

**SCOTTS HILL AND MT VULCAN PROJECT
TASMANIA
EL2/2017**

ANNUAL REPORT
15TH AUGUST 2019 TO 14TH AUGUST 2020

Tenement Holder/Manager
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Tasmania Energy Metals Pty Ltd

Note: All figures and grids are according to the GDA94 datum and MGA94 grid system.

ABSTRACT/EXECUTIVE SUMMARY

The main focus of Tasmania Energy Metals Pty Ltd (“TEM” or “the Company”) at the Scotts Hill and Mt Vulcan Project is lateritic nickel-cobalt mineralisation. TEM aims to develop an open pit mining operation at Scotts Hill and Mt Vulcan with production of nickel (Ni) and cobalt (Co) products undertaken off-site in Tasmania.

Work completed in the reporting year 2019-2020 was the estimation and release of the expanded JORC mineral resource estimate over the Scotts Hill–Mt Vulcan area, with favourable Ni and Co results. Additionally, metallurgical analysis was undertaken on samples obtained from the 2019 drilling program.

Work planned for the coming year will include further mineralogical and metallurgical analysis of samples obtained from the 2019 drilling program. This will complete the current stage of testwork. It is expected that a larger sample of ore will be needed for this work. Some further work is also planned to estimate a lower cut-off grade resource for the Scotts Hill and Mt Vulcan deposits. That will provide a resource covering potential feed into physical beneficiation. .

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Digital files submitted with this report:

Filename	File format
EL022017_202008_01_Report.doc	<i>doc</i>
EL022017_202008_02_Appendix_1.pdf	<i>pdf</i>

1 INTRODUCTION

The Scotts Hill and Mt Vulcan Project (EL2/2017) is located in northern Tasmania. The exploration licence covers an area of 13km² and contains a JORC 2012 inferred resource of 7.7Mt at 0.67% Ni and 0.047% Co (on a 0.5% Ni cut-off grade). The resource is made up of two interconnected resources known as the Mt Vulcan and Scott's Hill deposits (see Figure 1).

The Scotts Hill and Mt Vulcan Hill Project is located 5km west of the township of Beaconsfield near the Tamar River in northern Tasmania (see figure 1). The Scotts Hill and Mt Vulcan tenement can be accessed via a number of gazetted roads on the western side of the Tamar River. The Scotts Hill and Mt Vulcan resource can be directly accessed using Tattersall's Road, just west of Beaconsfield.

The exploration licence covers an area of 13km² and was granted on 15th August 2017 for a period of five years. It is owned 100% by Tasmania Energy Metals Pty Ltd, having been transferred from previous holder Monclar Pty Ltd. It is not subject to any current agreements with other companies. The exploration target is lateritic nickel-cobalt mineralisation that can act as feed for the proposed development of the adjacent Barnes Hill mine (on Lease 1872P/M) also held by TEM.

The land tenure plan shows EL2/2017 is covered by both Crown and Private Land. The Crown Land is variously classified. The private land only minorly impacts the Scotts Hill Ni-Co mineralisation to the east of the Tattersalls Road. Exploration and mining are permitted on Private Land but must be preceded by negotiation of an access and compensation agreement with the landowner. This agreement must be concluded in writing and lodged with Mineral Resources Tasmania (MRT). No exploration is currently proposed for private land.

Most of the Crown Land is classified either as Future Potential Production Forest (FPPF), Regional Reserve, and finally Conservation Area associated with the Dans Hill Conservation Area. The Scotts Hill mineralisation sits on FPPF, while Mt Vulcan sits on FPPF west of the Tattersalls Road and the Dans Hill Conservation area east of the Tattersalls Road.

Recent advances in leaching techniques and the availability in northeast Tasmania of grid power, roads, water, port facilities and a workforce make the Scotts Hill and Mt Vulcan Project attractive. The project comes with a clear development path focused on upgrading confidence in the current resource estimate and metallurgical testing of the ore to determine the most viable processing technique. It is considered that the joint development of the Scotts Hill and Mt Vulcan deposits with the nearby Barnes Hill deposits will give the project improved scale and greater commercial viability.

