# MINERAL RESOURCE ESTIMATE FOR THE RÖNNBÄCKEN NICKEL PROJECT, SWEDEN

Report prepared under the Guidelines of National Instrument 43-101 and accompanying documents 43-101.F1 and 43-101.CP



## Report Prepared for NICKEL MOUNTAIN AB Kungsgatan 44

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## Executive Summary

This report has been prepared for Nickel Mountain AB (Nickel Mountain), a subsidiary of IGE Nordic AB (IGE), by the Mitchell River Group Pty Ltd (MRG) and adheres to report structure of Chapters 12 (Sample Preparation, Analysis and Security) and 16 (Mineral Resource Estimate) of the National Instrument 43-101 (NI43-101). The author's scope of work for this document has been to produce a Mineral Resource Estimate of the Sundsberget deposits owned by Nickel Mountain. The asset form part of the Rönnbäcken Nickel Project (the Project).

Please note that this document is not a complete NI 43-101 Report and is an interim report designed to cover information relating to the Sundsberget Mineral Resource Estimate. For information relating to Chapters 1 to 11, 12 (for Rönnbäcksnäset and Vinberget), 13 to 15, 16 (for Rönnbäcksnäset and Vinberget) and 17 to 21 for the Rönnbäcken Project, please refer to the NI 43-101 report prepared for Nickel Mountain (IGE) by SRK Consulting in April 2010.

This report has been prepared by Mr Lauritz Barnes (MAusIMM) and Mr Lachlan Reynolds (MAusIMM). Mr Barnes and Mr Reynolds are a Qualified Persons as defined by the Canadian National Instrument 43- 101 and the companion policy 43-101CP in regard to the geology, style of mineralisation under investigation, the Mineral Resource estimation techniques and compilation of the Mineral Resource Statement.

The definitions of Measured, Indicated and Inferred Resources, as well as reserves as used by the author, conform to the definitions and guidelines of the CIM (Canadian Institute of Mining, Metallurgy and Petroleum) reporting codes.

A personal inspection was carried out by Mr Barnes on 17<sup>th</sup> March, 2008 to the area under investigation. A personal inspection was carried out by Mr Reynolds between the 14<sup>th</sup> and 16<sup>th</sup> of September, 2010 to assess the validity of the data provided by Nickel Mountain, and to inspect the area under investigation.

The Rönnbäcken Nickel Project is located 25 km south-southeast of Tärnaby, Storuman Municipality, Västerbotten County. The Rönnbäcken K nr 1 Exploitation Concession covers the Vinberget deposit on the mainland south of Lake Gardiken. The Rönnbäcken K nr 2 Exploitation Concession covers the Rönnbäcksnäset deposit what now is an island, Rönnbäcksnäset, in Lake Gardiken. The island was created in 1963 when a hydro power station was built and raised the water levels. The Rönnbäcksjon nr 7 Exploration Permit covers the Sundsberget deposit on the mainland on the north-east side of Lake Gardiken. The properties are centred at approximately:

- RT 90 2.5 gon v; 148200E, 726600N
- SWEREF 99 lat long (WGS84); north latitude 65°29'43"; west longitude 15°24'58"

The data used for the Mineral Resource Estimation, including drillhole databases and topographic surveys, was provided by Nickel Mountain. Other sources of information are referenced throughout the document.

The data used in the estimation and the associated quality control quality assurance (QAQC) data was given from Nickel Mountain to MRG. It is the opinion of MRG that the results of the certified standard used and the results of the blanks, duplicates, coarse reject duplicates and inter-laboratory duplicates show that a reasonable level of confidence can be attributed to the drill samples used in the Mineral Resource Estimate.

Mineralisation in the project area is hosted by serpentines in Alpine-type ultramafic rocks, considered to be tectonically displaced from the mantle into the crust. Nickel-sulphides in the serpentinites are of epigenetic origin, having formed during the release of nickel from olivine through a process of alteration and serpentinisation of the precursor dunite and peridotites rocks.

The purpose of the Project is to locate mineralisation that can be recovered by established metallurgical methods, i.e., flotation of sulphide minerals. The adapted assay technique is partial-leach that selectively dissolves nickel in sulphides and leaves the nickel bearing silicates and oxides unaffected. As the sulphur content is low, analyses of sulphur must be performed by methods with low detection limits, better than or equal to 0.01% S.

As the selective nickel leaching technique is not an accredited method for assaying nickel in sulphides, other accepted methods were included in the assay package such as Aqua Regia leach and Near Total Four Acid Leach. To support the values of the grades of nickel in sulphides, mineralogical studies and metallurgical tests were carried out by Nickel Mountain.

MRG created a geological model of the host serpentinite body for the Sundsberget deposit. Based on a statistical review of the validated drillhole data, MRG generated a single serpentinite domain for the Sundsberget deposit. The deposit also includes internal waste domains and internal mafic (pyroxenite) domains.

A 2m composite file was used in a geostatistical study (Variography) that enabled Ordinary Kriging (OK) to be used as the interpolation method. The results of the variography were utilised to determine the most appropriate search parameters.

The interpolated block model was validated through visual checks and a comparison of the mean composite and block grades. MRG is confident that the interpolated grades are a reasonable reflection of the available sample data.

The Mineral Resource Statement generated by MRG has been restricted to all classified material falling within the Whittle shell representing a nickel price of 9 US\$/ Ib and using a marginal cut-off grade of 0.05% Ni-AC. Processing costs, mining costs, slope angles, mining recoveries and revenue assumptions were also used to demonstrate economic viability. The material within the Whittle shell represents the material which MRG considers has reasonable prospect for eventual economic extraction potential based on the above Whittle optimisation analysis. Table 1 shows the resulting Mineral Resource Statement for Sundsberget. The statement has been classified by Qualified Persons Lauritz Barnes (MAusIMM) and Lachlan Reynolds (MAusIMM) in accordance with the Guidelines of National Instrument 43-101 and accompanying documents 43-101.F1 and 43-101.CP. It has an effective date of 27<sup>th</sup> October, 2010.

In total, the Rönnbäcken Project (including Rönnbäcksnäset, Vinberget and Sundsberget) has a combined Measured and Indicated resource of 257.1 Mt grading 0.180% Ni-Total and

0.110% Ni-AC. Of this, 28.2 Mt grading 0.188% Ni-Total and 0.132% Ni-AC is in the Measured category and 228.9 Mt grading 0.179% Ni-Total and 0.107% Ni-AC is in the Indicated category. In addition to the Measured and Indicated resources, 269.2 Mt grading 0.176% Ni-Total and 0.104% Ni-AC is in the Inferred category.

The quantity and grade of reported inferred resources in this estimation are uncertain in nature and there has been insufficient exploration to define these inferred resources as an indicated or measured mineral resource; and it is uncertain if further exploration will result in upgrading them to an indicated or measured mineral resource category.

