi Produksi ini dapat diberhentikan sementara, dicabut, atau dibatalkan, apabila pemegang IUP Operasi Produksi tidak memenuhi kewajiban dan larangan sebagaimana dimaksud dalam diktum Ketiga, Keempat, dan Kelima dalam Keputusan ini.

KEDELAPAN : Keputusan Bupati ini mulai berlaku pada tanggal ditetapkan dan apabila terdapat kekeliruan akan diadakan perbaikan sebagaimana mestinya.

Ditetapkan di : Bungku
Pada Tanggal : 12 November 2014

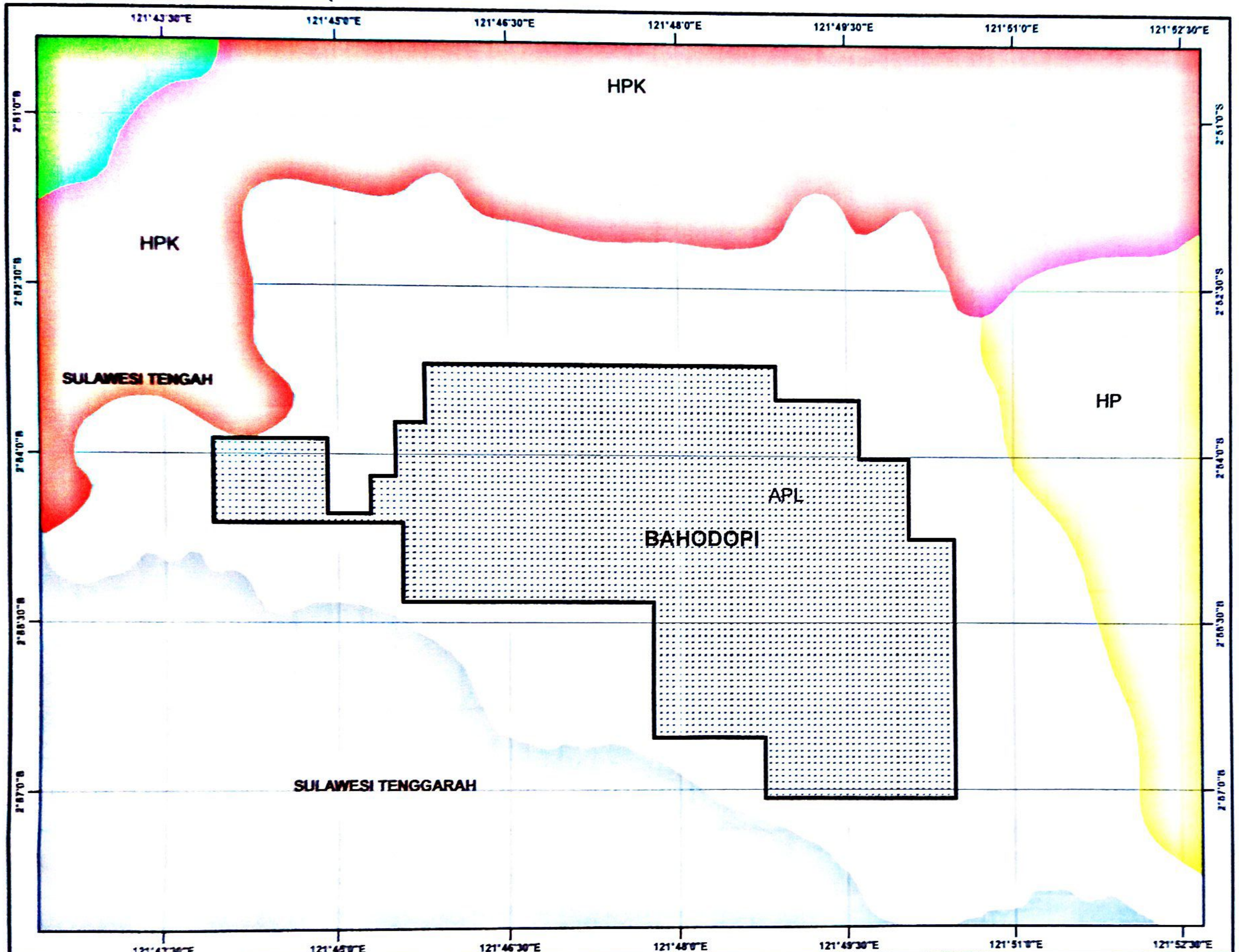
BUPATI

ANWAR HAFID

Tembusan disampaikan kepada Yth :

1. Menteri Energi dan Sumber Daya Mineral di Jakarta;
2. Menteri Keuangan di Jakarta;
3. Sekretaris Jenderal Departemen Energi dan Sumber Daya Mineral di Jakarta;
4. Inspektur Jenderal Departemen Energi dan Sumber Daya Mineral di Jakarta;
5. Direktur Jenderal Pajak, Departemen Keuangan di Jakarta;
6. Direktur Jenderal Perbendaharaan, Departemen Keuangan di Jakarta;
7. Direktur Jenderal Pendapatan Daerah, Departemen Dalam Negeri di Jakarta;
8. Gubernur Sulawesi Tengah di Palu;
9. Kepala Biro Hukum dan Humas/Kepala Biro Keuangan/Kepala Biro Perencanaan dan Kerjasama Luar Negeri, Setjen Departemen Energi dan Sumber Daya Mineral di Jakarta;
10. Sekretaris Direktorat Jenderal Mineral, Batubara dan Panas Bumi di Jakarta;
11. Direktur Teknik dan Lingkungan Mineral, Batubara dan Panas Bumi di Jakarta;
12. Direktur Pembinaan Program Mineral, Batubara dan Panas Bumi di Jakarta;
13. Direktur Pembinaan Pengusahaan Mineral dan Batubara di Jakarta;
14. Direktur Pajak Bumi dan Bangunan, Departemen Keuangan di Jakarta;
15. Kepala Dinas Energi dan Sumber Daya Mineral, Prop. Sulawesi Tengah di Palu;
16. Kepala Dinas Energi dan Sumber Daya Mineral, Kab. Morowali di Bungku;
17. Direksi PT. MANDIRI JAYA NICKEL di Jakarta.

Lampiran I
SK Bupati Morowali
Nomor : 540. 3/SK. 017/DESDM/XI/2014.
Tanggal : 12 November 2014



PETA WILAYAH IUP OPERASI PRODUKSI
PT. MANDIRI JAYA NICKEL
DESA BAHOMOAHI KECAMATAN BUNGKU TIMUR
KABUPATEN MOROWALI
PROVINSI SULAWESI TENGAH
LUAS 4.871 Ha

N

0 500 1000 2000 Meters

KODE WILAYAH	KETERANGAN
MW030	Tingkat Penyelidikan Geosains Potensi Sumberdaya Cadangan Nikel _______ Mwe

Keterangan Pengeluaran Peta Oleh
Pemerintah Daerah Kabupaten Morowali

LEGENDA

JALAN
Status Jalan :
- Jalan Kabupaten
- Jalan Nasional
- Jalan Provinsi
- Desa/Pemukiman

KAWASAN HUTAN
Nama Kawasan Hutan
- CA. MOROWALI
- Hutan Lindung
- Hutan Produksi Terbatas
- Hutan Produksi Tetap
- Hutan Produksi yang dapat di Konversi
- Areal Penggunaan Lain
- WIUP MANDIRI JAYA NICKEL

SUMBER PETA
1. Peta Rupa Bumi Indonesia Sakala 1 : 50.000
2. Peta Penunjukkan Kawasan Hutan 1 : 250.000

PETA INDEKS

Waktu Pencetakan Peta :

1. Pemohon	:	**PT. MANDIRI JAYA NICKEL**
2. Hari dan Tanggal Proses	:	**Rabu, 05 November 2014**
3. Jam Proses	:	**11.30 WITA**
4. Operator	:	-
5.Catatan	:	-

Dikeluarkan di : Bungku
Pada Tanggal :

BUPATI MOROWALI

ANWAR HAFID

LAMPIRAN II

Surat Keputusan (SK) Bupati Morowali
Nomor : 540. 3/SK. 017/DESDM/XI/2014.
Tanggal : 12 November 2014.

KOORDINAT WILAYAH IUP OPERASI PRODUKSI
PT. MANDIRI JAYA NICKEL

LOKASI
PROVINSI : SULAWESI TENGAH
KABUPATEN : MOROWALI
KECAMATAN : BUNGKU TIMUR
DESA : BAHOMOAHI
KOMODITAS : NIKEL DMP.
LUAS WILAYAH : 4.871 Ha
KODE WILAYAH : MW030

NO.	GARIS BUJUR (BUJUR TIMUR (BT))				GARIS LINTANG LINTANG UTARA (LU)/ LINTANG SELATAN (LS)			
	°	'	"	BT	°	'	"	LU/LS
1	121	45	45.25	BT	2	53	11.52	LS
2	121	48	51.74	BT	2	53	11.52	LS
3	121	48	51.74	BT	2	53	29.42	LS
4	121	49	36.31	BT	2	53	29.42	LS
5	121	49	36.31	BT	2	54	1.00	LS
6	121	50	2.95	BT	2	54	1.00	LS
7	121	50	2.95	BT	2	54	44.52	LS
8	121	50	27.84	BT	2	54	44.52	LS
9	121	50	27.84	BT	2	57	4.52	LS
10	121	48	45.26	BT	2	57	4.52	LS
11	121	48	45.26	BT	2	56	31.44	LS
12	121	47	45.75	BT	2	56	31.44	LS
13	121	47	45.75	BT	2	55	18.84	LS
14	121	45	33.54	BT	2	55	18.84	LS
15	121	45	33.54	BT	2	54	36.56	LS
16	121	43	54.95	BT	2	54	36.56	LS
17	121	43	54.95	BT	2	53	51.8	LS
18	121	44	53.96	BT	2	53	51.8	LS
19	121	44	53.96	BT	2	54	31.59	LS
20	121	45	16.61	BT	2	54	31.59	LS
21	121	45	16.61	BT	2	54	11.20	LS
22	121	45	29.81	BT	2	54	11.20	LS
23	121	45	29.81	BT	2	53	42.60	LS
24	121	45	45.25	BT	2	53	42.60	LS

BUPATI

ANWAR HAFID

LAMPIRAN III
Surat Keputusan (SK) Bupati Morowali :

Nomor : 540.3/SK.017/DESDM/XI/2014
Tanggal : 12 November 2014

Hak dan Kewajiban :

A. Hak

1. Memasuki WIUP sesuai dengan peta dan daftar koordinat;
2. Melaksanakan kegiatan IUP Operasi Produksi (Konstruksi, Produksi, Pengolahan Pemurnian dan Pengangkutan Penjualan) sesuai dengan ketentuan peraturan perundang-undangan;
3. Membangun fasilitas penunjang kegiatan IUP Operasi Produksi (Konstruksi, Produksi, Pengolahan Pemurnian dan Pengangkutan Penjualan) di dalam maupun diluar WIUP;
4. Dapat menghentikan sewaktu-waktu menghentikan kegiatan IUP Operasi Produksi (Konstruksi, Produksi, Pengolahan Pemurnian dan Pengangkutan Penjualan) di setiap bagian atau beberapa bagian WIUP dengan alasan bahwa kelanjutan dari kegiatan IUP Operasi Produksi (Konstruksi, Produksi, Pengolahan Pemurnian dan Pengangkutan Penjualan), tersebut tidak layak atau praktis secara komersial maupun karena keadaan kahar, keadaan yang menghalangi sehingga menimbulkan penghentian sebagian atau seluruh kegiatan usaha pertambangan;
5. Mengajukan permohonan pengusahaan mineral lain yang bukan merupakan asosiasi mineral utama yang diketemukan dalam WIUP;
6. Mengajukan pernyataan tidak berminat terhadap pengusahaan mineral lain yang bukan merupakan asosiasi mineral utama yang diketemukan dalam WIUP;
7. Memanfaatkan sarana dan prasarana umum untuk keperluan kegiatan IUP Operasi Produksi (Konstruksi, Produksi, Pengolahan Pemurnian dan Pengangkutan Penjualan) setelah memenuhi ketentuan peraturan perundang-undangan;
8. Dapat melakukan kerjasama dengan perusahaan lain dalam rangka penggunaan setiap fasilitas yang dimiliki oleh perusahaan lain baik yang berafiliasi dengan perusahaan atau tidak sesuai dengan ketentuan peraturan perundang-undangan;
9. Dapat membangun sarana dan prasarana pada WIUP lain setelah mendapat izin dari pemegang IUP yang bersangkutan.

B. Kewajiban

1. Memilih yurisdiksi pada Pengadilan Negeri tempat dimana lokasi WIUP berada;
2. Selambat-lambatnya 6 bulan setelah ditetapkannya keputusan ini, pemegang IUP Operasi Produksi harus sudah melaksanakan dan menyampaikan laporan pematokan batas wilayah IUP Operasi Produksi kepada Bupati;
3. Hubungan antara pemegang IUP Operasi Produksi dengan pihak ketiga menjadi tanggung jawab pemegang IUP Sesuai ketentuan perundang-undangan;
4. Melaporkan Rencana Investasi;
5. Menyampaikan rencana reklamasi;
6. Menyampaikan rencana pasca tambang;
7. Menempatkan jaminan penutupan tambang (sesuai umur tambang);
8. Menyampaikan RKAB selambat-lambatnya pada bulan November yang meliputi rencana tahun depan dan realisasi kegiatan setiap tahun berjalan kepada Bupati dengan tembusan kepada Menteri dan Gubernur;
9. Menyampaikan Laporan Kegiatan Triwulanan yang harus diserahkan dalam jangka waktu 30 (tiga puluh) hari setelah akhir dari triwulan takwim secara berkala kepada Bupati dengan tembusan kepada Menteri dan Gubernur;
10. Apabila ketentuan batas waktu penyampaian RKAB dan pelaporan sebagaimana dimaksud pada angka 8 (delapan) dan 9 (sembilan) tersebut di atas terlampaui, maka kepada pemegang IUP Operasi Produksi akan dibeikan peringatan tertulis;
11. Menyampaikan laporan produksi dan pemasaran sesuai dengan ketentuan peraturan perundang-undangan.

12. Menyampaikan Rencana Pengembangan dan Pemberdayaan Masyarakat sekitar wilayah pertambangan kepada Bupati;
13. Menyampaikan RKTTL setiap tahun sebelum penyampaian RKAB kepada Bupati;
14. Memenuhi ketentuan perpajakan sesuai dengan ketentuan peraturan perundang-undangan;
15. Membayar Iuran Tetap setiap tahun dan membayar Royalty sesuai dengan ketentuan peraturan perundang-undangan;
16. Menempatkan jaminan reklamasi sebelum melakukan kegiatan produksi dan rencana penutupan tambang sesuai ketentuan peraturan perundang-undangan;
17. Menyampaikan RPT (Rencana Penutupan Tambang) 2 Tahun sebelum kegiatan produksi berakhir;
18. Mengangkat seorang Kepala Teknik Tambang yang bertanggung jawab atas Kegiatan IUP Operasi Produksi (Konstruksi, Produksi, Pengolahan Pemurnian dan Pengangkutan Penjualan), Keselamatan dan Kesehatan Kerja Pertambangan serta Pengelolaan Lingkungan Pertambangan;
19. Kegiatan produksi dimulai apabila kapasitas produksi terpasang sudah mencapai 70% yang direncanakan;
20. Permohonan Perpanjangan IUP untuk Kegiatan Produksi harus diajukan 2 (dua) tahun sebelum berakhirnya masa izin ini dengan disertai pemenuhan persyaratan;
21. Kelalaian atas ketentuan tersebut pada butir 20, mengakibatkan IUP Operasi Produksi berakhir menurut hukum dan segala usaha pertambangan dihentikan. Dalam jangka waktu paling lama 6 (enam) bulan sejak berakhirnya keputusan ini. Pemegang IUP Operasi Produksi harus mengangkat keluar segala sesuatu yang menjadi miliknya, kecuali benda-benda/bangunan-bangunan yang dipergunakan untuk kepentingan umum;
22. Apabila dalam jangka waktu sebagaimana dimaksud dalam butir 21, pemegang IUP Operasi Produksi tidak melaksanakan maka barang/aset pemegang IUP menjadi milik pemerintah;
23. Pemegang IUP Operasi Produksi harus menyediakan data dan keterangan sewaktu-waktu apabila dikehendaki oleh pemerintah;
24. Pemegang IUP Operasi Produksi membolehkan dan menerima apabila pemerintah sewaktu-waktu melakukan pemeriksaan;
25. Menerapkan kaidah pertambangan yang baik;
26. Mengelola keuangan sesuai dengan sistem akuntansi Indonesia;
27. Melaporkan pelaksanaan pengembangan dan pemberdayaan masyarakat setempat secara berkala;
28. Mengutamakan pemanfaatan tenaga kerja setempat, barang dan jasa dalam negeri sesuai dengan ketentuan peraturan perundang-undangan;
29. Mengutamakan pembelian dalam negeri dari pengusaha lokal yang ada di daerah tersebut sesuai dengan ketentuan peraturan perundang-undangan;
30. Mengutamakan seoptimal mungkin penggunaan perusahaan jasa pertambangan lokal dan/atau nasional;
31. Dilarang melibatkan anak perusahaan dan/atau afiliasinya dalam bidang usaha jasa pertambangan di WUP yang diusahakannya, kecuali dengan izin Menteri;
32. Melaporkan data dan pelaksanaan penggunaan usaha jasa penunjang;
33. Menyerahkan seluruh data yang diperoleh dari hasil kegiatan IUP Operasi Produksi kepada Bupati dengan tembusan Menteri dan Gubernur;
34. Menyampaikan proposal yang sekurang-kurangnya menggambarkan aspek teknis, keuangan, produksi dan pemasaran serta lingkungan sebagai persyaratan pengajuan permohonan perpanjangan IUP Operasi Produksi;
35. Memberikan ganti rugi kepada pemegang hak atas tanah dan tegakan yang terganggu akibat kegiatan IUP Operasi Produksi;
36. Mengutamakan pemenuhan kebutuhan dalam negeri (DMO) sesuai ketentuan perundang-undangan;
37. Penjualan produksi kepada afiliasi harus mengacu kepada harga pasar;
38. Kontrak penjualan jangka panjang (minimal 3 tahun) harus mendapat persetujuan terlebih dahulu dari Menteri;

39. Perusahaan wajib mengolah produksinya didalam negeri.
40. Pembangunan sarana dan prasarana pada kegiatan konstruksi antara lain meliputi :
   a. Fasilitas-fasilitas dan peralatan pertambangan;
   b. Instalasi dan peralatan peningkatan mutu mineral/batubara;
   c. Fasilitas-fasilitas Bandar yang dapat meliputi dok-dok, pelabuhan-pelabuhan, dermaga-dermaga, jembatan-jembatan, tongkang-tongkang, pemecah-pemecah air, fasilitas-fasilitas terminal, bengkel-bengkel, daerah-daerah penimbunan, gudang-gudang, dan peralatan bongkar muat;
   d. Fasilitas-fasilitas transportasi dan komunikasi yang dapat meliputi jalan-jalan, jembatan-jembatan, kapal-kapal, feri-feri, pelabuhan-pelabuhan udara, rel-rel, tempat-tempat pendaratan pesawat, hanggar-hanggar, garasi-garasi, pompa-pompa BBM, fasilitas-fasilitas radio dan telekomunikasi, serta fasilitas-fasilitas jaringan telegraph dan telepon;
   e. Perkotaan, yang dapat meliputi rumah-rumah tempat tinggal, toko-toko, sekolah-sekolah, rumah sakit, teater-teater dan bangunan lain, fasilitas-fasilitas dan peralatan pegawai kontraktor termasuk tanggungan pegawai tersebut;
   f. Listrik, fasilitas-fasilitas air dan air buangan dan dapat meliputi pembangkit-pembangkit tenaga listrik (yang dapat berupa tenaga air, uap, gas atau diesel), jaringan-jaringan listrik, dam-dam, saluran-saluran air, sistem-sistem penyediaan air dan sistem-sistem pembuangan limbah (tailing), air buangan pabrik dan air buangan rumah tangga;
   g. Fasilitas-fasilitas lain-lain yang dapat meliputi namum tidak terbatas, bengkel-bengkel mesin, bengkel-bengkel pengecoran dan reparasi;
   h. Semua fasilitas tambahan atau fasilitas lain, pabrik dan peralatan yang dianggap perlu atau cocok untuk operasi pengusahaan yang berkaitan dengan WIUP atau untuk menyediakan pelayanan atau melaksanakan aktifitas-aktifitas pendukung atau aktifitas yang sifatnya insidentil.

BUPATI

ANWAR HAFID

COMMERCIAL TERMS OF THE ACQUISITION

MJN and ETL IUPs

- Nickel Industries to acquire 60% of the control and economic rights in each of MJN and ETL.
- Refundable commitment fee of US$3.0 million for each of MJN and ETL (US$5.9 million in total) (**Commitment Fee**), payable upon completion of the due diligence period, which is up to 90 days.
- Following the issuance of a positive due diligence notice, Nickel Industries will carry out an agreed Initial Exploration Program (**IEP**) within 18 months and for the purpose of determining the purchase consideration payable to the vendor at completion.
- After the IEP, Nickel Industries shall pay to the Vendor the purchase consideration, calculated as:

60% * the JORC Resource[1] * US$2.50 per dmt above 1.70% nickel.

- Nickel Industries will provide an Exclusive Financing Commitment (**EFC**) in the form of interest-bearing loans, repayable prior to any dividend distributions.
- Nickel Industries shall receive an agency fee from the first production from the IUPs, as compensation for the Commitment Fee.

GF IUP

- Nickel Industries to acquire 60% of the control and economic rights in GF for a total consideration of US$7 million, payable as follows:
  - an advance payment of US$2 million (already paid);
  - a first milestone payment of US$3 million (already paid); and
  - a final payment of US$2 million upon the transfer of 60% of GF to Nickel Industries.
- Nickel Industries will provide an EFC in the form of interest-bearing loans, repayable prior to any dividend distributions.
- **An application has been submitted to extend GF by an area of 491ha of prospective laterite**. Should this application be successful, Nickel Industries is to pay the vendor an additional US$4 million.

