

1 DECEMBER 2021

## UPDATE ON DFS PROGRESS AND ESG INITIATIVES

**VANADIUM RESOURCES LTD (ASX:VR8) (“VR8” OR “THE COMPANY”)**, the developer of the tier 1 Steelpoortdrift Vanadium project in Limpopo, South Africa, is conducting a Definitive Feasibility Study (“DFS”) to undertake mining operations and to construct a concentrator and salt roast plant, potentially capable of initially producing 12,500tpa of V<sub>2</sub>O<sub>5</sub> flake at an estimated capex of US\$200M<sup>1</sup>.

The Company is pleased to announce an update on the progress of the DFS:

### HIGHLIGHTS

- ◆ DFS engineers and consultants are completing the final DFS design and conducting various in-depth studies
- ◆ DFS progressing well and remains on track for completion in Q3 2022
- ◆ DFS remains within budget
- ◆ Additional ESG initiatives being investigated during DFS, with a focus on carbon emission reduction, social governance and waste utilisation
- ◆ Company engaging with potential stakeholders to prepare for a rapid advancement of the project upon completion of the DFS (expected in Q3 2022)

### CURRENT DFS PROGRESS

The DFS is progressing well with the following activities currently in progress:

1. Two box cut pits have been located and designed for the purpose of collecting a 100 ton bulk sample from the two main mineralised zones. SPH have been appointed to conduct the trial mining of these pits, including collection of the mineralised material. Currently final regulatory permitting is being completed for these pits and equipment is being mobilised, with the target date for commencement of trial mining being January 2022. Bulk samples collected will be used for Pilot Plant campaigns through Multotec (OEM magnetic separator supplier), as well as Mintek (Salt Roast R&D laboratory).
2. Specialist studies required for final environmental permitting, as well as updating of existing permits have commenced and will continue over a 6 month period in order to span over both wet and dry seasons.

3. Plant, waste dump and pit locations have been finalised with geotechnical borehole and trench positions identified. Geotechnical drilling and sampling will commence end January 2022 with a 2 month work program planned.
4. Engineering designs and equipment sizing is progressing on time and within budget for the Concentrator, Salt Roast plant and waste facilities.

### DFS ENGINEER AND CONSULTANT APPOINTMENTS

VR8 is pleased to announce the progress of an Association for the Advancement of Cost Engineering class 3 DFS for the Steelpoortsdraif Vanadium project located in Limpopo, South Africa. The DFS is a natural progression of the Pre-Feasibility Study (“PFS”) recently completed<sup>1</sup> with the aim to produce a high purity (>98% V<sub>2</sub>O<sub>5</sub>) vanadium product from primary Run of Mine mineralised material.

VR8 has appointed a highly qualified and experienced team of engineering and consulting firms as contributors to the final DFS design, some of whom have been intimately involved with the completion of the PFS. These companies include:

|                                                              |                                         |
|--------------------------------------------------------------|-----------------------------------------|
| Sound Mining Solutions Pty (Ltd) (“ <b>Sound Mining</b> ”) - | Mining and Geology                      |
| GeoActiv Pty (Ltd) (“ <b>GeoActiv</b> ”) -                   | Geotechnical drilling                   |
| SPH Kundalila Pty (Ltd) (“ <b>SPH</b> ”) -                   | Trial mining and bulk sample generation |
| United Mining Service (“ <b>UMS</b> ”) -                     | Concentrator processing plant           |
| Consulmet Pty (Ltd) (“ <b>Consulmet</b> ”) -                 | Salt Roast and Leach processing plant   |
| Nurizon Pty (Ltd) (“ <b>Nurizon</b> ”) -                     | Tailings storage facility               |
| DRA Minopex (“ <b>Minopex</b> ”) -                           | Operational Readiness and operations    |
| Red Kite Consulting (“ <b>Red Kite</b> ”) -                  | Environmental compliance                |
| Tenement Consulting (“ <b>Tenement</b> ”) -                  | Document compilation and QP sign off    |

### ESG INITIATIVES FOR THE DFS

In addition to the baseline design as described by the PFS<sup>2</sup>, a number of ESG initiatives have been identified and are currently being incorporated into the project design during the DFS phase, these include, amongst others, the following:

<sup>1</sup> Refer to ASX Announcement 22 June 2021. The Company confirms that it is not aware of any information or data that materially affects the information included in the market announcement, and that all material assumptions and technical parameters underpinning the announcement continue to apply.