Exploration completed during the reporting period has included the estimation of a new mineral resource estimate and a program of metallurgical testwork.

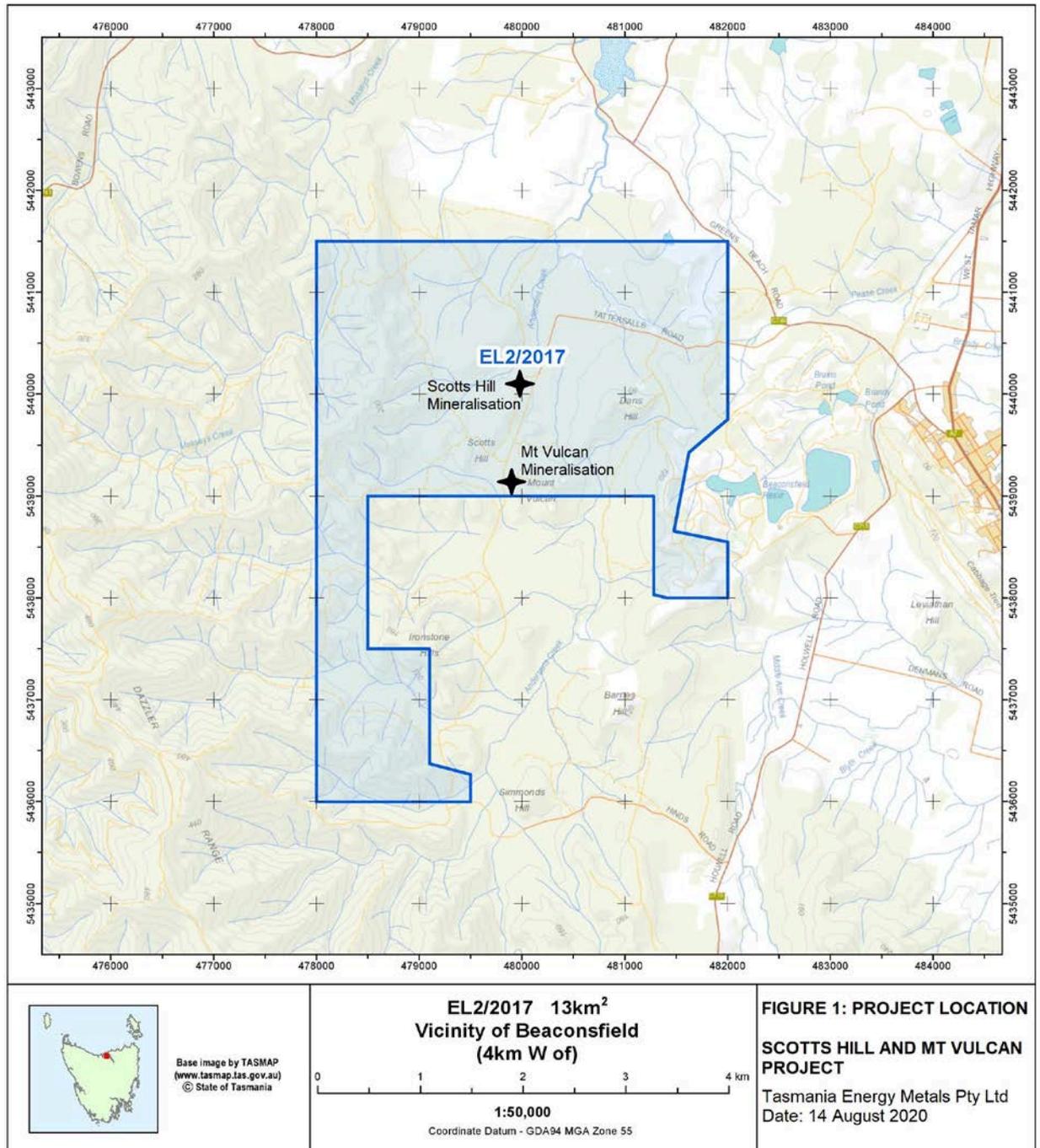


FIGURE 1 SUMMARY ACTIVITY MAP FOR SCOTTS HILL AND MT VULCAN

2 REVIEW OF PREVIOUS WORK AND GEOLOGICAL SETTING

Substantial exploration has been carried out over the last 50 years. A summary table below (Table 1) has been compiled by assessing old reports and specifically compilations made by Lindsay Newham (1997) and Dan Hampton (2012). King Island Scheelite (KIS), Allegiance Mining, Jervis Mining and Proto Resources & Investments Ltd completed most of the recent work on the Barnes Hill Ni-Co Laterite, including Scotts Hill and Mt Vulcan. This was followed by work by Monclar Pty Ltd on Scotts Hill and Mt Vulcan specifically.

Company	Start	Finish	Focus	Work Completed	Results	Conclusion	Report/EL
Monclar Pty Ltd	2017	2020	Ni, Co	Air core drilling of 20 holes at Scotts Hill and Mt Vulcan. Expanded mineral resource estimate for Scotts Hill and Mt Vulcan. Collection of metallurgical samples for leaching and filtration testwork.	New resource of 7.7Mt at 0.67% Ni and 0.047% Co (Scotts Hill and Mt Vulcan only)	Updated resource and metallurgical results suggest improved economic viability.	EL2/2017
Proto Resources and Investments Ltd	2008	2013	Ni, Co	Satellite imagery including ASTER and Quick-bird, air core drilling of Barnes hill part of license, metallurgical testwork, regional soil sampling, flora & fauna studies, and Aboriginal and European heritage surveys	Mining reserve issued over Barnes Hill part of EL then included in ML1872P/M	Financial pressure meant license was let to lapse in favour of neighbouring ML	EL17/2006
Jervois Mining	2001	2004	Ni, Co	Re-assaying, campsite sampling for met work	12.5 Mt at 1.07% NiEq (combined Ni,Co) (Scotts Hill, Mt Vulcan and Barnes Hill)	Budget pressure meant area dropped to focus on other projects	ETA 504
