

# Yellow Rock Resources Ltd

*(ASX Code: YRR)*

## GABANINTHA VANADIUM PROJECT

INVESTOR UPDATE  
July 2014

Lorry Hughes BSc (Geology) MAusIMM  
Chief Executive Officer

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## **Competent Persons Statement**

The information in this statement that relates to Exploration Results, Mineral Resources or Ore Reserves is based on information compiled by independent consulting geologist Brian Davis B.Sc (Hons), Dip.Ed. Mr Davis is a Member of The Australian Institute of Mining and Metallurgy and the Australian Institute of Geoscientists. Brian Davis is employed by Geologica Pty Ltd. Mr Davis has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity which is undertaken to qualify as a Competent Person as defined in the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'.

Mr. Davis 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 that refers to Exploration Results and Mineral Resources in this announcement was prepared and first disclosed under the JORC Code 2004. It has not been updated since to comply with the JORC Code 2012 on the basis that the information has not materially changed since last reported.

# Summary

## *Focus and Corporate Strategy*

### Recent Activity

- Appointment of new CEO in June 2014;
- Rights Issue Shortfall Placement (To be completed by 8<sup>th</sup> August);
- Focus on Flagship Gabanintha High-Grade Vanadium Project;
  - Determine the most commercially viable V<sub>2</sub>O<sub>5</sub> production (Include evaluation of high purity V<sub>2</sub>O<sub>5</sub> options, FeV<sub>80</sub> and by- products);
  - Assess high-grade Vanadium concentrate production including delivery to a 3<sup>rd</sup> party treatment option;
    - Update scoping studies;
      - Metallurgy;
      - Mining;
      - Transport;
      - EIS Baseline;
      - Stakeholder Consultation;
- Flag subsidiary named Australian Vanadium Resources Pty Ltd to concentrate on Vanadium project;
- Focus on Strategic Investment from Vanadium Industry;
- Advance gold, copper and uranium projects toward commercial outcomes.

Key Statistics	
Ordinary shares on issue	428.5m
Options on issue (\$0.015 - \$0.06 exercise price)	319.5m (230m expire Nov 2014)
Share price	AUD \$0.009
Market capitalisation	\$3.95m (Cash \$0.6m)

Substantial Shareholders	% holding
Kimbriki Nominees	~7%
Management	~10 %

Board of Directors	Title
<b>Sydney Chesson</b> Juris Doctor, M.B.A, C.R.E.M	Chairman
<b>Leslie Ingraham</b>	Executive Director
<b>Brenton Lewis</b> MBSc., BSc.(Hons)	Non-Executive Director
<b>Simon Chesson</b> C.P.A., C.F.P., M.B.A., B.Comm, AICD	Company Secretary

Management	Title
<b>Lorry Hughes</b> B.Sc. MAusIMM	CEO
<b>Brian Davis</b> B.Sc. RPGeo (AIG) MAusIMM	Geology Manager

# Vanadium Uses

## *Hi-Tech Metal – Steel, Chemicals and Energy Storage*

- Vanadium is a ductile transition metal with good structural strength, a natural resistance to corrosion and stability against alkalis, acids and salt water;
- Vanadium is highly resistant to corrosion and is a common alloy in steel making including rebar and structural steel, high speed tools, titanium alloys and aircraft);
- Vanadium is used in the chemical industry to make synthetic rubber, polyester, fiberglass and sulphuric acid;
- Vanadium is a commodity in the renewable energy spectrum. It is playing a vital role in battery technology particularly in automotive applications for electric and hybrid vehicles;
- Vanadium is also being used in grid-scale stationary energy storage for both renewable and conventional energy making it a valuable component in supporting sustainable energy in the future;
- ***There are large drivers to Vanadium demand across the steel making and chemical sectors including;***
  - ***Growth in high strength low alloy steel production (HSLA);***
  - ***Growth in Vanadium Redox Battery technology (VRB's).***