<sup>2</sup> Refer to ASX Announcement 22 June 2021. The Company confirms that it is not aware of any information or data that materially affects the information included in the market announcement, and that all material assumptions and technical parameters underpinning the announcement continue to apply.

1. Following recent Tailings Storage Facility (TSF) disasters that have occurred in the industry worldwide, the deposition of tailings will be dealt with differently at Steelpoortdrift to reduce the inherent risks associated with TSF's. For the Steelpoortdrift project the concentrator tailings will be filtered with a dry filter cake, returned to the mined-out areas and combined with mining waste (overburden) for continuous rehabilitation of the pit, thereby eliminating the inherent risk of a TSF and also minimizing legacy impacts. In addition, rehabilitated areas can then be re-used either by the mine or by the community in future.
2. The mine plan, design and schedule will allow for a two fenced access control system, whereby the local community will still be able to utilize major areas of the mine site for livestock grazing without being exposed to the potential dangers of a mining operation, thereby minimizing community impacts.
3. Under the current JDA with Senergy<sup>3</sup> a PV (solar) energy supply is being designed for the mine and concentrator site. The design (and capacity) of this facility will incorporate the following as part of the DFS:
  - a. Battery storage for the system will be by utilizing Vanadium Redox Flow Batteries,
  - b. Excess electricity from the PV plant will be fed back into the main grid, with the operations getting both financial credit and carbon credits.
  - c. A green hydrogen production capacity is being considered for inclusion into the PV design utilizing some of the excess electricity produced. The potential green hydrogen produced has been earmarked to power the mining haulage fleet. The preferred mining contractor (SPH) are investigating the implementation of a hydrogen-based mining fleet, with hydrogen sourced from our own PV circuit.
4. The road infrastructure close to the mine requires material movement through the main community, which could impact safety concerns for the community. As part of DFS the installation of a rope conveyor system, with a remote loadout facility away from the local community infrastructure is being investigated and costed. This will remove >90% of the heavy vehicle movement out of the community and significantly reduce impact the mine will have on

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<sup>3</sup> Refer to ASX Announcement of 6 July 2021. The Company confirms that it is not aware of any information or data that materially affects the information included in the market announcement, and that all material assumptions and technical parameters underpinning the announcement continue to apply.

local community. In addition, it is expected to have a positive impact on transport costs in terms of vehicle turnaround times. A similar system has been successfully implemented at a neighbouring Platinum mine and is shown in the following link <https://www.youtube.com/watch?v=4TTb6NXuHE4>