Allegiance	1996	2000	Ni, Co	Historical data compilation, Shallow drilling, Resource calculation environmental studies, metallurgical studies, 116 air core and 8 diamond holes		Low Ni prices and restricted tenement meant re focus on other projects	97_4013
CRA Exploration	1994	1995	NiS	Rock Chip surveys and IP survey	Rock chip sample 1.7% Ni in Serpentinite	not considered economic.	EL35/92
Placeco Australia	1988	1988	PGM, Au	Rock Chips composite sand samples	Failed to detect economic quantities of target minerals	No sampling of Laterite	EL 18/87
Northern Chromite	1969	1981	Cr	Cr production on western flank of Barnes Hill, drilling at Rifle Range south	660,000t at 12% Cr defined at Rifle Range and Barnes Hill	Mined Cr no Ni production	
Department of Mines	1979	1980	Cr	16 percussion holes, serpentinite clays intersected but not tested		Reconnaissance Cr drilling	
Allstate Exploration	1971	1972	Asb	15 Core holes and trenching	Top weathered section (Laterite not sampled)	No Ni Focus	
King Island Scheelite	1968	1969	Ni, Co, Cr	37 Holes, metallurgy test work resource calculation, environmental studies	6.014 long tonnes @1.04%Ni and 0.06% Co	sub economic in terms of size	69_544
BHP Minerals	1965	1967	Fe, Ni, Cu Zn, Mb, Cr, limestone	Stream sediment sampling, aero magnetic survey, Drilling, trenching, 99 - 3m deep pits	Drilling intersected magnetite bearing serpentinite	Sub economic mineral grades in all elements tested.	67_465
Consolidated Zinc	1957	1958	Ni	Series of auger samples at 100ft and 200ft intervals focused on previous work by Ben Lomond mining intervals resulting in	Intersected Ni grades between 1.2 to 1.8%	Didn't meet expected grade of 2.5%Ni considered economic at time.	58_0195
Ben Lomond Mining	1955	1956	Ni	Reconnaissance Sampling	Showed Ni rich clays developed on serpentinites more wide spread than known before	JV sort with Consolidated Zinc.	
Dept. of Mines	1929	1929	Ni	13 holes – location information sketchy	Difficulty in locating holes	Reconnaissance Ni laterite drilling	