Vanadium Demand by Application	
Application	% of Total
Steel	92
Titanium	4
Chemicals	4



# Vanadium Demand & Production

## *Significant Consumption Growth*

### Vanadium Production (MT)

Regions	2013	2012	2011	Growth %
China	43,500	37,500	38,100	14.17%
Nth America	4,431	3,908	3,937	12.55%
Europe/S.A./Russia/Kazak	28,103	26,181	31,429	-10.58%
Aust/NZ/Japan/Taiwan/Korea	2,500	2,800	2,000	25.00%
India	1,000	900	700	42.86%
<b>Total</b>	<b>79,534</b>	<b>71,289</b>	<b>76,166</b>	<b>4.42%</b>

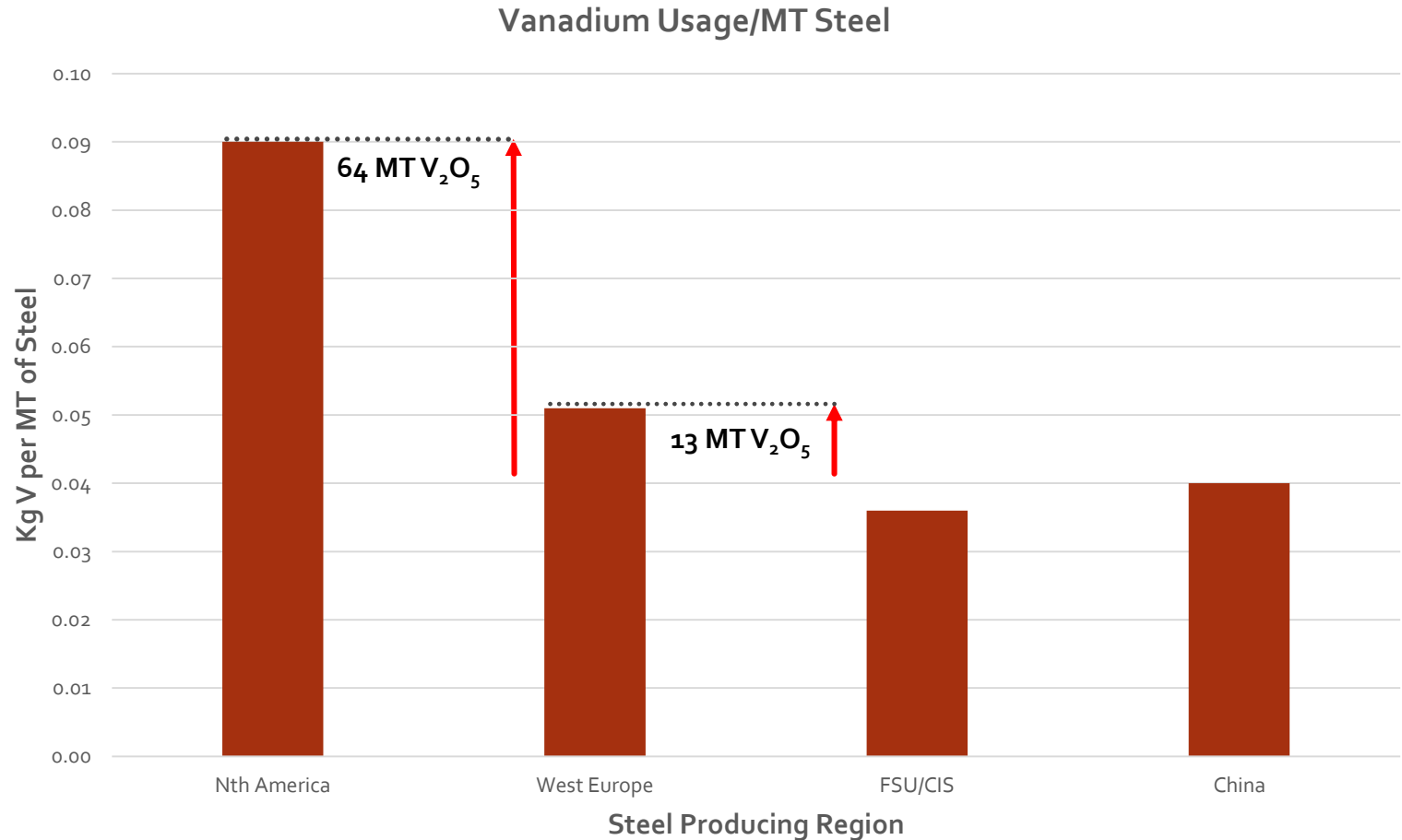
### Vanadium Demand (MT)

