

HIGH VANADIUM EXTRACTIONS CONFIRMED IN PELLET LEACH PILOT AS BFS PROGRESSES

88-90% vanadium extraction achieved during pilot scale mechanical water leaching, advancing key final processing design elements

KEY POINTS

- Vanadium extraction from roasted pellets averaging 89% demonstrated in first part of two-stage water leach flowsheet currently being piloted.
- Final pilot phase will validate overall vanadium leach extraction achieved by Bankable Feasibility Study (BFS) flowsheet.
- Vanadium extraction from the pilot test was consistent with lab scale work and demonstrated significantly better vanadium to impurities dissolution. Overall vanadium leach extraction from the two-stage leach is anticipated to be greater than 93%.
- Unique AVL mechanical leach circuit shown to be a viable, cost effective design, maximising onshore Australian extraction of high value critical mineral vanadium products.
- Another highly successful step advancing the Company's goal to design, build and operate the world's next and lowest cost primary vanadium operation.
- Work conducted at ALS testing facilities in Balcatta, Perth – a research partner in AVL's Australian Government's Cooperative Research Centre Projects scheme entitled: "Production of 99.95% Pure Vanadium Pentoxide and Vanadium Electrolytes".

Australian Vanadium Limited (ASX: AVL, "the Company" or "AVL") is pleased to advise the highly successful completion of the first stage of a two-stage pilot-scale water leach process for the Australian Vanadium Project (the Project). This is a significant milestone in the final pilot testwork program that will allow the Company to conclude its final processing designs, mass balances and detailed costings for the BFS.

Managing Director, Vincent Algar commented, “AVL understands the vital importance of representative pilot scale testing as part of the BFS design process. The AVL team’s extensive vanadium specific experience has been a key aspect in the successful development of the processing flowsheet. The success of this latest water leach testwork and the prior ground-breaking pellet roasting are testimony to this.

As we work to finalise the BFS in the coming months, the level of detail supplied by AVL’s testwork becomes critical to institutional investors, finance institutions and quality off-take partners which have the highest standards when scrutinising new projects for final investment.”

Pilot Process

The scaled pilot testing comprised an 80°C drum leach which simulated the water leaching of hot, quenched vanadium bearing pellets that emerge from the salt-roast process. The pilot set-up is shown in Figure 1. Primary leach liquors are being retained for final ammonium poly vanadate (APV) and V₂O₅ precipitation (material to be used for customer testing), the leach residues generated from this process have now been transferred to leach columns to simulate the final extraction operation in a second and final static water leach stage.



Figure 1. Pilot set-up showing rotating drum and filtering operations



Figure 2: Pilot feed - roasted pellets crushed to <6.3mm

The feed for this pilot leach testwork was generated in the recent pyrometallurgy pilot campaign in 2020-2021¹, which in turn came from the crushing, milling and beneficiation pilot plant run in 2019². Two parcels of ore were trialled in these previous runs, designed to represent both the first five years of production (Y0-5) and the life-of-mine (LOM).

The pelletised and roasted concentrates from these two ore parcels were tested in the pilot leach circuit. Most of the test sample was from the Y0-5 ore parcel, which is of more immediate importance for the startup of the planned operation. Elemental abundances for these are shown in Table 1.

¹ See ASX announcement dated 10th March 2021 “Final Pyrometallurgy Results Confirm World Leading Vanadium Extraction”

² See ASX announcement dated 17th March 2020 “Pilot Study Programme Confirms High Vanadium Recoveries And Concentrate Quality”

Table 1. Comparison of elemental abundances for the two roasted pellet blends

Element	Year 0-5	Life of Mine
Al	1.59	1.56
Ca	0.11	0.10
Cr	0.53	0.51
Fe	52.2	52.7
Mg	0.36	0.45
Mn	0.14	0.15
Na	1.66	1.70
P	0.01	0.01
S	0.02	0.00
Si	1.20	0.97
Ti	8.74	8.44
V	0.76	0.72

The mineralogy of the two samples prior to roasting was described in a previous ASX announcement³. Both samples had similar vanadium and silica grades. However, the Year 0-5 material was more oxidised and richer in hematite. After roasting, magnetite is converted to hematite.