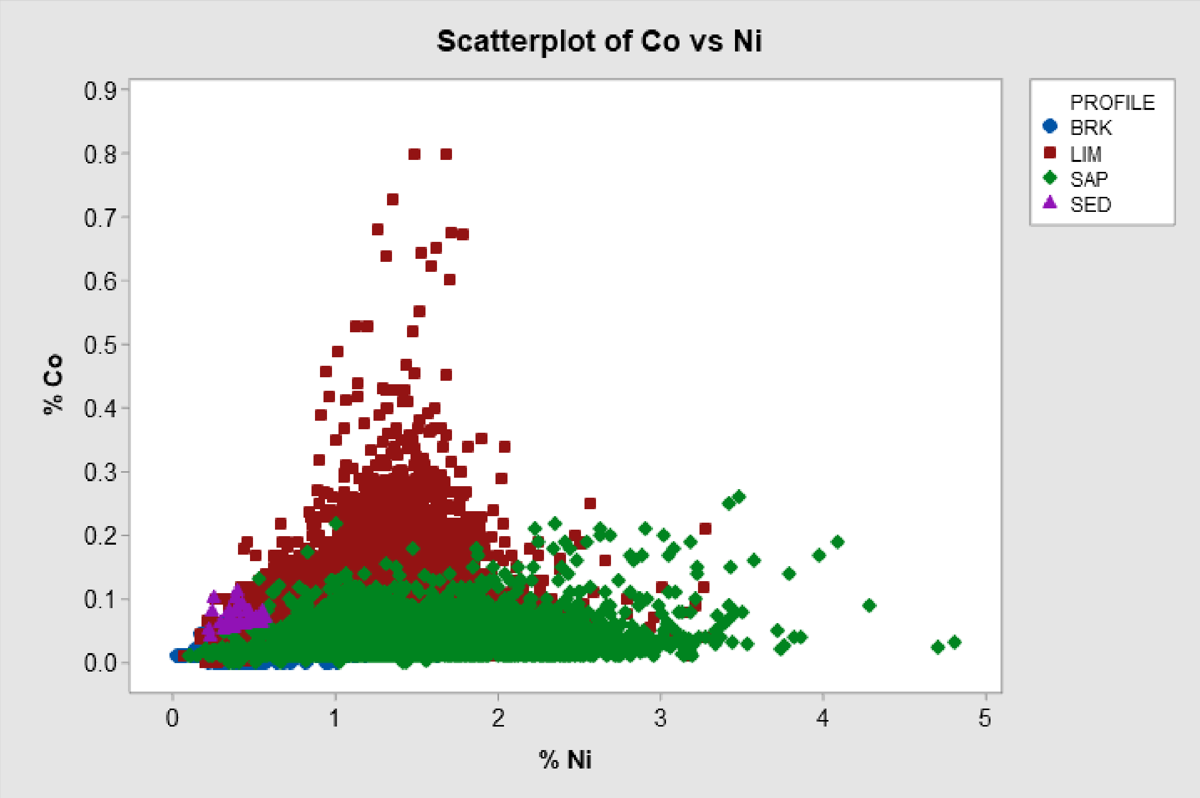
[1] Measured, indicated and inferred in dmt

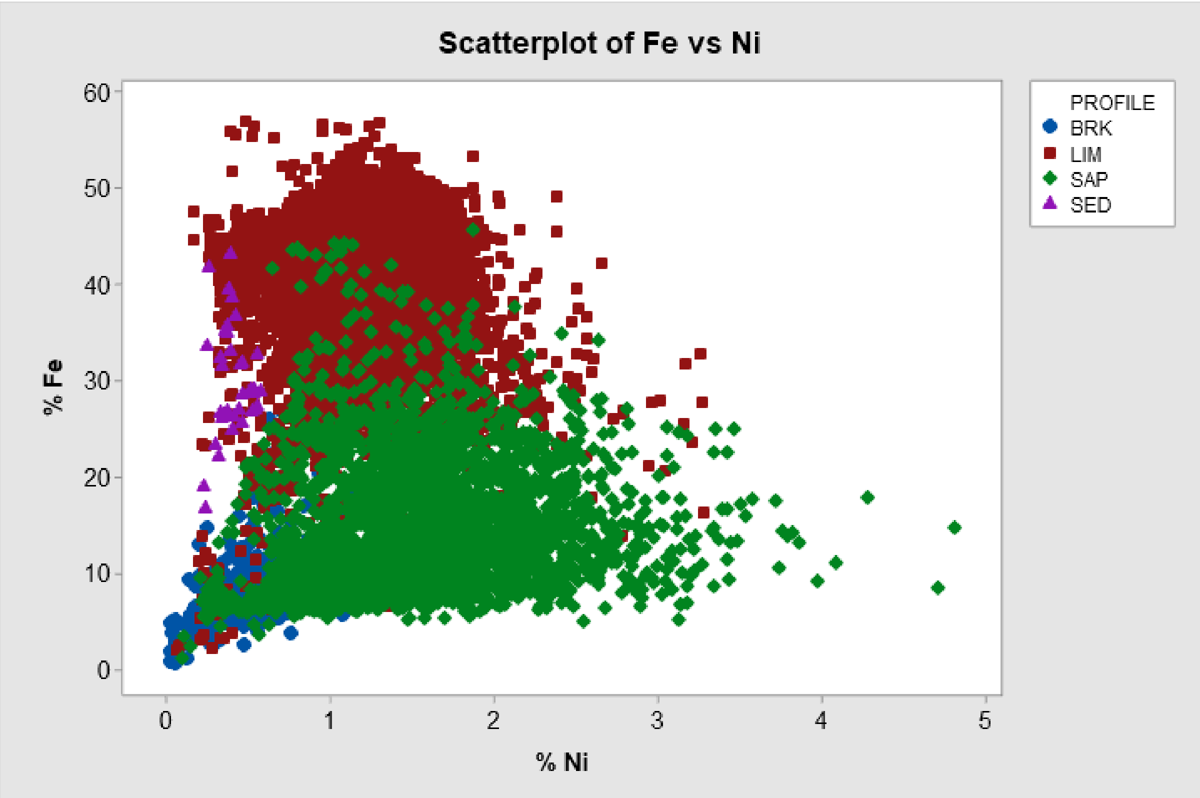
APPENDIX 3

MJN STATISTICAL ANALYSIS

PT MANDIRI JAYA NICKEL
DESCRIPTIVE STATISTICS
2022

SCATTERPLOT





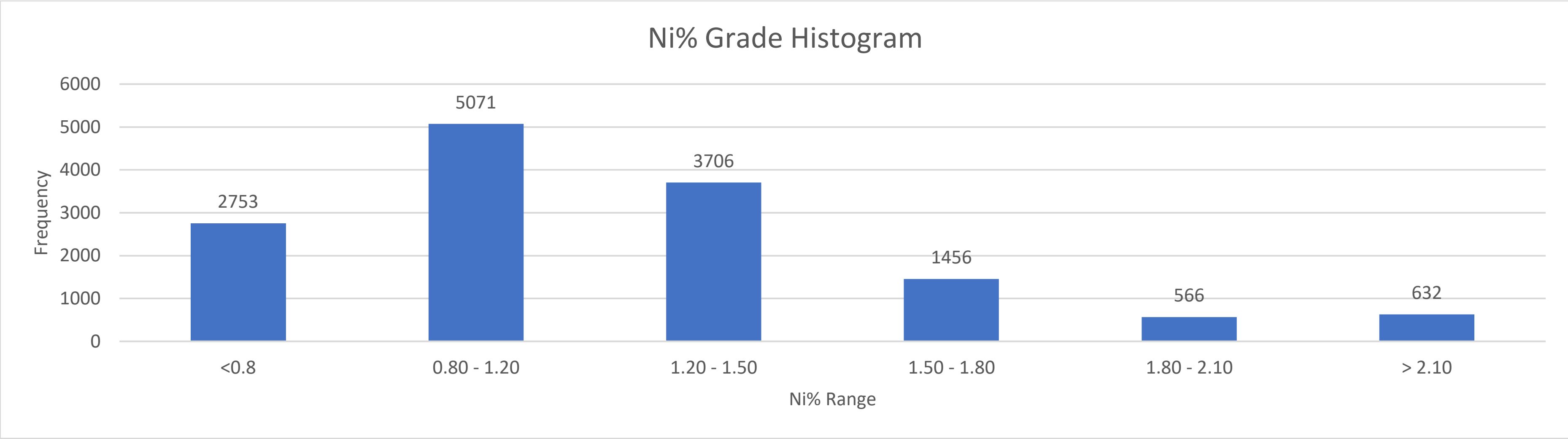
Sediment 35 samples | Limonite 10,089 samples | Saprolite 2,769 samples | Bedrock 1,291 samples

ASSAY RESULTS by LITHOLOGICAL LAYER

Profile	No. Assay	Statistics	Ni %	Co %	Fe %	MgO %	SiO2 %	Al2O3 %	CaO %	Cr2O3 %	MC	SM Ratio
SED	35	Minimum	0.22	0.04	16.68	0.85	0.43	14.03	0.01	2.21	0.00	0.29
		Average	**0.40**	**0.07**	**29.90**	**1.35**	**1.19**	**29.06**	**0.08**	**3.52**	**29.55**	**0.89**
		Maximum	0.57	0.11	43.09	2.10	4.60	40.78	0.14	4.46	36.71	3.29
LIM	10,089	Minimum	0.06	0.00	2.11	0.01	0.02	0.01	0.00	0.04	0.00	0.20
		Average	**1.15**	**0.10**	**40.94**	**1.81**	**6.70**	**10.77**	**0.10**	**2.64**	**40.91**	**4.68**
		Maximum	3.28	0.80	56.99	38.04	97.54	37.85	46.01	5.37	95.01	599.00
SAP	2,769	Minimum	0.09	0.00	1.31	0.17	1.29	0.01	0.01	0.14	0.00	0.97
		Average	**1.55**	**0.04**	**15.10**	**17.10**	**34.85**	**4.57**	**1.14**	**1.10**	**31.84**	**4.06**
		Maximum	4.81	0.26	45.67	38.34	92.00	18.78	12.57	3.38	98.59	230.70
BRK	1,291	Minimum	0.02	0.00	0.79	0.55	1.62	0.01	0.01	0.09	0.00	0.80
		Average	**0.45**	**0.02**	**7.26**	**26.95**	**38.02**	**2.97**	**1.99**	**0.51**	**7.92**	**2.76**
		Maximum	1.85	0.12	42.94	41.42	94.33	30.01	33.17	3.13	54.45	168.45
Total Assay	**14,184**											

STATISTICS AND HISTOGRAM OF ASSAY RESULTS by Ni

No. Assay	% No. Assay	Cum %	Ni% Range	Ni %	Co %	Fe %	MgO %	SiO2 %	Sm Ratio	Al2O3 %	CaO %	Cr2O3 %	MC
2,753	19%	100%	<0.8	0.52	0.04	22.77	14.41	23.48	5.53	8.31	1.06	1.46	20.47
5,071	36%	81%	0.80 - 1.20	1.01	0.09	37.71	3.74	9.88	4.53	10.35	0.28	2.39	37.37
3,706	26%	45%	1.20 - 1.50	1.33	0.11	37.77	4.01	10.52	4.01	9.00	0.27	2.52	42.46
1,456	10%	19%	1.50 - 1.80	1.62	0.10	32.49	6.81	16.80	3.82	7.58	0.44	2.29	43.08
566	4%	8%	1.80 - 2.10	1.92	0.07	22.90	12.14	26.83	3.33	6.19	0.66	1.64	39.63
632	4.5%	4.5%	> 2.10	2.50	0.06	17.68	16.05	31.33	2.40	4.60	0.59	1.24	36.75
14,184	**Total Assay**												



ASSAY RESULTS by ETO CLASS

LITH TYPE	ETO Class	Obs.	Obs. %	Ni %	Co %	Fe %	MgO %	SiO2 %	SM Ratio	Al2O3 %	CaO %	Cr2O3 %	MC
LIMONITE	OB	1,144	10%	0.63	0.06	41.97	1.08	2.77	2.46	14.19	0.04	2.59	32.85
	LGL	1,738	15%	0.91	0.08	42.12	1.22	4.30	4.35	12.05	0.05	2.61	36.53
	HGL	5,501	48%	1.22	0.11	42.32	1.44	5.31	4.18	10.30	0.07	2.74	42.85
SAPROLITE	SSO	542	5%	1.35	0.04	14.92	16.90	35.00	2.76	4.53	1.31	1.12	32.30
	LGSO	454	4%	1.64	0.04	15.82	16.20	33.93	2.65	4.84	1.07	1.17	35.19
	MGSO	236	2%	1.88	0.04	15.62	16.92	34.07	2.41	4.49	0.93	1.15	34.75
	HGSO	632	5%	2.45	0.05	15.21	17.77	33.58	2.12	4.16	0.69	1.10	35.31
BEDROCK	WST	1,291	11%	0.45	0.02	7.26	26.95	38.02	2.76	2.97	1.99	0.51	7.92

Code	Ni (%)	Fe (%)	Remarks
OB	Ni < 0.80	Fe >= 30	Overburden
LGL	0.80 <= Ni < 1.00	Fe >= 30	Low Grade Limonite
HGL	1.00 <= Ni < 1.50	Fe >= 30	High Grade Limonite
SSO	1.20 <= Ni < 1.50	Fe < 30	Sub Spec Ore
LGSO	1.50 <= Ni < 1.80	Fe < 30	Low Grade Saprolite Ore
MGSO	1.80 <= Ni < 2.00	Fe < 30	Medium Grade Saprolite Ore
HGSO	Ni >= 2.00	Fe < 30	High Grade Saprolite Ore
WST	Ni < 1.20	Fe < 30	Waste/ Boulder

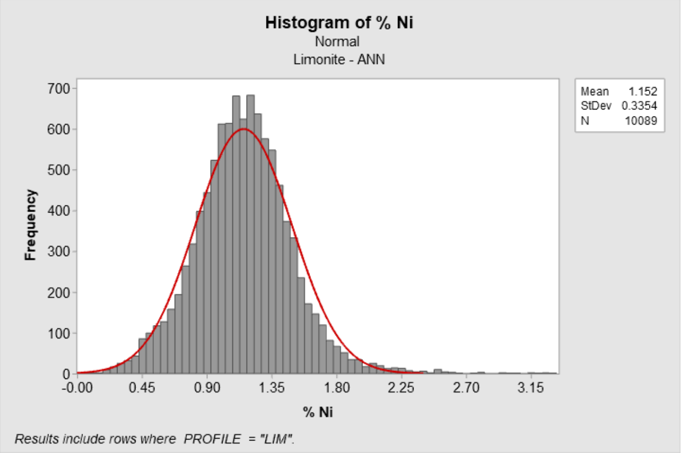
WEIGHTED AVERAGE

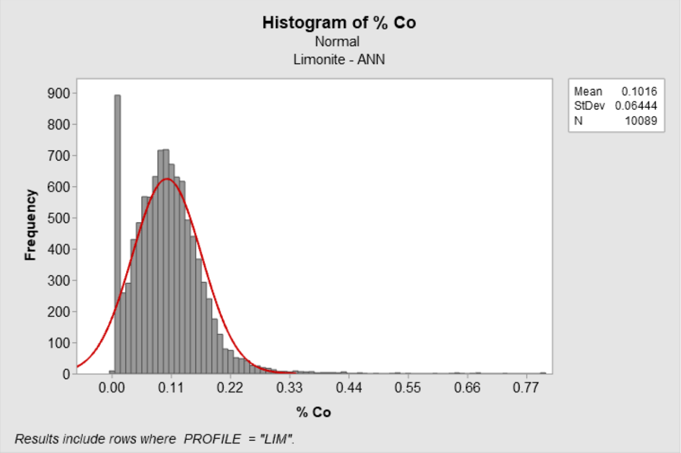
Profile	Thick	% Ni	% Co	% Fe	% MgO	% SiO2
Limonite	18.14	1.15	0.10	40.98	1.78	6.66
Saprolite	5.73	1.56	0.04	15.20	16.98	34.79

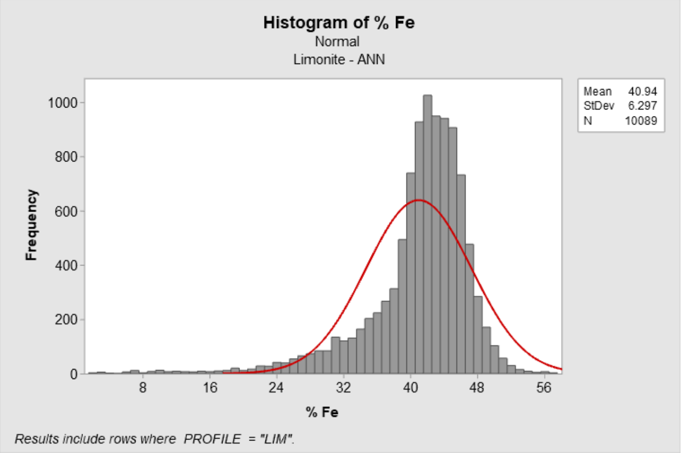
DESCRIPTIVE STATISTICS

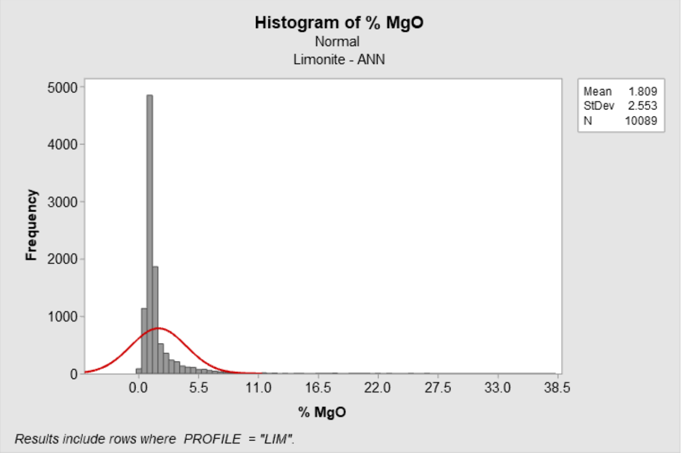
Variable	Profile	Samples	Mean	Median	StDev	Variance	CoefVar	Minimum	Maximum	Skewness	Kurtosis
Ni	SED	35	0.40	0.39	0.10	0.01	24.27	0.22	0.57	-0.02	-0.74
	LIM	10,089	1.15	1.15	0.34	0.11	29.11	0.06	3.28	0.48	2.05
	SAP	2,769	1.55	1.48	0.63	0.40	40.70	0.09	4.81	0.63	0.72
	BRK	1,291	0.45	0.38	0.25	0.06	54.35	0.02	1.85	1.59	3.73
Co	SED	35	0.07	0.06	0.02	0.00	22.62	0.04	0.11	0.84	0.47
	LIM	10,089	0.10	0.10	0.06	0.00	63.41	0.00	0.80	1.68	9.77
	SAP	2,769	0.04	0.03	0.03	0.00	77.14	0.00	0.26	2.06	6.36
	BRK	1,291	0.02	0.01	0.01	0.00	72.03	0.00	0.12	3.52	17.88
Fe	SED	35	29.90	28.78	5.94	35.28	19.87	16.68	43.09	0.20	0.13
	LIM	10,089	40.94	42.16	6.30	39.66	15.38	2.11	56.99	-1.91	5.97
	SAP	2,769	15.10	13.59	6.91	47.79	45.76	1.31	45.67	1.11	1.39
	BRK	1,291	7.26	6.65	2.75	7.56	37.86	0.79	42.94	5.10	42.78
MgO	SED	35	1.35	1.40	0.28	0.08	20.40	0.85	2.10	0.81	1.23
	LIM	10,089	1.81	1.14	2.55	6.52	141.15	0.01	38.04	6.58	57.68
	SAP	2,769	17.10	17.60	7.86	61.85	46.00	0.17	38.34	-0.12	-0.72
	BRK	1,291	26.95	28.40	7.16	51.32	26.58	0.55	41.42	-1.69	3.49
SiO2	SED	35	1.19	1.00	0.78	0.61	65.79	0.43	4.60	3.05	11.14
	LIM	10,089	6.70	2.90	8.68	75.41	129.69	0.02	97.54	3.22	16.29
	SAP	2,769	34.85	34.80	7.79	60.72	22.36	1.29	92.00	0.27	5.72
	BRK	1,291	38.02	36.60	7.81	61.03	20.55	1.62	94.33	2.58	12.76