Regions	2013	2012	2011	Growth %
European Union	11,000	11,700	NA	-5.98%
Other Europe	1,700	1,800	NA	-5.56%
C.I.S.	5,300	4,900	NA	8.16%
Nth America	11,300	11,300	NA	0.00%
Sth America	2,200	2,600	NA	-15.38%
Africa	700	600	NA	16.67%
Middle East	800	600	NA	33.33%
China (Including Taiwan)	35,500	30,400	NA	16.78%
India	2,700	2,400	NA	12.50%
Asia Non-China/India	7,700	8,800	NA	-12.50%
Oceania	400	400	NA	0.00%
<b>Total (64 Countries)</b>	<b>79,300</b>	<b>75,500</b>	<b>71,700</b>	<b>10.07%</b>

Source; Vanitec

# Vanadium in Steel - Demand Drivers

## *Global Steel Quality Improving*



Source; Vanitec

# Vanadium in Energy Storage

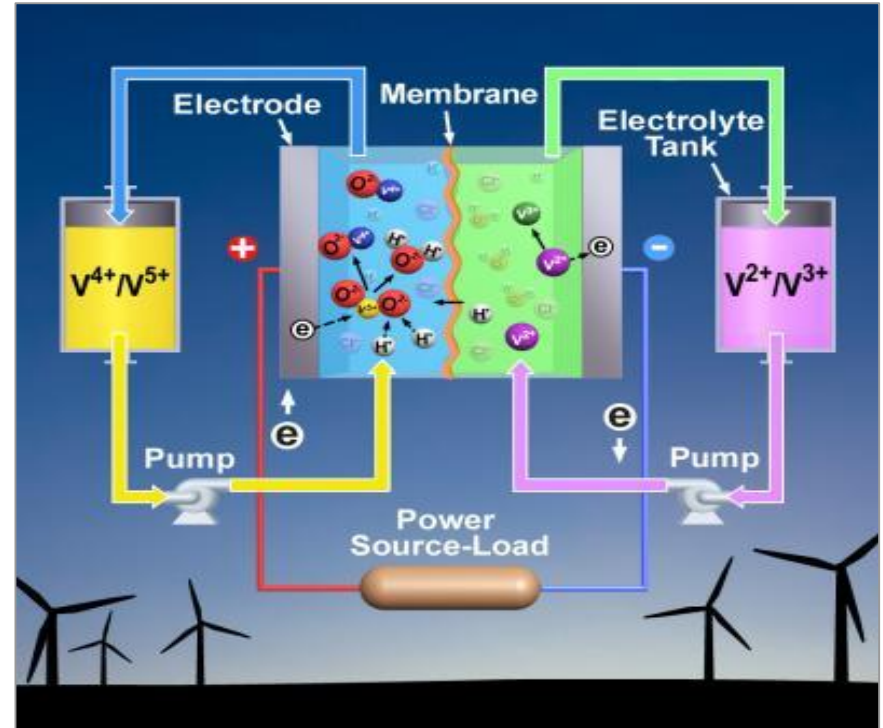
## Potential for Huge Growth in Vanadium Demand

Vanadium Redox to Lithium Battery Comparison

	Vanadium	Lithium
Lifespan	35-50 years	3-5 years
Low self-discharge	Yes	No
Low environmental footprint	Yes	No
Highly expandable	Yes	No
Generates low levels of heat	Yes	No
Charges and discharges simultaneously	Yes	No
Can release energy instantaneously	Yes	No
Suitable for connection to power grid	Yes	No