TABLE 1 SUMMARY OF HISTORIC EXPLORATION ACTIVITIES

The most recent work on EL2/2017 included an Air Core drill program of 20 vertical holes and geochemical and metallurgical analysis of samples recovered. Drilling work was completed by Tasmanian Drilling Services Pty Ltd using a truck mounted Drillmac 500 air core rig. Significant intercepts of the 2019 drilling program presented in Table 2 below and are reported in Richard (2019). A subset of the larger sample was sent to Beijing, China for Metallurgical testing with the BGRIMM Technology Group (“BGRIMM”). BGRIMM is an ISO certified laboratory with known expertise in nickel leaching for metallurgical testwork. That work was completed in this tenement reporting year.

Hole ID	Max Depth	From_m	To_m	Width m	Co%	Fe2O3%	MgO%	Ni%
MV001	3.5	None significant						
MV002	12.1	3	10	7	0.02	33.14	11.37	0.63
MV003	8	1	7	6	0.11	33.55	7.92	0.92
MV004	23.4	0	7	7	0.07	20.29	20.38	0.88
MV005	25	5	7	2	0.08	44.13	10.39	0.64
MV006	29	0	3	3	0.11	37.26	3.80	0.85
SH001	9.1	1	6	5	0.04	20.78	20.00	0.80
SH002	20	9	11	2	0.06	32.64	19.83	0.79
SH003	9.1	3	9	6	0.05	26.53	18.21	0.76
SH004	20	5	9	4	0.03	19.14	23.76	0.58
SH005	20	1	13	12	0.04	20.10	26.31	0.79
SH006	23	1	10	9	0.05	28.02	23.97	0.65
SH007	29	13	23	10	0.05	29.32	8.14	0.84
SH012	28.7	6	26	20	0.05	30.55	17.62	0.77
SH013	24.7	8	21	13	0.12	40.65	11.10	0.94
SH014	26	12	26	14	0.05	26.74	21.73	0.94
SH015	15.4	9	15.4	6.4	0.08	19.56	15.65	1.13
SH016	16.5	None significant						
SH017	16.5	8	17	9	0.05	22.59	19.81	0.91
SH018	6	None significant						

TABLE 2 SIGNIFICANT INTERCEPTS FROM 2019 AIR CORE DRILLING

The Scotts Hill and Mt Vulcan tenement sits in the Badger Head region of northern Tasmania, an important structural location, considered to be the area in which the Tamar Fracture System separates the western and eastern Tasmanian terrains. The area has a complex nature, a result of thrusting during the Devonian and later normal faulting in the Jurassic and Tertiary. The Precambrian Badger Head Block possibly overlies younger units of the Cambrian Port Sorell Block. The Andersons Creek Ultramafic Complex (ACUC) is considered to be a thrust slice caught up in this deformation. The ACUC is a layered wedge of Cambrian mafic and ultramafic stratigraphy consisting mainly of serpentinite, pyroxenite and gabbro.

Further to the east Ordovician Cabbage Tree Formation is thrust over the ACUC, and further east again the Beaconsfield Gold field sits on the western side of the Tamar River. The Beaconsfield gold mineralisation has a similar nature to Victorian quartz reef gold systems.

A review of previous work and explanation of geological setting, as well as historical minerals resource and metallurgical testwork was presented in the 2017-2018 Annual report for EL 2/2017 (Richard, 2018) and may be used for reference.

