

ASX ANNOUNCEMENT

25 MARCH 2024

# ACHIEVEMENT OF ULTRA-HIGH PURITY 99.9% VANADIUM PRODUCT

## KEY POINTS

- Pilot testwork achieves greater than 99.9% purity vanadium pentoxide from Australian Vanadium Project ore.
- Ultra-high purity flowsheet provides a scalable 'bolt-on' option to produce ultra-high purity vanadium oxides which demand a premium price.

Australian Vanadium Limited (ASX: AVL, "the Company" or "AVL") is pleased to announce that it has demonstrated the capability to produce greater than 99.9% ultra-high purity vanadium pentoxide ( $V_2O_5$ ) at pilot scale, using AVL ore. These results confirm a processing route that can easily be incorporated into the AVL flowsheet, employing well known processing technology that can be readily scaled to meet market demand.

Ultra-high purity vanadium pentoxide is critical in applications where even the smallest impurities can significantly affect performance, such as the chemical industry and specialty alloys for the aerospace industry, including defence. These growing market segments demand higher purity levels. AVL has identified the importance of satisfying this expanding market, in addition to other steel and battery markets which can use the Company's standard 99.5% purity level.<sup>1</sup>

CEO, Graham Arvidson, comments, "AVL's ability to produce 99.9% ultra-high purity vanadium pentoxide, in addition to our 99.5% standard high purity vanadium pentoxide, allows us to further strengthen our competitive advantage in specialised markets in which premium products attract a higher value.

"Our distinct advantage as a business continues to be our outstanding technical and economic vanadium processing acumen and I commend the team for the work undertaken to create and substantiate a new pathway for additional value creation. Our conviction remains that vanadium producers who can achieve the highest quality vanadium oxides will stand above the rest and command the greatest and most enduring returns. In addition to our proposed world-class vanadium project, our lowest quartile unit cost competitiveness strategy and our focus on product quality will provide further long-term competitive advantages to the Company and superior investor return.

<sup>1</sup> See ASX announcement dated 13 December 2021 'High Purity 99.5%  $V_2O_5$  Produced in Final Phase of Metallurgical Work for BFS'

*“We have been pleased to work with the team at ANSTO and for the support that the Australian Government has provided us in achieving this milestone. Adding value to vanadium through downstream processing in Australia aligns with the Federal Government’s Critical Minerals Strategy 2023-2030 and helps to keep the value of Australia’s minerals in the country as we transition to a net zero future.”*

The work undertaken to achieve ultra-high purity vanadium pentoxide was partly funded through a \$3.69 million Australian Government Modern Manufacturing Initiative Translation grant under the National Manufacturing Priority Roadmap.<sup>2</sup>

AVL worked in conjunction with Australia's Nuclear Science and Technology Organisation (ANSTO) in Sydney to develop a feasible processing route. The pilot for producing ultra-high purity vanadium pentoxide is the culmination of two years of work, exploring the most economic method for producing this product. The pilot was designed and operated to simulate processing of a stream diverted from the leach circuit developed in the AVL Bankable Feasibility Study (BFS) flowsheet.<sup>3</sup> This concept allows for easy integration of an ultra-high purity process, in addition to the Company’s high purity process, that can be scaled to match ultra-high purity demand.



**Figure 1 - AVL's Metallurgist Greg O'Connor alongside staff from ANSTO at the pilot facility**

<sup>2</sup> See ASX announcement dated 22 July 2021 'AVL Awarded \$3.69M Federal Government Manufacturing Grant'

<sup>3</sup> See ASX announcement dated 6 April 2022 'Bankable Feasibility Study for the Australian Vanadium Project'

The feed for the pilot was generated during AVL's pilot beneficiation,<sup>4</sup> pyrometallurgy<sup>5</sup> and hydrometallurgy<sup>6</sup> programs, conducted as a part of the BFS work undertaken in 2021. The feed materials for this sequence of pilot programs comprised two composites of drill core, designed to be indicative of the average first five years of production and life of mine production.<sup>7</sup>

Three composite samples of the final vanadium pentoxide product were taken during the course of the pilot and submitted for assay in triplicate. A full analysis was performed at the Bureau Veritas laboratory, using a combination of x-ray fluorescence (XRF) and laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS). The average result for each composite is found in APPENDIX 1

**Table 1** in Appendix 1 below. While vanadium pentoxide was not measured directly with these methods, the inferred value from measured elemental vanadium is greater than 99.9%. The most significant impurity was chromium, which was able to be reduced to 0.014%, with potential for further improvement. Most other impurities were below detection limits.