**“The grid-scale energy storage industry is tipped to grow from an estimated \$US 2.8 Billion to >\$US 100 Billion by 2020”**

Source; American Vanadium Corporate Presentation



**“VRB’s can hold 99% of their charge for 1 year”**

Two chambers are circulated with electrolytes containing active species of vanadium in different valence states,  $VO_2^+/VO^{2+}$  in the positive electrolyte and  $V^{2+}/V^{3+}$  in the negative electrolyte. During the energy discharge process,  $VO_2^+$  is reduced to  $VO^{2+}$  at the positive electrode and  $V^{2+}$  is oxidised to  $V^{3+}$  at the negative electrode. The reactions proceed in the opposite direction during the energy charge process. The active species are normally dissolved in a strong acid, and the protons transport across the ion-exchange membrane to balance the charge.



# Vanadium in Energy Storage Cont'd

## *Potential for Huge Growth in Vanadium Demand*

Production by Source			
Source	% of Total	~ Cost of Production V <sub>2</sub> O <sub>5</sub>	
		US\$/lb	US\$/kg
Slag	56	1.30	2.87
V ores	30	2.10	4.63
Secondary	14	4 - 11.00	8.82 – 24.25

Current Pricing		
	US\$/lb	US\$/kg
V <sub>2</sub> O <sub>5</sub> (98.5%)	5.70 - 6.80	12.57 – 15.00
V <sub>2</sub> O <sub>5</sub> (99.9%)	About 227	About 500
FeV <sub>80</sub>	11.11 – 12.25	24.50 - 27.00
V Electrolyte	>\$20	>44.10



- Vanadium redox batteries (VRB's) store base load energy and integrate solar and wind power into the electric grid;
- VRB's require high purity 99.9% vanadium pentoxide;
- Increases in vanadium applications should lead to improved demand and pricing;
- ***Vanadium is a high value product per tonne and can support increased transport distances to market.***

Sources; American Vanadium Corporate Presentation and [www.metal-pages.com/metalprices/ferrovanadium/](http://www.metal-pages.com/metalprices/ferrovanadium/)



# Gabanintha Vanadium Project

## *Favorable Mining Jurisdiction*

- 100% owned high-grade vanadium project located in the Murchison District of Western Australia, ~600km from the port of Geraldton and ~200km from the Windimurra Vanadium Mine;
- One of the highest grade  $V_2O_5$  deposits in the world;
  - \*JORC Compliant Indicated & Inferred Resource of 125.8Mt @ 0.70%  $V_2O_5$ , 8.64%  $TiO_2$  and 32.60% Fe including a;
  - **\*Separate High-Grade Indicated & Inferred Resource of 60.4Mt @ 0.98%  $V_2O_5$ , 11.40%  $TiO_2$  and 42.15% Fe;**
  - Deposit is at surface with open pit potential;
  - Significant potential to increase resource;
  - Initial magnetic separation test work has been highly encouraging.



\* High-grade massive V-Ti-Fe mineralisation from diamond drill hole GDH 903. Refer to full JORC Resource Table on Slide 10.