3 EXPLORATION COMPLETED DURING THE REPORTING PERIOD

Estimation of an updated mineral resource estimate was undertaken in accordance with the 2012 JORC code. The new resource is based on verified data from previous programs, especially drilling undertaken by Allegiance Mining NL in 1997 and the 20 new holes drilled by Monclar Pty Ltd in 2019. The mineral resource was estimated by Snowden Mining Industry Consultants Pty Ltd (“Snowden”), and is presented in the table below.

Class	Domain	Tonnes (Mt)	Ni %	Co %	MgO %	Fe ₂ O ₃ %	SiO ₂ %	Al ₂ O ₃ %	MnO %
Inferred	Transitional	1.2	0.65	0.093	3.7	42.4	29.9	8.5	0.5
	Saprolite	3.0	0.76	0.052	12.0	29.8	38.7	5.7	0.4
	Saprock	3.5	0.61	0.025	26.6	15.7	42.8	2.7	0.2
Total		7.7	0.67	0.047	17.3	25.4	39.2	4.8	0.3

Note: Small discrepancies may occur due to rounding

TABLE 5 SCOTTS-VULCAN MINERAL RESOURCE ESTIMATE, MARCH 2020

The cut-off grade of 0.5% Ni is based on the pit optimisation results Snowden completed for the nearby Barnes Hill deposit in 2010 and is commensurate with similar deposits.

Metallurgical testwork was also undertaken to evaluate leaching extractions of Ni and Co. Recognising the higher proportion (>80%) of Mg-rich saprolite/saprock in the new resource, a low-pressure acid leach was selected as being preferred over HPAL. This reflected the higher Mg content, which would not benefit from HPAL treatment as do projects where high-Fe limonite ore dominates. The testwork included sulphuric acid leaching of Ni and Co under a range of heat conditions to evaluate the potential of alternate leaching arrangements.

The work had been planned to commence using samples drawn by augur, but these samples were not representative of resource grades reported in the earlier 2001 resource, and were abandoned. Instead, the program was undertaken using samples composed from material collected during the 2019 drilling.

The aim of the program was to confirm that Scotts-Vulcan ore would perform similarly to Barnes Hill ore, and also to test improved operating conditions. For the testwork, TEM selected a purposive sample of 90 metre intersections from the 2019 air-core drilling. The samples were checked for representativeness against the Barnes Hill new mineral resource estimate. Following this, the entire bag of these 90 drilled intersections (excluding the speared laboratory sample of an average of 378g), was sent to the Beijing General Research Institute of Mining & Metallurgy (BGRIMM). 518.5kg was received by BGRIMM, with an average sample weight of 5.76kg. The testwork applied sequential leaching with varied blends of feed ore. In the first stage a blend of limonite/saprolite was processed with a high dosage of acid (950kg/t ore) at a leaching temperature of 95degC. This was followed a further stage of leaching of saprolite feed in an autoclave, where no additional acid was added but the temperature was raised to 160-170degC. A screened large-sized fraction from the saprock domain was then used for a neutralisation stage. This was ground and used in a tertiary leach to commence neutralisation, with no additional acid added and operating at temperatures of 70-90degC.

4 DISCUSSION OF RESULTS

The results met expectations and have suggested a processing pathway for the development of the project. The main results are discussed in this section.

4.1 Scotts Hill and Mt Vulcan Mineral Resource Estimate

The Mineral Resource Estimate was classified and reported by Snowden in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012). A block model was compiled using a parent block size of 50 mE by 50 mN by 1 mRL, based on the nominal drillhole spacing along with consideration of the geometry of the mineralisation and variogram models.