The Mineral Resource Estimate has not been affected by any known environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues.

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## 12. SAMPLE PREPARATION, ANALYSIS AND SECURITY

## 12.1 Chain of Custody and Sample Preparation

The drill contractor was responsible for transportation of the drill core from site to Nickel Mountain's core archive and logging facility in Skellefteå.

During the logging stage, the core was measured and sample intervals selected by a Nickel Mountain staff geologist or sub-contracting technician for sample analyses. These intervals were marked on the core and on the core boxes.

ALS Sweden AB, a subsidiary of ALS Chemex (ALS), was contracted to split the core and carry out the sample preparation. A separate room for sample preparation was set up for the Rönnbäcken Nickel Project. No other samples were treated in the room during the drilling campaigns.

The samples were logged in the tracking system, weighed, and split with a diamond saw (Almonte Core Saw). One half of the sawed core was treated according to ALS code PREP-31, which included drying and crushing to 70% minus 2 mm (Tyler 9 mesh. US Std. No. 10). A split of up to 300 g was taken and pulverised to 85% minus 75  $\mu$ m (Tyler 200 mesh. US Std. No. 200). The 300 g sample pulp was then split in two or three subsamples and sent to two different primary assay laboratories (Labtium and ALS Chemex). A third laboratory (ACME) was used for control assays.

The remainder of the coarse reject was labelled with the analytical number and stored at the assay laboratories. After a holding period at the laboratories, all of the rejects and pulps were returned to the Nickel Mountain storage facility in Skellefteå. The pulps at Labtium Oy in Rovaniemi, Finland (Labtium), duplicates of the pulps stored in Skellefteå, have been discarded.

A more detailed description is illustrated in the flowchart in Table 12.2-1. Note that the sample split is modified to up to 300 g instead of 250 g.



Figure 12.1-1: Sample preparation flow sheet (modified from ALS Chemex 2009)

## 12.2 Sample Analysis

Two assay laboratories were contracted for analyses: Labtium in Rovaniemi, Finland, and ALS in Vancouver, Canada. Check analyses were mainly performed by Acme Analytical Laboratories Ltd. (Acme) in Vancouver, Canada. The analyses carried out by the three laboratories are summarised in Table 12.2-1 below.

In the database, a total of 2,934 analyses were performed for the Sundsberget deposit of which all were core to completing the resource estimate and 293 or 10% of the available data were a variety of QA/QC analyses. This is considered by MRG to be a reasonable number of check assays. A summary of the analyses is presented in Table 12.2-2 below.

	Lab	Sample	Digest		Samp.		Main	
Lab	code	Digest	Туре	Analy.	(g)	Analytes	interest	Use
ALS Chemex	ME- 4ACD81	Four acid	Near total	ICP-AES	0.25	9	Ni, Cu, Co	Normal
	ME-MS81	Lithium borate fusion	Total	ICP-MS	0.2	38	Ni, Cu, Co	Normal
	ME-ICP06	Lithium borate fusion	Total	ICP-AES	0.2	13	Whole rock	Normal
	ME-MS42	Aqua regia	Near total	ICP-MS	0.5	6	As, Bi, Hg, Sb, Se, Te	Normal
	OA-GRA05	Fusion	Total	Gravimetric	1	1		Normal
	TOT- ICP06	Calculati	on based on LO	I and ME-ICP06	i	1		Normal
	PGM- ICP23	Fusion	Total	Fire Assay (ICP-AES)	30	3	Au, Pd, Pt	Normal
	C-IR07	High temp evolution	Total	Leco furnace		1	С	Normal
	S-IR08	High temp evolution	Total	Leco furnace		1	S	Normal
Labtium	240P	H2O2 + NH4 citrate	Sulphides	ICP-AES	0.15	4	Ni-AC, S-AC	Normal
Acme	7TD	Hot four acid	Near total	ICP-AES	0.5	22	Ni, Cu, Co	QC
	8NiS	H2O2 + NH4 citrate	Sulphides	ICP-AES	1	1	Ni-AC, S-AC	QC

Table 12.2-1: Laboratory Analysis Techniques

## Table 12.2-2: Summary of the QAQC analyses

Deposit	Core	Nickel Mountain duplicates	UM-4 (reference material)	Blank	Acme check	Subtotal QC	Total assay
SUN	2,934	116	72	72	33	293	2,934

## 12.2.1 Labtium

Labtium has FINAS T025 accreditation ISO/IEC 17025:2005. According to FINAS, "a laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems Requirements and are aligned with its pertinent requirements". This accreditation represents a higher standard than ISO 9001:2000. According to the website of Labtium, "Labtium's quality system fulfils the requirements of the Standards Council of Canada (CAN-P-1579), Guidelines for Accreditation of Mineral Analysis Testing Laboratories". However, the ammonium citrate leach procedure is not covered by the accreditation, as the method is relatively new to Labtium.

Ammonium citrate hydrogen peroxide leach (AC), Labtium code 240P, is described as follows. A 0.15 g subsample is leached in a mixture of ammonium citrate and hydrogen peroxide (1:2; total volume 15 mL). The leach is done on a shaking table for two hours at room temperature. The solution is decanted from the sample powder directly after the leach. The solutions are diluted (5:1) and measured with ICP atomic emission spectroscopy (ICPAES). It is a partial leach and is selective at dissolving nickel, cobalt, and copper from sulphide mineral species while leaving those elements in silicates unaffected. The detection limits are 10 ppm. This method was used to determine the recoverable nickel content for this Project, i.e. specifically to obtain accurate estimates of the metals that can be recovered by established metallurgical methods, such as flotation of sulphide minerals.

The results from Labtium are reported with three significant digits (zero uncounted) or <X where X is the detection limit. The latter is preferable to the ALS reporting method, even if the last digits are not significant.

For the 2010 drilling programme, all samples have been analysed using the 240P method through Labtium.

12.2.2 ALS

ALS is accredited by ISO 9001:2000 overall and conforms to the requirements of CAN-P-1579 and CAN-P-4E (ISO/IEC 17025:2005) by the Standards Council of Canada (SCC) for a number of specific test procedures, including the two methods employed by Nickel Mountain.

More detailed descriptions of ALS codes ME-4ACD81 and ME-MS81 follow. For ME-4ACD81, a prepared sample (0.25 g) is digested with perchloric, nitric, hydrofluoric and hydrochloric acids. The residue is topped up with dilute hydrochloric acid and the resulting solution is analyzed by inductively coupled plasma-atomic emission spectrometry. Results are corrected for spectral inter element interferences. For ME-MS81, a prepared sample (0.200 g) is added to lithium metaborate flux (0.90 g), mixed well and fused in a furnace at 1000°C. The resulting melt is then cooled and dissolved in 100 mL of 4% nitric acid. This solution is then analyzed by inductively coupled plasma - mass spectrometry.