# Geological Resource

## *Large High-Grade Resource*

Material	JORC Resource Class	Million tonnes	In situ bulk density	V <sub>2</sub> O <sub>5</sub> %	Fe%	TiO <sub>2</sub> %	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	LOI%
<b>High grade</b>	<b>Indicated</b>	<b>14.4</b>	<b>4.17</b>	<b>1.03</b>	<b>42.14</b>	<b>12.07</b>	<b>11.42</b>	<b>7.84</b>	<b>3.37</b>
	<b>Inferred</b>	<b>46.0</b>	<b>4.16</b>	<b>0.97</b>	<b>42.15</b>	<b>11.19</b>	<b>12.37</b>	<b>8.28</b>	<b>3.20</b>
<b>Subtotal</b>		<b>60.4</b>	<b>4.16</b>	<b>0.98</b>	<b>42.15</b>	<b>11.40</b>	<b>12.15</b>	<b>8.17</b>	<b>3.24</b>
Low grade	Indicated	42.7	2.71	0.44	23.37	6.08	29.25	18.09	8.94
	Inferred	22.7	2.67	0.42	22.65	6.08	30.62	16.96	6.92
Subtotal	Indicated	57.0	2.97	0.59	28.10	7.59	24.76	15.51	7.54
Subtotal	Inferred	68.8	3.51	0.79	35.70	9.50	18.40	11.15	4.43
<b>Total</b>		<b>125.8</b>	<b>3.25</b>	<b>0.70</b>	<b>32.60</b>	<b>8.64</b>	<b>21.29</b>	<b>13.13</b>	<b>5.84</b>

Note: In-situ dry bulk density has been assigned based on V<sub>2</sub>O<sub>5</sub> grade, therefore density values quoted here are weighted average values. The Mineral Resource was estimated as a block model within constraining wireframes based upon logged geological boundaries and grade cut-offs of 0.30% V<sub>2</sub>O<sub>5</sub> for Low Grade (LG) and 0.70% V<sub>2</sub>O<sub>5</sub> for High Grade (HG). Tonnages have been rounded to reflect that this is an estimate.

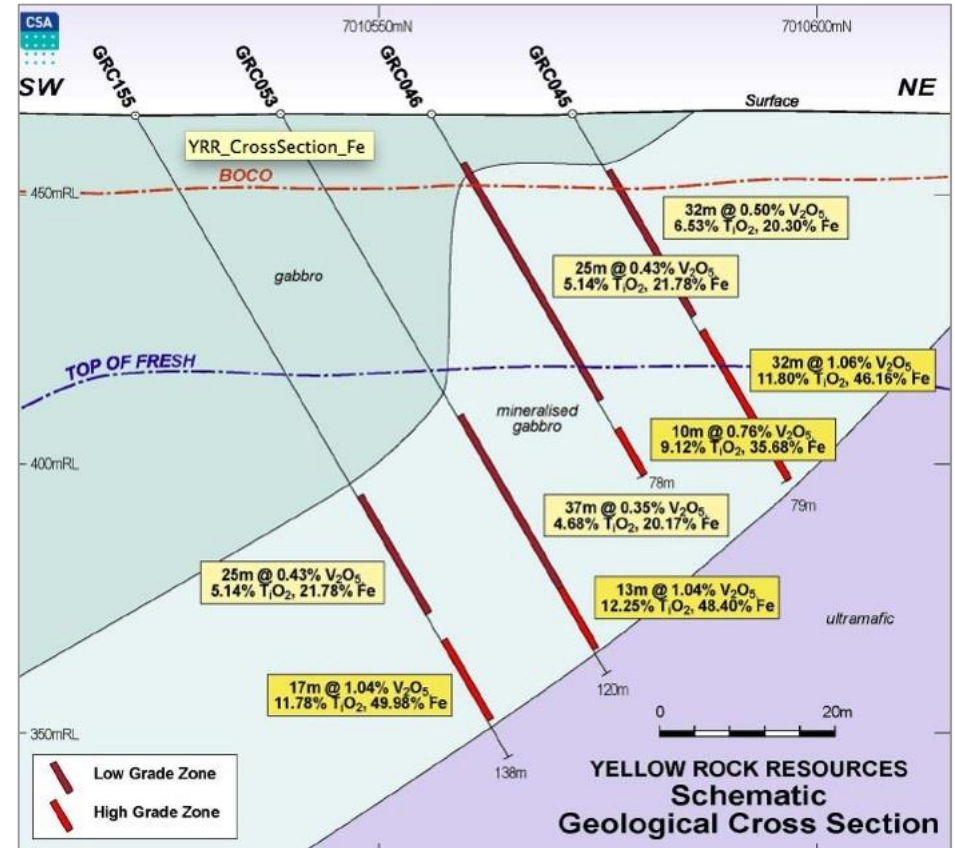
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# Geological Resource Cont'd