The new resource was based on drilling data from Allegiance Mining (1997) and Monclar Pty Ltd (2019). QAQC for the historical data, which comprised inclusion of reference materials and field duplicates at a rate of approximately 1:50, was assessed by Snowden in 2010 for the Barnes Hill resource model. The drilling at Scotts-Vulcan was conducted concurrently with the drilling at Barnes Hill using the same QAQC protocols. Overall, the CRM results show acceptable analytical accuracy was achieved for the 1997 assaying with no significant bias identified and the duplicate data was deemed to be within acceptable variance limits. For the 2019 drilling, CRMs and field duplicates were inserted into the sample batches with an insertion rate of approximately 1:40 for each of the CRMs and duplicates. As part of the resource estimate, control charts for Ni showed that there is no analytical bias and a high level of analytical accuracy has been achieved. In Snowden's opinion the field duplicates from the 2019 drilling generally showed reasonable precision, although there appears to be an issue with the duplicates in holes SH004 and SH006, which show significant differences in MgO, Fe₂O₃ and SiO₂. Additionally, a batch of 36 sample pulps was sent to the SGS laboratory in Perth for check assaying, with the SGS check assays comparing closely to the ALS primary assays, with typical differences of 1–2%.

A topographic surface was provided by TEM, based on a light detection and ranging (LiDAR) derived 5 m digital elevation model of the northwest region of Tasmania completed by Geoscience Australia in 2013. The LiDAR has a reported 0.15 m vertical and horizontal accuracy.

In situ dry bulk density values were assigned to each block based on the domain code. As no density samples have been collected at Scotts-Vulcan and given the similar geology to Barnes Hills, the values were applied as per the Barnes Hill Mineral Resource estimate for that adjacent deposit which is interpreted to have formed at the same time and under similar conditions to Scotts Hill and Mt Vulcan.

Snowden estimated Ni, Co, Al₂O₃, Fe₂O₃, MgO, MnO and SiO₂ using ordinary block kriging (parent cell estimates) using Datamine Studio RM software. All domain boundaries were treated as hard boundaries for estimation purposes, with only assays from within each wireframe/domain used to estimate blocks within that domain. Dynamic anisotropy was used to locally adjust the orientation of the search ellipse and variogram models due to variations in the dip and strike of the domains.

The block grade estimates were validated using:

- Visual comparison of the block grade estimates and the input drillhole composites.
- Global comparison of the average composite (naïve and de-clustered) and estimated block grades.
- Grade trend plots (also known as swath plots) analysis of the block grades and the input drillhole composites with respect to the de-clustered means.
- Comparison of correlations in the input data and block estimates.

The Mineral Resource was classified in its entirety as an Inferred Resource. The classification was developed based on an assessment of the following criteria: nature and quality of the drilling and sampling methods; drill spacing; uncertainty in the collar coordinates of historical holes due to grid transformations; confidence in the understanding of the underlying geological and grade continuity; analysis of the QAQC data; confidence in the estimate of the mineralised volume; results of the model validation; and the quantity of bulk density data.

Snowden found that there were reasonable prospects for eventual economic extraction of the resource based on pit optimisations carried out by Snowden for the nearby Barnes Hill deposit, which has similar geological and chemical characteristics to Scotts-Vulcan (Snowden, 2010). On that basis, a cut-off grade of 0.5% Ni was selected, which is commensurate with similar deposits. Snowden found that cut-off grade to be reasonable assuming a standard open-pit mining approach with low to moderate selectivity.

4.2 Scotts Hill and Mt Vulcan Metallurgy

Pre-feasibility study level testwork in ongoing. This report provides preliminary results which will form part of a formal report to be issued at the end of the current program of testwork.

Central findings of the testwork conducted so far have included key processing parameters such as the required residence time and associated acid consumption. During the reporting period, 60 leaching tests were conducted, detailed analysis of the experimental outputs were taken at 154 time points across combinations of experimental conditions. This allowed measurement of extraction of all major elements (Al, Co, Fe, Mg, Mn and Ni) on the basis of the original ore and solid residue content. The optimal leaching conditions were found to be as below:

	Primary	Secondary
Feed slurry (% solids)	30	30
Acid addition (t acid/t prim ore)	0.95	-
Acid utilisation (t acid/t Ni leached)	132	84
Temperature	95	160
Reaction Time (hrs)	6	2
Feed particle size (%-75 micron)	45 and 85	85