Four acid digestions are able to dissolve most minerals. However, although the term "near-total" is used, depending on the sample matrix, not all elements are quantitatively extracted. Therefore, the leach is less useful to the Project as an estimate of recoverable metals. It is mainly included to demonstrate the need of the partial leach method and to provide an extra check of sulphur content. The elements analysed and ranges of the procedure are shown in Table 12.2-3. The upper limits have never been reached.

ME-4ACD81							
Ag	0.5 – 1,000	Co	1 – 10,000	Ni	1 – 10,000		
As	5 – 10,000	Cu	1 – 10,000	Pb	2 – 10,000		
Cd	0.5 - 500	Мо	1 – 10,000	Zn	2 - 10,000		
ME-M	<b>S81</b>						
Ag	1 – 1,000	Ga	0.1 – 1,000	Pb	5 – 10,000	Tm	0.01 – 1,000
Ba	0.5 - 10,000	Gd	0.05 – 1,000	Pr	0.03 – 1,000	U	0.05 – 1,000
Ce	0.5 - 10,000	Hf	0.2 - 10,000	Rb	0.2 - 10,000	V	5 - 10,000
Co	0.5 - 10,000	Ho	0.01 – 1,000	Sm	0.03 – 1,000	W	1 – 10,000
Cr	10 - 10,000	La	0.5 – 10,000	Sn	1 – 10,000	Y	0.5 – 10,000
Cs	0.01 - 10,000	Lu	0.01 – 1,000	Sr	0.1 – 10,000	Yb	0.03 – 1,000
Cu	5 – 10,000	Мо	2 - 10,000	Та	0.1 – 10,000	Zn	5 – 10,000
Dy	0.05 – 1,000	Nb	0.2 - 10,000	Tb	0.01 – 1,000	Zr	2 – 10,000
Er	0.03 - 1,000	Nd	0.1 – 10,000	Th	0.05 – 1,000		
Eu	0.03 - 1,000	Ni	5 – 10,000	TI	0.5 – 1,000		

 Table 12.2-3:
 Elements analysed and their ranges for ME-4ACD81 and ME-MS81

Analytes and Ranges (ppm)

The detection limits of PGM-ICP23 are 1 ppb for Au and Pt and 5 ppb for Pd. The upper limit is 10 ppm and has never been reached.

The results from ALS are reported by increments of the detection limits. For example, if the detection limit is 1, the result given is <1, 1, 2, 3, etc., with some exceptions such as Pb (<2, 2, 3, 4, etc.).

## 12.2.3 ACME

Acme is accredited as complying with ISO 9001:2000. Check assays were mostly done at Acme using the four acid digestion and ammonium citrate methods.

## 12.3 Quality Assurance and Quality Control (QAQC)

The Nickel Mountain Quality Control/Quality Assurance (QA/QC) programme comprised submitting sample blanks, standard reference samples, sample duplicates, and interlaboratory check samples. The approximate rate of sample submissions is summarised in Table 12.3-1 below.

Sample Type	Frequency
Blank	1/50
UM-4 (Reference material)	1/50
Duplicate	1/25
Interlab Check Assays	1/50

Table 12.3-1: Rate of QAQC samples in sample submissions

Additional checks were done on near total and total nickel on coarse rejects. In addition, the laboratories performed analyses of duplicates, in-house standards, etc., which were also forwarded to Nickel Mountain. The QA/QC results from the laboratory were checked as they were returned.

## 12.3.1 Sample Blanks

Since the 1<sup>st</sup> January 2009, Nickel Mountain has submitted 72 sample blanks relating to Sundsberget into the sample stream to check for contamination and drift. The blanks were prepared from pale coloured granite and were inserted by the sample preparation laboratory (ALS Chemex, Piteå). Of the 72, 56 were also analysed through Labtium.

The relevant checks in the Project are for Ni, Ni-AC, and Co-AC and their detection limits are 1 ppm, 10 ppm, and 1 ppm, respectively.

## 12.3.2 Reference Material

Reference Samples were inserted in the sample stream to check the accuracy of the assay laboratory. Reference UM-4 sample was purchased from CANMET Mining and Mineral Sciences Laboratories (CANMET) and originated from the Werner Lake - Gordon Lake district of north-western Ontario, Canada. The reference sample is intended as a reference material for the determination of ascorbic acid/hydrogen peroxide-soluble copper, nickel, and cobalt in ultramafic rocks. There are no certified standards for the sulphide selective leach method used, mostly due to the lack of laboratories offering such analytical services.

Therefore, no Round Robin Test was done and no performance gates were recommended which are normally based on the Round Robin statistics. The reference grades recommended by CANMET are 0.19% Ni and 0.007% Co.

Nickel Mountain submitted 72 UM-4 samples relating to Sundsberget for analysis of which 60 were also analysed through Labtium by the ammonium citrate method (Ni-AC) described in Section 12.2.1 above.

#### 12.3.3 Repeat Pulp Samples

126 sample pulps were assayed as lab repeats.

#### 12.3.4 Duplicate Coarse Reject Samples

116 samples of coarse rejects were renumbered and resubmitted for assay in order to test if the 70% minus 2 mm crush size would achieve repeatable results.

## 12.3.5 Interlaboratory Check Assays

A total of 33 samples originally assayed at Labtium were submitted for assay at Acme principally as a check on the accuracy of the Ni-AC results.

## 12.3.6 Density Measurements

The specific gravity was measured by Nickel Mountain at its base in Skellefteå on a total of 2,972 samples using the water immersion method.

## 12.4 QAQC Analysis

MRG undertook an analysis of the QAQC data provided by Nickel Mountain. This includes blanks, reference material and duplicates as described above. The results of the QAQC includes all data supplied to MRG for Sundsberget during the period starting 1<sup>st</sup> January 2009 through to the end of 2010.

## 12.4.1 Reference Material (UM-4)

Figure 12.4-1 to Figure 12.4-7 shows the performance of the ALS Chemex (total Ni, Cu and Co) and Labtium laboratory analysis (Ni-AC, Cu-AC, Co-AC and S-AC) in reference material UM-4. Please note that the charts shown below for Labtium include not only UM-4 results for Nickel Mountain submitted samples (totalling 60) but also laboratory standards used by Labtium which is also UM-4 (a total of 29 samples).

For the total Ni, Cu and Co, the vast majority of results lie within 2 standard deviations of the calculated mean. Please note that the standard certificate for UM-4 does not quote certified reference values for total Ni, Cu and Co. This has been reviewed only for a check of consistency. One sample has a significantly lower Cu value. This has been checked and found to be a switch in the sample sequence, and the database has now been adjusted accordingly. It has no material impact on the estimate. The majority of results for the AC method at Labtium lie within 5% of the reference grade recommended by CANMET (0.19% Ni). There does not appear to be a bias over time and the results appear to be evenly distributed about the recommended grade.

