ASX Announcement

Cobalt added to Vanadium at Gabanintha

Potential by-product containing key battery metals cobalt, nickel and copper demonstrated in metallurgical test work

Australian VANADIUM LIMITED

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ASX ANNOUNCEMENT

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Projects:

Gabanintha – Vanadium
Blesberg,South Africa – Lithium/Tantalum/Feldspar
Nowthanna Hill – Uranium/Vanadium
Coates – Vanadium

Highlights:

- **Cobalt, Nickel and Copper in a sulphide concentrate recovered from non-magnetic stream in bench-scale tests on fresh high-grade massive magnetite at Gabanintha.**
- **Sulphide concentrates produced from flotation containing 3.8 to 6.3% of base metals including 1.54 to 2.02% Cobalt, 1.36 to 2.58% Nickel and 0.82 to 1.70% Copper.**
- **Sulphide recovery circuit to be evaluated as part of the PFS processing flowsheet.**
- **Cobalt is a critical metal at long term high-prices due to extreme battery demand with ethical supplies highly sought after.**
- **Sale of a byproduct Cobalt, Nickel and Copper sulphide concentrate has potential to increase revenue at Gabanintha.**
- **Resource estimate on base metals currently being conducted.**
- **New drilling and further test work to be undertaken to fully evaluate this unique opportunity.**

Australian Vanadium Limited (ASX: AVL, "the Company" or "AVL") has confirmed the sucessful recovery of cobalt, nickel and copper in a sulphide concentrate at Gabanintha, adding another saleable battery metal opportunity to the Company's flagship vanadium project. The Company had previously reported significant cobalt assays from drilling in fresh rock containing vanadium in magnetite (refer to ASX announcement dated 31st March 2017).

Cobalt pricing is currently at all-time highs due to its position as a strategic battery metal. The increasing demand for cobalt, as well as the demand from consumers for ethically sourced cobalt, has contributed to a price rise to over US$90,500[1] per metric tonne.

[1] According to London Metal Exchange (LME) spot rate as at 18th May 2018

The Company has successfully extracted sulphide concentrate containing up to 6.3% base metals (cobalt, nickel and copper) from the non-magnetic tail produced when preparing the magnetic vanadium concentrate (See Figure 1).

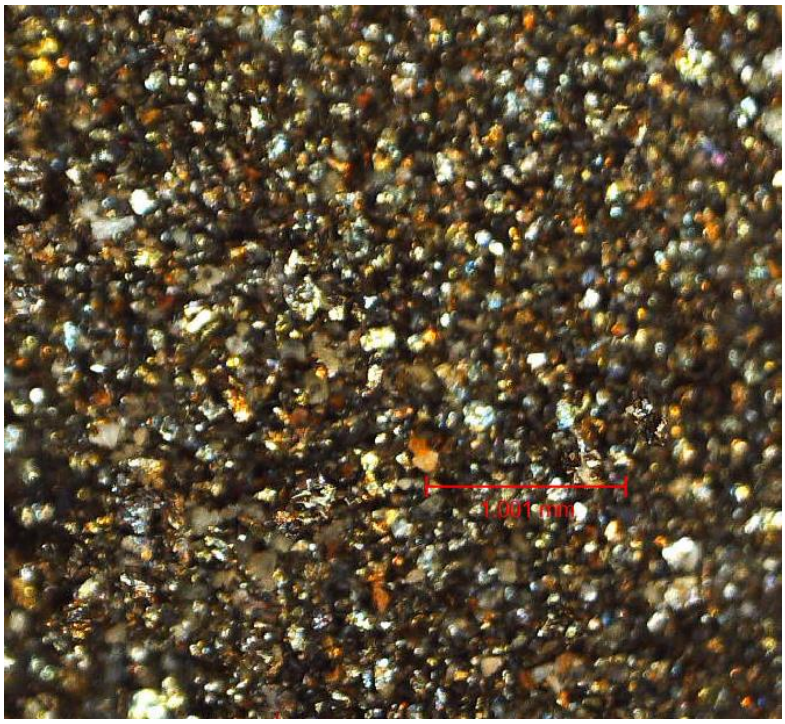

Figure 1. Microscope image of sulphide flotation concentrate containing 4% cobalt, nickel and copper combined. Scale bar is 1 mm

Potential Additional Revenue Stream

Managing Director, Vincent Algar commented on the new findings, “Since we initially identified this opportunity, we have been interested in its implications for the project. Adding a high-value battery focused metal to the product suite at Gabanintha could potentially prove an important revenue stream, further enabling AVL’s Gabanintha project to be on the lowest end of the vanadium cost curve. A preliminary design and costing for a sulphide recovery circuit has been added to the PFS scope in light of these results.”

The Company is currently preparing a mineral resource update, which will include sulphur and base metals, allowing these components to be included in the pit-optimisation and PFS studies currently underway. The Company plans to engage with potential Australian and offshore buyers to discuss indicative terms for the sale of a sulphide concentrate.

The current all-time high cobalt price of US$90,500 per tonne and the recovery parameters indicated by the work, have added support for additional drilling to expand the vanadium resource and better define the sulphide byproduct potential.

Bryah Resources Limited holds the rights to any nickel, copper and gold recovered from any production, however AVL will benefit from this development in processing due to its 14% holding in Bryah (ASX: BYH).

Cobalt, Nickel and Copper in Sulphide Minerals

Following a review of drilling results reported in March 2017, AVL's geologists and engineers have seized the opportunity presented by the presence of sulphide in the silicate phase of the layered mafic intrusion at Gabanintha. Cobalt, nickel and copper are found primarily in a sulphide component in layers containing vanadiferous, titaniferous magnetite. The sulphides are preferentially located in the interstitial silicate minerals of the magnetite rich layers (See Figures 2 and 3).

Sulphides are only observed in fresh rock, and have a higher abundance overall in the main zone of economic interest at Gabanintha, being the basal massive magnetite horizon.

During metallurgical test work conducted in 2015, a significant upgrade in sulphur (S), cobalt (Co), nickel (Ni) and copper (Cu) was observed in the non-magnetic tail stream when fresh rock was subjected to Low Intensity Magnetic Separation (LIMS).

The presence of a sulphide phase is commonly associated with layered mafic intrusions such as Gabanintha and the rocks of the Bushveld Igneous Complex. The Bushveld complex is the single largest repository of platinum group metals ever discovered. These occur as a sulphide phase in the Merensky pegmatoidal pyroxenite and the UG2 Chromitite of the Bushveld complex.

Sulphides are also reported in the main zone Magnetites and Magnetite Gabbros of the Bushveld complex and in many other layered intrusions. Drilling results and the current test-work indicate that the Gabanintha Project contains a recoverable sulphide phase in association with the vanadium rich massive iron mineralisation that could extend over the Company's 11km of tenure.