The majority of material processed through the leach pilot plant was from Year 0-5. During the final production run, this feed was processed for over seven hours, with vanadium extraction proving extremely consistent at between 88% and 90%. The life-of-mine material was then introduced and

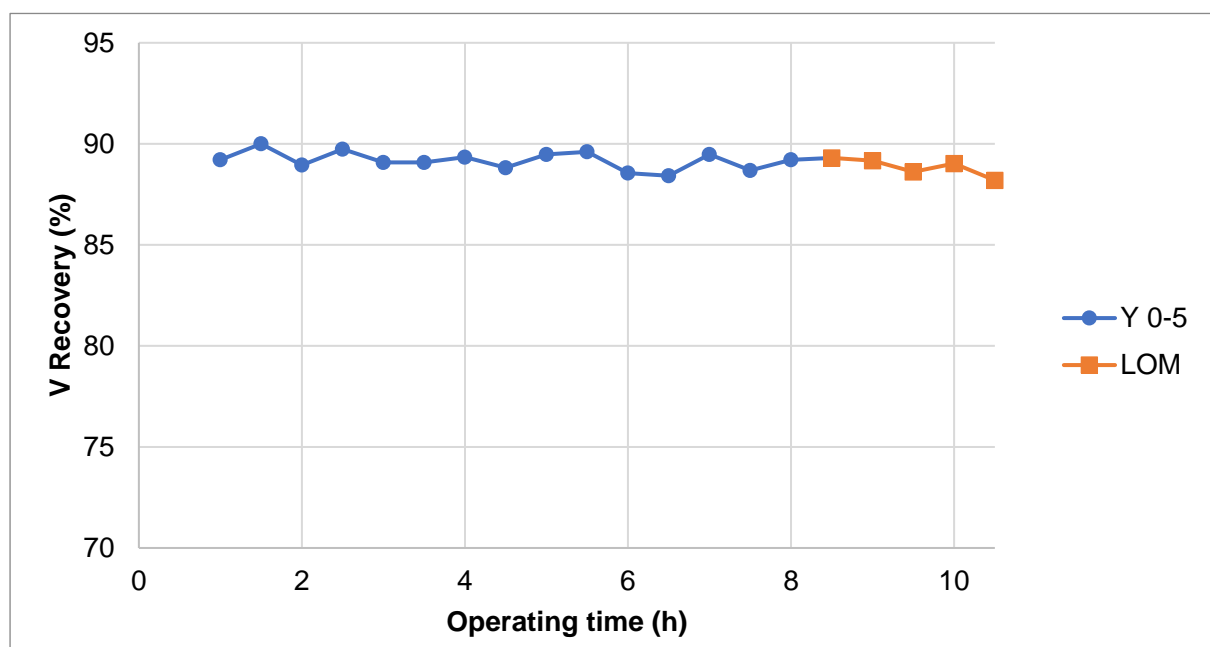


Figure 3 Vanadium extraction measured from solids analysis for the stage 1 pellet leach campaign

³ See ASX announcement dated 10th March 2021 “Final Pyrometallurgy Results Confirm World Leading Vanadium Extraction”

run for over two and a half hours, achieving a similar vanadium extraction. The transition between the two ores was approximately one hour, the residence time in the drum. The feed rate to the pilot leach was 32 kg/h, with a total of 333 kg of Y0-5 and 94 kg of LOM run through the production campaign.

An important measure, the impurity dissolution, was lower or equal to that observed in laboratory scoping tests. The level of impurity dissolution is best interpreted relative to the vanadium dissolution. This is indicated by the ratio of vanadium to the impurity as shown in Table 2. The ratios achieved in the pilot are consistently higher or equal to the prior benchscale laboratory tests. This favourable result simplifies the downstream precipitation process for generating high purity V_2O_5 .

	V/Cr	V/Si	V/Al	V/S	V/Na
Pilot	120	48	∞^*	1000	1
Lab	18	48	24	70	1

*Note: Al in solution was below detection limits for the pilot run.

Table 2. Comparison of ratio of vanadium to various impurities in solution for pilot and lab tests.

The mechanical leach pilot is considered by the AVL team and its consulting engineers to have been highly successful. The results are strongly supportive of the proposed use of pelletised roasting as being highly effective at solubilising the vanadium in the concentrate during the roast phase, importantly confirming at a pilot level the Project's ability to deliver world-leading vanadium leach extraction.

Next steps in Pilot Program

The leach residues generated by the mechanical leach circuit have been transferred to columns to recover the remaining soluble vanadium. This work will determine the duration and number of counter current stages required to finalise the mass, energy and water balance for the Project's vanadium leach extraction process. Overall vanadium leach extraction at the conclusion of the two-stage leach is anticipated to be greater than 93%, consistent with the Company's earlier laboratory work.

The pregnant leach solution generated from the mechanical pilot leach has progressed to a bench scale APV and V_2O_5 precipitation program. This work will provide data for the design of a full-scale precipitation circuit, with the aim of producing a high-purity V_2O_5 precipitate.

Significant amounts of AVL's iron-titanium co-product will be generated by the pilot leach program. Samples of which are destined for blast furnace customer testing in Asia. Vanadium pentoxide (V_2O_5) products will be analysed and used for specific customer testing in vanadium redox flow battery and specialty chemical applications.