![](_page_15_Figure_1.jpeg)

![](_page_15_Figure_2.jpeg)

![](_page_15_Figure_3.jpeg)

Figure 12.4-2: Labtium UM-4 for Ni

![](_page_15_Figure_5.jpeg)

![](_page_15_Figure_6.jpeg)

![](_page_16_Figure_1.jpeg)

![](_page_16_Figure_2.jpeg)

![](_page_16_Figure_3.jpeg)

Figure 12.4-5: ALS UM-4 for Co

![](_page_16_Figure_5.jpeg)

Figure 12.4-6: Labtium UM-4 for Co

![](_page_17_Figure_2.jpeg)

Figure 12.4-7: Labtium UM-4 for S

## Summary – Standards

The results of the QAQC standards show that the majority of the samples fall within an acceptable range relative to the nickel and cobalt grades recommended by CANMET. Given that CANMET's recommended grades of UM-4 reference material were obtained through a different dissolution procedure compared the methodology used by Labtium (ascorbic acid hydrogen peroxide leach as opposed to ammonium citrate hydrogen peroxide leach) SRK considered that these results indicate acceptable accuracy of assays for nickel and cobalt in sulphides.

However, MRG agrees with SRK's previous comment that in addition to being referenced against a different assay method, the recommended nickel grade of the UM-4 reference material lies well above typical sulphide nickel grades found in the Project serpentinites. MRG also recommends that Nickel Mountain create reference material from a composite of Rönnbäcken serpentinite as a more suitable means of gauging future exploration Ni-AC assay precision.

## 12.4.2 Blanks

Figure 12.4-8 to Figure 12.4-14 shows the performance of the Labtium laboratory analysis of total Ni, Cu and Co plus Ni-AC, Cu-AC, Co-AC and S-AC in sample blanks. Nickel Mountain replaced all results reporting at less than the detection limit to 0.5 times the detection limit, or 5ppm Ni-AC. Please note that the charts shown below for ALS Chemex include not only blank sample results for Nickel Mountain submitted samples (totalling 72) but also laboratory blanks used by ALS Chemex.

A total of 1 sample had a result which was above detection limit for Ni-AC and also is an anomaly in the total Ni results. Reviewing this sample, it appears that this is actually an incorrectly labelled drillhole sample. It has no material impact on the estimate.

The results indicate a potential for minor contamination during sample preparation at ALS Chemex or instrument drift during assaying at Labtium. The grouped nature of slightly high results may indicate periods in which the routine cleaning of equipment between samples was not undertaken thoroughly. An alternative explanation, though perhaps more unlikely, could be that minor silicate Ni from mafic minerals in the granite was leached in these instances.

In MRG's opinion, the results of the sample blank assays indicate an acceptable level of contamination and drift at the sample laboratories.

- BLANK

60

50

![](_page_18_Figure_1.jpeg)

Ni ppm 40 30 20 10 P e, é Instance

Figure 12.4-8: ALS results for blanks for Ni

![](_page_18_Figure_4.jpeg)

Figure 12.4-9: Labtium results for blanks for Ni

![](_page_18_Figure_6.jpeg)

Figure 12.4-10: ALS results for blanks for Cu

48

-- BLANK

![](_page_19_Figure_1.jpeg)

![](_page_19_Figure_2.jpeg)

Figure 12.4-11: Labtium results for blanks for Cu

![](_page_19_Figure_4.jpeg)

Figure 12.4-12: ALS results for blanks for Co

![](_page_19_Figure_6.jpeg)

Figure 12.4-13: Labtium results for blanks for Co

![](_page_20_Figure_2.jpeg)

Figure 12.4-14: Labtium results for blanks for S

## 12.4.3 Laboratory repeats

Figure 12.4-15 to Figure 12.4-21 show the results of the laboratory repeats for total Ni, Cu and Co plus Ni-AC, Cu-AC, Co-AC and S-AC. The duplicate samples show a strong correlation to the original sample. Sample preparation and analysis shows an acceptable level of repeatability.

![](_page_20_Figure_6.jpeg)

Figure 12.4-15: Results for laboratory repeats for Ni – ALS

![](_page_21_Figure_1.jpeg)

Figure 12.4-16: Results for laboratory repeats for Ni – Labtium

![](_page_21_Figure_3.jpeg)

Figure 12.4-17: Results for laboratory repeats for Cu – ALS

Lab Check Cu ppm

![](_page_22_Figure_1.jpeg)

![](_page_22_Figure_2.jpeg)

Original Cu ppm

Figure 12.4-18: Results for laboratory repeats for Cu – Labtium

![](_page_22_Figure_5.jpeg)

Figure 12.4-19: Results for laboratory repeats for Co – ALS

![](_page_23_Figure_2.jpeg)

Figure 12.4-20: Results for laboratory repeats for Co – Labtium

![](_page_23_Figure_4.jpeg)

Figure 12.4-21: Results for laboratory repeats for S – Labtium

Figure 12.4-22 to Figure 12.4-28 show the results of the coarse reject duplicates for total Ni, Cu and Co plus Ni-AC, Cu-AC, Co-AC and S-AC. The coarse reject duplicate samples show a strong correlation to the original sample. Accounting for a minor number of outliers, the coarse rejects exhibit an acceptable level of repeatability. The effect of the outliers has no material impact on the estimate.

![](_page_24_Figure_2.jpeg)

Figure 12.4-22: Results for coarse crush duplicates for Ni – ALS

![](_page_25_Figure_1.jpeg)

Figure 12.4-23: Results for coarse crush duplicates for Ni – Labtium

![](_page_25_Figure_3.jpeg)

Figure 12.4-24: Results for coarse crush duplicates for Cu – ALS

![](_page_26_Figure_2.jpeg)

Figure 12.4-25: Results for coarse crush duplicates for Cu – Labtium

![](_page_26_Figure_4.jpeg)

Figure 12.4-26: Results for coarse crush duplicates for Co – ALS

![](_page_27_Figure_2.jpeg)

Figure 12.4-27: Results for coarse crush duplicates for Co – Labtium

![](_page_27_Figure_4.jpeg)

Figure 12.4-28: Results for coarse crush duplicates for S – Labtium

## 12.4.5 Interlaboratory Check Assays

Figure 12.4-29 shows the results of the control analysis for Ni-AC carried out at Acme, against the original Ni-AC analysis carried out at Labtium. The control assays display a strong correlation to the original assays, and removing the single outlier which appears to be a sampling error, show similar mean grades of 870 ppm Ni-AC and 840 ppm Ni-AC for Acme and Labtium respectively and a correlation of 0.9. In MRG's opinion, the interlaboratory check assays performed at Acme provide good support for Ni-AC assays carried out by Labtium

![](_page_28_Figure_4.jpeg)

Figure 12.4-29: Labtium vs. ACME results for sulphide Ni (Ni-AC)

## 12.5 Security

## 12.5.1 Storage of Drill Cores

Drill core, coarse rejects, and pulps are stored in a locked unheated storage building inside a fenced area at Nickel Mountain's core depot in Skellefteå. All drill core from Sundsberget is stored on pallets.