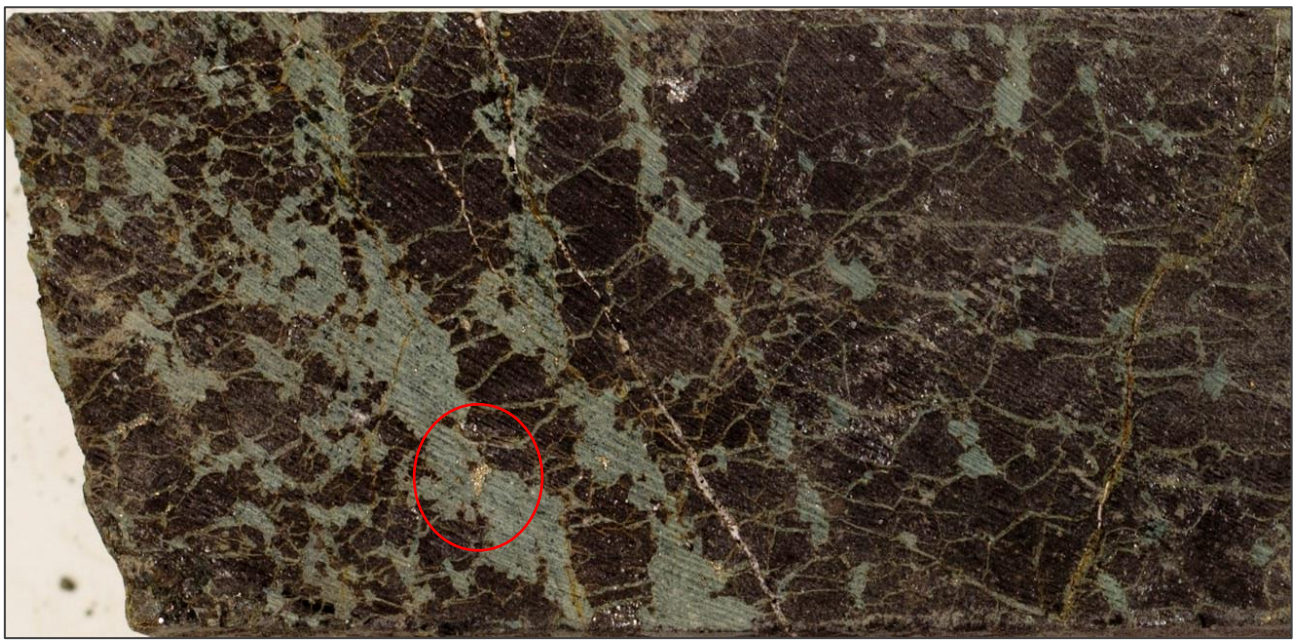

Figure 2. Sulphide minerals preferentially located in silicates (light coloured areas) within massive magnetite (dark coloured areas). Image shows 15cm along core GHD914 (horizonal length of photo) with the sulphide particle circled, located 121.2m down hole.

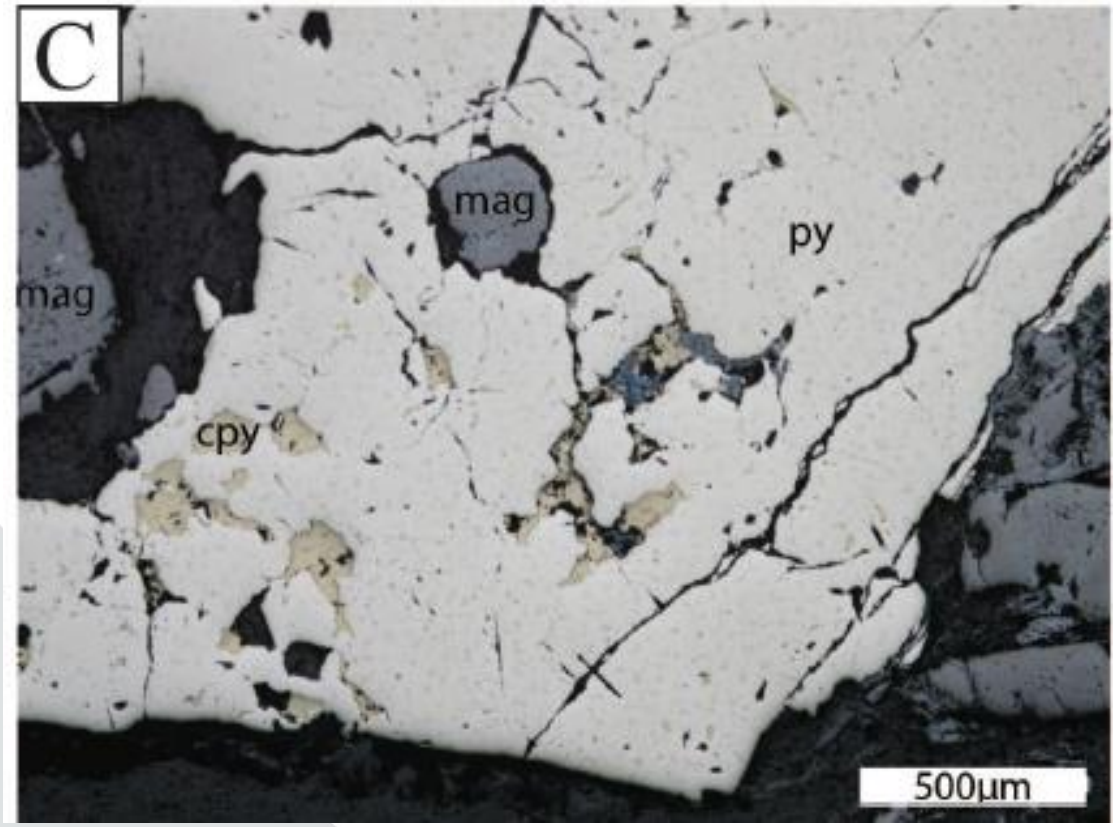

Figure 3. Polished thin section image under reflected light showing chalcopyrite (cpy) and pyrite (py) sulphide minerals. GHD914, 121.2m.

LIMS separation of Magnetite and Sulphide Recovery

The Company has carried out metallurgical testwork on three high-vanadium grade magnetite samples for the recovery of both a magnetic concentrate and a sulphide concentrate. Sample 2 Fresh (Fr) (25kg) and sample 7 Fresh (Fr) (25kg) and a Bulk-composite (90kg containing equal parts of samples 1 Fr, 3 Fr, 4 Fr, 5 Fr, 6 Fr, 7 Fr, 8 Fr, 9 Fr and 10 Fr) were used in the evaluation.

Each sample was ground to P_{80} 106 µm and underwent wet magnetic separation using a low intensity (1500 Gauss) magnetic separation drum. The non-magnetic stream was dried, subsplit and provided feed for bench-scale sulphide flotation testwork.

Table 1 compares magnetic separation and flotation test data for the three samples. The flotation concentrate chemistry presented represents analysis of the first rougher or cleaner concentrate in open circuit testwork and so provides an indication of the potential chemistry of a sulphide concentrate.

Table 1: Sulphide Recovery Testwork - Magnetic separation and flotation test data

	Sample		
	2 Fr	**7 Fr**	**Bulk Composite**
Feed Grades[1]			
V_2O_5 %	1.34	1.23	1.09
S %	0.19	0.23	0.17
Co ppm	240	260	210
Ni ppm	940	1020	740
Cu ppm	230	280	180
Magnetic Stream V_2O_5 Grade (%)	1.44	1.37	1.36
Non Magnetic Stream Mass Recovery (%)	10.2	12.5	25.7
Non Magnetic Stream Grades[1] (%)			
S	1.63	1.58	0.68
Co	0.13	0.13	0.05
Ni	0.18	0.21	0.09
Cu	0.07	0.10	0.04
Flotation test reference	*2 Fr 4113/2*	*7 Fr 4113/3*	*BC 4113/2*
Flotation Concentrate 1 Grades (%)			
S	26.5	31.0	31.5
Co	1.71	2.02	1.54
Ni	1.61	2.58	1.36
Cu	0.82	1.70	0.94
Total Base Metals in Cleaner Concentrate 1 (%)	4.14	6.30	3.84

[1] Feed and non magnetic stream grades are calculated based on measurements of the downstream product streams

A summary of the key findings from the sulphide recovery testwork are outlined below;

- The flotation results demonstrate the potential to generate a sulphide concentrate containing 4 to 6% combined colbalt, nickel and copper from massive magnetite material proposed as feed to the Gabanintha vanadium recovery process.
- Preliminary mineralogy work indicates the cobalt in the flotation concentrate is hosted in solid solution in pyrite (Co)FeS_2 and in the cobalt nickel mineral, Siegenite ($CoNi_2S_4$).
- There is reasonable potential to further improve the concentrate quality in the samples tested as with other fresh massive iron mineralisation with high cobalt grade in the non-magnetic fraction.

Cobalt in drilling

Cobalt has been found in the layered mafic igneous sequence (Lady Alma Igneous Complex) at Gabanintha, distributed within the magnetite rich layers which form the bulk of the vanadium resource. The cobalt is present in a non-magnetic sulphide component present in the silicate phase within the fresh magnetite and magnetite gabbro domains.