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

<sup>4</sup> See ASX announcement dated 17 March 2020 'Pilot Study Programme Confirms High Vanadium Recoveries and Concentrate Quality'

<sup>5</sup> See ASX announcement dated 10 March 2021 'Final Pyrometallurgy Results Confirm World Leading Vanadium Extraction'

<sup>6</sup> See ASX announcement dated 8 June 2021 'High Vanadium Extractions Confirmed in Pellet Leach Pilot as BFS Progresses'

<sup>7</sup> See ASX announcement dated 21 January 2019 'Metallurgical Drilling Commences at Gabanintha Vanadium Project.'

## APPENDIX 1

Table 1 – Assay results for ultra-high purity V<sub>2</sub>O<sub>5</sub> from three composites by XRF and (LA-ICP-MS)

Element	Unit	AVL01	AVL02	AVL03	Element	Unit	AVL01	AVL02	AVL03
Fe	%	0.01	<0.01	<0.01	Eu_LA	ppm	<0.01	<0.01	0.02
P	%	<0.001	<0.001	<0.001	Ga_LA	ppm	0.2	0.3	<0.1
S	%	0.001	0.001	0.001	Gd_LA	ppm	0.06	0.07	0.36
Zn	%	<0.001	<0.001	<0.001	Ge_LA	ppm	<0.05	<0.05	<0.05
Pb	%	<0.001	<0.001	0.001	Hf_LA	ppm	0.33	0.29	0.22
Cu	%	0.001	0.001	0.001	Ho_LA	ppm	<0.01	<0.01	0.02
Ba	%	<0.001	<0.001	0.003	In_LA	ppm	<0.05	<0.05	<0.05
As	%	<0.001	<0.001	<0.001	La_LA	ppm	0.20	0.06	0.30
Ni	%	<0.001	<0.001	<0.001	Lu_LA	ppm	<0.01	<0.01	0.01
Co	%	<0.001	<0.001	0.001	Mn_LA	ppm	2	1	3
Sn	%	<0.001	<0.001	0.001	Mo_LA	ppm	0.2	<0.2	0.2
Sr	%	0.001	<0.001	<0.001	Nb_LA	ppm	5.48	4.95	3.41
Zr	%	<0.001	<0.001	0.001	Nd_LA	ppm	0.11	0.04	0.24
Cl	%	0.001	0.001	0.001	Ni_LA	ppm	2	<2	<2
V	%	55.99	56.01	56.02	Pb_LA	ppm	<1	<1	<1
V <sub>2</sub> O <sub>5</sub> *	%	99.95	99.98	99.99	Pr_LA	ppm	0.02	<0.01	0.06
Cr	%	0.026	0.023	0.014	Rb_LA	ppm	0.05	0.05	0.05
Na	%	<0.01	<0.01	<0.01	Re_LA	ppm	<0.01	<0.01	<0.01
Al	%	0.005	0.004	0.005	Sb_LA	ppm	0.1	0.1	<0.1
Ca	%	<0.01	<0.01	<0.01	Sc_LA	ppm	0.1	0.2	0.15
K	%	0.007	0.006	0.006	Se_LA	ppm	<5	<5	<5
Mg	%	<0.01	<0.01	<0.01	Sm_LA	ppm	0.09	0.06	0.30
Mn	%	<0.001	<0.001	0.002	Sn_LA	ppm	0.2	<0.2	0.3
Si	%	<0.001	<0.001	<0.001	Sr_LA	ppm	<0.1	<0.1	0.1
Ti	%	<0.001	<0.001	<0.001	Ta_LA	ppm	0.02	0.02	0.02
Ag_LA	ppm	<0.1	<0.1	<0.1	Tb_LA	ppm	1.11	1.34	25.97
As_LA	ppm	<0.2	<0.2	<0.2	Te_LA	ppm	<0.2	<0.2	<0.2
Ba_LA	ppm	1	1	2.5	Th_LA	ppm	0.01	0.01	0.11
Be_LA	ppm	<0.2	<0.2	<0.2	Ti_LA	ppm	4	2	3
Bi_LA	ppm	0.02	0.02	0.02	Tl_LA	ppm	<0.2	<0.2	<0.2
Ca_LA	%	0.02	0.02	0.03	Tm_LA	ppm	<0.01	<0.01	<0.01
Cd_LA	ppm	<0.1	<0.1	<0.1	U_LA	ppm	0.22	0.08	0.71
Ce_LA	ppm	0.29	0.10	0.69	V_LA	ppm	563,000	560,000	562,000
Co_LA	ppm	0.1	0.1	0.1	V <sub>2</sub> O <sub>5</sub> *	ppm	>99.99	99.96	>99.99
Cr_LA	ppm	253	229	139	W_LA	ppm	0.5	0.5	<0.5
Cs_LA	ppm	0.01	0.01	0.01	Y_LA	ppm	0.15	0.06	0.25
Cu_LA	ppm	6	5	7	Yb_LA	ppm	0.01	<0.01	0.02
Dy_LA	ppm	0.92	1.36	22.63	Zn_LA	ppm	<5	<5	<5
Er_LA	ppm	<0.01	<0.01	<0.01	Zr_LA	ppm	1.2	0.5	0.5