## 12.5.2 Database

All project data are stored on the Nickel Mountain exploration office server, with data backup. Also, a full version of the database is now managed through MRG in Perth, Western Australia. The database is managed using industry standard DataShed<sup>™</sup> software.

## 16 MINERAL RESOURCE ESTIMATE

## 16.1 Introduction

A statistical study of the available data for the Sundsberget deposit was undertaken to determine suitable geological domains to be used in the Mineral Resource Estimation. It is clear that the dominant Ni mineralisation is limited to the serpentinite body at Sundsberget with a hard contact to the host metasediments. Internal mafic units also contain low levels of Ni mineralisation in addition to internal zones of non-mineralised serpentinite.

## 16.1.1 Local Grid

To aid in generating the wireframes and populating the block model, it was decided to utilise a Local Grid for the Sundsberget model. This is a simple two point grid transformation using the following two coordinates in Table 16.1-1.

	RTS	90	Loca	l Grid
Point	Easting	Northing	Easting	Northing
SUN001	1482173.0	7270810.0	10000.000	10000.000
SUN033	1481253.0	7270320.0	9303.073	9224.892

Table 16.1-1: Coordinates used grid transformation – RT90 to Local Grid

The elevation used is the same for both grid systems.

## 16.2 Statistical Analysis and Geological Domaining

16.2.1 Sundsberget

The Sundsberget deposit consists of a single serpentinite body that strikes in a north-northeast – south-southwest (NNE-SSW) orientation. The serpentinite body, where exposed at surface, is roughly 1.1–1.2km long (NNE-SSW) and 0.5-0.6km wide (WNW-ESE). Figure 16.2-1 shows the drillhole distribution and solid wireframe created for the serpentinite body and Figure 16.2-2 shows the histogram of Ni-AC distribution for all assays associated with the mineralised serpentinite body. As shown in Figure 16.2-3 shows the probability plot for Ni-AC for the same data with a subtle grade break evident at 0.05% and 0.10% Ni-AC. When applying the identified grade break to the drillhole file, no clear trends in the mineralisation are observed for the higher value (0.1% Ni-AC) but the 0.05% Ni-AC identifies a coherent body. The serpentinite body has therefore not been domained in any greater detail.

![](_page_30_Figure_2.jpeg)

![](_page_30_Figure_3.jpeg)

Figure 16.2-2: Histogram of Ni-AC distribution for all assays associated with the mineralised serpentinite body

![](_page_31_Figure_2.jpeg)

Figure 16.2-3: Probability plot for Ni-AC

## 16.3 Geological Modelling and Block Model Creation

The geological modelling was conducted in Gemcom Surpac<sup>™</sup> version 6.1.4 software and comprised the following:

- Linking to the collar, survey, assay and geology data through Surpac to a Microsoft Access database to view the drillhole database;
- importing the topography data file;
- the creation of a mineralisation wireframe based on the logged serpentinite body and the grade domains outlined above (>= 0.05% Ni-AC);
- the creation of a low-grade serpentinite wireframe based on the logged serpentinite and the grade domains outlined above(< 0.05% Ni-AC);
- the creation of a barren pyroxenite wireframe based on the logged pyroxenite and the geochemical analysis for MgO; and
- the creation of an empty block model coded by zone to distinguish the different geological domains identified (Figure 16.3-4, Figure 16.3-5 and Table 16.3-1). The empty block model created used a parent cell size of 50mN by 50mE by 10mZ, representing a division of the current drillhole spacing observed at the deposit (Table 16.3-2).

When analysing the drillhole data on a section-by-section basis, it was noticed that generally the logged serpentine was mineralised except for a barren serpentinite core and that the pyroxenite was also barren. This is very similar to trends in the nearby Rönnbäcksnäset deposit.

In drillholes SUN017 and SUN033, there appeared to be zones of barren logged serpentinite where adjacent, the serpentinite is mineralised. When logging the core, these rock types are sometimes difficult to distinguish. To try and clarify whether there were mistaken lithological logged intervals, an analysis of the logged rock types by geochemistry was conducted.

MgO is useful in determining differences in mafic rocks. A comparison of expected MgO levels by rock type shown in Table 16.3-1 identified a reasonably tight symmetrical expected range for serpentinite (mean of 36.5% MgO, 25<sup>th</sup> percentile of 35.5%, 75<sup>th</sup> percentile of 39.5%) whereas the pyroxenite had a very stretched upper range (mean of 27% MgO, 25<sup>th</sup> percentile of 20.5%, 75<sup>th</sup> percentile of 35%). Two key holes (SUN017 and SUN033) appeared to have strange logged intervals. With these two holes removed from the sample population, Figure 16.3-2 shows much more symmetrical and defined ranges for MgO for both serpentinite and pyroxenite (now showing a mean of 23% MgO, 25<sup>th</sup> percentile of 20% MgO, 75<sup>th</sup> percentile of 25% MgO). Utilising MgO in the interpretation removed issues with odd rock type logging.

![](_page_32_Figure_3.jpeg)

Figure 16.3-1: Comparison of expected MgO levels by rock type (before correction)

![](_page_33_Figure_2.jpeg)

Figure 16.3-2: Comparison of expected MgO levels by rock type (after correction)

The serpentinisation process results in the formation of magnetite as well as nickel sulphides. The use of ground magnetic surveys has been identified as a useful exploration tool to target potential zones of nickel sulphide mineralisation. An analysis of magnetic susceptibility by logged rock type, illustrated in Figure 16.3-3 clearly shows differences that assisted with the modelling process. The serpentinites and the pyroxenites are clearly distinguished from the remainder of the rock types. Also, there is a clear difference between the magnetic susceptibility of the pyroxenite and the serpentinite.

![](_page_34_Figure_2.jpeg)

Figure 16.3-3: Analysis of magnetic susceptibility by logged rock type

A comparison between the surface ground magnetic survey and the 3-D interpretation of the rock type using the drillhole data matched well as shown in Figure 16.3-4. The Serpentinite or Mineralised Zone correlates well with the magnetic highs, with zone of lower magnetics correlating with the barren pyroxenite interpretation. The surrounding 'country' rocks (metasediments), with orders of magnitude lower magnetic susceptibility readings, are clearly distinguished from the mafic rocks.

![](_page_35_Figure_2.jpeg)

Figure 16.3-4: The relationship between the Mineralised Zone (the serpentinite) and the barren pyroxenite with the ground magnetics.

![](_page_36_Figure_1.jpeg)

Figure 16.3-5 shows a cross-section through the interpretation illustrating the wireframe domains.