The review of drilling and metallurgical testwork data identified the following key information (refer to ASX announcement dated 31st March 2017):

- The resource database contains 10,979 x 1m cobalt assay results (RC and diamond) from previous drilling (see Figure 4 which illustrates the location of plus 500 ppm cobalt intervals in the main resource area).
- Of these, 1,270 x 1m samples from 99 separate drillholes assayed over 200ppm Co with an average of 275ppm Co.
- 14 drillholes had intercepts averaging over 5,000 grade metres (ppm x m) of cobalt with the largest down hole interval being 61 metres at 239ppm Co in GDH903 from 154m to 215m (14,590 grade metres).
- 26 separate drillholes report intersections above 500ppm Co, at an average of 537ppm Co.
- Maximum assay of 0.18% (1,828ppm) Co recorded in GRC102 (42m-43m).
- Wide intersections of up to 61m at 239ppm Co from 154m to 215m in GDH 903.
- A close association of cobalt exists with the vanadium rich magnetite horizons and the footwall rocks below the main magnetite horizon.
- Cobalt and sulphur appears to be mostly absent from the oxidised material, providing an excellent proxy for the base of oxidation.

Future Cobalt Investigation

AVL has developed significant Intellectual Property (IP) in the process of extracting and understanding the cobalt-opportunity at Gabanintha.

Further flotation optimisation tests will be undertaken on the bulk composite reserve and future drilling is being designed to target sufficient sample mass to optimise a sulphide recovery flowsheet, improve concentrate quality and detemine an overall base metal recovery.

AVL recognises the importance of the opportunity and that further work is required to fully evaluate and integrate the potential addition of these valuable cobalt, nickel and copper credits to the developing vanadium project at Gabanintha.

The current results and follow up test results will be used to engage with potential Australian and offshore buyers to discuss indicative terms for the sale of a sulphide concentrate.

For further information, please contact:

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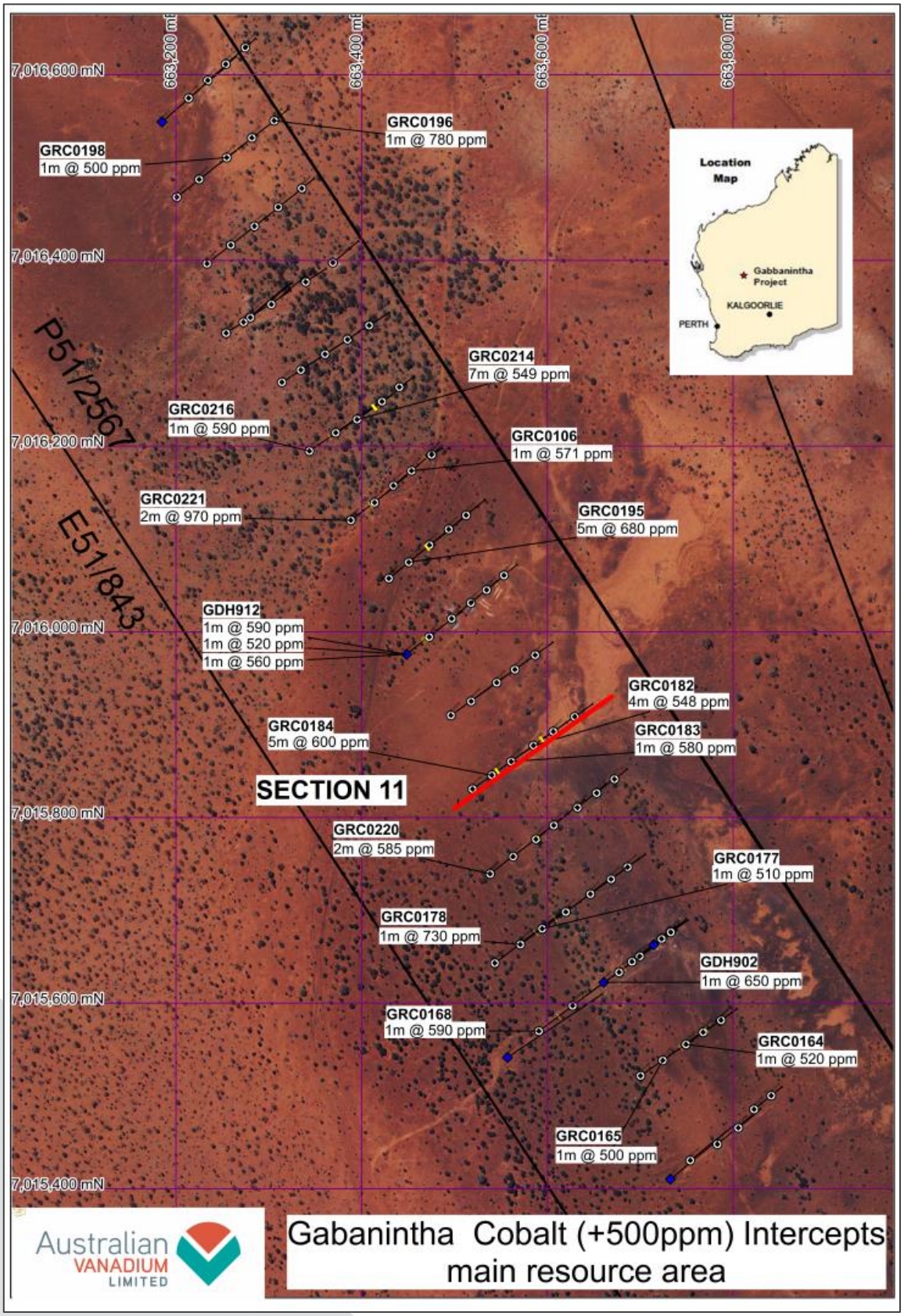

Figure 4: Location of +500ppm Co drill intercepts within the main Gabanintha resource area

Competent Person Statement — Mineral Resource Estimation

The information in this report that relates to Mineral Resources is based on and fairly represents information compiled by Mr Lauritz Barnes, (Consultant with Trepanier Pty Ltd) and Mr Brian Davis (Consultant with Geologica Pty Ltd). Mr Davis is a shareholder of Australian Vanadium Limited. Mr Barnes is a member of the Australasian Institute of Mining and Metallurgy and Mr Davis is a member of the Australian Institute of Geoscientists and both have sufficient experience of relevance to the styles of mineralisation and types of deposits under consideration, and to the activities undertaken to qualify as Competent Persons as defined in the 2012 Edition of the Joint Ore Reserves Committee (JORC) Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Specifically, Mr Barnes is the Competent Person for the estimation and Mr Davis is the Competent Person for the database, geological model and site visits. Mr Barnes and Mr Davis consent to the inclusion in this report of the matters based on their information in the form and context in which they appear.

Competent Person Statement – Metallurgical Results

The information in this statement that relates to Metallurgical Results is based on information compiled by independent consulting metallurgist Brian McNab (CP. B.Sc Extractive Metallurgy), Mr McNab is a Member of The Australasian Institute of Mining and Metallurgy. Brian McNab is employed by Wood Mining and Metals. Mr McNab has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which is undertaken, to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'.

Mr McNab consents to the inclusion in the report of the matters based on the information made available to him, in the form and context in which it appears.

The information is extracted from the report entitled "Significant vanadium resource upgrade at Gabanintha" released to ASX on 5 September 2017 and is available on the company website at www.australianvanadium.com.au.

The company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of estimates of Mineral Resource or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The company confirms that the form and context in which the competent person's findings are presented has not been materially modified from the original market announcement.

