24 November 2021

ADDITIONAL INFORMATION : UPDATE ON ESG TECHNOLOGY DEVELOPMENT

Vanadium Resources Limited (ASX: VR8) provides the following additional information in relation to the Company Annoucement releaed 16 November 2021, titled 'Update on ESG Technology Development', following consultation with the ASX.

INITIAL METALLURGICAL TEST WORK RESULTS

The aim of the metallurgical testwork program is to confirm parameters for the techncological development of a two-stage process for extraction of Vanadium, Iron and other value metals using concentrates produced and obtained from the Steelpoortdrift Project in South Africa or other sources if applicable. Current development of the Steelpoortdrift project will continue on the basis of the Salt Roast process as reported previously (ASX announcement 22 June 2021: Steelpoortdrift PFS delivers superior results) whilst the ESG techncology is being developed separately.

Stage 1

The first stage of the process involves selective extraction and separation of Iron and Vanadium. The second stage of the process involves extraction of other value metals, including Titanium and Aluminium, and to maximize the extraction of Iron and Vanadium.

The elements of interest in the feed material; VR8/CONC2/19/04/2021 sample 776920, are presented in Table 1.

Fe %	V_2O_5 %	TiO_2 %	Al_2O_3 %
53,9	1,97	11,1	4,72

Table 1 Concentrate Composition.

A series of tests were conducted over a range of temperature and reductant concentration conditions for the first and second stage of the process to empirically derive the optimal parameters.

Near optimal Stage 1 extraction parameters were attained in test FS-5B, with % metals extracted presented in table 2.

Fe	V_2O_5	TiO_2	Al_2O_3
95,9 %	95,6 %	4,10 %	13,4 %

Table 2 Stage 1 Metals Extraction.

This indicates high selectivity for Iron (95.9% extraction) and Vanadium (95.6% extraction) and rejection of Titanium (only 4.1% extraction).

The rejected Titanium material is then fed into Stage 2 of the process.

Stage 2

Residues from the Stage 1 process were processed at the near optimal Stage 2 extraction parameters selected from the results obtained from Stage 1 in test BL-A, with % metals extracted presented in table 3. Variable temperatures were not tested during this test.

Fe	V_2O_5	TiO_2	Al_2O_3
91,0 %	99,3 %	97,8 %	40,0 %

Table 3 Stage 2 Metals Extraction.

This demonstrates that high extraction yields for Titanium (97.8%) can be achieved. Additionally, the Stage 2 process is able to recover the remaining Iron and Vanadium; as well as Aluminium (40% extracted).

The overall extraction yields for the combined Stage 1 and Stage 2 processes are above 99% for Iron, Vanadium and Titanium.

JORC Tables

The concentrates tested were produced during the previous pilot test campaign reported (ASX announcement 24 and 25 June 2020: Testwork enhances concentrate from Steelpoortdrift) with the relevant JORC tables included in appendix below.

APPENDIX A.

The following Tables are provided to ensure compliance with the JORC Code (2012 Edition) requirements for the reporting of Exploration Results at the Steelpoortdrift Vanadium Project.

Section 1: Sampling Techniques and Data

(Criteria in this section applies to all succeeding sections)

Criteria	JORC Code explanation	Commentary
Sampling techniques	*Nature and quality of sampling (eg cut channels, random chips, or specific specialised 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.*	Metallurgical samples made up by compositing excess sample material ("bulk rejects") from diamond core drilling (NQ size) and RC drilling using 5 ¼" face sampling hammer.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	RC & DD drilling sampled at 1m intervals RC drilling split on site using a riffle splitter. DD drilling split at core shed used a core saw.
	Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.	All aspects of the determination of mineralisation are described in this table. Drilling using these methods is considered appropriate for sampling the vanadiferous titanomagnetite unit which hosts the mineralisation. All of the drill samples have been sent to a commercial laboratory for crushing, pulverising and chemical analysis by industry standard practises. Metallurgical testwork has followed standard techniques for extraction of magnetite using a magnetic separation process.
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 of standard tube, depth of diamond tails, face-sampling bit or other type, whether core is orientated and if so, by what method, etc).*	RC drilling uses face sampling hammer and 5 ¼" bit sizes. DD drilling used NQ sized core
Drill sample recovery	*Method of recording and assessing core and chip sample recoveries and results assessed.*	RC drill samples are weighed to give a quantitative basis to estimation of recovery. Diamond core is measured to quantify core recovery each run.