Figure 16.3-5: Cross-section (9800mN Local Grid) through the Sundsberget deposit

Table 16.3-1: Coding applied to the various geological domains in the Sundsberget deposit geological model.

Geology	Code
Serpentinite (Min Zone)	1
Serpentinite (Barren)	2
Pyroxenite	3
Country Rock (metasediments)	9998
Air	9999

Table 16.3-2: Block model parameters used to build the empty block model for the Sundsberget deposit.

Direction	Start	End	Block Size	Sub-block
Х	9000	10500	50	12.5
Y	8500	10500	100	25
Z	-200	550	10	2.5

## 16.4 Available Data

The Sundsberget deposit consists of 33 diamond drillholes for a total of 7111.35 drilled metres. Of this, 5,855.6 drilled meters have been assayed for Ni-AC.

All available data was validated through DataShed drillhole validation tools and through connection to and visualisation within Surpac. No drillholes were removed with no errors were found in the data files provided. MRG is satisfied that the data is suitable to be used in the Mineral Resource Estimate.

## **16.6** Raw Statistics

Table 16.6-1 shows the raw drillhole sample statistics for the domains modelled at Sundsberget. As shown, the mean Ni-AC grade of the Sundsberget mineralised serpentinite is 0.099% and the mean grade of the 'barren' serpentinite is 0.043%.

The Coefficient of Variation (CoV) can be used to describe the shape of the distribution and is defined as the ratio of the standard deviation to the mean. A CoV greater than one indicates the presence of some erratic high values that may have a significant impact on the final estimation. Within the main mineralised serpentinite Table 16.6-1 shows that CoV values is very low, being 0.29 indicating the low variability of the data.

ZONE	No. SAMP	MIN	MAX	RANGE	MEAN	VAR	SDEV	CoV
3 (Min. Serp)	1,953	0.001	0.206	0.205	0.099	0.001	0.028	0.287
6 (Pyrox.)	393	0.001	0.121	0.120	0.029	0.001	0.024	0.851
7 (Barren Serp)	415	0.016	0.076	0.060	0.043	0	0.011	0.264
9998 (Other)	174	0.001	0.137	0.136	0.032	0.001	0.037	1.162

Table 16.6-1: Summary raw sample statistics for the Sundsberget deposit

## 16.7 Compositing

Data compositing is commonly undertaken to reduce the inherent variability that exists within the population and to generate samples more appropriate to the scale of the mining operation envisaged. It is also necessary for the estimation process, as all samples are assumed to be of equal weighting, and should therefore be of equal length.

The majority of samples at Sundsberget are 2m in length (see Figure 16.7-1) with smaller samples being present to mark the geological contacts. Due to the very low CoV observed in the database and the near normal populations shown in the histograms of the raw data, all samples have been composited to 2m as increasing the sample to a larger composite length has little impact on the variability of the database. The composite statistics for the Sundsberget mineralised domain is shown in Table 16.7-1.

![](_page_38_Figure_2.jpeg)

Figure 16.7-1: Histogram showing intervals for drillhole samples

ZONE	N0. SAMP	MIN	MAX	RANGE	MEAN	VAR	SDEV	CoV
3 (Min. Serp)	1,965	0.001	0.206	0.205	0.099	0.001	0.028	0.282

Table 16.7-1: Composite statistics for the Sundsberget mineralised domain

## 16.8 Specific Gravity (SG) Analysis

A comprehensive density dataset has been generated by Nickel Mountain using the methodology described in Section 10.6 of the SRK Report, April 2010. In total, 2,972 SG measurements are present for the Sundsberget. SG measurements have also been acquired for the waste domains allowing accurate tonnages to be determined for all material types. Figure 16.8-1 shows the breakdown of samples by rock type. Table 16.8-1 shows the SG values used to populate the block model by domain and to report the resource tonnage.

![](_page_39_Figure_2.jpeg)

Figure 16.8-1: Box plots for SG by rock type

 Table 16.8-1: SG by rock type used to populate the block model

DOMAIN	N0. SAMP	MIN	MAX	RANGE	MEAN (g/cm <sup>3</sup> )	VAR	SDEV
3 + 7 (Min. & Barren Serp)	2,412	2.55	3.23	0.68	2.83	0.012	0.111
6 (Pyrox.)	415	2.51	3.24	0.73	3.02	0.019	0.138
9998 (Other)	145				2.83		

## 16.9 Geostatistical Study

## 16.9.1 Variography

The 2m composited drillhole database, coded by the modelled domains, was imported into ISATIS software for the geostatistical analysis. Variography was attempted on the main serpentinite ore domain (3).

An omnidirectional downhole experimental semi-variogram was produced for the Sundsberget deposit for Ni-AC. In the plane of the mineralised body, no obvious anisotropy is apparent, so the variogram was modeled omnidirectional in the pane of mineralisation. Although omni-directional, a ratio of 1:1:3 for Major:Semi-major: Minor was used due to the interpreted dip and strike direction observed for the serpentinite body.

The semi-variograms were produced using a 2m (composite length) lag in the downhole / omni directional direction allowing the short-scale structures and nugget variance to be determined. Along strike and down-dip variograms for the were then produced with the nugget fixed from the downhole variogram, and using a lag spacing of 100m with a 50% tolerance being applied to the lag spacing.

Figure 16.9-1 shows the plane used to define the directional variography using a  $0^{\circ}$  azimuth (Local Grid), 35° dip to the west and a 0° plunge.

Ellipsoid Visualiser				
Anisotropy Ratios		Orienta	tion	
Max Search Radius	100	Bearing	270	
Major/Semi-Major	1	Plunge	-35	and the second sec
Major/Minor	3	Dip	0	and the second second
Axes of Rotation				AND THE BOY
Surpac ZXY LRL	•			HUUU
First A> Second	d Axis T	hird Axis		
@ Z @ X	OY C	XON	ΟZ	
View Plan Sec Curre	tion Int View: Pl	Long Sect	ion	Y X
Create String File		String	File Origin	
Location	•	Y O		Appearance
ID		X 0		Ellipsoid Detail
Save	Now	Z 0		

Figure 16.9-1: Plane used to define the directional variography

Figure 16.9-2 and Figure 16.9-3 show the Ni-AC semi-variograms. Sample pairs are not displayed on the variograms for easier visualisation purposes; however, they were checked in the variography process with sufficient numbers being used.

![](_page_41_Figure_2.jpeg)

![](_page_41_Figure_3.jpeg)

![](_page_42_Figure_2.jpeg)

Figure 16.9-3: Ni-AC along strike omni-variogram

Variograms produced were applied to Co-AC also.

The results of the variography are shown in Table 16.9-1.