Appendix 1: Australian Vanadium Limited Gabanintha Project Metallurgical Results JORC 2012 Table 1

The following is provided to ensure compliance with the JORC (2012) requirements for the reporting of exploration results:

Section 1: Sampling Techniques and Data

Criteria	JORC Code Explanation	Commentary
Sampling techniques	Nature and quality of sampling (e.g. cut channels, random chips, or specific specialized 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.	The Gabanintha deposit was sampled using diamond core and reverse circulation (RC) percussion drilling from surface. A total of 233 RC holes and 17 diamond holes (3 of which are diamond tails) were drilled into the deposit. 68 of the 250 holes were either too far north or east of the main mineralisation trend, or excised due to being on another tenancy. One section in the southern part of the deposit (holes GRC0156, GRC0074, GRC0037 and GRC0038) was blocked out and excluded from the resource due to what appeared to be an intrusion which affected the mineralised zones in this area. Of the remaining 182 drillholes, one had geological logging but no assays. The total metres of drilling available for use in the interpretation and grade estimation were 16,287m at the date of the resource estimate. The initial 17 RC drillholes were drilled by Intermin Resources NL (IRC) in 1998. These holes were not used in the 2015 and 2017 estimates due to very long unequal sample lengths and a different grade profile from subsequent drilling. 31 RC drillholes were drilled by Greater Pacific NL in 2000 and the remaining holes for the project were drilled by AVL, Australian Vanadium Ltd (Previously YRR) between 2007 and 2015. This drilling includes 17 diamond holes (3 of which are diamond tails) and 57 RC holes, for a total of 17,144m drilled. All of the drilling sampled both high and low-grade material and were sampled for assaying of a typical Iron Ore suite, including Vanadium and Titanium.

Criteria	JORC Code Explanation	Commentary
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	For the most recent drilling, in 2015, the drillhole collars were originally set out using hand held GPS and on completion the collars were surveyed by survey contractors using high precision digital GPS. The earlier drilling programmes were retrospectively surveyed using DGPS using the remaining collar PVC pipe positions. Only a few of the very earliest drilled holes (1998) were not able to have their collars accurately surveyed, as they had been rehabilitated and their position was not completely clear. Downhole surveys were completed for all of the diamond holes, using gyro surveying equipment, as well as the RC holes drilled in 2015 (from GRC0159). All of the other RC holes were given a nominal -60° dip measurement. These older RC holes were almost all 120m or less in depth. Diamond core was quarter-core sampled at regular intervals (usually one metre) and constrained to geological boundaries where appropriate. Most of the RC drilling was sampled at one metre intervals, apart from the very earliest programme in 1998.
	Aspects of the determination of mineralisation that are Material to the Public Report.	RC drilling samples were collected at one metre intervals and passed through a cone splitter to obtain a nominal 2-5kg sample at an approximate 10% split ratio. These split samples were collected in pre-numbered calico sample bags. The sample was dried, crushed and pulverised to produce a sub sample (~200g) for laboratory analysis using XRF and total LOI by thermo-gravimetric analysis. Diamond core was drilled predominantly at HQ size for the earlier drilling (2009), with the 2015 drilling at PQ3 size. Field duplicates, standards and blanks have been inserted into the sampling stream at a rate of nominally 1:25 for blanks, 1:11 for standards (including internal laboratory), 1:10 for field duplicates, 1:9 for lab checks and 1:74 for umpire assays.
Drilling techniques	Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. 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.).	Diamond drillholes account for 12% of the drill metres and comprises HQ and PQ3 sized core. RC drilling (generally 135 mm to 140 mm face-sampling hammer) accounts for the remaining 88% of the drilled metres. Three of the diamond holes have RC pre-collars (GDH911, GDH913 & GDH916), otherwise all holes are drilled from surface. No core orientation data has been recorded in the database.

Criteria	JORC Code Explanation	Commentary
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	Diamond core recovery is measured when the core is recovered from the drill string. The length of core in the tray is compared with the expected drilled length and is recorded in the database. For the recent (2015) drilling, RC chip sample recovery was gauged by how much of the sample was returned from the cone splitter. This was recorded as good, fair, poor or no sample. The older drilling programmes used a different splitter, but still compared and recorded how much sample was returned for the drilled intervals. All of the RC sample bags (non-split portion) from the 2015 programme were weighed as an additional check on recovery. An experienced AVL geologist was present during drilling and any issues noticed were immediately rectified. No significant sample recovery issues were encountered in the RC drilling.
	Measures taken to maximize sample recovery and ensure representative nature of the samples.	Core depths are checked against the depth given on the core blocks and rod counts are routinely carried out by the drillers. Recovered core was measured and compared against driller's blocks. RC chip samples were actively monitored by the geologist whilst drilling. All drillholes were collared with PVC pipe for the first metre or two, to ensure the hole stayed open and clean from debris.

Criteria	JORC Code Explanation	Commentary
	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.	No relationship between sample recovery and grade has been demonstrated. Two shallow diamond drillholes were drilled to twin RC have been completed to assess sample bias due to preferential loss/gain of fine/coarse material. Geologica Pty Ltd is satisfied that the RC holes have taken a sufficiently representative sample of the mineralisation and minimal loss of fines has occurred in the RC drilling resulting in minimal sample bias.
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.	All diamond core and RC chips were logged. Diamond core was geologically logged using predefined lithological, mineralogical and physical characteristics (such as colour, weathering, fabric, texture) logging codes and the logged intervals were based on lithological intervals. RQD and recoveries were also recorded. Minimal structural measurements were recorded (bedding to core angle measurements) but have not yet been saved to the database. The logging was completed on site by the responsible geologist. All the drilling was logged onto paper and transferred to a SQL Server drillhole database using DataShed™ database management software. The database is managed by Mitchell River Group (MRG). The data was checked for accuracy when transferred to ensure that correct information was recorded. Any discrepancies were referred back to field personnel for checking and editing. All core trays were photographed wet and dry. RC chips were logged generally on metre intervals, with the abundance/proportions of specific minerals, material types, lithologies, weathering and colour recorded. Physical hardness for RC holes is estimated by chip recovery and properties (friability, angularity) and in diamond holes by scratch testing. The recent drilling also had magnetic susceptibility recorded, with the first nine diamond holes (GDH901-GDH909) having readings taken on the core every 30 cm or so downhole. Holes GDH910 to GDH917 had readings every 50 cm and RC holes GRC0159 to GRC0221 had readings for every one metre green bag. All of the diamond core and RC samples have been logged to a level of detail to support Mineral Resource estimation and classification to Measured Mineral Resource at best.

	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging was both qualitative and quantitative in nature, with general lithology information recorded as qualitative and most mineralisation records and geotechnical records being quantitative. Core photos were collected for all diamond drilling.
	The total length and percentage of the relevant intersections logged.	All recovered intervals were geologically logged.

Criteria	JORC Code Explanation	Commentary
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	Diamond core was cut in half and then the right-hand side of the core (facing downhole) was halved again using a powered core saw. Quarter core samples were sent to the laboratories for assaying. Sample intervals were marked on the core by the responsible geologist considering lithological and structural features. No core was selected for duplicate analysis.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC drilling was sampled by use of an automatic cone splitter for the 2015 drilling programme; drilling was generally dry with a few damp samples. Older drilling programmes employed riffle splitters to produce the required sample splits for assaying. One in 40 RC samples was resampled as field duplicates for QAQC assaying.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	The sample preparation techniques employed for the diamond core samples follow standard industry best practice. All samples were crushed by jaw and Boyd crushers and split if required to produce a standardised ~3kg sample for pulverising. The 2015 programme RC chips were split to produce the same sized sample. All samples were pulverised to a nominal 90% passing 75 micron mesh and sub sampled for assaying and LOI determination tests. The remaining pulps are stored at an AVL facility. The sample preparation techniques are of industry standard and are appropriate for the sample types and proposed assaying methods.
	Quality control procedures adopted for all sub-sampling stages to maximize representivity of samples.	Field duplicates, standards and blanks have been inserted into the sampling stream at a rate of nominally 1:25 for blanks, 1:11 for standards (including internal laboratory), 1:10 for field duplicates, 1:9 for lab checks and 1:74 for umpire assays. For the recent sampling at BV, 1 in 20 samples were tested to check for pulp grind size.

	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.	To ensure the samples collected are representative of the in-situ material, a 140mm RC hammer was used to collect one metre samples and either HQ or PQ3 sized core was taken from the diamond holes. Given that the mineralisation at Gabanintha is either massive or disseminated magnetite/martite hosted vanadium, which shows good consistency in interpretation between sections and occurs as percentage values in the samples, Geologica Pty Ltd considers the sample sizes to be representative. Core is not split for duplicates, but RC samples are split at the collection stage to get representative (2-3kg) duplicate samples. The entire core sample and all the RC chips are crushed and /or mixed before splitting to smaller sub-samples for assaying.