Criteria	JORC Code explanation	Commentary
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	RC drilling – consistent drilling technique, cleaning of cyclone. Diamond drilling –consistent drilling technique.
	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 observed between recovery and grade. There is no known or reported relationship in historical drilling between sample recovery and grade.
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.*	RC drill chips & drill core is being geologically logged for the total length of the hole. Logging is recording lithology, mineralogy, alteration, veining, structure, mineralisation and weathering. Logs are coded using the company geological coding legend and entered into Excel worksheets prior to being loaded into the company database. All core is being photographed with images to be stored on the company server. Logging is appropriate and sufficiently detailed to support Mineral Resource estimates.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.	Logging of chips and core is both qualitative (eg. colour) and quantitative (eg. minerals percentages).
	The total length and percentage of the relevant intersections logged.	100% of all drilling to date by the Company has been logged.
Sub-sampling techniques and sample preparation	*If core, whether cut or sawn and whether quarter, half or all core taken.*	Sampling for all diamond core samples is undertaken on split core, halved via a core saw.
	If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.	RC drilling is sampled dry and split through a riffle splitter. Following laboratory preparation , the excess crushed sample is returned to the Company. The sample is composited on a hole by hole basis according to the stratigraphic unit of the mineralised zone (Upper, Intermediate and Lower). Samples from the same stratigraphic zone are combined and submitted for the metallurgical testwork
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	The sampling techniques are of consistent quality and appropriate.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	To ensure representivity sampling followed the same methodology at all times (both for assay and for metallurgy). Field duplicates taken and inserted for the assay samples. Certified Reference Materials (CRMs) were selected to be similar in chemistry to the mineralisation being targeted.

Criteria	JORC Code explanation	Commentary
	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.	One field duplicate is collected per 20 assay samples in addition to laboratory duplicates which were also reported. For the metallurgical samples samples were combined based on stratigraphic units. Repeat assays were carried out on the samples prior to magnetic separation as well as afterwards.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The material and sample sizes are considered appropriate given the magnetite unit being sampled.
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.*	The samples were sent to ALS Johannesburg, an ISO accredited commercial laboratory, for preparation and whole rock analysis. All samples were analysed by XRF fusion for Al2O3, As, Ba, CaO, Cl, Co, Cr2O3, Cu, Fe, K2O, MgO, Mn, Na2O, Ni, P, Pb, S, SiO2, Sn, Sr, TiO2, V, Zn and Zr as well as loss on ignition. Davis Tube analysis was carried out by SGS Laboratories Johannesburg, an ISO accredited commercial laboratory. Davis Tube analysis carried out at magnetic field of 1000G with magnetic and non-magnetic fractions analysed by XRF fusion for Fe, TiO2, V2O5, P2O5, SiO2, Al2O3, CaO, Cr2O3, MgO, MnO, Na2O, K2O and loss on ignition. Metallurgical testwork utilised the large scale magnetic separation units at Multotec's R&D Division. The initial magnetic concentrate produced in May 2019 was re-milled to 80% passing 106um, then passed through varying magnetic fields as detailed in Table 1 of the ASX Announcement dated 24 June 2020. LIMS utilised magnetic fields of 1550G while HIMS utilised magnetic fields of 6500G. Samples were analysed at SGS laboratories using the same methods as for the Davis Tube samples.
	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.	Hand held assay devices have not been reported.
	Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.	For assay samples QA/QC samples are inserted every 10 samples. These alternate between a CRM & blank, and a field duplicate (RC drilling only). CRM are sourced from an accredited source and are of similar material to the mineralisation being sampled. QA/QC samples are checked following receipt of each assay batch to confirm acceptable accuracy and precision.