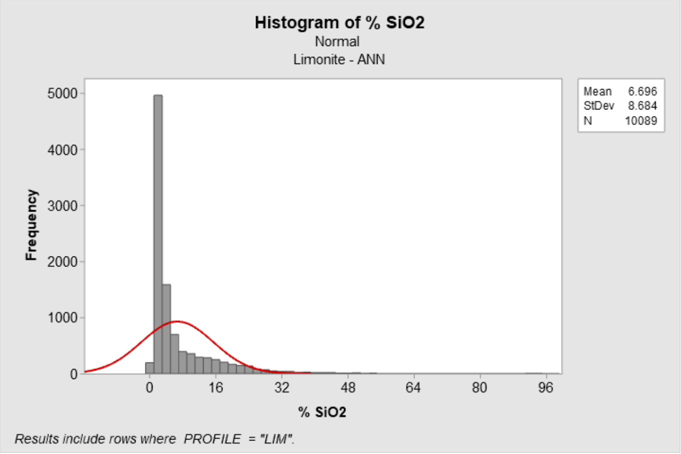
HISTOGRAM: LIMONITE



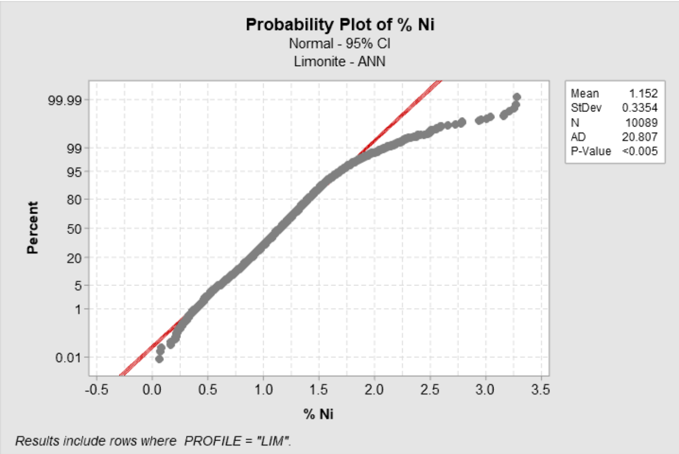


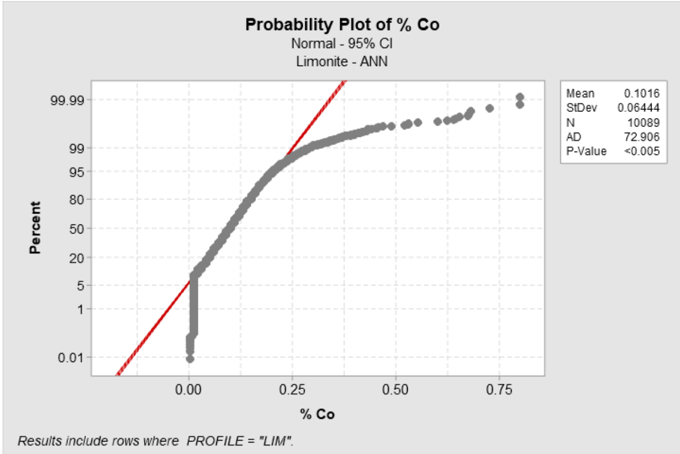


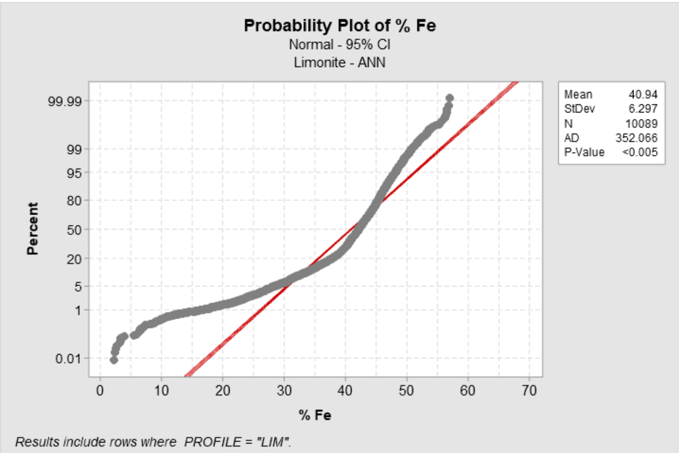


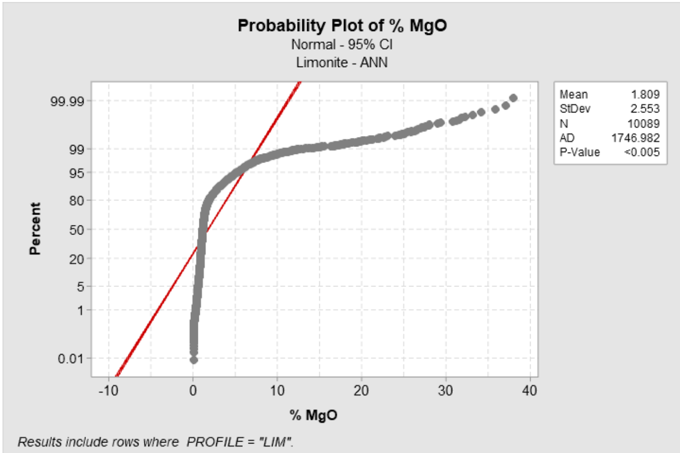


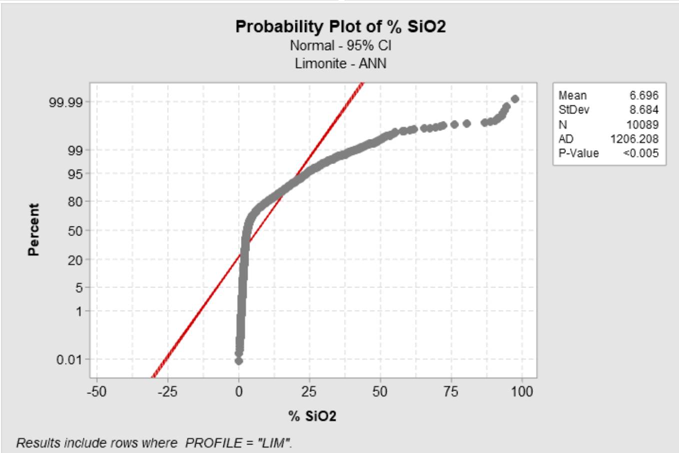
PROBABILITY PLOT: LIMONITE











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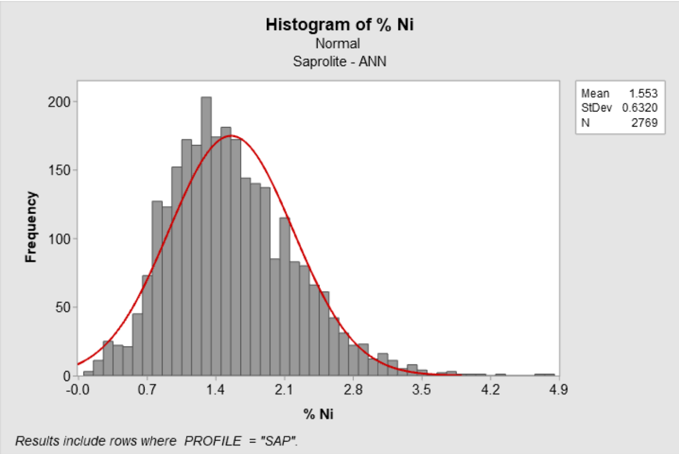
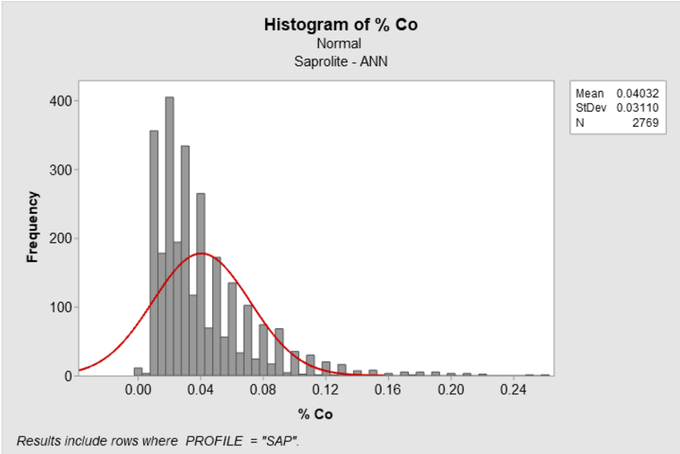
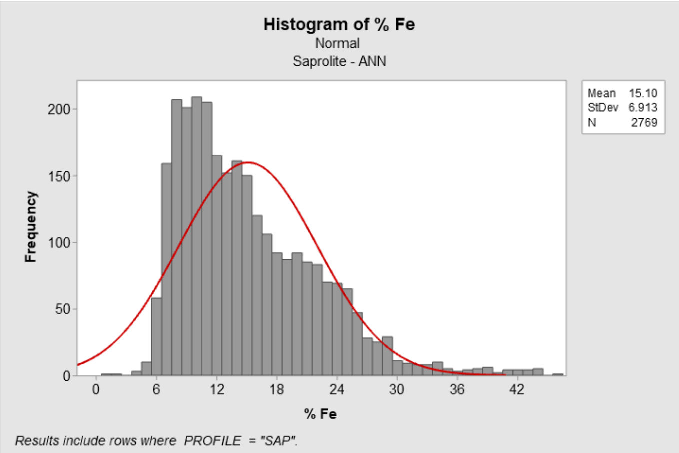
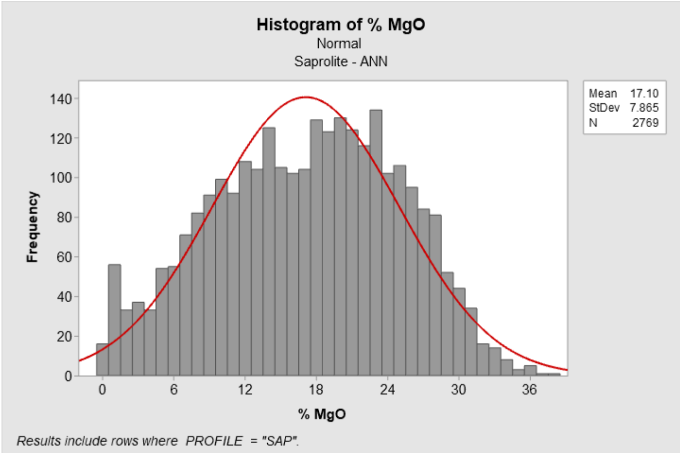
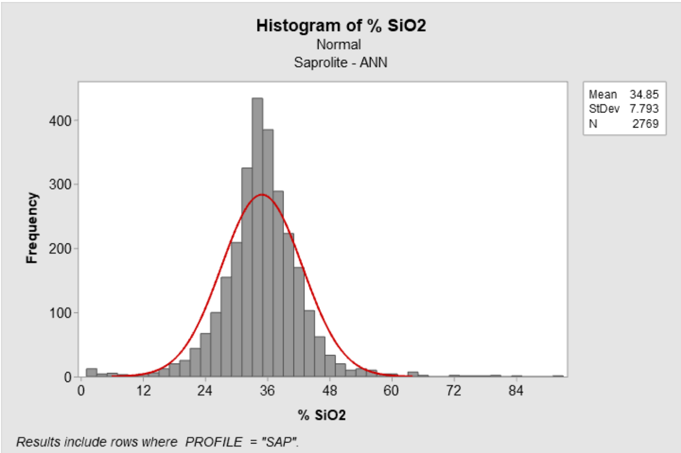