Criteria	JORC Code Explanation	Commentary
	Whether sample sizes are appropriate to the grain size of the material being sampled.	As the variables being tested occur as moderate to high percentage values and generally have very low variances (apart from Cr_2O_3), the chosen sample sizes are deemed appropriate.
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.	All samples for Gabanintha were assayed for the full iron ore suite by XRF (24 elements) and for total LOI by thermo-gravimetric technique. The method used is designed to measure the total amount of each element in the sample. Although the laboratories changed over time for different drilling programmes, the laboratory procedures all appear to be in line with industry standards and appropriate for iron ore deposits, and the commercial laboratories have been industry recognized and certified Samples are dried at 105^{O}C in gas fired ovens for 18-24 hours before RC samples being split 50:50. One portion is retained for future testing, while the other is then crushed and pulverised. Sub-samples are collected to produce a 66g sample that is used to produce a fused bead for XRF based analysing and reporting. Certified and non-certified Reference Material standards, field duplicates and umpire laboratory analysis are used for quality control. The standards inserted by AVL were designed to test the V_2O_5 grades around 1.94%, 0.95% and 0.47%. The internal laboratory standards used have varied grade ranges, but do cover these three grades as well. Most of the laboratory standards used show an apparent underestimation of V_2O_5, with the results plotting below the expected value lines; however, the results generally fall within ± 5-10% ranges of the expected values. The other elements show no obvious material bias. Standards used by AVL generally showed good precision, falling within 3-5% of the mean value in any batch. The standards were not certified but compared with the internal laboratory standards (certified), they appear to show good accuracy as well. Field duplicate results from the recent drilling (2015) all fall within 10% of their original values. The BV XRF machine calibrations are checked once per shift using calibration beads made

		using exact weights and they performed repeat analyses of sample pulps at a rate of 1:20 (5% of all samples). The lab repeats compare very closely with the original analysis for all elements.

Criteria	JORC Code Explanation	Commentary
	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.	The only geophysical readings taken for the Gabanintha core and RC samples and recorded in the database were magnetic susceptibility. This was undertaken using an RT1 hand magnetic susceptibility meter (CorMaGeo/Fugro) with a sensitivity of 1 X 10–5 (dimensionless units). The first nine diamond holes (GDH901 – GDH909) were sampled at approximately 0.3m intervals, the last eight (GDH910 – GDH917) at0.5m intervals and the RC chip bags for every green bagged sample (one metre). Four completed drillholes were tested by acoustic televiewer (GDH911, 912, 914 and 915) as a prequel to geotechnical logging.
	Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.	QAQC results from both the primary and secondary assay laboratories show no material issues with the main variables of interest for the recent assaying programmes.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	Diamond drill core photographs have been reviewed for the recorded sample intervals. Geologica Pty Ltd Consultant, Brian Davis, visited the Gabanintha project site and the BV core shed and assay laboratories in September 2015 and on multiple occasions over a 10 year period. Whilst on site, the drillhole collars and remaining RC chip samples were inspected. All of the core was inspected in the BV facilities in Perth and selected sections of drillholes were examined in detail in conjunction with the geological logging and assaying.
	The use of twinned holes.	Two diamond drillholes (GDH915 and GDH917) were drilled to twin the RC drillholes GRC0105 and GRC0162 respectively. The results show excellent reproducibility in both geology and assayed grade for each pair.

	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	All primary geological data has been collected using paper logs and transferred into Excel spreadsheets and ultimately a SQL Server Database. The data were checked on import. Assay results were returned from the laboratories as electronic data which were imported directly into the SQL Server database. Survey and collar location data were received as electronic data and imported directly to the SQL database. All of the primary data have been collated and imported into a Microsoft SQL Server relational database, keyed on borehole identifiers and assay sample numbers. The database is managed using DataShed ™ database management software. The data were verified as it was entered and checked by the database administrator (MRG) and AVL personnel
	Discuss any adjustment to assay data.	No adjustments or calibrations were made to any assay data, apart from resetting below detection limit values to half positive detection values.

Criteria	JORC Code Explanation	Commentary
Location of data points	Accuracy and quality of surveys used to locate drillholes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.	For the 2015 drilling, all of the collars were set out using a Trimble real-time kinematic (RTK) GPS system. After completion of drilling all of the collars were re-surveyed using the same tool. Historical drillholes were surveyed with RTK GPS and DGPS from 2008 to 2015, using the remaining visible collar location positions where necessary. Only five of the early drillholes, drilled prior to 2000, had no obvious collar position when surveyed and a best estimate of their position was used based on planned position data.
	Specification of the grid system used.	The grid projection used for Gabanintha is MGA_GDA94, Zone 50. All reported coordinates are referenced to this grid.
	Quality and adequacy of topographic control.	High resolution Digital Elevation Data was supplied by Landgate. The northern two thirds of the elevation data is derived from ADS80 imagery flown September 2014. The data has a spacing of 5M and is the most accurate available. The southern third is film camera derived 2005 10M grid, resampled to match it with the 2014 DEM. Filtering was applied and height changes are generally within 0.5M. Some height errors in the 2005 data may be +/- 1.5M when measured against AHD but within the whole area of interest any relative errors will mostly be no more than +/- 1M. In 2015 A DGPS survey of hole collars and additional points was taken at conclusion of the drill program. Trepanier compared the elevations the drillholes with the supplied DEM surface and found them to be within 1m accuracy.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	The closer spaced drilled areas of the deposit now have approximately 80m to 100m spacing by northing and 25m to 30m spacing by easting. Occasionally these spacings are closer for some pairs of drillholes. Outside the main area of relatively close spaced drilling (approximately 7015400mN to 7016600mN), the drillhole spacing increases to several hundred metres in the northing direction, but maintains roughly the same easting separation as the closer spaced drilled area.
	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	The degree of geological and grade continuity demonstrated by the data density is sufficient to support the definition of Mineral Resources and the associated classifications applied to the Mineral Resource estimate as defined under the 2012 JORC Code. Variography studies have shown very little variance in the data for most of the estimated variables and primary ranges in

	procedure(s) and classifications applied.	the order of several hundred metres.
	Whether sample compositing has been applied.	All assay results have been composited to one metre lengths before being used in the Mineral Resource estimate. This was by far the most common sample interval for the diamond drillhole and RC drillhole data.
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.	The grid rotation is approximately 45o to 50o magnetic to the west, with the holes dipping approximately 60o to the east. The drill fences are arranged along the average strike of the high grade mineralised horizon, which strikes approximately 310o to 315o magnetic south of a line at 7015000mN and approximately 330o magnetic north of that line. The mineralisation is interpreted to be moderate to steeply dipping, approximately tabular, with stratiform bedding striking approximately north-south and dipping to the west. The drilling is exclusively conducted perpendicular to the strike of the main mineralisation trend and dipping approximately 60o to the east, producing approximate true thickness sample intervals through the mineralisation.
	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.	The orientation of drilling with respect to mineralisation is not expected to introduce any sampling bias. Drillholes intersect the mineralisation at an angle of approximately 90 degrees.
Sample security	The measures taken to ensure sample security.	Samples were collected onsite under supervision of a responsible geologist. The samples were then stored in lidded core trays and closed with straps before being transported by road to the BV core shed in Perth (or other laboratories for the historical data). RC chip samples were transported in bulk bags to the assay laboratory and the remaining green bags are either still at site or stored in Perth. RC and core samples were transported using only registered public transport companies. Sample dispatch sheets were compared against received samples and any discrepancies reported and corrected.

Audits or reviews	The results of any audits or reviews of sampling techniques and data.	A review of the sampling techniques and data was completed by Mining Assets Pty Ltd (MASS) and Schwann Consulting Pty Ltd (Schwann) in 2008 and by CSA in 2011. Neither found any material error. AMC also reviewed the data in the course of preparing a Mineral Resource estimate in 2015. The database has been audited and rebuilt by AVL and MRG in 2015. In 2017 geological data was revised after missing lithological data was sourced. Geologica Pty Ltd concludes that the data integrity and consistency of the drillhole database shows sufficient quality to support resource estimation.