Element	Nugget	Rel. Nugget	Structure	Variance	Down- dip	Along Strike	Downhole
Ni-AC	0.0002	25.6%	1	0.0002	40	40	12
			2	0.0002	125	125	125
			3	0.00018	350	350	125

Table 16.9-1: Summary of variography

## 16.9.2 Summary

The directional experimental semi-variograms produced for Sundsberget allowed the generation of reasonable variogram models to be generated in the downhole and down-dip/along-strike directions (35° to Local Grid west) for Ni-AC.

As a result of the variography, Ordinary Kriging (OK) was deemed the most appropriate interpolation technique to be applied to Ni-AC.

## 16.10 Mineral Resource Estimation

## 16.10.1 Interpolation

An empty block model was generated using the lithology wireframes with block dimensions as shown in Table 16.10-1. These block dimensions approximate half the drillhole spacing at Sundsberget. A block height of 10m was chosen, being the

assumed working bench height of the operating pit. Table 16.10-1 summarises the block model parameters.

Direction	Start	End	Block Size	Sub-block
X	9000	10500	50	12.5
Y	8500	10500	100	25
Z	-200	550	10	2.5

Table 16.10-1: Sundsberget block model parameters

Grades of Ni-AC, Co-AC and Ni-Total were interpolated into the model using OK and using the kriging parameters as given above in Table 16.9-1. Ni-Total was interpolated using the Ni-AC kriging parameters and represents the nickel present in both silicate and sulphide phases.

Only Domain 3 (the mineralised domain) was populated.

## 16.10.2 Search Ellipse Parameters

The dip and strike of the Sundsberget deposit is approximately 35 to Local Grid west. Figure 16.10-1 shows the search ellipse generated for use for the Sundsberget deposit, with the dip and strike of the ellipse corresponding with the dip and strike of the orebody wireframe.

![](_page_43_Figure_8.jpeg)

Figure 16.10-1: Search ellipse generated for use for the Sundsberget deposit

Three different grade estimation runs with specific sample criteria were undertaken. The first run uses a major search distance of 250m (against a drill spacing of 200m N-S by 100m E-W). The second run doubles the dimensions of the search ellipse and the third run triples the original search ellipse.

Table 16.10-3 shows the search ellipse parameters used for the three estimation runs for Ni-AC.

Run	Major Distance	Ratio Maj : SM : Min	Min Samp	Max Samp	Max per hole	Dip / Dip Direction
1	250	1:1:3	12	36	8	35 / 270
2	500	1:1:3	12	36	8	35 / 270
3	750	1:1:3	12	36	8	35 / 270

Table 16.10-3:	Search ellipse	parameters
10010 10110 01	o o dai o i i o inipo o	paramotoro

## 16.10.3 Block Model Validation

The block model has been validated using the following techniques:

- visual inspection of block grades in plan and section and comparison with drillhole grades;
- comparison of global mean block grades and sample grades.
- comparison of mean block grades and sample grades in northing slices.

## Visual Validation

Figure 16.10-2 shows an example of the visual validation checks between block Ni-AC grades and the input composite Ni-AC grade on cross section 9800mN (Local Grid). The grades follow the strike and dip of the orebody showing that the search ellipse orientation has been used appropriately.

![](_page_44_Figure_10.jpeg)

Figure 16.10-2: Comparison between block Ni-AC grades and the input composite Ni-AC grade on cross section 9800mN (Local Grid)

Table 16.10-4 shows a comparison of the global block mean grades with the global sample means grades for Ni-AC, Co-AC and density.

Table 16.10-4: Comparison of the global block mean grades with the global sample means grades

Comps	Decl. Comps	Pass	BM Grade	Diff. Decl. Grade	% filled
0.099%	0.097%	1	0.097%	0.7%	92.6%
		2	0.087%	-10%	7.3%
		3	0.085%	-12%	0.1%
		Combined	0.097%	0.2%	100%

## Sectional mean grade comparison

Figure 16.10-3 and Figure 16.10- show comparisons of the sectional block mean grades with the sectional sample means grades for Ni-AC by northing (200m slices) and elevation (50m slices) for blocks filled by pass 1 only and then for all populated blocks.

![](_page_45_Figure_5.jpeg)

Figure 16.10-3: Comparisons of the block mean grades and sectional sample means grades for Ni-AC by northing (200m slices) – Pass 1 only

![](_page_46_Figure_2.jpeg)

Figure 16.10-4: Comparisons of the block mean grades and sectional sample means grades for Ni-AC by northing (200m slices) – All populated blocks

![](_page_47_Figure_2.jpeg)

Figure 16.10-5: Comparisons of the block mean grades and sectional sample means grades for Ni-AC by elevation (50m slices) – Pass 1 only

![](_page_48_Figure_2.jpeg)

Figure 16.10-6: Comparisons of the block mean grades and sectional sample means grades for Ni-AC by elevation (50m slices)

Overall, MRG is confident that the interpolated grades are a reasonable reflection of the available sample data with the key grade fields being well within acceptable limits.

## 16.11 Mineral Resource Classification

The definitions given in the following section are taken from the 2000 Canadian Institute of Mining Standing Committee on Reserve Definitions' guidelines on Mineral Resources and Reserves, to comply with National Instrument 43-101.

## 16.11.1 CIM Definitions

## **Mineral Resource**

Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories. An Inferred Mineral Resource has a lower level of confidence than that applied to an Indicated Mineral Resource. An Indicated Mineral Resource has a higher level of confidence than an Inferred Mineral Resource but has a lower level of confidence than a Measured Mineral Resource.

A Mineral Resource is a concentration or occurrence of natural, solid, inorganic or fossilised organic material in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.

The term Mineral Resource covers mineralisation and natural material of intrinsic economic interest which has been identified and estimated through exploration and sampling and within which Mineral Reserves may subsequently be defined by the consideration and application of technical, economic, legal, environmental, socio-economic and governmental factors. The phrase 'reasonable prospects for economic extraction' implies a judgement by the Qualified Person in respect of the technical and economic factors likely to influence the prospect of economic extraction. A Mineral Resource is an inventory of mineralisation that, under realistically assumed and justifiable technical and economic conditions, might become economically extractable. These assumptions must be presented explicitly in both public and technical reports.

## Inferred Mineral Resource

An 'Inferred Mineral Resource' is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes.

Due to the uncertainty which may attach to Inferred Mineral Resources, it cannot be assumed that all or any part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource as a result of continued exploration. Confidence in the estimate is insufficient to allow the meaningful application of technical and economic parameters or to enable an evaluation of economic viability worthy of public disclosure.

Inferred Mineral Resources must be excluded from estimates forming the basis of feasibility or other economic studies.

## **Indicated Mineral Resource**

An 'Indicated Mineral Resource' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes that are spaced closely enough for geological and grade continuity to be reasonably assumed.

Mineralisation may be classified as an Indicated Mineral Resource by the Qualified Person when the nature, quality, quantity and distribution of data are such as to allow confident interpretation of the geological framework and to reasonably assume the continuity of mineralisation. The Qualified Person must recognise the importance of the Indicated Mineral Resource category to the advancement of the feasibility of the project. An Indicated Mineral Resource estimate is of sufficient quality to support a Preliminary Feasibility Study which can serve as the basis for major development decisions.