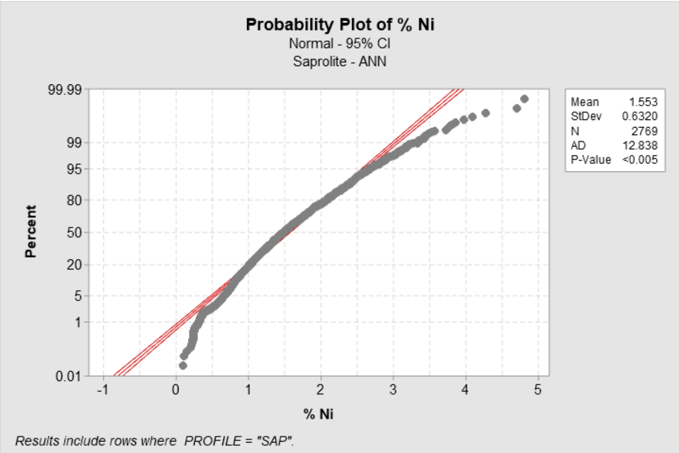


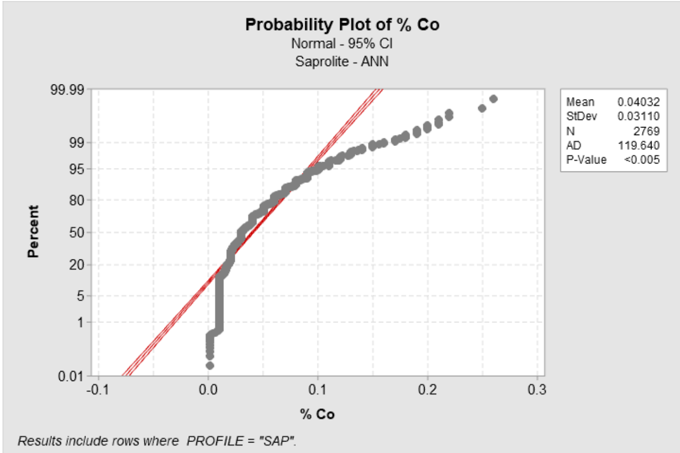


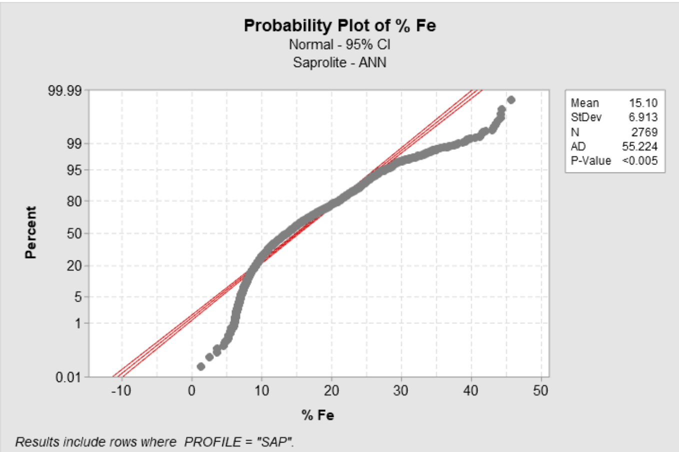


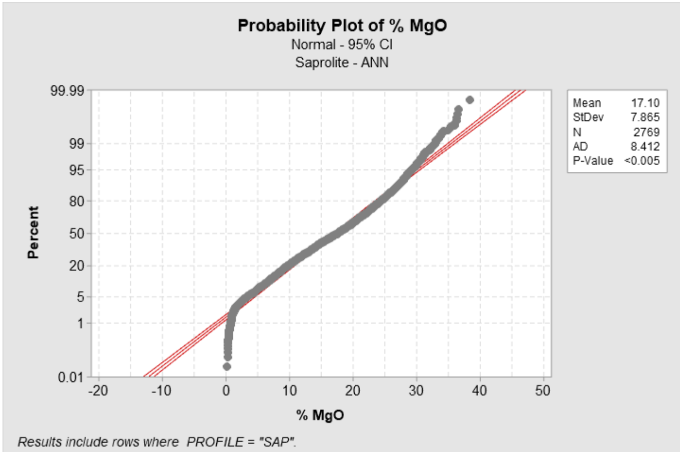


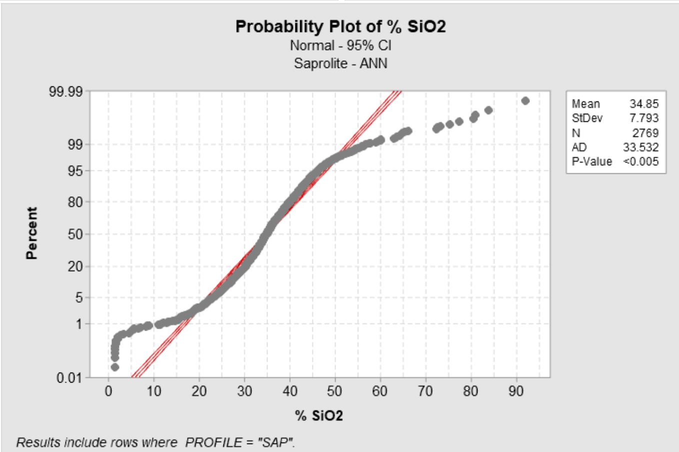
PROBABILITY PLOT: SAPROLITE



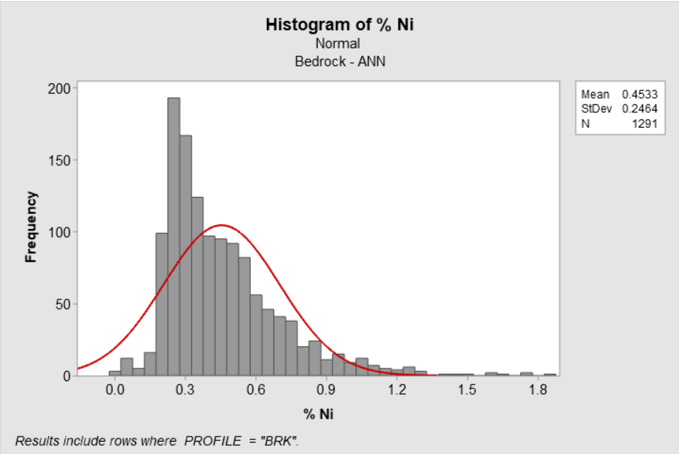


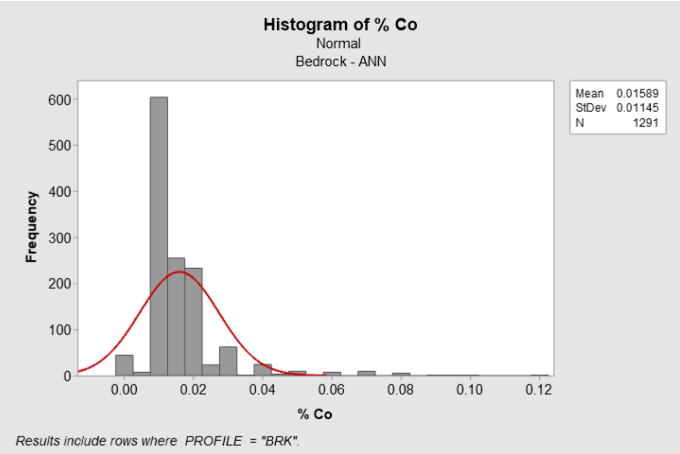


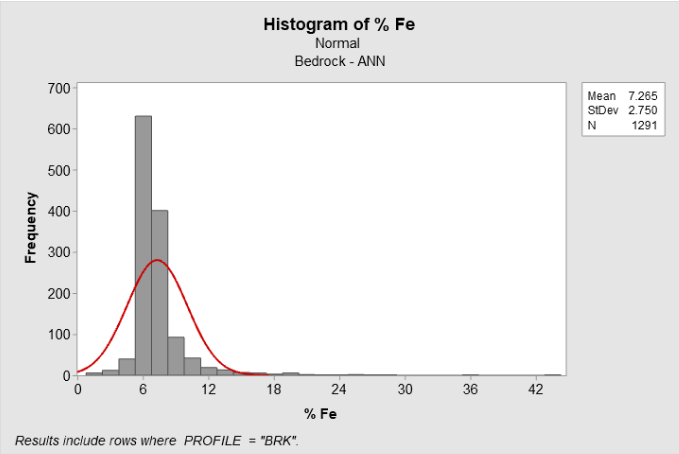


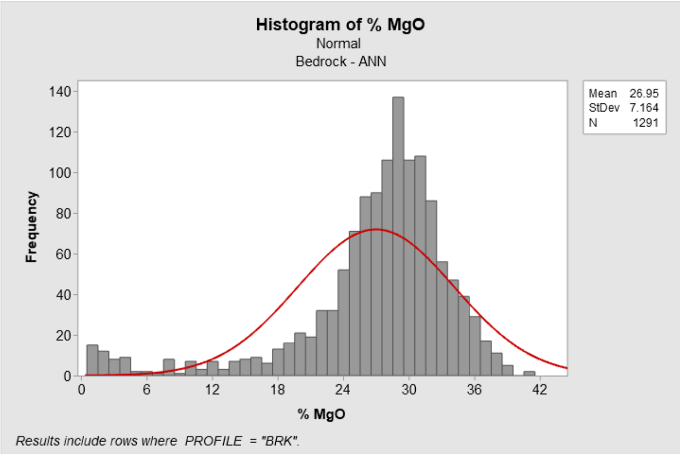


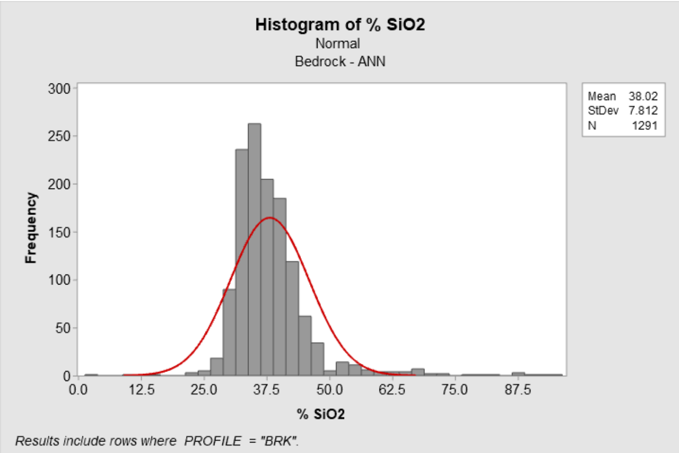
HISTOGRAM: BEDROCK



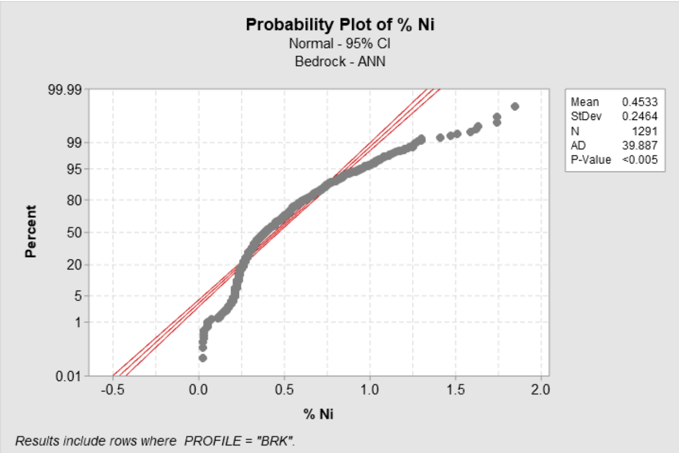


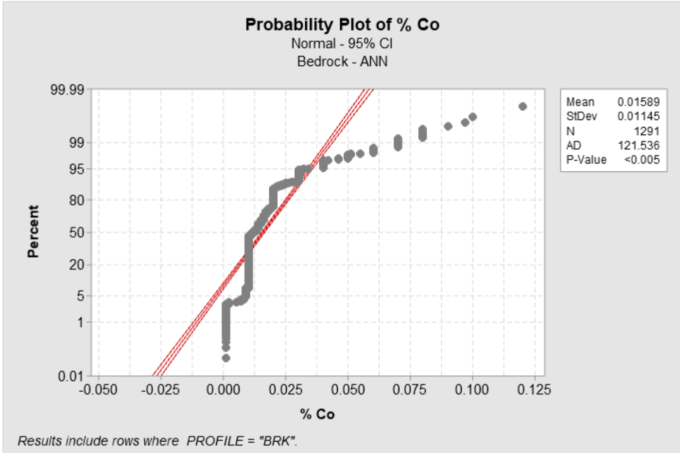


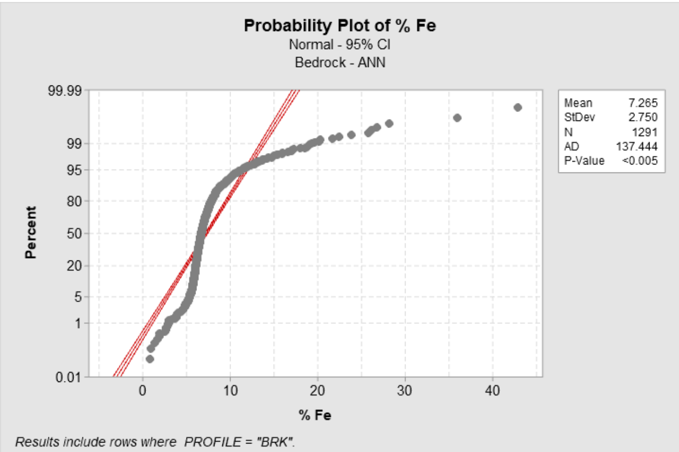


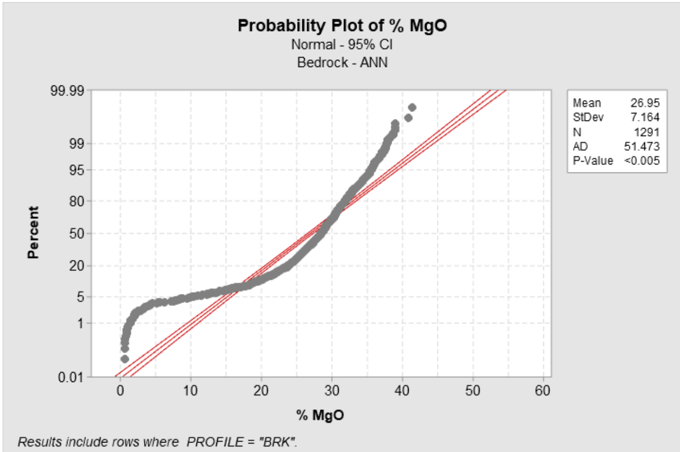


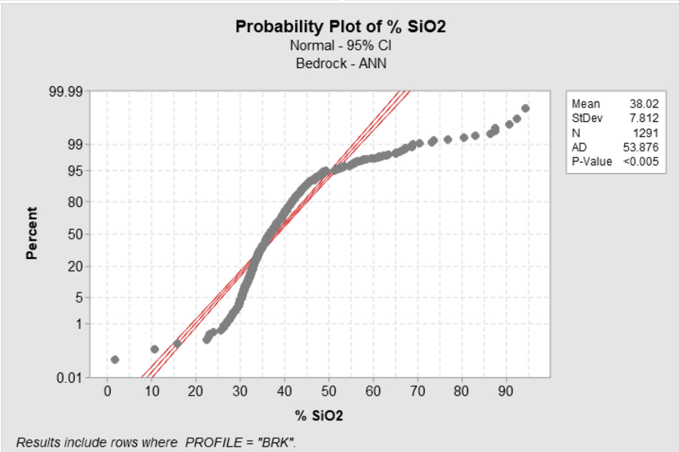
PROBABILITY PLOT: BEDROCK





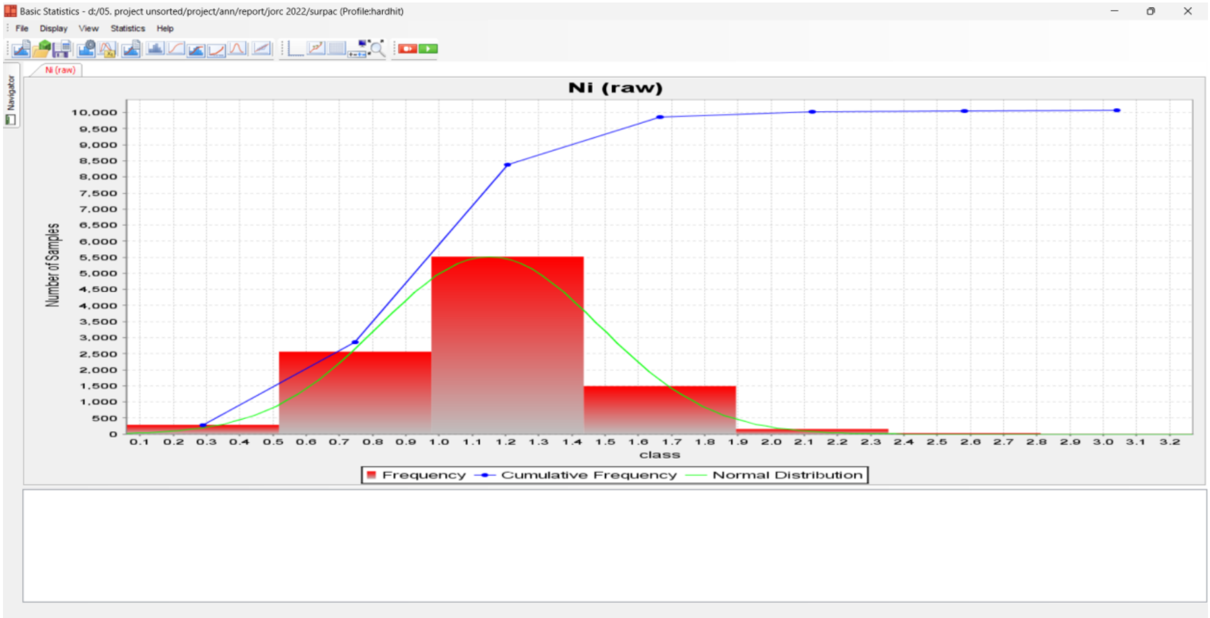




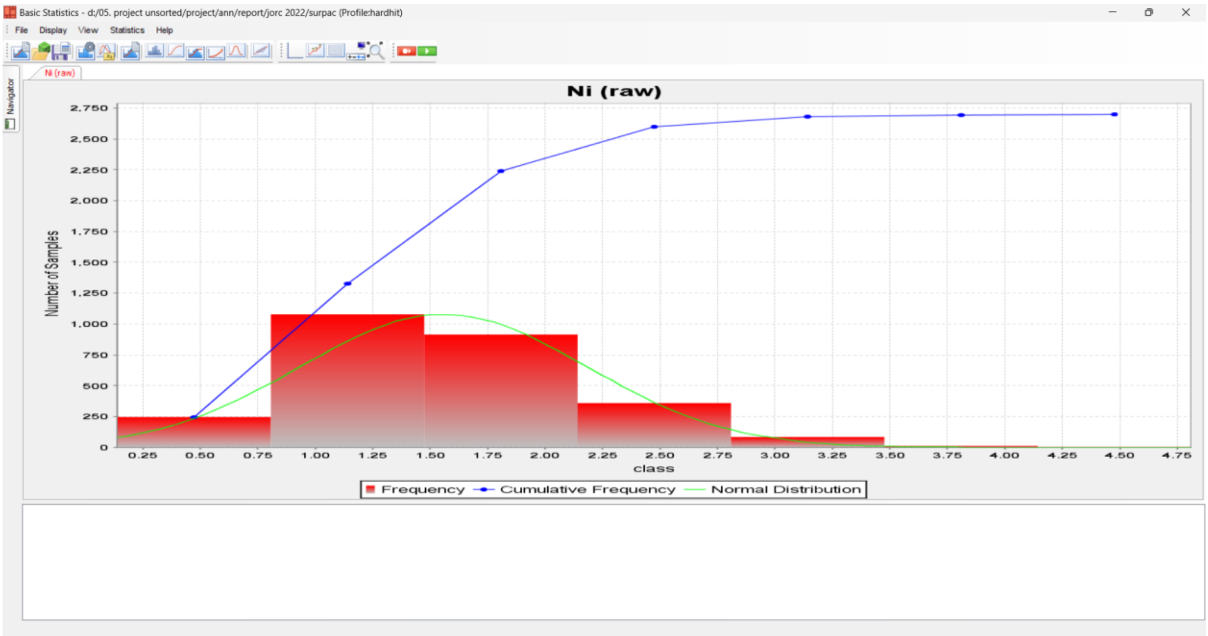


PT MANDIRI JAYA NICKEL
GEOSTATISTICS & SWATH PLOT
2022

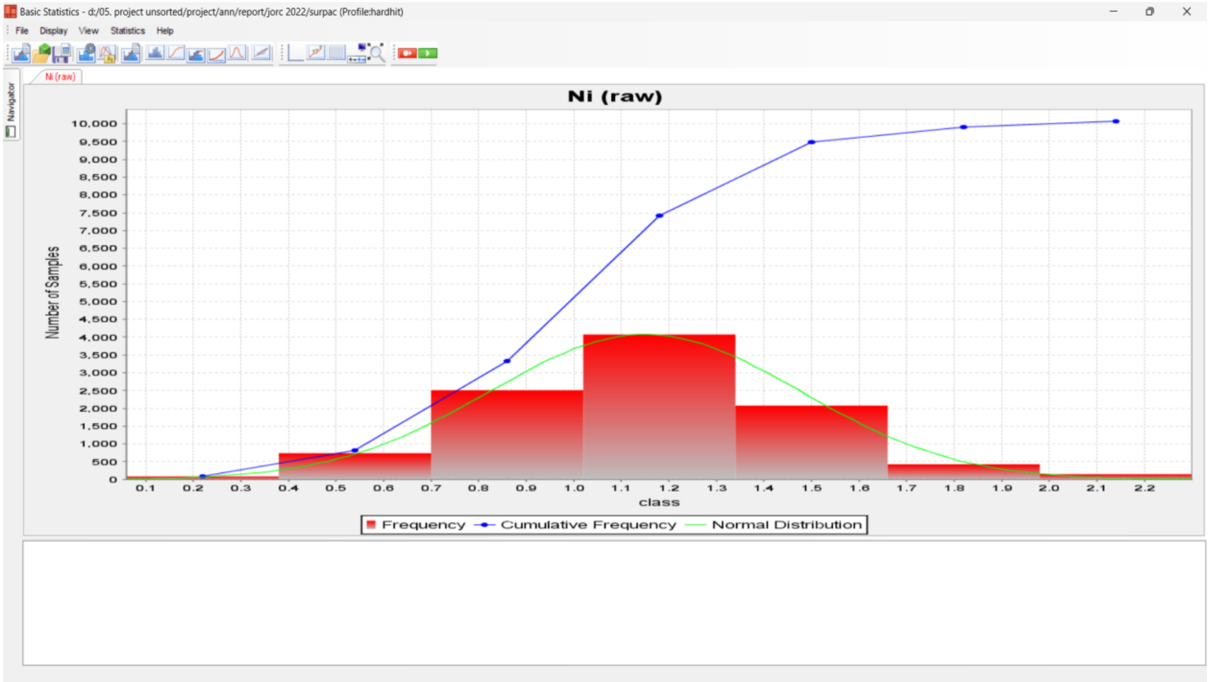
Drillhole Composite Ni Limonite Histogram



Drillhole Composite Ni Saprolite Histogram



Drillhole Composite Ni Limonite (Top Cut) Histogram



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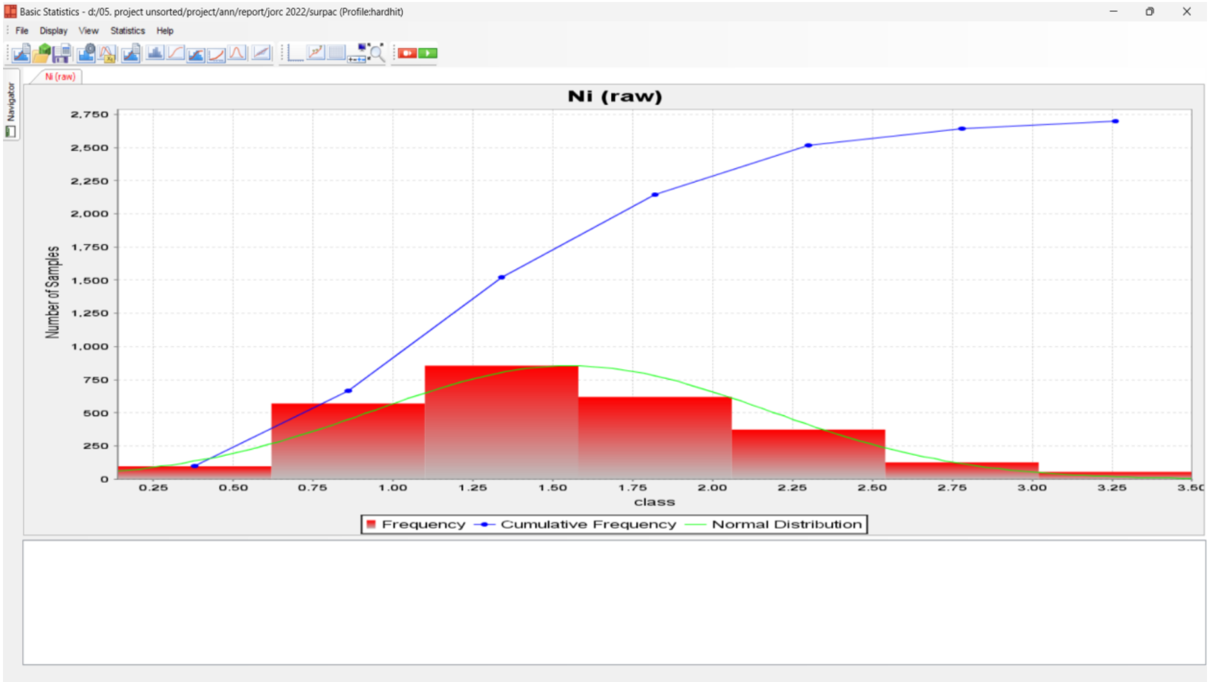
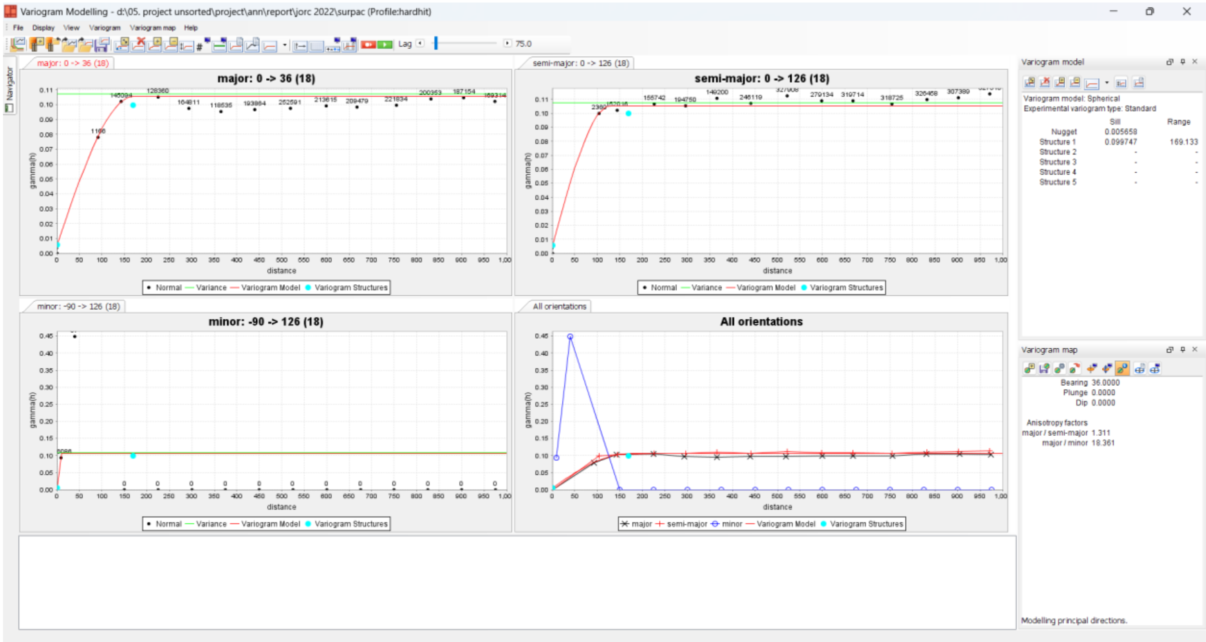


Ni Limonite Experimental Variogram



Ni Saprolite Experimental Variogram

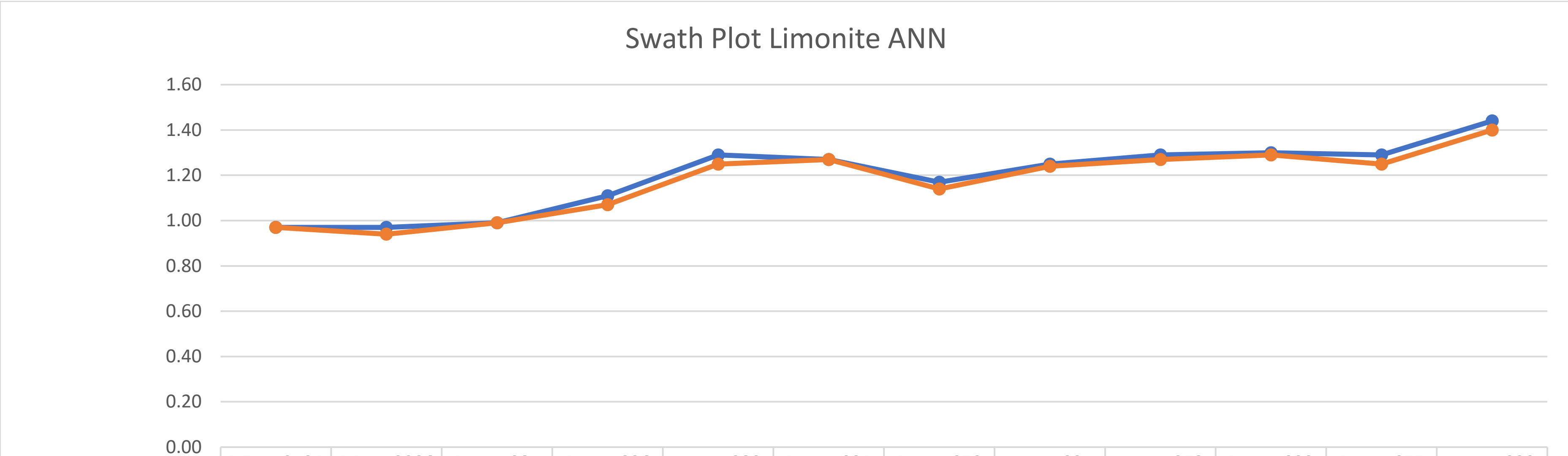
Semi Variogram Model Parameter

Project	Variogram model: Spherical								Anisotropy Factor	
	Experimental Variogram type: Standard								Major/Semi-Major	Major/Minor
	Profile	Element	Bearing	Plunge	Dip	Range	Nugget	Structure 1 (Sill)		
ANN	LIM	Ni	36	0	0	169.133	0.005658	0.099747	1.311	18.36
	SAP	Ni	22.5	0	0	185.042	0.063954	0.283038	1.17	11.809

Search Elipsoid Applied

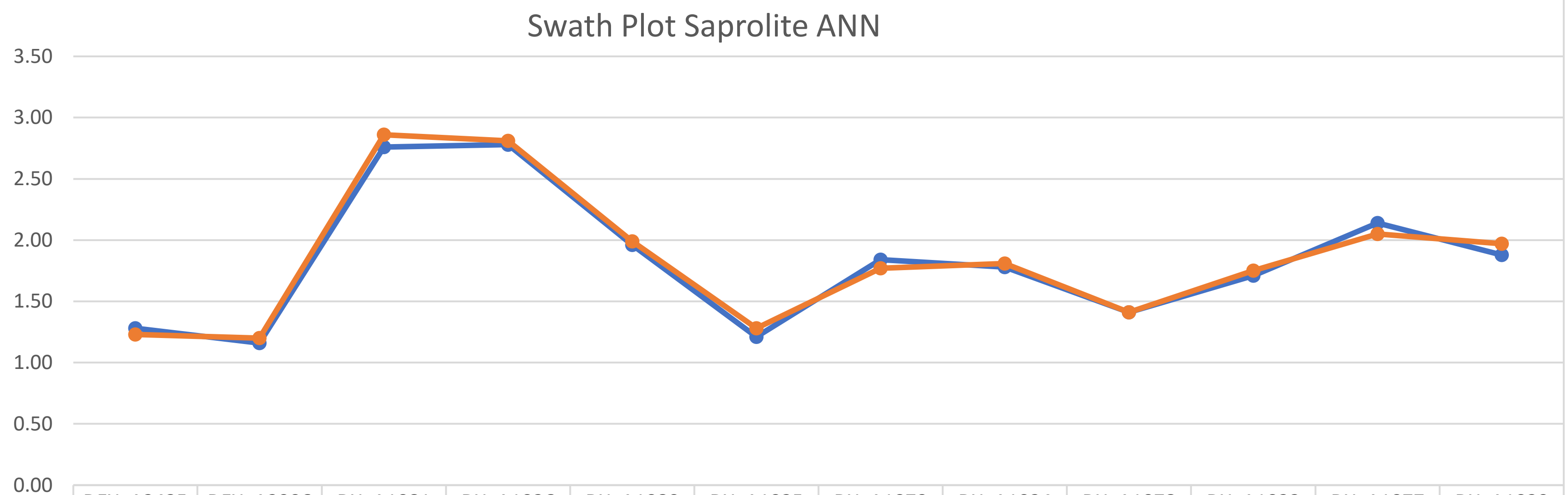
Lithology zone by Domain	Limonite			Saprolite		
Search Type	Elipsoid			Elipsoid		
Bearing	36			22.5		
Plunge	0			0		
Dip	0			0		
Major-Semi Major Ratio	1.311			1.17		
Major-Minor Ratio	18.36			11.809		
Search Pass	Pass 1	Pass 2	Pass 3	Pass 1	Pass 2	Pass 3
Max Search Radius (m)	75	170	500	75	185	500
Max Vertical Search Distance (m)	2	2	5	2	2	5
Minimum Samples	15	15	15	15	15	15
Maximum Samples	3	2	1	3	2	1
Max. Samples per Hole	3	3	3	3	3	3
Block Discretization	3 X by 3 Y by 3 Z			3 X by 3 Y by 3 Z		

Swath Plot Limonite



	DEX_A2435	DEX_A2906	DX_A1081	DX_A1036	DX_A1080	DX_A1035	DX_A1079	DX_A1034	DX_A1078	DX_A1033	DX_A1077	DX_A1029
DH Composite	0.97	0.97	0.99	1.11	1.29	1.27	1.17	1.25	1.29	1.30	1.29	1.44
BM Composite	0.97	0.94	0.99	1.07	1.25	1.27	1.14	1.24	1.27	1.29	1.25	1.40

Swath Plot Saprolite



	DEX_A2435	DEX_A2906	DX_A1081	DX_A1036	DX_A1080	DX_A1035	DX_A1079	DX_A1034	DX_A1078	DX_A1033	DX_A1077	DX_A1029
DH Composite	1.28	1.16	2.76	2.78	1.96	1.21	1.84	1.78	1.41	1.71	2.14	1.88
BM Composite	1.23	1.20	2.86	2.81	1.99	1.28	1.77	1.81	1.41	1.75	2.05	1.97

APPENDIX 4

INTERNAL LABORATORY REPORTS; PROCEDURES AND QA/QC

Laboratory and Sample Analysis Procedures at the HM Laboratories JORC Compliant Report

C.E. Watson

August 2022

For:
Tony Green – Chief Operations Officer
Willem Dique – Operations Manager
Daniel Madre - Danmar

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Introduction

This report on the QAQC Department's activities at the PT Hengjaya Mineralindo (HM) preparation and assay laboratories at their Tangofa Camp in Sulawesi, Indonesia, has been compiled as part of a JORC Compliant Report and according to the guiding principles of the JORC Code, 2012 Edition, which states: *"Transparency and Materiality are the guiding principles of the Code, and the Competent Person must provide explanatory commentary on the material assumptions underlying the declaration of Exploration Results, Mineral Resources or Ore Reserves."* This report endeavours to address the sections on Sub-sampling techniques and sample preparation and the Quality of assay data and laboratory tests in JORC TABLE 1, Section 1, Sampling Techniques and Data, a copy of which is attached.