AVL recognises the importance of vanadium as a global critical mineral and intends to build Australia's high value vanadium industry through the development of the Australian Vanadium Project in Western Australia.

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This announcement has been produced in accordance with the Company's published continuous disclosure policy and has been approved by the Board.

ABOUT AUSTRALIAN VANADIUM LTD

AVL is a resource company focused on vanadium, seeking to offer investors a unique exposure to all aspects of the vanadium value chain – from resource through to steel and energy storage opportunities. AVL is advancing the development of its world-class Australian Vanadium Project at Gabanintha. The Australian Vanadium Project is currently one of the highest-grade vanadium projects being advanced globally, with 208.2Mt at 0.74% vanadium pentoxide (V_2O_5), containing a high-grade zone of 87.9Mt at 1.06% V_2O_5 , reported in compliance with the JORC Code 2012 (see ASX announcement dated 4th March 2020 ‘*Total Vanadium Resource at the Australian Vanadium Project Rises to 208 Million Tonnes*’ and ASX announcement dated 22nd December 2020 ‘*Technical and Financial PFS Update*’).

VSUN Energy is AVL’s 100% owned subsidiary which is focused on developing the market for vanadium redox flow batteries for energy storage.

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 Resources 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 have not been materially modified from the original market announcement.

APPENDIX 1

The Australian Vanadium Project – Mineral Resource estimate by domain and resource classification using a nominal 0.4% V₂O₅ wireframed cut-off for low-grade and nominal 0.7% V₂O₅ wireframed cut-off for high-grade (total numbers may not add up due to rounding).

2020 Feb	Category	Mt	V ₂ O ₅ %	Fe %	TiO ₂ %	SiO ₂ %	Al ₂ O ₃ %	LOI %
HG	Measured	10.1	1.14	43.9	13.0	9.2	7.5	3.7
	Indicated	25.1	1.10	45.4	12.5	8.5	6.5	2.9
	Inferred	52.7	1.04	44.6	11.9	9.4	6.9	3.3
	Subtotal	87.9	1.06	44.7	12.2	9.2	6.8	3.2
LG 2-5	Indicated	44.5	0.51	25.0	6.8	27.4	17.0	7.9
	Inferred	60.3	0.48	25.2	6.5	28.5	15.3	6.7
	Subtotal	104.8	0.49	25.1	6.6	28.0	16.1	7.2
Trans 6-8	Inferred	15.6	0.65	28.4	7.7	24.9	15.4	7.9
	Subtotal	15.6	0.65	28.4	7.7	24.9	15.4	7.9
Total	Measured	10.1	1.14	43.9	13.0	9.2	7.5	3.7
	Indicated	69.6	0.72	32.4	8.9	20.6	13.2	6.1
	Inferred	128.5	0.73	33.5	8.8	20.2	11.9	5.4
	Subtotal	208.2	0.74	33.6	9.0	19.8	12.1	5.6

The Australian Vanadium Project - Ore Reserve Statement as at December 2020, at a cut-off grade of 0.7% V₂O₅.

Ore Reserve	Mt	V ₂ O ₅ %	Fe ₂ O ₃ %	TiO ₂ %	SiO ₂ %	LOI%	V ₂ O ₅ production kt	Ore Reserve	Mt
Proved	9.8	1.08	59.9	12.4	8.7	3.5	63.2	Waste	244.5
Probable	22.4	1.04	61.7	11.8	8.3	2.8	158.9	Total Material	276.7
Total Ore	32.1	1.05	61.2	12.0	8.4	3.0	222.1	Strip Ratio	7.6

COMPETENT PERSON STATEMENT — MINERAL RESOURCE ESTIMATION

The information in this announcement 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 Barnes and Mr Davis are both members of the Australasian Institute of Mining and Metallurgy (AusIMM) and the Australian Institute of Geoscientists (AIG). 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 announcement of the matters based on their information in the form and context in which they appear.

COMPETENT PERSON STATEMENT — ORE RESERVES

The technical information in this announcement that relates to the Ore Reserve estimate for the Project is based on information compiled by Mr Ross Cheyne, an independent consultant to AVL. Mr Cheyne is a Fellow of the Australasian Institute of Mining and Metallurgy. He is an employee and Director of Orelogy Mine Consulting Pty Ltd. Mr Cheyne has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being 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 Cheyne consents to the inclusion in the announcement of the matters related to the Ore Reserve estimate in the form and context in which it appears.

COMPETENT PERSON STATEMENT – METALLURGICAL RESULTS

The information in this announcement that relates to Metallurgical Results is based on information compiled by independent consulting metallurgist Brian McNab (CP. BSc Extractive Metallurgy). Mr McNab is a Member of AusIMM. He 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 JORC 2012 Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr McNab consents to the inclusion in the announcement of the matters based on the information made available to him, in the form and context in which it appears.