5. The Company has engaged a major South African haulage and logistics company to develop an integrated logistics plan to cover the following:
  - a. A spoke and hub system for material to be delivered to mine for both construction and operational phases (consumables, construction material, reagents etc). This will minimize transport costs as it will eliminate half loads and also reduce truck volumes into mine site.
  - b. Concentrate transport between concentrator and SRL plant will include the following:
    - i. Trucks to be hybrid hydrogen powered, with main power drive to be hydrogen powered utilizing green hydrogen generated at mine site.
    - ii. The transport contractor is to develop a commercial model whereby the community becomes a shareholder in the concentrate transport contract.
6. The Senergy JDA is currently limited to mine and concentrator site. Senergy is in the process of reviewing the SRL circuit design and thermodynamic balances to investigate the possibility of farming radiant heat energy from the Salt Roaster to produce additional green hydrogen. This is to be used by the concentrate transport fleet, as well as for renewable energy generation for use within existing systems. Based on their findings, a separate JDA focused on the SRL circuit will be developed.
7. The roaster is to be converted from a coal based firing system to utilizing Liquefied Natural Gas (LNG), which can be transported from Sasolburg/Witbank (approximately 160km away) where the main gas line from the Pembe gas fields terminate. LNG is a much more efficient heat source and has significantly cleaner (lower carbon) emissions compared to that of coal and would thus result in a significantly reduced carbon footprint for the process.
8. The SRL design will incorporate an Ion Exchange (IX) system, with the main focus being to maximize Vanadium recovery, but as a secondary benefit Sodium Sulphate could potentially be recovered from the waste streams to be re-used as reagent during the roasting process. This will reduce reagent consumption rates as well as reduce the volume of waste streams requiring disposal.

## KEY UPCOMING EVENTS FOR THE COMPANY

- Section 11 approval and transfer to attain 73.95% holding (expected in Q1 2022)
- Progress on ESG process development (TCM) studies, including:
  - additional confirmatory test work
  - completion of PFS level engineering designs and costing
  - completion of PFS for TCM process (expected Q2 2022)
- Engagement with a University Research Study Group to investigate technological improvements to process design, in order to maximise efficiencies of the Company's planned processing capacity
- Results in preparation for the raising of construction finance after completion of the DFS, including:
  - Potential LSE dual listing
  - Potentially securing long term offtake agreements from various purchasers of product
  - Procurement of a debt financing consortium consisting of parties such as major South African banks as debt funders, major traders and/or consumers for offtake financing or pre-payments, Development or Upliftment Funds for BEE-funding, Strategic investors for equity placements, convertible notes or royalty streaming funding.

Milestones associated with completion of the DFS (expected Q3 2022) include:

- First Blast Test Pit for Bulk Sample
- Pilot Scale Test Work Results
- Geotech Drilling Results
- Updated Resource and Reserve
- Project site infrastructure and establishment
- Environmental Permitting

*This announcement has been authorised for release by the Board of Vanadium Resources Ltd.*

**For further information please contact:**

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**VANADIUM RESOURCES LIMITED**

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#### COMPETENT PERSONS STATEMENT

The information in this announcement that relates to Mineral Resources, including the Mineral Resources contained within the Production Target, complies with the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (**JORC Code**) and has been compiled, assessed and created by Mr Kerry Griffin BSc.(Geology), Dip Eng Geol., a Member of the Australian Institute of Geoscientists and a Principal Consultant at Mining Plus Pty Ltd, consultants to the Company. Mr Griffin 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 JORC Code. Mr Griffin is the competent person for the resource estimation and has relied on provided information and data from the Company, including but not limited to the geological model and database.

The information in this announcement that relates to geotechnical studies, the mine design criteria and the mine design only, is aligned with the JORC Code and has been compiled and assessed under the supervision of Vaughn Duke, a Professional Engineer of the Engineering Council of South Africa and a Fellow of the South African Institute of Mining and Metallurgy. Mr Duke is a Principal Mining Engineer and Partner of Sound Mining Solution Pty Ltd. He 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 JORC Code. Mr Duke consents to the inclusion in this announcement of the information related to the geotechnical and mining engineering components of the PFS in the form and context in which it appears.

The information in this announcement that relates to metallurgy has been compiled and assessed under the supervision of Mr Eugene Nel, a Professional Engineer of the Engineering Council of South Africa and a Member of the South African Institute of Mining and Metallurgy (both Recognised Professional Organisations as defined in the JORC Code). Mr Nel is the Chief Executive Officer (CEO) of VR8, and 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 JORC Code. Mr Nel consents to the inclusion in this announcement of matters based on his information in the form and context in which it appears.

As stated above at footnotes 1 to 3, 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 announcements.