PT Hengjaya Mineralindo (HM) has two separate facilities at the Tangofa Camp site for processing and assaying samples collected in the exploration (drilling) programme and mining (production) operations at the site. These two facilities are the Sample Preparation Laboratory (Prep Lab), where the samples are converted from raw samples into 200# (75 micron) pulp samples, and the Assay Laboratory, where the 200# pulp samples are assayed using XRF Spectrometers to provide the elemental composition of the drill and mine samples, in particular, the weight percent of nickel, iron, silicon dioxide and magnesium oxide, and the grade of the valuable elements, nickel and iron.

The purpose of sampling and sample preparation is described in the AusIMM Field Geologists Manual, Fifth Edition , 2011, as being *"…the reduction in particle size, through crushing and pulverising, and its sample size, through splitting, while retaining the representativeness of the medium being sampled."*

Roden & Smith describe three elements essential for a satisfactory assay and sampling system, these being: maintaining the integrity of the sample in the field, selecting the appropriate assay method and monitoring the complete sampling and assay process on a continuous basis.

At HM, mining samples of as much as 400 – 600 tons are mined and sampled (STP), and these samples processed at the Prep Lab to produce a 60 gm pulp sample from which a 10 gm pressed powder pellet is produced for XRF analysis.Exploration samples are submitted from the Danmar drill programme in batches of 100 samples, each sample representing a 1 meter advance in the drill hole and weighs approximately 8 kgs, wet, on its arrival at the prep lab. As with the mine samples, the drill samples are reduced in volume and sample particle size to produce a 60 gm pulp sample, from which a 10 gm sample is taken for a pressed pellet, or a fused bead, for XRF. The expectation is that the results obtained on the 10 gm pressed powder pellets or fused beads are produced from the 600 ton mine or 8 kg drill sample are, within acceptable limits, representative of the original samples. It is the primary responsibility of the HM QAQC Department to ensure that this is the case.

1.Quality Assurance and Quality Control

Quality Assurance and Quality Control (QAQC) are two separate processes, but are often combined and referred to as QAQC. The purpose of QAQC is determining the quantity and concentration of the economic element of interest and providing the confidence we have in these numbers to allow us to put them in context with where we are in the mining value chain. It ensures that the data we are going to collect and the data we are collecting are of suitable quality (Sterk, 2019).

Quality Assurance means assuring the quality of the data by having a set of standard operating procedures (SOPs) in place, aiming to prevent errors being made in the sampling or measuring process. Wikipedia describes QA as including two principles, the first being "fit for purpose", the product needs to be suitable for the intended purpose, and the second being "right first time", where mistakes should be eliminated. Sterk summarizes the above by saying Quality Assurance is about the prevention of errors, and it occurs before sampling or measurement, while Quality Control is about the detection and correction/rejection of errors as they occur during the sampling or measurement process.

1.1 Quality Assurance at PT HM

The primary Standard Operating Procedure (SOP) for the samples submitted by the exploration and mining operations at PT HM is the "JIS Method for Sampling and Method of Determination of Moisture Content of Garnierite Nickel Ore" JIS M-8109-1996, by H.Kanazawa, August 1996. This Japanese industrial Standard specifies the following methods for this purpose of determination of the average grade and moisture content of a lot of garnierite nickel ore as follows:

1. Method of taking the sample
2. Method of sample preparation for moisture test sample and quality sample.
3. Method of measuring the moisture content
4. Method of determination of the moisture content and dry mass of the lot.

The JIS standard addresses the reduction in particle size and of the sample size through incremental sample reduction according to different sized scoops depending upon the particle size of the material being sampled. This SOP is used in reducing the size of the sample in the mining operations and in the sample preparation laboratory at the sample receival area, after drying, after jaw crushing, Roll Crushing and pulverising, and at the assay laboratory prior to the production of a pressed pellet or fused bead prior to XRF spectroscopy.

1.2 Quality Control at PT HM Sample Prep Lab

Quality Control is ensuring that checks and balances are implemented and are constantly reviewed and assessed, in order to identify whether the sampling /measuring systems and the laboratory are providing quality assays, ie are "in control". In the minerals industry, the checks and balances commonly used to monitor the sample preparation and assaying processes includes standards, blanks and duplicates.

Sterk discusses how geoscientists should be aware of variance, and QA,QC and Acceptance Testing (Reporting and Review) are relevant at every stage of the sample collection, sample preparation and assaying treatment. This is important, and we should assess the QA, QC and AT at each and every one of our sample treatment stages. At HM, these could are considered as Primary Sample, 1st Split, 2nd Split, 3rd Split etc., and Analytical, and a short summary of these different stages is given below. These samples are collected at the HM Sample Prep Lab.

1.2.1 First Lab Split Stage Prior to Drying - Both the reduction in particle size and the reduction in sample size take place at the Sample Preparation Laboratory (the Prep Lab), where the mining samples and the exploration samples are submitted, checked, and the mining samples split according to the JIS standard.

The exploration samples have not been split at this stage, only the mining samples have been incrementally split as per the standard, with the objective of reducing the sample size before drying.

1.2.2.Drying Stage - Samples are dried as the first stage of in sample preparation at temperatures 105° or 110°, for different durations, depending on the source material:

Exploration samples	- 8 to 12 hrs at 105° to 110° C
Mining samples	- 6 to 8 hrs at 105° to 115° C

Moisture Content - 24 hrs at 105° C

Once the drying is complete, the samples are removed from the oven and weighed, and the weights recorded for data entry, the Moisture Content being the difference between the wet weight and the dry weight divided by the wet weight and shown as a % figure. The average figure for the saprolite samples recovered in the HM drill programme is around 40% moisture.

1.2.3 First Crushing Stage – Jaw Crusher - The first crushing stage of the oven dried drill sample occurs at the Jaw Crusher, where the two trays of dried sample are poured into the jaw crusher and reduced in size to a -10 mm product which is collected underneath the Jaw Crusher.

1.2.4 First Splitting Stage – Jones Riffle Splitter - The Jaw crusher product is now poured into a Jones Riffle Splitter which produces two similar products, one of which is taken forward to the next crushing stage, while the second Riffle Splitter product is discarded.

The first crushing stage and the first splitting stage are now complete, all part of the incremental crushing and splitting process in reducing the grain size and sample size of the original dried sample. These two stages continue to follow the details provided in the JIS standard, part of the HM Quality Assurance programme.

1.2.5 Second Crushing Stage – Roll Crusher - The second crushing stage comprises the Jones Riffle split product being poured into a Double Roll Crusher which reduces the -10 mm jaw crusher product into a – 3 mm product which is collected beneath the double roll crusher.

1.2.6 Second Splitting Stage – Manual Incremental Reduction - As described in the JIS M 8109 – 1996 standard, the second splitting stage consists of the - 3 mm double roll crusher product being reduced by manual incremental reduction into two incremental split samples weighing approximately 500 gms each, one is labelled and sent to sample storage, while the other sample will be sent to the next stage in the processing cycle, the pulveriser. In addition to the split samples collected above, before discarding the remaining double roll crusher product, a further sample is collected, one approximately every 20 samples, and placed in a brown paper envelope and numbered with a DR suffix, this being a Double Roll Crusher product sample that will be sent for assay to test the performance of the two crushing and splitting stages, often referred to as the Course Reject sample, or at HM, the Double Roll (DR) sample. This is the first of the Laboratory check samples to be collected as part of the HM Quality Control programme, and will be used to monitor the quality of the jaw crushing and roll crushing stages in reducing the particle size and the sample size during the sample preparation programme.

1.2.7 Pulverising Stage - The fifth stage consists of the 500 gm -3 mm double roll sample being placed into a pulverizing bowl, a puck added, the lid is replaced and this unit placed inside the Essa Pulverizer using a cradle. The cradle is removed and the machine turned on and run for 5 minutes, after which the pulverizer bowl is removed from the machine using the cradle, the lid removed, the puck taken out, and the pulverised sample, the “pulp”, placed onto a tray, and passed on to the next stage of incremental splitting.

This pulverising stage is third stage in the reduction in particle size in the sample preparation process, where the dried exploration sample of approximately >20 mm was reduced in size to -10 mm at the Jaw Crusher, and then to -3 mm at the Roll crusher, and finally to -200# at the pulverising stage

1.2.8 Third Splitting Stage – Manual Incremental Reduction - The sixth stage of sample preparation is where the pulp sample is incrementally reduced with enough pulp to place into two brown paper envelopes, one of which goes to the Assay Lab, and the second sample goes to storage.

A further check sample is taken from the residual pulp remaining from this second incremental splitting before being discarded to waste, and is placed into a brown sample bag and given the sample number with a DA suffix. This is the second check sample taken to monitor the pulverising quality at the HM Prep Lab and is referred to as the DA check sample, or Pulp Reject sample. This is part of the Quality Control programme to test the quality of the pulverising process.

1.3 Particle Sizing Test (PST) – Checking the Quality of the Pulverizing Process – A PST is taken on one in every ten of the pulverised product, the pulps, to ensure the pulverisation has been done properly. A small sample of material is weighed and then placed on a 200# (75 micron) stainless steel screen and screened until all the sample that can pass the 75 micron screen has passed The weights of the – 75 micron material and the+ 75 micron products are both weighed and recorded. If the weight of the – 75 micron product is more than 95% of the total pulp sample weight, then the pulverisation process is acceptable. If the weight of the – 75 micron product is less than 95% of the total weight then this is not acceptable and the process is repeated.

Other Sample Preparations - In addition to the standard sample processing procedures described above, two further sample processing techniques are performed at the PT HM sample preparation laboratory to provide additional information for the geological and mining databases, these being Specific Gravity (density) testing and the measurement of the Moisture Content of selected samples.

1.4 Specific Gravity Measurement

At the Sample Prep. Lab the specific gravity of the four different lithological samples, collected from the drilling operations, eg the soil or overburden, limonite, saprolite and bedrock are measured by the displacement method.

1.5 Moisture Content - Nickel ore is hygroscopic and it is important to ensure that all moisture is removed from the sample to prevent the assay results showing a low bias by an amount equivalent to the weight percent residual moisture. This has the potential to affect its behaviour during smelting, which in turn can result in a lower price received per ton of smelted ore. For this reason, accurate measurement of moisture content of the mining samples before the ore is shipped to the IMIP smelter is one of the important tasks undertaken at the Sample Prep Lab.

The moisture content of the drill samples is calculated through weighing the drill samples wet, before they are placed in the ovens for drying, and again when they have been removed from the ovens and prior to the first stage of crushing. The difference in weight between the weights of the samples before and after drying, divided by the original wet weight of the sample gives the moisture content as a percentage figure.

2. Quality Control at the PT HM Assay Lab

The pulp samples of 50 – 60 gms from each consignment completed at the sample prep lab are sent to the Assay Lab where they are recorded into the production register and then placed into an oven to protect the samples from absorbing atmospheric moisture. This is the analytical stage of the sample treatment, where the samples collected at the Prep Lab are snet to the Assay Lab for analysis.

A new assay lab number is assigned to each pulp sample packet, this is undertaken at the same time as Certified Reference Materials (CRMs), pulp duplicate samples, coarse rejects, blank check and replicate check samples are inserted into the sample streams as part of the Quality Control procedures. After checking that the renumbering of these samples has been completed correctly, the samples are then taken through to the preparation room and placed in a dessicator to await the production of pressed pellets or go to the room where they will be processed into fused beads using the Bruker xrFuse6 equipment.

Roden & Smith mention how XRF assay procedures have not changed significantly but the use of fused beads instead of pressed powder pellets have resulted in better precision and lower detection limits. They go on to say that XRF is an analytical method capable of producing very precise assays over wide concentration ranges and is therefore widely used for assaying nickel laterite ores and iron ores, a similar statement being made by Bruker claiming the S2 Puma XRF offers high accuracy and precision in determining the elemental composition of nickel laterite ores.

HM presently have two XRF Spectrometers at their Tangofa Assay Lab, one a Malvern Panalytical Epsilon 4 XRF, the other a Bruker S2 Puma XRF. These are compact energy dispersive spectrometers that are capable of undertaking elemental analysis and configured with dedicated software specifically for the nickel laterite suite of elements. Both the Epsilon 4 and the Puma S2 XEF's use a Nickel XRF 12 Element Suite for Ni, Fe, Co, MgO, SiO2, CaO, Al2O3, Cr2O3, MnO, P2O5, SO3 and TiO2.

Sample preparation quality, reflecting sub-sampling precision and contamination during sample preparation, are measured by the insertion of coarse grained control samples that are placed in the sample stream prior to or during the sample preparation phase. Samples used for these tests are coarse blanks and coarse duplicates.

2.1 Coarse Blanks

Contamination is assessed by using coarse blank samples, these being barren samples in which the elements being tested, at HM these are Ni and Fe. In order to be effective, coarse blank samples are inserted into the exploration sample batch streams at the rate of 4 coarse blanks, 4 CRM's and 92 original samples, prior to submission of the samples to the Prep Lab.

2.2 Coarse Duplicates

Coarse duplicate samples, often referred to as coarse rejects, and by HM QA/QC staff as DR samples. They are collected from the Double Roll crusher product, during the incremental splitting of this product, by the same operator, and at the same time and place as the sample is split to provide material for pulverising, and a representative sample of material is collected for storage. Coarse duplicate samples are used to test the sub-sampling precision of the first crushing and incremental splitting stages.

Figure 1: Scatterplot showing results of 1020 Coarse Reject original vs duplicate assays

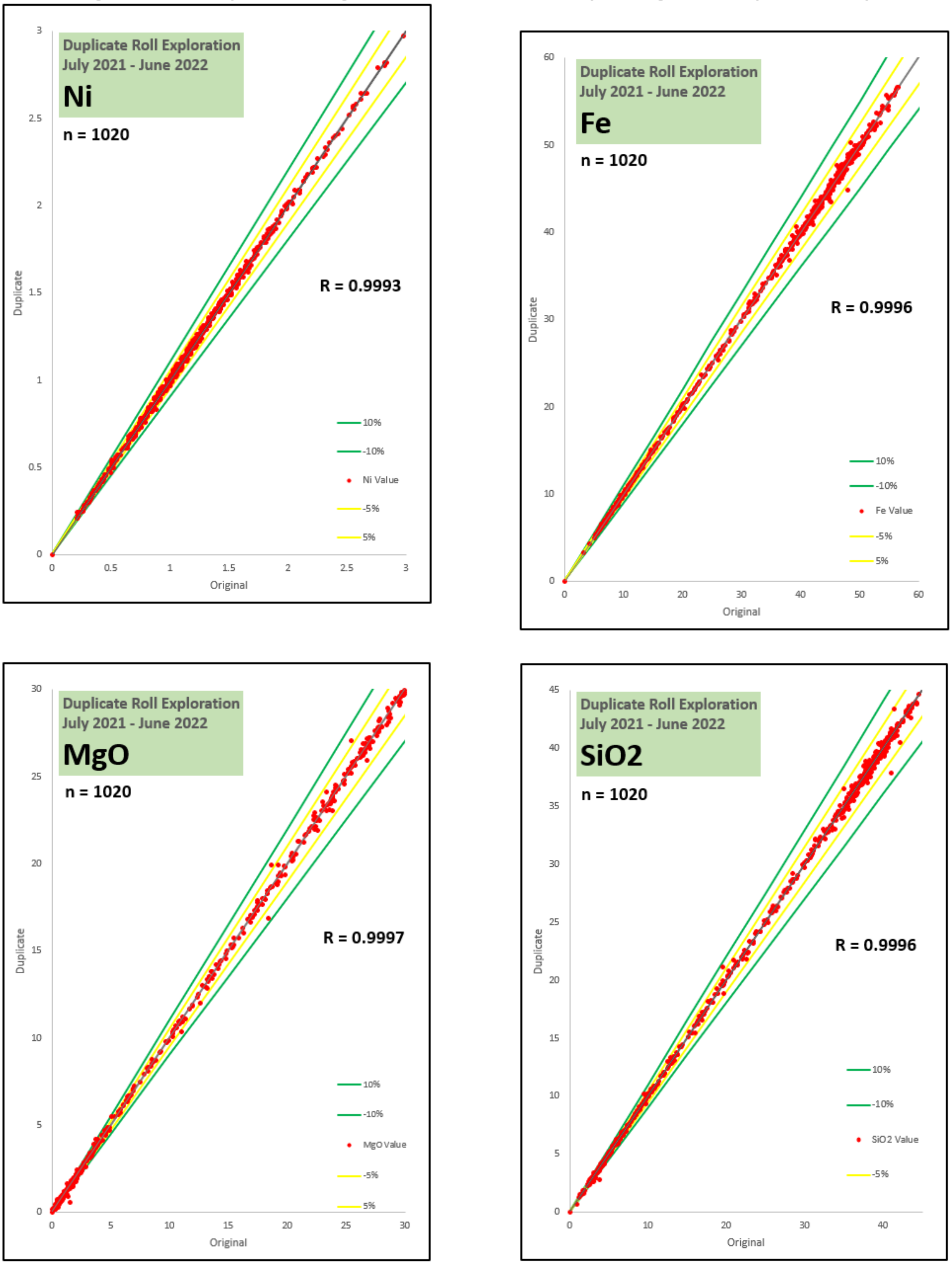


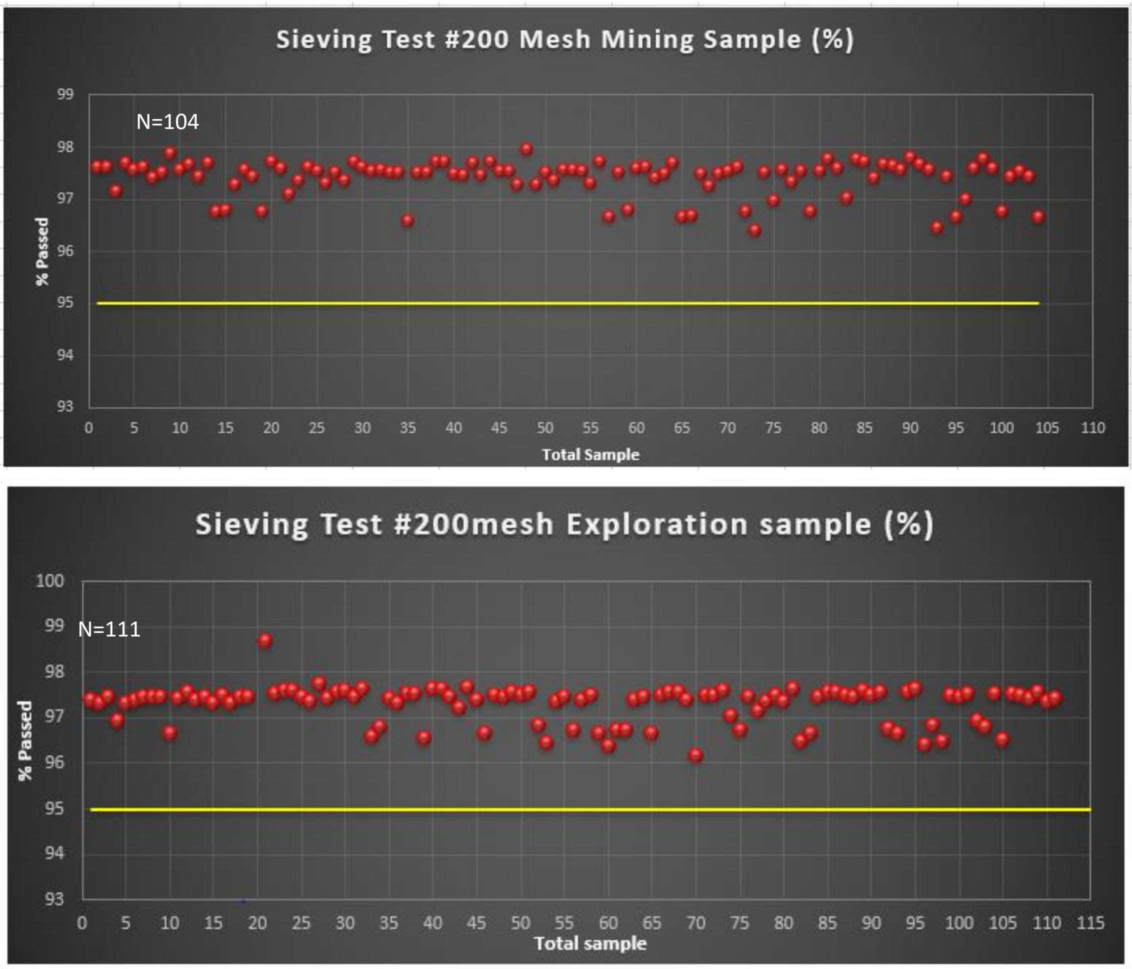
Figure 1 is a scatterplot showing the results for the four elements Ni, Fe, MgO and SiO2 from the original and duplicate roll sample results from 1,020 exploration assays undertaken over the period July 2021 to March 2022. The graphs show the original and duplicate elemental values in red plotted on a middle grey line representing the mean elemental values of these samples. The two yellow lines above and below the mean line represent the correlation between the assay variables with a variance of +5% and -5%, and the outer green lines represent the variance between the assay variables of +10% and -10%. Scatterplots where the results slope from the lower left to upper right indicate a positive correlation.