These conditions are distinct from atmospheric leaching approaches (that run at 20-30 °C for heap leaching or 80 °C for ATL) and HPAL (~250 °C). It confirmed theorised differences across leaching stages, with the first leach stage and second leach stage being optimised at very different temperatures (95 °C vs. 160 °C). Extraction of major elements are presented as below and surpassed the >90% extraction target:

	Primary	Secondary
Overall Extraction (Tertiary = Ore)		
% Ni	93.64	91.31
% Co	95.66	92.89
% Fe	68.31	13.19
% Mg	89.06	92.21

Results under these conditions supported the ability to achieve overall Nickel and Cobalt extraction of over 90% the leaching stages with an acid consumption of 509kg/t feed ore. Additionally, the leach residues presented only minor remaining contaminants which would allow dry-stacking into mining voids. These were:

	Primary	Secondary
Residue grade		
% Ni	0.091	0.096
% Co	0.006	0.006
% Fe	13.247	23.493
% Mg	1.017	0.793
Residue solids mass remaining (%)	53.710	71.393
Residue solids mass remaining (%) Si	52.652	68.814
PLS Fe:Ni ratio		2.79
Test reference number	HCY-5, 27, 29, 34, 35	HJY-33, 34, 35

5 CONCLUSIONS

The expanded resource and metallurgical assessment has been favourable and provide encouragement for further development of the Scotts Hill–Mt Vulcan resource. Further testwork is needed to compare processing approaches and finalise the proposed flowsheet. This will likely involve some larger scale samples. There is then a need to commence feasibility studies, which will also require bringing a sufficient part of the resource into indicated or measured status, in order to allow a mine reserve to also be estimated.

6 PROPOSED EXPLORATION

The activities proposed to be undertaken at the Scotts Hill and Mt Vulcan Project on EL2/2017 in the coming term include:

- Completion of the current program of metallurgical testwork leading to the issuance of the formal report on the testwork program completed so far.
- Metallurgical testwork to further evaluate the mineral processing approach best suited to the Scotts-Vulcan ore. This will include physical beneficiation (screening, gravity and magnetic separation) as well as mineralogical analysis. The expectation is that these studies may suggest that a larger proportion of the ore (i.e., down to a lower cut-off grade) is suitable for mining. It is expected that a larger bulk sample will be needed to facilitate this testwork.
- This would be followed by estimation of further lower cut-off grade mineral resource estimate in accordance with the 2012 JORC code.

7 ENVIRONMENTAL MANAGEMENT

No further ground work was undertaken in this reporting period. The 2019 drilling was conducted using existing tracks. As reported previously, those air core holes were plugged below surface using ‘octo plugs’, and drill holes were covered following surveying of collar locations.

The site was visited several times during the period in the course of ongoing water monitoring and in preparation for environmental studies. No new environmental or rehabilitation concerns were reported.

8 EXPENDITURE

Expenditure from 15th August 2019 to 14th August 2020 is summarised below for the Scotts Hill and Mt Vulcan EL2/2017 licence.

TABLE 2 EXPENDITURE 15 AUGUST 2019 TO 14 AUGUST 2020.

1. Geoscience	\$6,873.84
2. Drilling and Gridding	\$0
3. Land Access	\$0
4. Rehabilitation	\$0
5. Feasibility Studies	\$92,880.27
6. Other	\$0
7. Administration	\$7,103.02
TOTAL - ELIGIBLE	\$106,857.12

9 KEY REFERENCES

Jannink, A (2006) JORC Indicated category confirmation letter for Barnes Hill, Scotts and Mt Vulcan Resources EL 18/2006 Beaconsfield, Tasmania. Douglas McKenna and Partners Pty Ltd (Author A Jannink), (12 December 2006)

Richard, P (2018) EL2/2017 Annual Report 15th August 2017 to 14th August 2018. Scotts Hill and Mt Vulcan Project. Available from Mineral Resources Tasmania.

Richard, P (2019) EL2/2017 Annual Report 15th August 2018 to 14th August 2019. Scotts Hill and Mt Vulcan Project. Available from Mineral Resources Tasmania.

Appendix 1
MINERAL RESOURCE ESTIMATE