## Measured Mineral Resource

A 'Measured Mineral Resource' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes that are spaced closely enough to confirm both geological and grade continuity.

Mineralisation or other natural material of economic interest may be classified as a Measured Mineral Resource by the Qualified Person when the nature, quality, quantity and distribution of data are such that the tonnage and grade of the mineralisation can be estimated to within close limits and that variation from the estimate would not significantly affect potential economic viability. This category requires a high level of confidence in, and understanding of, the geology and controls of the mineral deposit.

## 16.11.2 Classification

## Introduction

To classify the Sundsberget deposit, the following key indicators were used:

- drillhole spacing;
- geological complexity;
- quality of data used in the estimation:
  - QAQC, density analysis
- results of the geostatistical analysis
  - variography
- quality of the estimated block model.

## Drillhole Spacing and Geological Complexity

The amount of drill data permits MRG to see clear geological continuity between sections and deduce a clear geological model with all of the mineralisation occurring within the serpentinite body. The drill spacing has allowed for the interpretation of a zone of mafic material with a low associated Ni-AC grade although the interpretation is not conclusive. Internal waste (i.e. barren serpentinite and barren pyroxenite) zones have been interpreted that are harder to join from adjacent sections and require further targeted drilling to confirm their orientations and nature.

A statistical study shows a very low variability to the grade distribution with near normal populations of data being present. A continuous low grade serpentinite unit has been identified from the statistical study that was subsequently domained as a separate unit.

It is the opinion of MRG that the associated risk relating to geological complexity is moderate to low, predominantly associated with the interpretation of the pyroxenite zones.

## Quality of the Data used in the Estimation

Quality assurance and quality control (QAQC) checks were implemented throughout the assaying period that included the insertion of standards, blanks, laboratory duplicates and the use of an umpire laboratory. The results of the QAQC checks provided reasonable results.

Overall, MRG is confident that the results of the QAQC analysis have validated the accuracy of the database being used to generate the Mineral Resource Estimate.

A comprehensive dataset of SG readings has also been generated by Nickel Mountain throughout the sampling period that has enabled MRG to confidently apply appropriate SG values to the block model. MRG is therefore confident that the associated tonnages are a reasonable reflection of the Sundsberget deposit.

## **Results of the Geostatistical Analysis**

The data used in the geostatistical analysis resulted in reasonable variogram models being produced for Sundsberget. This enabled the nugget and short-scale variation in grade to be determined with a comfortable level of confidence.

## Quality of the Estimated Block Model

The validation tools show that the input data used to estimate the model is replicated in the estimation. Mean grades of the block model and composites are comparable for all modelled domains.

## Classification

The Sundsberget deposit has been classified as containing Inferred Resources. This is primarily due to the current drill spacing (200m N-S and 100m E-W in the Local Grid) and the uncertainty associated with the interpretation of the pyroxenite and barren serpentinite zones.

To determine the final Mineral Resource Statement, and so as to comply with the NI 43-101 guidelines, the resulting blocks have been subjected to a Whittle pit optimisation exercise to determine the proportion of the material defined that has a reasonable prospect of economic extraction. This exercise is not intended to generate a Mineral Reserve and is purely used to assist in determining the possible extent of the resource model.

## **16.12 Whittle Parameters**

The Whittle optimisation requires the input of reasonable processing and mining cost parameters in addition to appropriate pit slope angles and processing recoveries. Table 16.12-1 shows the assumptions applied in the Whittle optimisation.

The Whittle optimisation has assumed that only the serpentinite is to be treated as potential ore material.

Revenue						
Ni Price	USD 9/lb					
Govt Royalty	0.05%					
Landowner Royalty	0.15%					
Discount Rate	0%					
Process and M	ining Statistics					
Overall Slope Angle	52°					
Mining throughput	6Mt and 10Mt per annum					
Mining Recovery	95%					
Mining Dilution	2.5%					
Process Recovery	78%					
OP Mining Cost at surface.	1.0 USD/tonne					
Incremental Mining Cost above surface	0.05 USD/tonne/10m					
Incremental Mining Cost below surface	0.07 USD/tonne/10m					
Processing Cost	4.24 USD / ore tonne					
Effective charges per lb Ni in smelter feed	2.26 USD / lb					
General & Administration	1.0 USD / ore tonne					
Rail / Road Transport Cost	0.35 USD / ore tonne					
Concentrate Grade	28.0%					

Table 16.12-1:	Whittle o	ptimisation	parameters
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It is noted that subsequent to the optimisation results being used to assist with determining the classification of the resource, it was picked up that there was an error in the parameters above, where a royalty of 2% instead of 0.2% was used. It was decided that the resource numbers outlined below would be left as is for the time being as the impact of this change is not significant and it adds some minor conservatism to the published resource numbers.

## 16.13 Mineral Resource Statement

The Mineral Resource Statement generated by MRG has been restricted to all classified material falling within the Whittle shell representing a nickel price of 9 US\$/lb and through the application of the parameters outlined in Section 16.12 and selecting the 10Mt per annum throughput. MRG assumed a nickel price of USD9.00/lb in a whittle open pit optimisation exercise to limit the material reported to that which MRG considers has reasonable prospects for eventual economic extraction and applied a cut-off grade of 0.05% Ni-AC representing the calculated marginal cut-off grade for the deposits.

The statement has been classified by Qualified Persons Lachlan Reynolds (MAusIMM) and Lauritz Barnes (MAusIMM) in accordance with the Guidelines of National Instrument 43-101 and accompanying documents 43-101.F1 and 43-101.CP. It has an effective date of 27<sup>th</sup> October, 2010.

Classification	Tonnes (Mt)	Ni Total	Ni-AC Total	Ni Total Kt	Ni-AC kt
Measured	-	-	-	-	-
Indicated	-	-	-	-	-
Inferred	185.7	0.176	0.104	327	193

Table 16.13-1: Mineral Resource Statement for Sundsberget.

Mineral resources that are not mineral reserves do not have demonstrated economic viability and MRG and Nickel Mountain are not aware of any factors (environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant factors) that have materially affected the Mineral Resource Estimate. The Sundsberget deposit is a greenfield site and therefore is not affected by any mining, metallurgical or infrastructure factors.

Figure 16.9-2 shows the Sundsberget Whittle pit shell generated using a nickel price of 9 US\$/lb and through the application of the parameters outlined in Section 16.12.

![](_page_53_Figure_6.jpeg)

Figure 16.13-1: Sundsberget Whittle pit shell with block model

## 16.14 Strip Ratio

The calculated waste to ore strip ratio from the Whittle optimisation is 0.78 with a total waste tonnage of 141 Mt.