Figure 1 shows that with all four elements the red dots plot within the +10% and -10% variance lines. In fact, the majority plotting between the +5% and -5% yellow lines, showing there is a high correlation between the original and the duplicate assay values. This is further confirmed with the correlation coefficient (R^2) values of > 0.999 for the elements being assayed. These figures confirm the high precision of the jaw crushing, the first splitting and roll crushing stages and supports the use of the Coarse Duplicate assay data for resource estimation purposes.

2.3 Particle Sizing Test- -200# Screen Test

Figure 2 shows two graphs showing the results of the particles sizing tests undertaken on 111 exploration samples and 104 mining samples at the HM Prep Lab during March 2022. The yellow line is for 95% of the pulverised material passing the 200# screen, and shows the majority of the samples returning a figure of between 97% and 98% for both the exploration samples and the mining samples. These results show the repeatability precision of the pulverizing process in reducing the particle size of the samples to be high

Figure 2 : Screen Test Results – March 2022



3 Sample Assay Quality

What is quality, and how do we define it?

Sample assay quality is defined through analytical accuracy, analytical precision and contamination during assaying. It is assessed using fine grained, pulverised samples that are inserted into the sample stream after the preparation stage and before the assaying stage. Samples used in testing assay quality include pulp duplicates, Certified Reference Materials (CRMs) and fine blanks.

The AusIMM Field Geologists' Manual, (2011) defines accuracy as *"…the closeness of agreement between a test result and the 'true' value or accepted reference value."* Similarly, it defines precision as *"…the closeness of agreement between independent test results under stipulated conditions."*

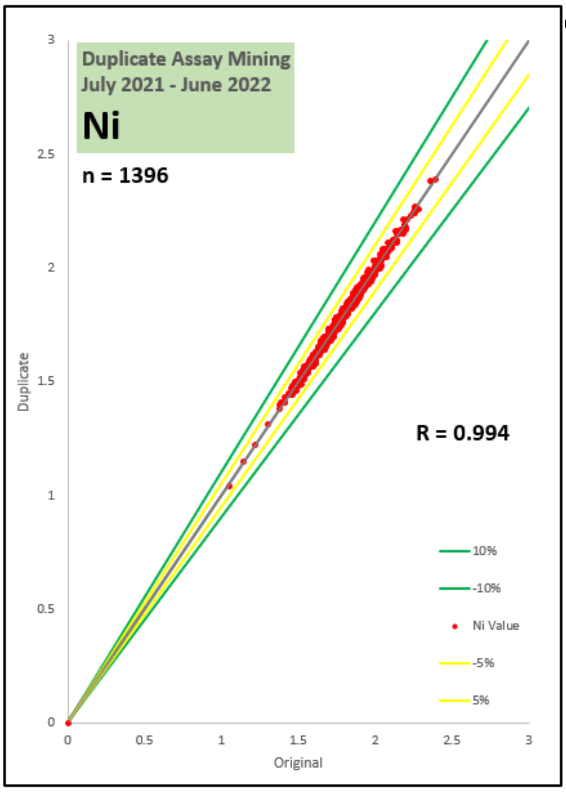
Accuracy and precision are the two key elements in understanding data quality, and are illustrated with the dartboard diagram. We need to quantify the precision and accuracy (bias). Sampling or analysis is said to be accurate when the mean error approaches zero. Sampling or analysis is said to be precise when there is a small spread of errors around the mean sampling error.

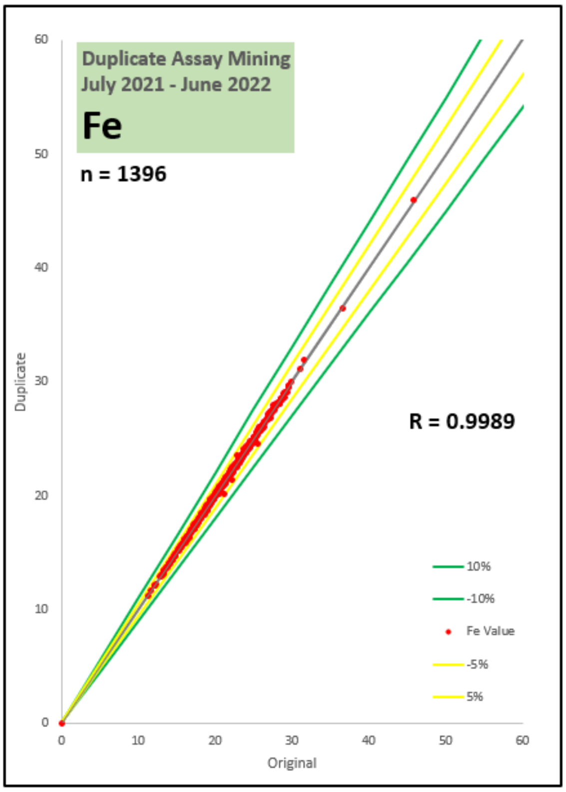
Date with "good" accuracy and "good" precision can be regarded as "Good Quality" and as such, will be "fit for purpose". We also use the terminology "representative", when the precision and accuracy are within acceptable tolerances.

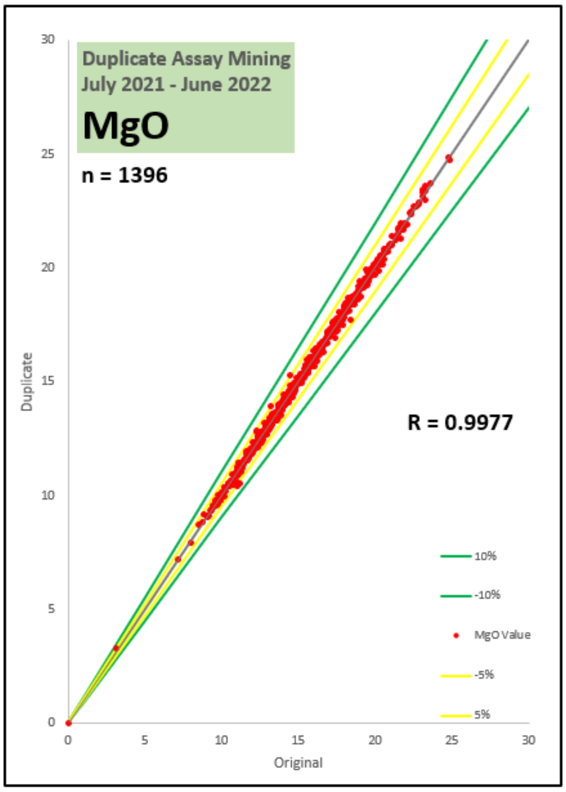
3.1 Pulp Duplicates, or Duplicate Assay

Pulp duplicates, or Duplicate Assays (DA) as they are called at HM, are second splits of the fine grained pulp samples that are collected in the final incremental splitting of the samples after pulverising. Along with the incremental split sample that is taken and bagged for XRF assay at the HM assay lab, and the sample taken for storage and future reference if required, a third sample is collected from each batch and analysed at the same time as the original sample, but with a different sample number. The pulp duplicates are indicators of the analytical precision, which can be affected by the quality of the pulverisation process and the homogenisation of the sample.

f 1,396 plots for Pulp original vs duplicate assays







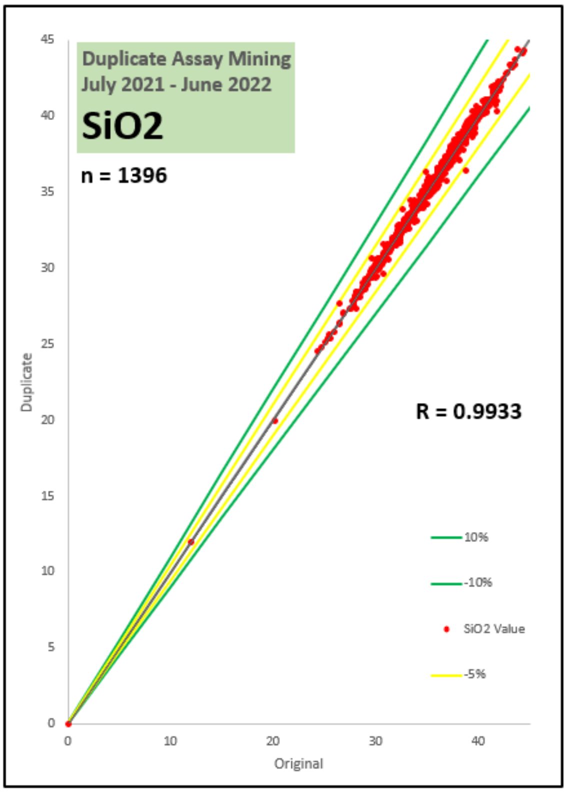


Figure 3 shows scatterplots for the elements Ni, Fe, MgO and SiO2 from original and duplicate assays from 1,396 pulp samples analysed between July 2021 and June 2022. The scatterplots are similar to those shown in Figure 1 for the Coarse Reject assays, with the majority of the Ni and Fe falling within the two yellow lines representing a +/- 5% variance from the assay, a high precision, and reflected with correlation coefficients of 0.994 and 0.9989 respectively.

One difference between the Pulp Duplicate and the Duplicate Roll Graphs shown in Figure 1 is the lack of data points for the lower values of Ni, Fe MgO and SiO2. The reason for this is that Figure 1 shows the wider range of elemental results for exploration samples, while Figure 3 shows results from mining samples with cut-off grades of 1.5% Ni reflected in the average saprolite grades of around 1.75% Ni. Similalrly, average saprolite Fe results are around 20%, for MgO an average of 23%, and for SiO2, around 38%.

3.2 Accuracy

Accuracy refers to the component of the measurement error that in replicate measurements remains constant or varies in a predictable manner. It is assessed by using Certified Reference Materials, eg OREAS 193, and by inserting these CRMs into the sample stream, it is possible to assess the performance of the assay lab undertaking the assay work for internal control. When sent to commercial laboratories with Interlaboratory Check samples it allows comparison of the HM Aassay Lab performance against commercial laboratories and assess for any bias.

Accuracy is treated as a qualitative attribute, ie low or lower accuracy, high or higher accuracy, and should not be given a quantitative value. Accuracy is measured through the bias, which is the difference between the expectation of the test results and an accepted reference value. There is an inverse relationship between accuracy and bias, the higher the absolute value of the bias, the lower the accuracy, and vice versa.

3.3 Check Standards, or Certified Reference Materials (CRM's)

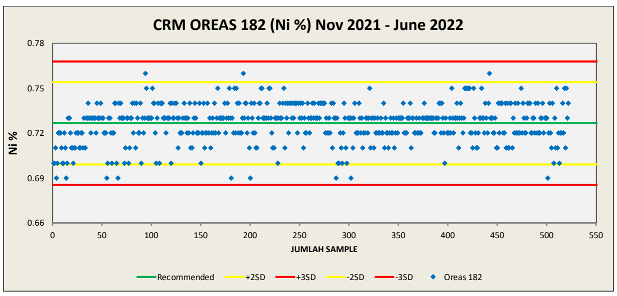
Certified Reference Materials, CRM's, are samples with certified grades, prepared under specially controlled conditions and have a certified mean value for the contained elements in that standard, along with associated confidence and tolerance limits. They are used in Quality Control to monitor the values of the standard against those of the unknown samples being assayed and allow the accuracy of the assay process to be monitored. HM use CRMs produced by OREAS (Ore Research & Exploration P/L, from Victoria, Australia. OREAS CRMs currently used are Standards 182, 187, 192, 193, 194 and 195 with certified Nickel values of 0.707, 1.37, 1.77, 1.93, 2.13 and 2.94 respectively. In addition, these standards have certified standard deviations and state the 95% Confidence and Tolerance Limits with low and high values.

CRMs are generally placed into the sample stream at a frequency of one in 20 samples with mine samples and higher frequency of one in 10 exploration samples, this higher value due to the first sample in each run on the Epsilon 4 and Puma S2 XRF spectrometers being a standard as described in the Standard Operating Procedure.

Figures 4, 5, 6, 7 and 8 are Shewart Control Charts for the results of assays using the OREAS standards 182, 187, 192 and 195 over an eight month period from November 2021 to June 2022. The assay results obtained over a period of time are plotted on a chart of showing certified values against the number of samples assayed, with one line showing the certified mean value, and two green lines showing the expected value plus/minus two standard deviations, also referred to as Upper and Lower Warning Limits, and two red lines representing the Upper and Lower Control Limits at three standard deviations.

Abzalov describes how specific analytical problems have recognizable patterns on certain diagrams , the different distribution patterns of the analytical results being indicative of the error sources and types, being most effective when applied to certified standards such as the OREAS CRM's. Good quality analyses will be characterised by a random distribution points around the certified mean value, with 95% of the data points lying within two standard deviations of the mean. The same number of analyses should fall above and below the mean.

Figure 4: CRM OREAS 182 - 537 Exploration Sample Analyses



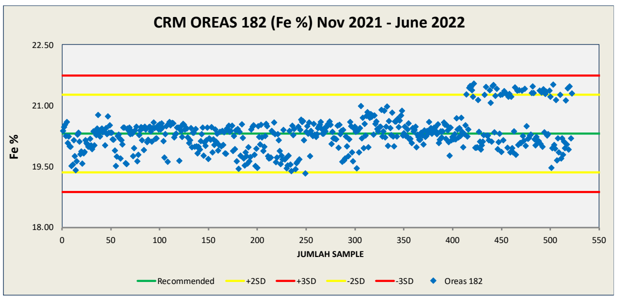


Figure 4, the OREAS Standard 182 shows the results plotting with 95% within two standard deviations of the mean for both Ni and Fe and showing good precision. However, with the Fe graph, the accuracy is not as good on the right hand side of the graph.

Figure 5: CRM OREAS 187 – 582 Exploration Analyses

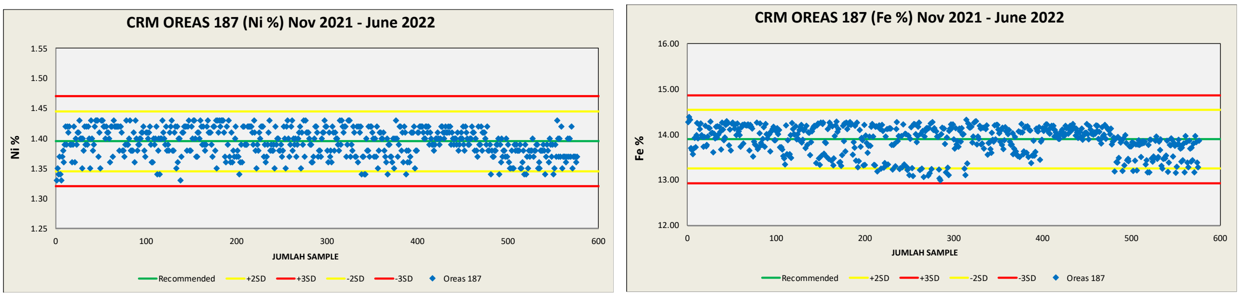


Figure 5 shows the results for 582 exploration samples for Ni and Fe, with both elements showing good precision, 95% of the results plotting within two standard deviations of the mean, and similar numbers of samples above and below the mean. Accuracy in the Fe graph is not as good, with the appearance of more samples below the mean value.

Figure 6: CRM OREAS 192 – 339 Exploration Analyses

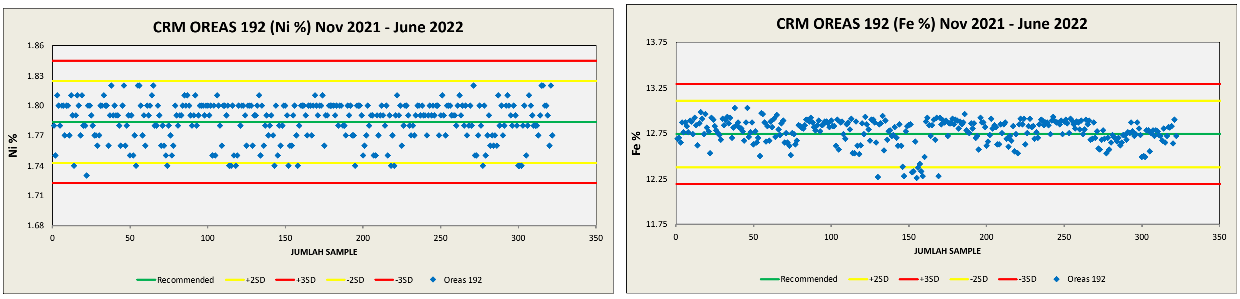


Figure 6 shows good distribution of 339 exploration data results, with 95% of the data points plotting within two standard deviations of the mean, and similar numbers of data points above and below the mean for excellent precision, but the Fe graph shows a number of data points close to the negative -10% warning line which reduces the accuracy in this graph.

Figure 7: CRM OREAS 195 – 193 Exploration Analyses

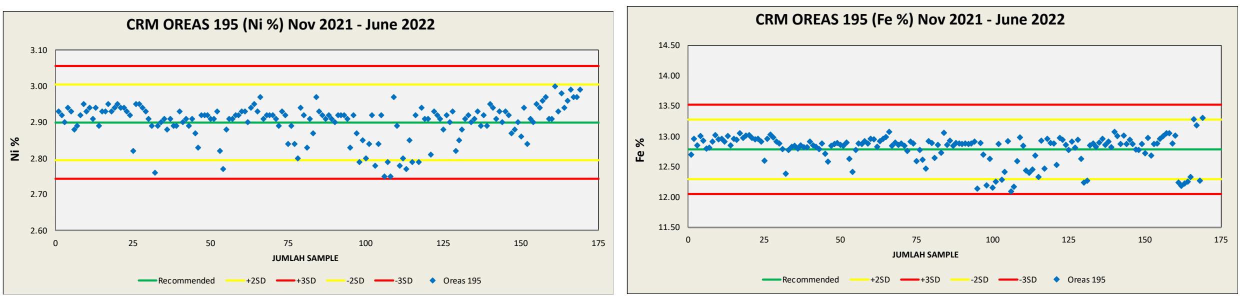


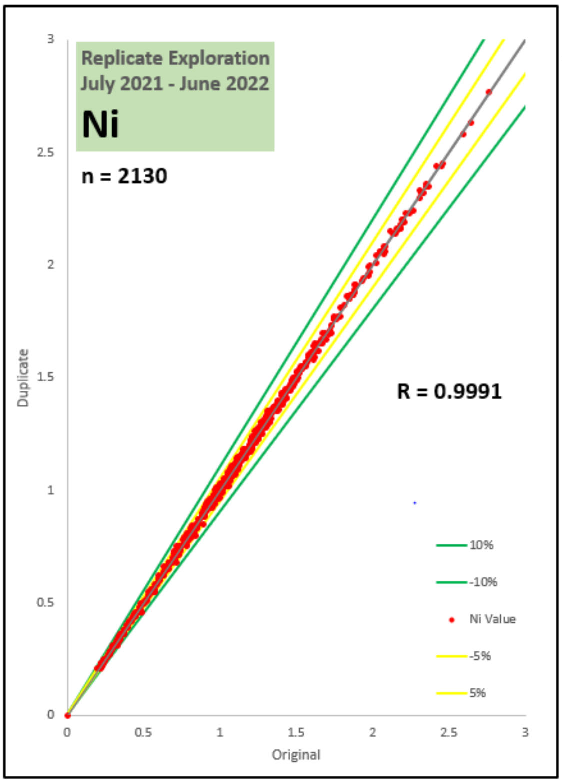
Figure 7 shows a good distribution of the 193 exploration data points with 95% of the results plotting within two standard deviations of the mean for both Ni and Fe, but as with the previous graphs, the accuracy appears to drop around the 100 sample mark for approximately 10 samples which indicates less accuracy.