Section 2: Reporting of Exploration Results

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.	Exploration Prospects are located wholly within Lease P51/2567 and E51/843. The tenements are 100% owned by Australian Vanadium Ltd. The tenements lie within the Yugunga Nya Native Title Claim (WC1999/046). A Heritage survey was undertaken prior to commencing drilling which only located isolated artefacts but no archaeological sites *per se.* Mining Lease Application M51/878 covering most of E51/1843 and the vanadium project is currently under consideration by the Department of Mines and Petroleum. AVL has no joint venture, environmental, national park or other ownership agreements on the lease area. A Mineral Rights Agreement has been signed with Bryah Resources Ltd for copper and gold exploration on the AVL Gabanintha tenements.
	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.	At the time of reporting, there are no known impediments to obtaining a licence to operate in the area and the tenement is in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The Gabanintha deposit was identified in the 1960s by Mangore P/L and investigated with shallow drilling, surface sampling and mapping. In 1998, Drilling by Intermin Resources confirmed the down dip extent and strike continuation under cover between outcrops of the vanadium bearing horizons. Additional RC and initial diamond drilling was conducted by Greater Pacific NL and then AVL Australian Vanadium up until 2015. Previous Mineral Resource estimates have been completed for the deposit in 2001 (Mineral Engineering Technical Services Pty Ltd (METS) and Bryan Smith Geosciences Pty Ltd. (BSG)), 2007 (Schwann), 2008 (MASS & Schwann), 2011 (CSA) and 2015 (AMC).

Geology	Deposit type, geological setting and style of mineralisation.	The Gabanintha Project is located approximately 40kms south of Meekatharra in Western Australia and approximately 100kms along strike (north) of the Windimurra Vanadium Mine. The mineralisation is hosted in the same geological unit as Windimurra, which is part of the northern Murchison granite greenstone terrane in the north west Yilgarn Craton. The project lies within the Gabanintha and Porlell Archaean greenstone sequence oriented approximately NW-SE and is adjacent to the Meekatharra greenstone belt. Locally the mineralisation is massive or bands of disseminated vanadiferous titano-magnetite hosted within the gabbro. The mineralised package dips moderately to steeply to the west and is capped by Archaean acid volcanics and metasediments. The footwall is a talc carbonate altered ultramafic unit. The host sequence is disrupted by late stage dolerite and granite dykes and occasional east and east southwest trending faults with apparent minor offsets. The mineralisation ranges in thickness from several metres to up to 20 to 30m in thickness. The oxidized weathering surface extends 50 to 80m below surface and the magnetite in the oxide zone is usually altered to Martite.
Drillhole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drillholes: easting and northing of the drillhole collar elevation or RL (Reduced Level – elevation above sea level in metres) of the drillhole collar dip and azimuth of the hole down hole length and interception depth hole length.	Refer drilling intercepts table in Appendix 1 of this announcement.
Data aggregation methods	In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.	Length weighed averages used for exploration results are reported in Appendix 1 of this announcement. Cutting of high grades was not applied in the reporting of intercepts.

Criteria	JORC Code Explanation	Commentary
	Where aggregate intercepts incorporate short lengths of high grade 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.	There were negligible residual composite lengths, and at present these were excluded from the estimate.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used.
Relationship between mineralisation widths and intercept lengths	If the geometry of the mineralisation with respect to the drillhole angle is known, its nature should be reported.	Drillholes intersect the mineralisation at an angle of approximately 90 degrees.
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 drillhole collar locations and appropriate sectional views.	See Figures 1-4.
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.	Comprehensive reporting of drilling details has been provided in Appendix 1 in this announcement.
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.	All meaningful & material exploration data has been reported.
Further work	The nature and scale of planned further work (e.g. tests for	The decision as to the necessity for further exploration at Gabanintha is

	lateral extensions or depth extensions or large-scale step-out drilling).	pending completion of mining technical studies on the currently available resource.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	The decision as to the necessity for further exploration at Gabanintha is pending completion of mining technical studies on the currently available resource.

Section 3: Estimation and Reporting of Mineral Resources

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.	All the drilling was logged onto paper and has been transferred to a digital form and loaded into a Microsoft SQL Server relational drillhole database using DataShed™ management software. Logging information was reviewed by the responsible geologist and database administrator prior to final load into the database. All assay results were received as digital files, as well as the collar and survey data. These data were transferred directly from the received files into the database. All other data collected for Gabanintha were recorded as Excel spreadsheets prior to loading into SQL Server. The data have been periodically checked by AVL personnel, the database administrator as well as the personnel involved in all previous Mineral Resource estimates for the project.

	Data validation procedures used.	The data validation was initially completed by the responsible geologist logging the core and marking up the drillhole for assaying. The paper geological logs were transferred to Excel spreadsheets and compared with the originals for error. Assay dispatch sheets were compared with the record of samples received by the assay laboratories. Normal data validation checks were completed on import to the SQL database. Data has also been checked back against hard copy results and previous mines department reports to verify assays and logging intervals. Both internal (AVL) and external (Schwann, MASS, CSA and AMC) validations were/are completed when data was loaded into spatial software for geological interpretation and resource estimation. All data have been checked for overlapping intervals, missing samples, FROM values greater than TO values, missing stratigraphy or rock type codes, downhole survey deviations of ±10° in azimuth and ±5° in dip, assay values greater than or less than expected values and several other possible error types. Furthermore, each assay record was examined and mineral resource intervals were picked by the Competent Person. QAQC data and reports have been checked by the database administrator, MRG. MASS & Schwann and CSA both reported on the available QAQC data for Gabanintha.

Criteria	JORC Code Explanation	Commentary
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The drill location was inspected by John Tyrrell of AMC in 2015 for the initial 2012 JORC resource estimation. Consulting Geologist Brian Davis of Geologica Pty Ltd visited the Gabanintha project drilling sites in 2016 and 2017 and has been familiar with the Gabanintha iron-titanium-vanadium orebody since 2006. The geology, sampling, sample preparation and transport, data collection and storage procedures were all discussed and reviewed with the responsible geologist for the 2015 drilling. Visits to the BV laboratory and core shed in Perth were used to add knowledge to aid in the preparation of this Mineral Resource Estimate.
	If no site visits have been undertaken indicate why this is the case.	N/A
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The Gabanintha Vanadium mineralisation lies along strike from the Windimurra Vanadium Mine and the oxidised portion of the high-grade massive magnetite/martite mineralisation outcrops for almost 14km in the company held lease area. Detailed mapping and mineralogical studies have been completed by company personnel and contracted specialists between 2000 and 2015, as well as four separate drilling programmes to test the mineralisation and continuity of the structures. These data and the relatively closely-spaced drilling has led to a good understanding of the mineralisation controls. The mineralisation is hosted within altered gabbros and is easy to visually identify by the magnetite/martite content. The main high-grade unit shows consistent thickness and grade along strike and down dip and has a clearly defined sharp boundary. The lower grade disseminated bands also show good continuity, but their boundaries are occasionally less easy to identify visually as they are more diffuse over a metre or so.
	Nature of the data used and of any assumptions made.	No assumptions are made regarding the input data.

	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Alternative interpretations were considered in the current estimation and close comparison with the 2015 resource model was made to see the effect of the new density data and revised geology model. The continuity of the low-grade units, more closely defined from lithology logs is now better understood and the resulting interpretation is more effective as a potential mining model. The near-surface alluvial and transported material has also been more closely modelled in this estimation. The impact of the current interpretation as compared to the previous interpretation would be a greater volume of low grade mineralisation and a higher overall V_2O_5 grade for that mineralisation in the current estimate.
	The use of geology in guiding and controlling Mineral Resource estimation.	Geological observation has underpinned the resource estimation and geological model. The high-grade mineralisation domain has a clear and sharp boundary and has been tightly constrained by the interpreted wireframe shapes. The low-grade mineralisation is also constrained within wireframes, which are defined and guided by visual (from core) and grade boundaries from assay results. The low grade mineralisation has been defined as four sub-domains, which strike sub-parallel to the high-grade domain. In addition, there is a sub parallel laterite zone and two transported zones above the top of bedrock surface. The resource estimate is constrained by these wireframes. Domains were also coded for oxide and fresh, as well as above and below the alluvial and bedrock surfaces. The extents of the geological model were constrained by fault block boundaries. Geological boundaries were extrapolated to the edges of these fault blocks, as indicated by geological continuity in the logging and the magnetic geophysical data.