\*V<sub>2</sub>O<sub>5</sub> value calculated from measured elemental V



## 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.

VSUN Energy is AVL's 100% owned renewable energy and energy storage subsidiary which is focused on developing the Australian market for vanadium flow batteries for long duration energy storage. VSUN Energy was set up in 2016 and is widely respected for its VFB expertise. AVL's vertical integration strategy incorporates processing vanadium to high purity, manufacturing vanadium electrolyte and working with VSUN Energy as it develops projects based on renewable energy generation and VFB energy storage.

## ASX CHAPTER 5 COMPLIANCE AND CAUTIONARY AND FORWARD-LOOKING STATEMENTS

### *ASX Listing Rules 5.19 and 5.23*

#### **ASX Listing Rule 5.19**

The information in this announcement relating to production targets, or forecast financial information derived from a production target, is extracted from the announcement entitled 'Bankable Feasibility Study for the Australian Vanadium Project' released to the ASX on 6 April 2022 which is available on the Company's website [www.avl.au](http://www.avl.au).

The Company confirms that all material assumptions underpinning the production target, or the forecast financial information derived from a production target, in the original market announcement continue to apply and have not materially changed.

#### **ASX Listing Rule 5.23**

The information in this announcement relating to exploration results and mineral resource and ore reserve estimates for the Australian Vanadium Project is extracted from the announcement entitled 'Bankable Feasibility Study for the Australian Vanadium Project' released to the ASX on 6 April 2022 which is available on the Company's website [www.avl.au](http://www.avl.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 that all material assumptions and technical parameters underpinning the estimates in the original 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.

### **Forward-Looking Statements**

This release may contain certain forward-looking statements with respect to matters including but not limited to the financial condition, results of operations and business of AVL and certain of the plans and objectives of AVL with respect to these items.

These forward-looking statements are not historical facts but rather are based on AVL's current expectations, estimates and projections about the industry in which AVL operates and its beliefs and assumptions.

Words such as "anticipates," "considers," "expects," "intends," "plans," "believes," "seeks," "estimates", "guidance" and similar expressions are intended to identify forward looking statements and should be considered an at-risk statement. Such statements are subject to certain risks and uncertainties, particularly those risks or uncertainties inherent in the industry in which AVL operates.

These statements are not guarantees of future performance and are subject to known and unknown risks, uncertainties, and other factors, some of which are beyond the control of AVL, are difficult to

predict and could cause actual results to differ materially from those expressed or forecasted in the forward-looking statements. Such risks include, but are not limited to resource risk, metal price volatility, currency fluctuations, increased production costs and variances in ore grade or recovery rates from those assumed in mining plans, as well as political and operational risks in the countries and states in which we sell our product to, and government regulation and judicial outcomes. For more detailed discussion of such risks and other factors, see the Company's Annual Reports, as well as the Company's other filings.

AVL cautions shareholders and prospective shareholders not to place undue reliance on these forward-looking statements, which reflect the view of AVL only as of the date of this release.

The forward-looking statements made in this announcement relate only to events as of the date on which the statements are made.

AVL will not undertake any obligation to release publicly any revisions or updates to these forward-looking statements to reflect events, circumstances or unanticipated events occurring after the date of this announcement except as required by law or by any appropriate regulatory authority.