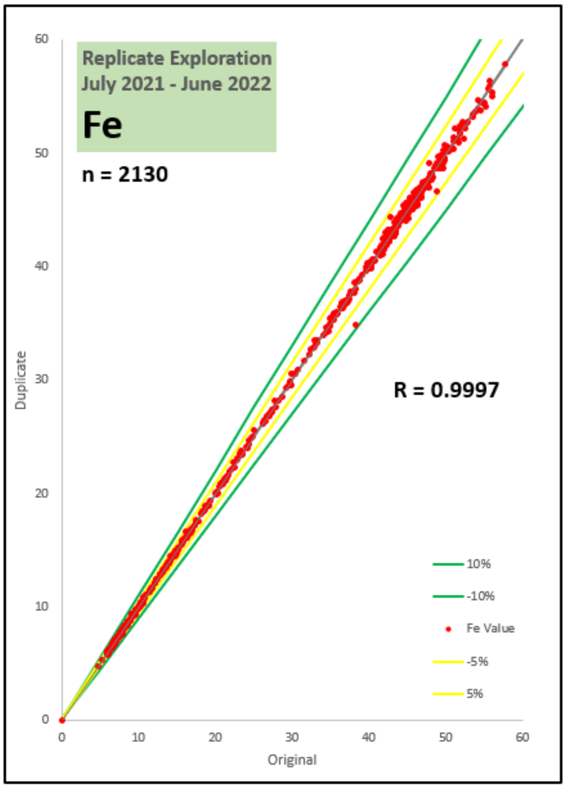
These graphs show that for the 1,651 exploration samples assayed using 4 different OREAS Laterite Suite CRM's the precision between the original and the CRM values are generally excellent, whilst the accuracy for the Ni is good to excellent whilst for the Fe it is of lower quality.

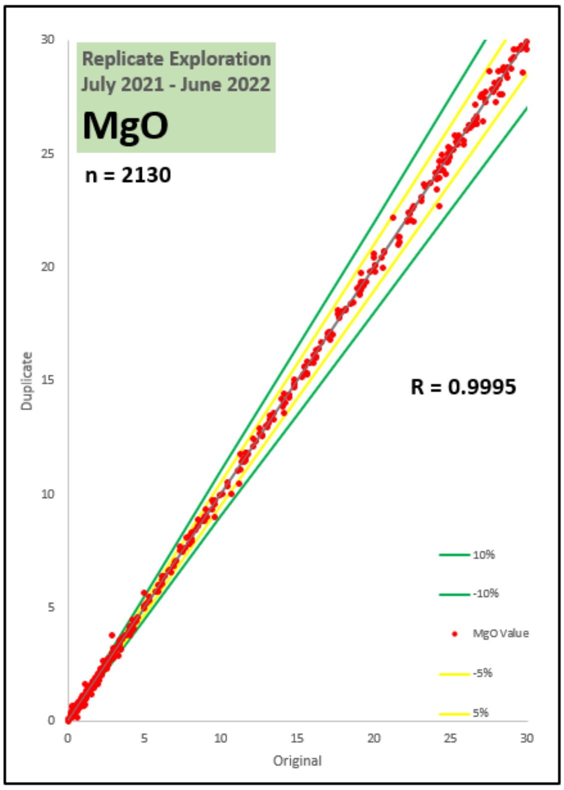
3.4 Replicate Samples

These are two portions of the same pulp samples that are used to produce two separate pressed pellets or fused beads, that are given different sample numbers before being inserted into the same batch, or Job Sheet. At HM they are taken as part of the standard package of check samples, these being one DA or pulp assay, one DR or coarse reject assay, one REP or replicate sample and one CRM.

of 2,130 plots for original vs replicate assays







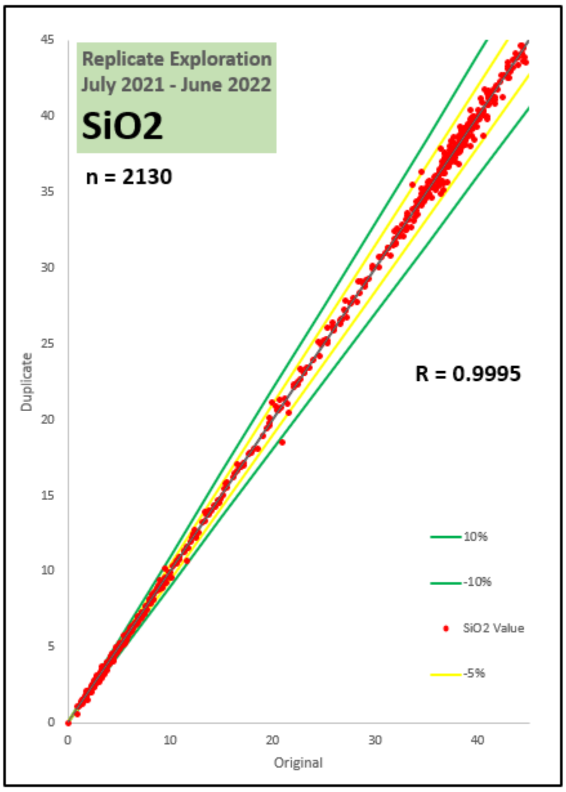


Figure 8 shows scatterplots for 2,130 replicate analyses undertaken between July 2021 and June 2022. The format of the scatterplots is the same as for the previous scatterplots for the Coarse Rejects (DR) and the Pulp Duplicates (DA), with these results showing the wider range in values for the elements due to the samples being tested originating from exploration samples.

The scatterplots for replicate sample assays show the majority of the results plotting within the two yellow lines indicating a 95% confidence in the result plotting withing these limits, and is considered an excellent result. The graphs also show correlation coefficients of more than 0.999, indicating high precision. Spreadsheet data shows there is also an even spread of the replicate assay being both similar to, higher than, and lower than the primary assay in the case of Ni, whilst for Fe, MgO and SiO2 there are slightly more duplicate assays in the Assay<Original category with a corresponding lower figure in the Assay=Original category. This confirms a normal distribution of assay values for these elements and indicates there is little evidence of systematic bias occurring in this replicate check assay programme.

3.5 Interlaboratory Check Samples

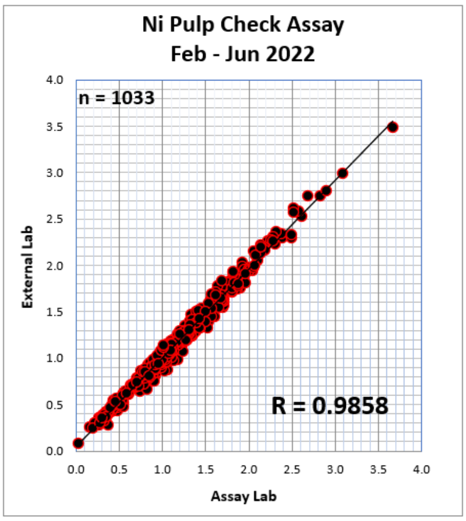
3.5.1 HM Lab vs PT Geoservices Lab

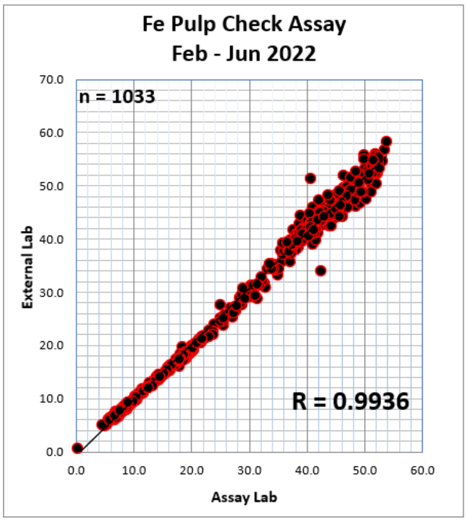
Interlaboratory Check samples are second splits of both the coarse reject samples and the finer 200 # pulp samples that are routinely assayed at the HM Assay Lab and submitted to second, commercial, laboratories under a different sample number. These samples are used to assess the assay accuracy of the HM laboratory relative to the secondary, Geoservices Laboratory.

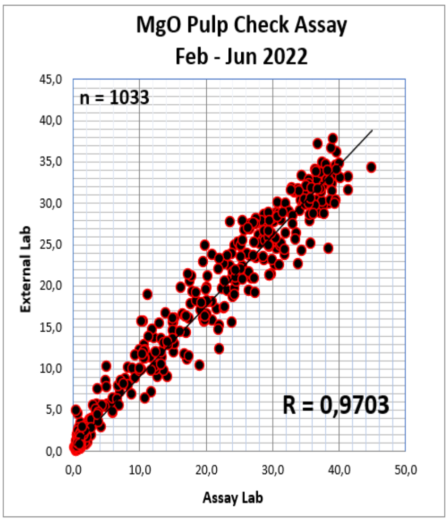
Batches of Exploration samples were sent to the Geoservices Laboratory in Kendari on a periodic basis where the coarse reject samples underwent pulverising and incremental splitting, to be sent off for XRF assay at the Geoservices Analytical Laboratory in Bandung, along with duplicate pulp assay samples. Geoservices then forwarded the HM pulp sample checks to their analytical lab as a different consignment, and once assayed, the results were returned to the Assay Laboratory at the Tangofa site.

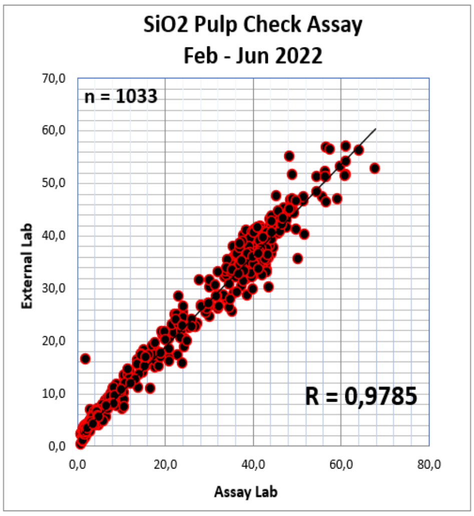
Figure 9 shows the results of the inter laboratory check sample tests comparing the results of 1033 split Exploration coarse reject and 200# pulp samples assayed at the original HM assay laboratory with samples sent to the Gesoservices assay Laboratory in Bandung.

Figure 9: Scatterplot showing results of 1033 plots of HM original vs Geoservices duplicate assays









The scatterplots show differing precision for the different elements, with the best correlation shown between the results for Fe and Ni, 0.9936 and 0.9858 respectively, SiO2 and SiO2 have lower correlations at 0.9785 and 0.9703.

Data for the results for the two laboratories shows a difference between the mean for the Ni and Fe values for the HM Lab as 1.15 % Ni and 27.52 % Fe against 1.13 % Ni and 26.93 % Fe for Geoservices, a difference of 1.74% for Ni and 2.14% for Fe. These represent a +/- 5% variance from the assay, a high precision, and reflected with correlation coefficients of 0.9858 and 0.9936.

These results show lesser precision than was the case with the internal checks using Coarse Rejects, Pulp Assays and Replicate Assays at the HM Lab. This indicates the difference is likely to be due to different sample processing procedures at the two laboratories, and different accuracies and precision due to different equipment. There is a difference between the pressed powder pellets used at the HM Lab with the Fused Bead system used at Geoservices. Similalrly, the HM Assay Lab uses a Malvern Panalytical Epsilon 4 XRF and a Buker Puma S2 XRF that was brought into operation in 2021 and any differences between these XRF Units and those used at Geoservices could result in small differences being recorded.

3.5.2 Comparison PT HM Assay Lab vs IMIP Smelter Results

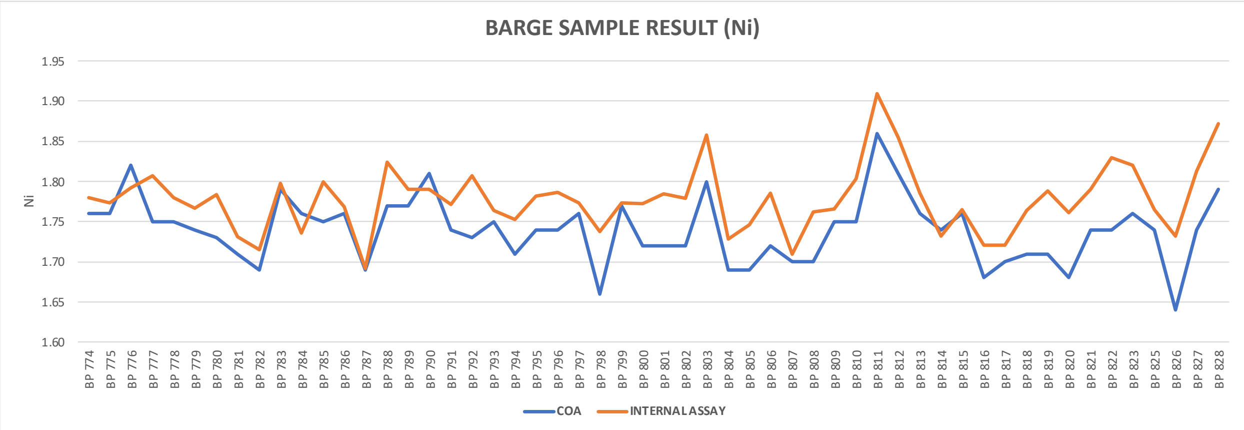
When the barges carrying ore from the HM Jetty to the IMIP smelter arrive, samples are collected from the saprolite ore and assayed at the IMIP facility. These results are used to determine the price paid for the nickel laterite ore. These results are provided in a Certificate of Assay (COA) and Certificate of Quality by PT Intertek Utama Services, Indonesia.

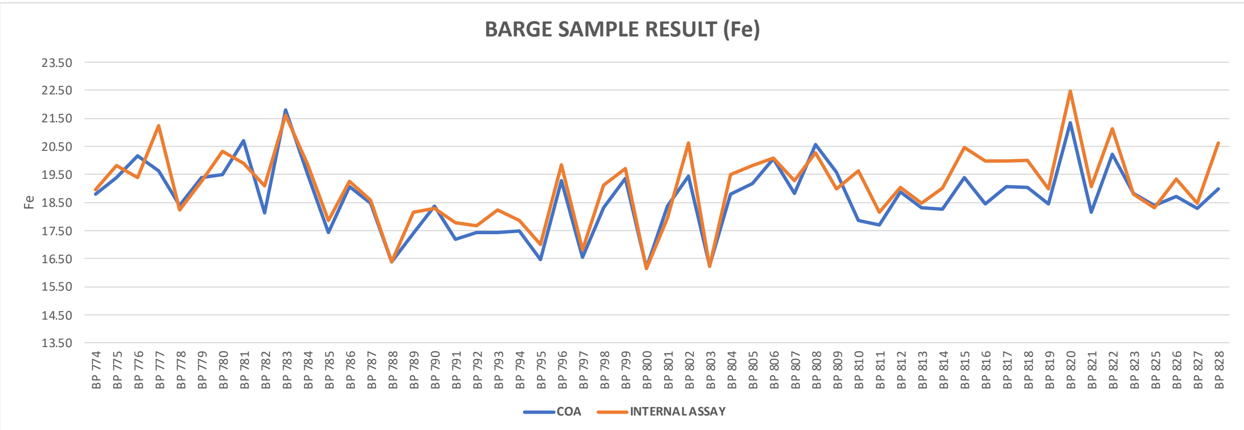
Figure 10 shows graphics of the plots of the Ni and Fe results from the HM Assay Lab and the IMIP COA for 54 samples from barge numbers BP 774 and BP 828 which delivered saprolite ore from the HM Mining Operations to the IMIP Smelter between May 2022 and July 2022.

These graphs represent HM assay results with means of 1.78% Ni and 19.10 % Fe, standard deviations of 0.04 and 1.30, and variances of 0.0016 and 1.6834 respectively. Similar results of 1.74% Ni and 18.66% Fe, standard deviations of 0.04 and 1.20, and variances of 0.0017 and 1.4441 were recorded on the IMIP COA's. Interestingly, the difference between the two sets of data shows a mean difference of 0.04, or 2.2% for the Ni values, with 50 of the 54 COA values being less than the HM assay values. With the Fe values, there is a 2.3% difference between the HM and COA values, with 41 of the 54 COA's returning lower values than HM.

The consistency of results from these 54 samples is interesting, and as before, can be the result of sample processing differences, eg pressed pellet vs fused bead, different equipment and calibration issues.The other problem is the hygroscopic nature of nickel ore, and how the increase in moisture content of the saprolite between leaving the HM stockpiles and being fed into the smelter is likely to result in differences in the Ni values, and may explain the variation between the Ni and Fe graphs.

Figure 10: Graphic showing results of 54 saprolite samples assayed at HM and IMIP Smelter





4. Control Sample Insertion Rates

HM operates a quality control programme at its Tangofa Laboratories where different types and sub-types of control samples are inserted into the sample stream in order to monitor precision, accuracy and possible contamination at the different stages in the sampling, sample preparation and sample assaying sequence.

Sample collection is usually controlled through the use of twin samples and field duplicates, but due to all the Jackro triple barrel drill core being sent for sample preparation and assay, these control samples are not sent for checking.

Sample preparation is controlled through the use of coarse blanks, coarse rejects (DR) and 200# particle sizing tests at the HM Prep Lab.

Sample assay is controlled through the use of pulp duplicates (DA), CRM's, Replicate samples and Interlaboratory check samples.

Mendez (2011) described the frequency of control samples using information from International QA/QC consultants, Exploration and Mining Companies, various authors and the Toronto Stock Exchange and found that a figure of 20% (1 in 5) of the total samples assayed comprise control samples of various types.

During the period July 2021 to June 2022 a total of 50,102 exploration samples were processed at the HM Sample Prep and Assay Labs. The following check samples were added into this original sample stream:

Table 1:
Exploration Control Sample Insertion Rates
July 2021 - June 2022

Period	Exploration Samples	Coarse Rejects/DR		Pulp Duplicates/DA		Replicates		CRM's		Interlab Checks	
		No.	%	No.	%	No.	%	No.	%	Checks	%
May - July 2022	50,102	1,020	2.0%	1,110	2.2%	2,130	4.2%	1,997	4.0%	1,951	3.9%

The Coarse Reject and Pulp Duplicate samples comprise 2.0% and 2.2% of the samples submitted. These figures correspond to those proposed by Mendez, of 2% and 2% respectively.

Replicate samples and CRMs comprise 4.2% and 3.98% respectively of the samples submitted. Although Mendez does not appear to specifically include replicates, this figure of 4.2% allows an additional measurement of the Assay Quality at the HM labs, and is due to two replicate samples being inserted into the sample stream instead of the one coarse reject and one pulp duplicate sample per batch.

The differences between the % of check samples proposed by Mendez, 1 in 5, or 20%, and the 12.5% at HM is due to the lack of Twin Samples collected at the sample collection stage, 2%, because the whole drill core is sent for sample preparation and assay, and a further 2% by way of pulp blanks are also not collected at HM. With 4% of the samples being CRM's this is less than the 6% CRM's suggested by Mendez, but 1,951 Interlaboratory Check samples were sent for assay at Geoservices, 3.9% of the total exploration samples, and in line with the 4% suggested by Mendez.

In summary, a total of 8,208 check samples were inserted into the sample stream of 50,102 exploration samples and submitted for assay ay the Geoservices Assay Laboratory, a total of 16.4% as compared to the 20% suggested by Mendez.

5.Review, Reporting and Continuous Improvement

This section covers three aspects of of the activities undertaken at the QAQC Department thatdeserve a mention.

The Review section is similar to the Acceptance Testing that Sterk discusses, and which he believes should accompany each QA and QC stage in the sample collection, preparation and analysis stages of the sample processing stream. At present, the HM QC team undertake the following:

- Receive printout of assay results for the batches/consignments of exploration samples.
- Check results to confirm check samples inserted into sample stream by HM staff/client.
- Identify check samples and compare CRM results with original results to confirm acceptable precision and accuracy, and present to Supervisor to confirm acceptability of results, and whether or not samples need to be re-assayed in the event of contamination, bias or poor precision.
- If CRM results not acceptable, the analyst and Foreman will consult and clean the Tube Filter and repeat the analysis. If the next analysis is in order the sample assaying will continue.
- If the repeat assay is not acceptable, the next assay will be conducted with a different CRM. If this assay produces an acceptable result, the assay sampling will continue. If this assay produces an unacceptable result, the Supervisor will inform the Lab Superintendent and the Supervisor will undertake recalibration of the unit.
- Lab Foreman then decides and approves circulation of results internally.
- Lab Superintendent decides and approves results going out to client.
- Lab Foream decides and approves entry of sample results data onto HM database.
- Lab Supervisor checks and confirms data entry is correct and in order.

In addressing any issues with Interlaboratory Check Samples, Sterk emphasises the importance of communicating with the commercial laboratory which undertook the assaying of check samples, and discussing what may have caused any serious differences in precision or accuracy.

Reporting of the analysis of the Quaity Control samples is continual, ongoing process and the HM QAQC Department issues a Monthly Report detailing the activities of the department for each calendar month. Sections covered in the QAQC Laboratory Monthly Report for June 2022 are:

- Health & Safety – Near Miss Report
- Accident Report
- Radiation Accident Report
- Preparation Lab Production Report
- Assay Lab Production Report
- Sample Type Statistics
- Monthly Sample Split eg Mining, Exploration, Barging, QAQC
- Quality Control – Sieving Test
- Precision
- Accuracy
- CRM's
- InterLaboratory Check Samples
- Personnel
- Planning, Implementation and Constraints
- Photos

Continuous Improvement is an ongoing procedure that is necessary to maintain the quality of the sample preparation and assay at the HM Laboratories in response to the increase in production at the PT HM Tangofa Mine, from 75,000 wmt per month during 2019 to 300,000 wmt per month in June 2022. Accompanying this three fold increase in the production of saprolite ore, Nickel Industries is now commencing the mining of limonite to feed an HAPAL Plant at IMIP to produce batteries for electric vehicles in Sulawesi. This increase in production has seen a corresponding increase in the staffing levels at the Sample Prep and Assay laboratories, as well as the purchase of additional equipment to meet the increased production with upgrading the equipment at the sample prep lab, the assay lab and associated storage.Nickel Industries have signed MOU's and other agreements in order to acquire additional resources to provide additional feedstock for additional RKEF lines at IMIP at Morowali and IWIP at Halmahera.

To meet the challenges of the increased production and implementation of additional technologies and equipment to handle these increases it will be important to upgrade the skill sets of the staff to ensure that the increase in production will see a corresponding increase in the quality of the data generated at the labs, and continue to seek higher standards of precision and accuracy through improved techniques.

Current international standards for the reporting of exploration and mining results, such as JORC Code 2012 and Canadian NI43-101, require that a programme of data verification is included with any exploration programme to confirm the validity of the exploration data, and this is normally done by inclusion of JORC Code , 2012 Edition – Table 1 Report Template, a copy of which is attached as Table 2.