	The factors affecting continuity both of grade and geology.	Key factors that are likely to affect the continuity of grade are: • The thickness and presence of the high grade massive magnetite/martite unit, which to date has been very consistent in both structural continuityand grade continuity. • The thickness and presence of the low grade banded and disseminated mineralisation along strike and down dip. The low grade sub-domains are less consistent in their thickness along strike and down dip with more pinching and swelling than for the high-grade domain. • SW-NE oriented faulting occurs at a deposit scale and offsets the main orientation of the mineralisation. These regional faults divide the deposit along strike into kilometer scale blocks. Internally the mineralised blocks show very few signs of structural disturbance at the level of drilling.

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.	The massive magnetite/martite unit strikes approximately 14 km, is stratiform and ranges in thickness from less than 10m to over 20m true thickness. The low grade mineralised units are sub-parallel to the high-grade zone, and also vary in thickness from less than 10m to over 20m. All of the units dip moderately to steeply towards the west, with the exception of two predominantly alluvial units (domains 7and 8) and a laterite unit (domain 6) which are flat lying. All units outcrop at surface, but the low grade units are difficult to locate as they are more weathered and have a less prominent surface expression than the high grade unit. The high and low-grade units are currently interpreted to have a depth extent of approximately 200m below surface. Mineralisation is currently open along strike and at depth.

Criteria	JORC Code Explanation	Commentary
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.	Grade estimation was completed using ordinary kriging (OK) for the Mineral Resource estimate. Surpac™ software was used to estimate grades for V_2O_5, TiO_2, Fe_2O_3, SiO_2, Al_2O_3, Cr_2O_3, Co and loss on ignition (LOI) using parameters derived from statistical and variography studies. The majority of the variables estimated have coefficients of variation of significantly less than 1.0, with Cr_2O_3 being the exception. Drillhole spacing varies from approximately 80 m to 100 m along strike by 25 m to 30 m down dip, to 500 m along by 25 m to 30 m down dip. Drillhole sample data was flagged with numeric domain codes unique to each mineralisation domain. Sample data was composited to 1 m downhole length and composites were terminated by a change in domain or oxidation state coding. No grade top cuts were applied to any of the estimated variables as statistical studies showed that there were no extreme outliers present within any of the domain groupings. Grade was estimated into separate mineralisation domains including a high-grade bedrock domain, four low grade bedrock domains and low grade alluvial and laterite domains. Each domain was further subdivided into a fault block, and each fault block was assigned its own orientation ellipse for grade interpolation. Downhole variography and directional variography were performed for all estimated variables for the high-grade domain and the grouped low-grade domains. Grade continuity varied from hundreds of metres in the along strike directions to sub-two hundred metres in the down-dip direction although the down-dip limitation is likely related to the extent of drilling to date.

Criteria	JORC Code Explanation	Commentary
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Prior to 2017, there have been five Mineral Resource estimates for the Gabanintha deposit. The first, in 2001 was a polygonal sectional estimate completed by METS & BSG. The subsequent models by Schwann (2007), MASS & Schwann (2008) and CSA (2011) are kriged estimates. AMC (2015) reviewed the geological interpretation of the most recent previous model (CSA 2011), but used a new interpretation based on additional new drilling for the 2015 estimate. In 2017 a complete review of the geological data, weathering profiles, magnetic intensity and topographic data as well as incorporation of additional density data and more accurate modelling techniques resulted in a re-interpreted mineral resource. No mining has occurred to date at Gabanintha, so there are no production records.
	The assumptions made regarding recovery of by-products.	No assumptions were made regarding recovery of by-products.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterization).	Estimates were undertaken for Fe_2O_3, SiO_2, TiO_2, Al_2O_3, Co and LOI, which are non-commodity variables, but are useful for determining recoveries and metallurgical performance of the treated ore. Estimated Fe_2O_3% grades were converted to Fe% grades in the final for reporting (Fe% = Fe_2O_3/1.4297). Estimates were also undertaken for Cr_2O_3 which is a potential deleterious element. The estimated Cr_2O_3% grades were converted to Cr ppm grades in the final model for reporting (Cr ppm = (Cr_2O_3*10000)/1.4615).

	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.	The Gabanintha block model uses a parent cell size of 40 m in northing, 10 m in easting and 5 m in RL. This corresponds to approximately half the distance between drillholes in the northing and easting directions and matches an assumed bench height in the RL direction. Accurate volume representation of the interpretation was achieved. Grade was estimated into parent cells, with all sub-cells receiving the same grade as their relevant parent cell. Search ellipse dimensions and directions were adjusted for each fault block. Three search passes were used for each estimate in each domain. The first search was 120m and allowed a minimum of 8 composites and a maximum of 24 composites. For the second pass, the first pass search ranges were expanded by 2 times. The third pass search ellipse dimensions were extended to a large distance to allow remaining unfilled blocks to be estimated. A limit of 5 composites from a single drillhole was permitted on each pass. In domains of limited data, these parameters were adjusted appropriately. No selective mining units were considered in this estimate apart from an assumed five metre bench height for open pit mining. Model block sizes were determined primarily by drillhole spacing and statistical analysis of the effect of changing block sizes on the final estimates.

Criteria	JORC Code Explanation	Commentary
	Any assumptions about correlation between variables.	All elements within a domain used the same sample selection routine for block grade estimation. No co-kriging was performed at Gabanintha, but correlation studies on the composite data showed very good correlation (0.8 or above) between most variables, apart from Cr which has a correlation coefficient of 0.65 with V_2O_5.
	Description of how the geological interpretation was used to control the resource estimates.	The geological interpretation is used to define the mineralisation, oxidation and alluvial domains. All of the domains are used as hard boundaries to select sample populations for variography and grade estimation.
	Discussion of basis for using or not using grade cutting or capping.	Analysis showed that none of the domains had statistical outlier values that required top-cut values to be applied.
	The process of validation, the checking process used, the comparison of model data to drillhole data, and use of reconciliation data if available.	Validation of the block model consisted of: • Volumetric comparison of the mineralisation wireframes to the block model volumes. • Visual comparison of estimated grades against composite grades. • Comparison of block model grades to the input data using swathe plots. As no mining has taken place at Gabanintha to date, there is no reconciliation data available.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	All mineralisation tonnages are estimated on a dry basis. The moisture content in mineralisation is considered very low.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	A nominal 0.4% V_2O_5 wireframed cut off for low grade and a nominal 0.7% V_2O_5 wireframed cut off for high grade has been used to report the Mineral Resource at Gabanintha. Consideration of previous estimates, as well as the current mining, metallurgical and pricing assumptions, while not rigorous, suggest that the currently interpreted mineralised material has a reasonable prospect for eventual economic extraction at these cut off grades.

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 made.	AVL completed a mining Scoping Study in October 2016 for Gabanintha. The primary mining scenario being considered is conventional open pit mining. AVL has assumed, based on initial concept study work and the nearby presence of a similar project (Windimurra mine site), that the Gabanintha deposit is amenable to open-pit mining methods.