Criteria	JORC Code explanation	Commentary
		Duplicates are taken of each metallurgical sample (feed, magnetics, non-magnetics) and analysed
Verification of sampling and assaying	*The verification of significant intersections by either independent or alternative company personnel.*	Assay results and intersections have been reviewed by independent geological consultants.
	The use of twinned holes.	Twinned holes are being drilled as part of the drilling programme.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Primary data is collected in the field and entered into Excel worksheets prior to being loaded into a database managed by an independent consultant.
	Discuss any adjustment to assay data.	Analytical result for V converted to V_2O_5 by multiplying by 1.785.
Location of data points	*Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.*	Location data has been recorded by handheld GPS (±5m accuracy on easting and northing) and will be regularly checked by survey by a licensed surveyor. Drillhole deviation for drilling is being measured via in-rod surveys during drilling.
	Specification of the grid system used.	The grid system for the SPD Vanadium Project is UTM Zone 35 S (WGS 84 Datum).
	Quality and adequacy of topographic control.	Good, based on recent UAV and heliborne surveys.
Data spacing and distribution	*Data spacing for reporting of Exploration Results.*	Drilling to date over the SPD Vanadium Prospect is on approximately 150m - 300m centres east-west and 300m -450m centres north-south over the mineralised body.
	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 procedure(s) and classifications applied.	Data spacing is deemed sufficient to establish geological and grade continuity to establish a mineral resource estimate, refer ASX Announcement 29 April 2020.
	Whether sample compositing has been applied.	No sample compositing has been applied.
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 majority of the drilling at the SPD Vanadium Project is vertical which is considered appropriate given the shallow dip and regional and local geological stratigraphy.
	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.	To date, orientation of the mineralised domain has been favourable for perpendicular drilling and sample widths are not considered to have added a significant sampling bias.
Sample security	*The measures taken to ensure sample security.*	Samples are stored at a secure yard. Samples are then delivered to the assay laboratory in Johannesburg by representatives of the Company.

Criteria	JORC Code explanation	Commentary
Audits or reviews	*The results of any audits or reviews of sampling techniques and data.*	No independent audits have been undertaken.

Section 2: Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section)

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.*	The Steelpoortdrift Vanadium Project comprises a Mining Right covering the farm Steelpoortdrift 365 KT.
	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.	The tenure is in good standing.
Exploration done by other parties	*Acknowledgment and appraisal of exploration by other parties.*	The Project has previously been explored for magnetite-hosted Fe-V-Ti deposits.
Geology	*Deposit type, geological setting and style of mineralisation.*	Vanadium mineralisation at the SPD Project is located close to the contact between the Upper Zone and Main Zone of the Bushveld Igneous Complex and adjacent to the Steelpoort Fault. Mineralisation is hosted in two layers, the Upper Magnetite Layer (UML) and Lower Magnetite Layer (LML), which dip shallowly (10-12deg) to the west.
Drill hole Information	*A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* • *easting and northing of the drill hole collar* • *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* • *dip and azimuth of the hole* • *down hole length and interception depth* • *hole length.*	Refer ASX Announcments 12 Oct 2018, 25 Oct 2018, 28 Nov 2018, 14 Jan 2019, 16 Jan 2019. 18 Mar 2019, 29 Jan 2019, 18 Mar 2019, 5 Aug 2019, 25 Sep2019, 19 Nov 2019.
	If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.	

Criteria	JORC Code explanation	Commentary
Data aggregation methods	*In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.*	All results > 0.5% V_2O_5 have been averaged weighted by downhole length, and inclusive of a maximum of 2m internal waste. Davis Tube results are reported for the same intervals as the whole rock analyses.
	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.	High grade intervals > 1% V_2O_5 and 1.5% V_2O_5 have also been reported. No internal waste used for these.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values are being used for reporting exploration results.
Relationship between mineralisation widths and intercept lengths	*These relationships are particularly important in the reporting of Exploration Results. If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported. If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	Downhole lengths reported, true widths not known at this time.
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 drill hole collar locations and appropriate sectional views.*	Appropriate diagrams are shown in the ASX Announcments of 12 Oct 2018, 25 Oct 2018, 28 Nov 2018, 14 Jan 2019, 16 Jan 2019. 18 Mar 2019, 29 Jan 2019, 18 Mar 2019, 5 Aug 2019, 25 Sep2019, 19 Nov 2019..
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.*	All results > 0.5% V_2O_5 included.
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.*	Exploration data is contained in previous ASX Announcements. Previous metallurgical testwork results were detailed in ASX Announcement of 18 March 2019. This announcement serves as a record of improvements to the process flow to efficiently separate the vanadium bearing magnetite from waste rock. Testwork involved a set of trials using both dry and slurried feed, at varying magnetic intensities. Further metallurgical testwork will focus on the extraction of vanadium from the magnetite using the salt roasting and leaching process established globally as the preferred process path.
Further work	*The nature and scale of planned further work (eg*	As detailed in the text – concentrate produced

Criteria	JORC Code explanation	Commentary
	tests for lateral extensions or depth extensions or large-scale step-out drilling). *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	from this testwork is being used in further testwork testing the amenability of the product produce high purity V_2O_5 products using the salt roasting – leaching method.

Complaince Statement

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.

The Company confirms that all material assumptions and parameters underpinning Metallurgical Test Work reported in the market announcements identified above continue to apply and have not materially changed and that it is not aware of any new information or data that materially affects the information that has been included in this announcement.