6. Conclusions

This report has been submitted as part of a JORC Code 2012 Edition Compliant report following the guiding principles of Transparency, Materiality and Competence with the author providing details of the QAQC activities at the HM operations at their Tangofa Camp.

The purpose of Quality Assurance and Quality Control is to determine the quantity and concentration of Ni and Fe and associated lateritic nickel elements and provide confidence in the numbers to allow us to use these numbers in resource estimation, and ensuring that the data we are going to collect and the data we are collecting are of suitable quality. Quality Assurance is about the prevention of errors occurring before the sampling or measurement and Quality Control is about the detection/correction of errors as they occur during the sampling or measurement process (Sterk, 2019).

The Standard Operating Procedure (SOP) for the samples submitted by the exploration and mining operations at PT HM is the “JIS Method for Sampling and Method of Determination of Moisture Content of Garnierite Nickel Ore” JIS M-8109-1996, by H.Kanazawa, August 1996. Other SOP’s are added as new equipment and technologies are introduced into the Sample Prep and Sample Assay Labs.

Descriptions of the various splitting, drying, crushing and pulverising stages are given and what check samples are collected from and introduced into the sample stream at those times. This is where *“…the reduction in particle size, through crushing and pulverising, and its sample size, through splitting, while retaining the representativeness of the medium being sampled”* is our mantra.

Sample preparation quality is measured using Coarse Blanks, Coarse Rejects/Coarse Duolicates and Sample Sizing Tests: Figure 1 shows plots for the four elements with the majority of the data points plotting between the +5% and -5% yellow lines, showing there is a high correlation between the original and the duplicate assay values, with correlation coefficient (R^2) values of > 0.999 for the elements being assayed. These figures confirm the high precision of the jaw crushing, the first splitting and roll crushing stages and supports the use of the Coarse Duplicate assay data for resource estimation purposes.

Figure 2 shows two graphs showing the results of the particle sizing tests undertaken on 111 exploration samples and 104 mining samples at the HM Prep Lab during March 2022. The yellow line is for 95% of the pulverised material passing the 200# screen, and shows the majority of the samples returning a figure of between 97% and 98% for both the exploration samples and the mining samples. These results show the repeatability precision of the pulverizing process in reducing the particle size of the samples to be high.

Sample assay quality is measured using Pulp Duplicate/DA’s, CRM’s, Replicates and Inter Laboratory Checks. Figure 3 shows scatterplots for the elements Ni, Fe, MgO and SiO2 from original and duplicate assays from 1,396 pulp samples analysed between July 2021 and June 2022. The scatterplots show the majority of the Ni and Fe falling within the two yellow lines representing a +/- 5% variance from the assay, a high precision, and reflected with correlation coefficients of 0.994 and 0.9989 respectively.

Figures 4, 5, 6 and 7 are Shewart Control Charts for the results of assays undertaken using OREAS Standards 18, 187, 192 and 195 for Ni and Fe. They show the data points falling within the 2 SD and 3 SD lines, with generally 95% of the Ni and Fe assays falling within 2 standard deviations of the mean, and similar numbers of assays faling above and below the mean line, indicating good precision and accuracy. The results for Fe also show good precision, but the accuracy is not as good for some of the Fe assay results, where we believe some calibration issues occurred following the installation of a new XRF machine.

Figure 8 shows scatterplots for replicate sample assays show the majority of the results plotting within the two yellow lines indicating a 95% confidence in the result plotting withing these limits, and is considered an excellent result. The graphs also show correlation coefficients of more than 0.999, indicating high precision. Spreadsheet data shows there is also an even spread of the replicate assay being both similar to, higher than, and lower than the primary assay for Ni, an excellent result.

Figure 9 shows the results of Inter Laboratory checks between HM Assay Lab and Geoservices.The scatterplots show excellent precision for Ni and good precision for Fe, with the best correlation shown between the results for Fe and Ni, 0.9936 and 0.9858 respectively, SiO2 and SiO2 have lower correlations at 0.9785 and 0.9703.Data for the results for the two laboratories shows a difference between the mean for the Ni and Fe values for the HM Lab as 1.15 % Ni and 27.52 % Fe against 1.13 % Ni and 26.93 % Fe for Geoservices, a difference of 1.74% for Ni and 2.14% for Fe. These represent a +/- 5% variance from the assay, a high precision, and reflected with correlation coefficients of 0.9858 and 0.9936.

Figure 10 shows graphics of the plots of the Ni and Fe results from the HM Assay Lab and the IMIP COA for 54 samples from barge numbers BP 774 and BP 828 which delivered saprolite ore from the HM Mining Operations to the IMIP Smelter between May 2022 and July 2022.These graphs represent HM assay results with means of 1.78% Ni and 19.10 % Fe, standard deviations of 0.04 and 1.30, and variances of 0.0016 and 1.6834 respectively. Similar results of 1.74% Ni and 18.66% Fe, standard deviations of 0.04 and 1.20, and variances of 0.0017 and 1.4441 were recorded on the IMIP COA's. Interestingly, the difference between the two sets of data shows a mean difference of 0.04, or 2.2% for the Ni values, with 50 of the 54 COA values being less than the HM assay values. With the Fe values, there is a 2.3% difference between the HM and COA values, with 41 of the 54 COA's returning lower values than HM.

Table 1. is a summary showing a total of 8,208 check samples were inserted into the sample stream of 50,102 exploration samples and submitted for assay ay the Geoservices Assay Laboratory, a total of 16.4% as compared to the 20% suggested by Mendez. The difference is due to the lack of Twin Samples from the drill site, due to the complete drill core being submitted for sample prep and assay, and 4% CRM's as opposed to the 6% suggested by Mendez.

It was suggested that data with "good" accuracy and "good" precision can be regarded as "Good Quality" and as such, will be "fit for purpose" when the precision and accuracy are within acceptable tolerances. It is the author's belief that the Quality Assurance and Quality Control team at the HM Sample Prep Lab and Assay Lab have shown in the work described in this report that the data generated from the labs is of Good Quality and Fit for Purpose, with the precision and accuracy within acceptable limits and is suitable for inclusion in the calculation of mineral resources for the JORC Compliant Report for PT Hengjaya Mineralindo.

Charles Watson
24th August 2022

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C.E.Watson
August 2022

APPENDIX 5

COMPETENT PERSONS RESUME

DANIEL MADRE , MSc (GEOLOGY)

EXPLORATION SPECIALIST

Summary

Daniel Madre has been an Australian coal and mineral geologist since 1980, with full time work experience in Indonesia since 1988. He is specialist in exploration and for this reason is familiar with most coal and mineral projects in the country since their earliest stage of development. He has a diverse network of professionals throughout the industry. Daniel has a Master of Science degree in Geology. Daniel Madre is a member of the Australasian Institute of Mining and Metallurgy (no: 100878), the Australian Institute of Geoscientists (no: 5632), Ikatan Ahli Geologi Indonesia (no: 5000) and Masyarakat Geologi, Ekonomi Indonesia (no: B-0718). Daniel is a Competent Person in Indonesia for KCMI Code for Coal Resources.

Daniel runs a successful exploration consultancy and has in-house capabilities that range from geology, geophysics, drilling, geological modelling, mine design and planning. The company has discovered coal in East Kalimantan and Sumatra which has resulted in numerous coal mine developments. The company is formally registered by the Indonesian Department of Minerals and Energy to carry out exploration surveys and report coal and mineral resources.

Since 2005, the company diversified into nickel and mineral sands exploration and resource development. This work resulted in the development of the first nickel mine in Kalimantan. Other nickel projects investigated by the company are located in Sulawesi, Halmahera and Papua. Mineral sands projects have been investigated in Sumatra and Papua.

Commodities

Coal, oil shale, nickel laterites, phosphate, gold, manganese and mineral sands

Countries

Indonesia, Australia, USA, PNG, Kenya

Experience

Nov, 2000 - present PT Danmar Explorindo Jakarta, Indonesia
Managing Director

1996–Nov 2000 Independent Consultant Jakarta, Indonesia
Consultant Geologist

1988–1996 PT Petrosea Jakarta, Indonesia
Manager of Geology

1982–1988 Greenvale/Esperance group Sydney, Australia
Exploration Manager

1981–1982 Oil Refining & Exploration PL Sydney, Australia
Field geologist

1980 – 1981 NSW Coastal Engineers Sydney, Australia
Lab attendant

Education

1986- 1989 University of Wollongong Australia
Master of Science (geology)

1978- 1980 University of Sydney Australia
Bachelor of Science (geology and marine science)

Some Articles & Publications

- **1987, The Geology of the Alpha Oil Shale Deposit, Fuel, Vol.66, Butterworths UK**
- **1990, Torbanite Deposits of the World, Thesis: University of Wollongong**
- **2000, Coal Geology of the Bengkulu Block, Journal Asian Earth Science, Elsevier Advances in Sedimentology Series, Elsevier Special editions**
- **2005, Coal Geology of the Bengkulu Block. Proc. SE Asian Coal Geology Conference, Bandung**
- **2012, Coal Deposits of Sumatra, Coal Trans Conference Bali**
- **2012, Low Rank Coal Deposits of Indonesia, Coal Trans Conference Bali**
- **2013, Tectonic Framework of Sumatra & the Distribution of Coal Deposits, Ozmine Conference, Jakarta**
- **2014, Coal Potential of Sumatra, Coal Markets Workshop, Singapore**
- **2014 Adding Value Through Optimizing Exploration Techniques, 2nd Asian Nickel Conference**
- **2014 Coal Potential of Sumatra, World Coal Magazine volume 23**
- **2016 The Exploration Potential of Sumatra, Sumatra Miner Conference, Palembang Sumatra**
- **2016 Why Things are Improving in the Indonesian Coal Industry, RTC Kalimantan, Conference Balipapan, Indonesia**
- **2019 The Coal and Mineral Potential of Sumatra, Sumatra Miner Conference, Palembang Sumatra**

Resume

Name: Tobias Geoffrey Maya
Date of Birth: 26 March 1981
Marital Status: Married
Nationality: Australian

Address: Jl. H. Saidi II No. 16 RT.011 RW.07,
Cipete Utara, Kebayoran Baru,
Jakarta Selatan 12150,

Mobile: (+62) 0812 3869379 ;
Email : tobiasmaya@yahoo.com.au
tobias.maya@danmar.asia

Since 2004, Tobias has been working full time in the Indonesian coal and minerals exploration industry specializing in exploration geology, regional mineral studies, due diligence work, database validation and resource development. Tobias has a Bachelor of Science degree from the Charles Sturt University in NSW, Australia. He has also held a membership with the AusIMM since 2009.

Tobias has more than 15 years exploration experience throughout the country. This work includes the exploration and development of numerous nickel laterite projects. providing a key role in the optimization of exploration techniques that can be used to minimize costs & maximize project value, increasing confidence in estimation of Nickel laterite volumes to determine what are the controlling factors for project development within Indonesian deposits.

EDUCATION AND TRAINING

2006-2013	Completed BSc with major in Spatial Science with 2 minors in information technology and management Charles Sturt University, Wagga Wagga, NSW
2013	Certificate for successful completion of Valuation and Technical-Economic Assessment of Mining Projects, SRK Consultacy
2009	Certificate for successful completion of Mining and Minerals optimization course, Whittle Consultacy
1999-2001	Completed Geographic Information Systems (GIS)Diploma Wollongong TAFE
1998	Higher School Certificate; Bulli High School
1996	School Certificate; Bulli High School
1994	St Johns Ambulance First Aid Certificate

MEMBERSHIP OF PROFESSIONAL ORGANIZATIONS

Since 2009 Member of the AusIMM (No.304661)

EMPLOYMENT & WORK EXPERIENCE

2013 – Present **PT. Geo Search (full-time) part of the Danmar Group**

- President Director.
- Geophysical surveys
- Principle consultant to PT Danmar Explorindo

2004 – 2013 **PT. Danmar Explorindo (full-time)**

- Head GIS/Resource Geologist (SURPAC).
- Management Coal and Mineral Exploration, (Drilling, Survey, Resource Estimates).
- Business development / client relationship manager
- Coal Reconciliations of Operational Mines(monthly)
- Database validation (JORC)
- Training Personnel in GIS (SURPAC, Mapinfo, ESRI,).
- Drafting JORC reports under Principle Mr Daniel Madre, MSc (AusIMM member - 100878)

Provided above Consultancy services for following projects:

2018-present **PT.Hengjaya Mineralindo (HM) -** Morowali, Sulawesi.
-Laterite Nickel Exploration and database validation
-Resource Geology assessments
-Mine planning and production reconciliations
-UltraGPR survey 203km

2018-Present **PT.Kumamba Mining (KM**) - Sarmi, Papua, Indonesia
-Exploration management and database validation
- Geology assessments
- Trial UltraGPR survey 30km
- Trial Ground Magnetometer survey 30km

2018-present **PT.Halmahera Sukses Minerals (HSM)** - Halmahera, Maluku.
-Laterite Nickel Exploration and database validation
-Resource Geology assessments
-UltraGPR survey 75km

2017-2019 **PT.Sarana Mineralindo Perkasa (SMP)** - Morowali, Sulawesi..
- Laterite Nickel Exploration and database validation
-Resource Geology assessments
-Mine planning and pit optimization
-UltraGPR survey 85km

2017-2018 **PT.Ceria Nugraha Indotama (CNI)** - Kolaka, Sulawesi..
-Laterite Nickel Exploration and database validation
-UltraGPR survey 175km

2017-2018	**PT.Tiga Samudra Perkasa (TPS)** - Malili, Sulawesi -Laterite Nickel Exploration and database validation -Resource Geology assessments -UltraGPR survey 75km
2018-2019	**PT.Sulawesi Cahaya Mineral (SCM)** – North Konawe, Sulawesi -Laterite Nickel Exploration and Project support -UltraGPR survey 600km
2005-2019	**PT.Ratu Samban Mining (RSM) -** Bengkulu, Sumatra. -Thermal Coal Exploration management and database validation -Resource Geology assessments -Mine planning and production reconciliations -Nedo regional study 2011 -Jogmec regional study 2013 -Bathymetric survey
2009-2018	**PT.Gunung Bara utama (GBU) -** Kutai Barat, East Kalimantan. -Thermal Coal Exploration management and database validation -Resource Geology assessments -Pre-JORC study 2010 -JORC (2004) compliant reports 2011 & 2012
2005-2011	**PT.Itamatra Nusantara (ITM)** - Morowali, Central Sulawesi. -Laterite Nickel Exploration management and database validation -Resource Geology assessments -Bathymetric survey
2004-2010 Kalimantan	**PT.Telen Indoclay (TIC) Long Ikis Nickel** - Pasir, East -Laterite Nickel Exploration management -database validation -Resource Geology assessments -Mine Construction and Production -Mine planning and production reconciliations -Grade control -Bathymetric survey
2010-2016	**PT.Trisula Kencana Sakti (TKS)** - Barito Utara, Central Kalimantan for **Golden Energy Mines (GEMS)** -Thermal Coal Exploration management and database validation -Resource Geology assessments -JORC (2004) compliant reports 2010 & 2012 -JORC (2012) compliant reports 2013
2010-2018	**PT.Moa Maju Kurina Utama (MMKU)** - Bulungan, North Kalimantan -Lignite Exploration management and database validation

-Resource Geology assessments
-Mine planning
-JORC (2004) compliant reports 2010 & 2011
-JORC (2012) compliant reports 2013

2011-2015	**PT.Delta Samudra (DS) -** Kutai Barat, East Kalimantan -Lignite Exploration management and database validation -Resource Geology assessments -JORC (2004) compliant reports 2013
2012-2018	**PT.Berau Usaha Mandiri (BUM) -** Berau, East Kalimantan -Lignite database validation -Resource Geology assessments -Mine planning
2010-2015	**PT.Inti Putera Kanaan (IPK) -** Musi banyuisn, South Sumatra -Lignite Exploration management and database validation -Resource Geology assessments -Mine planning -JORC (2004) compliant report 2012
2006-2014	**PT.Mulawarman Putra Abadi Sakti (MPAS) -** East Kalimantan -PCI Coal Exploration management and database validation -Resource Geology assessments -JORC (2012) compliant reports 2014
2011-2013	**PT.Satria Lestari (SL)** - Tenggarong, East Kalimantan -Thermal Coal exploration management and database validation - Resource Geology assessment
2013	**Jingella Resources Pty Ltd** - Dingo, Queensland, Australia -PCI Coal database validation -Resource Geology assessments
2013	**Greenvale Mining Pty Ltd - (Alpha Oil shale)** Alpha, Queensland, Australia -Torbanite / Cannel Coal database validation -Resource Geology assessments
2013	**PT.Bumi Merapi Energi (BME)** - Lahat, South Sumatra -Thermal Coal database validation -Resource Geology assessments -Mine planning -JORC (2004) compliant report 2012
2010-2012	**PT.Komunitas Bangun Bersama (KBB)** - Samarinda, East Kalimantan -Lignite Resource Geology assessment -JORC (2004) compliant reports 2010 & 2012

2012	**PT.Delma Mining Corporation (DMC) -** Bulungan, North Kalimantan -Lignite database validation -Resource Geology assessments -JORC (2004) compliant report 2012
2012	**PT.Indonesia Pacific Energy (IPE) & PT.Mega Multi Cemerlang (MMC) -** Meulaboh, Aceh Barat & Nagan Raya, Aceh -Lignite database validation -Resource Geology assessments -JORC (2004) compliant report 2012
2012	**Draig Resources Pty. Ltd -** Teeg & Nariin Teeg mining license, ovorhangay Province, Central Mongolia -PCI COAL database validation -Resource Geology assessments -JORC (2004) compliant report 2012
2004-2010	**PT.Tunas Inti Abdai (TIA) -** Tanah Bumbu, South Kalimantan for **ABM investama (ABM)** -Thermal Coal Exploration management and database validation -Resource Geology assessments -JORC (2004) compliant reports 2010 & 2011
2010	**PT.Bukit Utama Sehjatera (BUS)** - Sorong, West Papua -Lignite Exploration management and database validation -Resource Geology assessments
2010	**PT.Sri Bangun Jaya Persada (SBJP)** - East Kalimantan -PCI COAL Exploration management and database validation -Resource Geology assessments
2006-2010	**PT.Mifa Bersaudara (MIFA) & PT.Bara Energy Leastari (BEL)** - Meulaboh, Aceh Barat & Nagan Raya, Aceh -Lignite Exploration management and database validation -Resource Geology assessments -Mine planning -JORC (2004) compliant report 2010
2009	**PT.Bakti Pertiwi Nusantara (BPN)** – Weda Utara, Central Halmahera, maluku -Laterite Nickel database validation -Resource Geology assessments -JORC (2004) compliant report 2009
2009	**Bildan.Pty.Ltd -** Pulau Talud, North sulawesi -Manganese Exploration management
2008	**PT.Berau Bara Energy (BBE)** - Berau, East Kalimantan -Thermal Coal database validation

-Resource Geology assessments
-JORC (2004) compliant report 2008

2008 **PT.Tripabara (TPB) -** Tapan, West Sumatra Province
-Thermal Coal Exploration management and database validation

2008 **PT.Lion Power Energy (LPE) -** Prabumuliah, South Sumatra
-Lignite Exploration management and database validation
-Resource Geology assessments

2007-2008 **PT.Ratu Samban Mining (RSM) -** Krui, Lampung. Sumatra.
-Iron Sand Exploration management

2006-2008 **PT.Tekno Marina Cipta (TMC) -** Kota Bangun, East Kalimantan
-Thermal Coal Exploration management and database validation
-Resource Geology assessments

2004-2007 **CV. Gudang Hitam Prima (GHP/BBM) -** Sanga Sanga Coal Mine, Samarinda, East Kalimantan
-Thermal Coal Exploration management and database validation
-Resource Geology assessments
-Mine planning and production reconciliations

2006 **PT.Borneo Indobara (BIB) -** Tanah Bumbu, south kalimantan for SINAR MAS MINING
- Project Due diligence study Grimulya Block

2004-2006 **PT. Multi Prima Energy (MPE) -** Loa Raya Coal Mine, Tenggarong, East Kalimantan.
-Thermal Coal Exploration management and database validation
-Resource Geology assessments
-Mine planning and production reconciliations

Previous Employment

1999- 2004 Natural Beauty Floor Sanding (full-time)

- Surface preparation; punch & fill, sanding & edging
- Applying coating product

September 2000 Hydrographic Sciences Australia (2 weeks work experience)

- Re-editing Hydrographic charts
- Hydrographic chart compilation
- Sounding selection

CONFERENCE PAPER PRESENTATIONS

November 2018	**"Indoneisa, Hi-CV coal supply?"** - 7th annual Coaltrans Emerging Asia Marketes, Hanoi, Vietnam
May 2018	**" Developing efficiency in the Indonesian coal supply chain"** - 24th annual Coaltrans Asia, Bali,
September 2017	" **Exploration potential for new Nickel supplies in Indonesia"** - Metal Bulletin: 5th Asian Nickel Conference, Jakarta,
July 2016	**" Which Indonesian coal energy projects will attract Korean investors through 2020?"** - Korea Coaltrans Asia, Seoul,
March 2015	**"The Coal Potential of Sumatra"** - Sumatra Miner 2015 conference
September 2014	**"Adding value through optimizing exploration techniques"** - 2nd Asian Nickel Conference
December 2012	**"Low Rank Coal Deposits of Indonesia"** - IHS Mcloskey Asia Pacific Coal Outlook Conference 2012, Bali
June 2012	**"The Coal Deposits of Sumatra"** - 18th annual Coaltrans Asia, Bali

SOFTWARE EXPERIENCE

- SURPAC Mining software – Good Knowledge of Geodatabase, Surface modelling, Block Modelling, Pit optimisation, Pit design modules.
- WHITTLE Pit optimisation Software – good knowledge of Pit optimisation procedure and analysis
- ArcGIS 9.3 and ArcView 3.2 GIS Software – Good knowledge of Spatial interpolation techniquies and map design
- MapINFO and Surfer GIS software
- Microsoft 7-10, VISTA, XP and NT operation systems
- Microsoft office 2003, 2007 & 2010 Word, Excel, Access, Powerpoint
- Adobe acrobat 8 Professional
- AutoCAD 2009

REFERENCES

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