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr><td>Metallurgical factors or assumptions</td><td>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.</td><td>Metallurgical studies are at an early stage and have focused on bench-scale comminution and magnetic separation test work on 24 contiguous drill core intervals from the high-grade vanadium domain. These samples included 10 off from the “fresh” rock zone, 9 off from the zone defined as “transitional” and 5 off from the near surface oxidised horizon, “oxide”.
<table>
<tr><th>Metallurgical Sample</th><th>Drill hole origin</th><th>From (m)</th><th>To (m)</th><th>Interval (m)</th><th>Mass (kg)</th></tr>
<tr><td>1 Fr</td><td>GDH903</td><td>191</td><td>199</td><td>8</td><td>33</td></tr>
<tr><td>2 Fr</td><td>GDH903</td><td>199</td><td>209</td><td>10</td><td>47</td></tr>
<tr><td>3 Fr</td><td>GDH903</td><td>209</td><td>215.2</td><td>6.2</td><td>25</td></tr>
<tr><td>4 Fr</td><td>GDH911</td><td>98.9</td><td>105.5</td><td>6.6</td><td>59</td></tr>
<tr><td>5 Fr</td><td>GDH911</td><td>108</td><td>113.2</td><td>5.2</td><td>54</td></tr>
<tr><td>6 Fr</td><td>GDH912</td><td>124</td><td>129</td><td>5</td><td>52</td></tr>
<tr><td>7 Fr</td><td>GDH912</td><td>129</td><td>134.2</td><td>5.2</td><td>54</td></tr>
<tr><td>8 Fr</td><td>GDH912</td><td>134.3</td><td>141</td><td>6.7</td><td>69</td></tr>
<tr><td>9 Fr</td><td>GDH914</td><td>108</td><td>114</td><td>6</td><td>58</td></tr>
<tr><td>10 Fr</td><td>GDH914</td><td>114</td><td>121</td><td>7</td><td>75</td></tr>
<tr><td>11 Tr</td><td>GDH902</td><td>98</td><td>105.8</td><td>7.8</td><td>34</td></tr>
</table>
</td></tr>
</table>

Criteria	JORC Code Explanation	Commentary

12 Tr	GDH902	105.8	111.1	5.3	31
13 Tr	GDH902	111.1	117.1	6	27
14 Tr	GDH911	105.5	108	2.5	27
15 Tr	GDH913	127.9	133.2	5.3	26
16 Tr	GDH913	133.2	140	6.8	47
17 Tr	GDH913	140	145.2	5.2	45
18 Tr	GDH916	132	139	7	32
19 Tr	GDH916	139	151.3	12.3	101
20 Ox	GDH901	38	45	7	29
21 Ox	GDH901	45	54	9	44
22 Ox	GDH915	12	18	6	44
23 Ox	GDH915	18	23	5	35
24 Ox	GDH917	14.1	21.1	7	44

The comminution test work has included SMC, Bond ball mill work index and Bond abrasion index testing.

Bench-scale magnetic separation test work has included Davis tube testing (1500 gauss) and a customised two stage separation using a hand held rare earth magnetic rod (2600 gauss at surface). 21 element XRF and LOI analysis has been carried out on the magnetic and non-magnetic products and selected magnetic concentrates underwent QXRD to determine the contained

Criteria	JORC Code Explanation	Commentary
		minerals and or QEMScan analysis to gain an understanding of the mineral associations, grains size, locking and liberation. Some preliminary sulphide concentrate recovery testing has been undertaken on selected 25kg fresh samples and a 90kg fresh composite sample. These samples were ground to a P_{80} of 106 µm and underwent wet magnetic separation using a low intensity (1500 Gauss) magnetic separation drum. The non-magnetic stream was dried, sub split and provided feed for benchscale sulphide flotation testwork. The flotation testing has been carried out at benchscale using a scheme of typical sulphide flotation reagents. Rougher, scavenger and cleaner flotation has been tested with one concentrate (test BC 4113/2) reground prior to cleaning. The preliminary metallurgical investigation has demonstrated: - the oxide, transitional and fresh materials are similar in comminution behaviour and exhibit a moderate rock competency and ball milling energy demand. The abrasiveness is considered low to moderate. - a positive and predictable response to magnetic separation for material from the fresh and transitional high-grade domain. The majority of vanadium exists within magnetic minerals which when separated at a grind size P_{80} of approximately 106 µm, generates a consistently high V_2O_5 grade, low silica and alumina grade concentrate. Further testing including non-magnetic separation options are being carried out to optimise the response of the oxide material type. At this stage of metallurgical understanding a primary mill grinding to P_{80} 106 µm and application of magnetic drum separation is considered a reasonable flowsheet concept to produce a vanadium rich concentrate (>1.4% V_2O_5) from material classified as transitional and fresh within the high-grade domain. No

Criteria	JORC Code Explanation	Commentary
		test work has yet been undertaken in processing of the magnetic concentrate to extract vanadium. Given the indicated quality of the concentrate it is assumed that production of a saleable V_2O_5 product would be achieved via a traditional roast, leach and ammonium meta vanadate (AMV) flowsheet path, as was applied in the treatment of similar magnetic concentrate in Xstrata's Windimurra refinery flowsheet in Western Australia and at Largo Resources Maracas vanadium project in Bahia, Brazil.
Environmental 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 greenfield 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 studies are currently being undertaken for the scoping study and Pre-Feasibility work.
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.	Bulk density determinations (using the Archimedes' method) were made on 15 diamond drillholes. Bulk density data from 313 direct core measurements were used to determine average densities for each of the mineralisation and oxide domains. Bulk Density was estimated for HG, LG, Alluvial and waste material in Core taken to represent the main lithological units.

Criteria	JORC Code Explanation	Commentary
	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.	The water immersion method was used for direct core measurements; all 231 of the latest measurements have been done using sealed core, the previous 97 measurements were not wrapped. AMC's observation of the core indicates that observable porosity was not likely to be high for most of the core at the deposit.

Criteria	JORC Code Explanation	Commentary
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	The average bulk density values for at Gabanintha are: Domain Oxidation State Bulk Density 10 (high grade) Oxide 3.42 10 (high grade) Fresh 3.68 2-8 (low grade) Oxide 2.13 2-8 (low grade) Fresh 2.45 Alluvial Oxide 2.62 (waste) Oxide 2.02 (waste) Fresh 2.45 All values are in t/m^3. Regressions used to determine bulk density based on iron content are as follows: Oxide: BD = (0.0382 x Fe_2O_3 %) + 0.7317 Fresh: BD = (0.0369 x Fe_2O_3 %) + 1.1701 The final bulk density used for reporting of the Gabanintha Mineral Resource is based on the regression as it provides a more reliable local estimated bulk density.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.	Classification for the Gabanintha Mineral Resource estimate is based upon continuity of geology, mineralisation and grade, consideration of drillhole and density data spacing and quality, variography and estimation statistics (number of samples used and estimation pass). The current classification is considered valid for the global resource and applicable for the nominated grade cut-offs.

Criteria	JORC Code Explanation	Commentary
	Whether appropriate account has been taken of all relevant factors (i.e. 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).	At Gabanintha, the central portion of the deposit is well drilled for a vanadium deposit, having a drillhole spacing from a nominal 80 m to 100 m x 25 m to 30 m in northing and easting. The lower confidence areas of the deposithave drillhole spacings ranging up to 500 m x 25 m to 30 m in northing and easting directions. In general, the estimate has been classified as Measured Mineral Resource in an area restricted to the fresh portion of the high-grade domain where the drillhole spacings are less than 80 to 100m in northing. Indicated Mineral Resource material is generally restricted to the oxide high grade and oxide and fresh low grade in the same area of relatively closely spaced drilling. Inferred Mineral Resource has been restricted to any other material within the interpreted mineralisation wireframe volumes. The background waste domain estimate has not been classified, due to very low possibility of economic extraction and limited data.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	Geologica Pty Ltd and Trepanier Pty Ltd believe that the classification appropriately reflects their confidence in the grade estimates and robustness of the interpretations.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The current Mineral Resource estimate has not been audited.

Criteria	JORC Code Explanation	Commentary
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 resource classification represents the relative confidence in the resource estimate as determined by the Competent Persons. Issues contributing to or detracting from that confidence are discussed above. No quantitative approach has been conducted to determine the relative accuracy of the resource estimate. The Ordinary Kriged estimate is considered to be a global estimate with no further adjustments for Selective Mining Unit (SMU) dimensions. Accurate mining scenarios are yet to be determined by mining studies. No production data is available for comparison to the estimate. The local accuracy of the resource is adequate for the expected use of the model in the mining studies. Further investigation into bulk density determination and infill drilling will be required to further raise the level of resource classification.
	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 levels of confidence and accuracy relate to the global estimates of grade and tonnes for the deposit.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	There has been no production from the Gabanintha deposit to date.