## *High-Grade Zone, Simple Geometry*



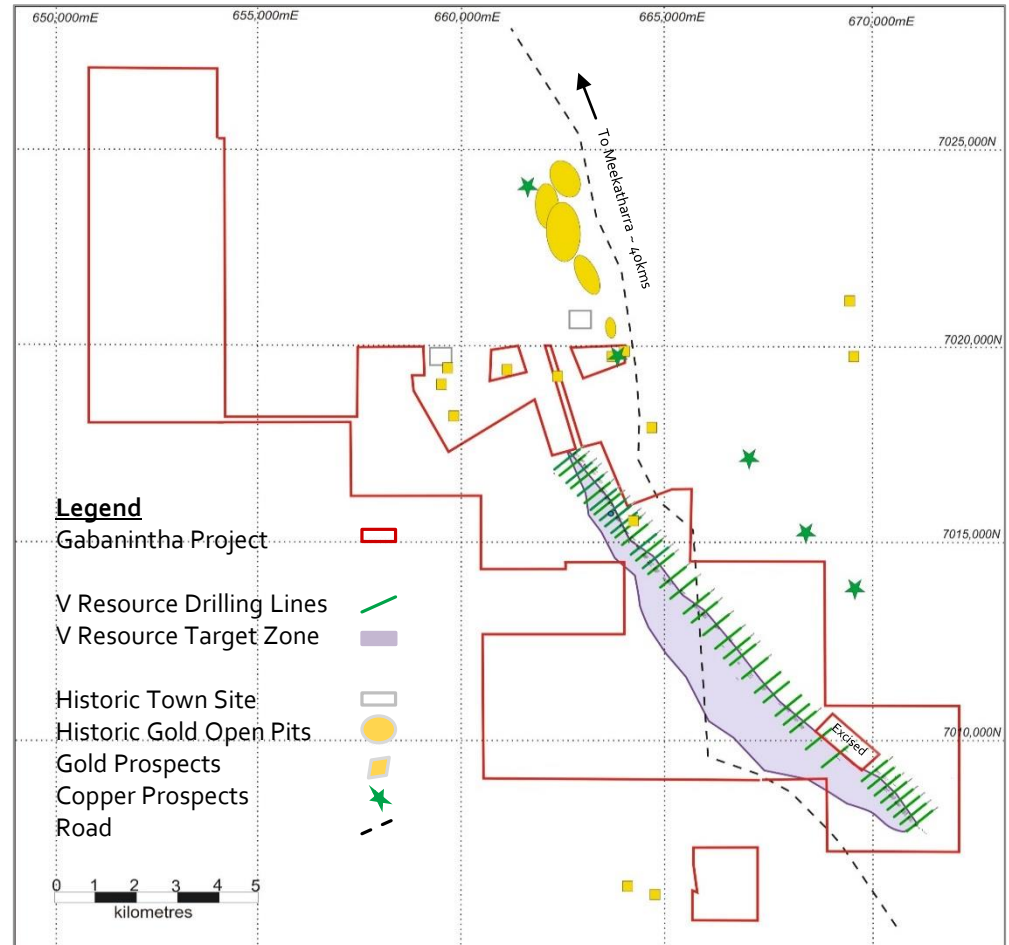
Two distinct zones of mineralization – a basal, massive, high grade zone and a lower grade upper disseminated zone have been identified.



# Gabanintha Vanadium Project Cont'd

## *A Development Project*

- Mineralisation outcrops for over 12km;
- Dips 60o to west;
- Mineralisation is up to +100m wide in places and continuous;
- Simple and inexpensive mining costs;
- Strong potential to extend resource at depth;
- Significant historic and modern day exploration and mining has occurred in the immediate area;
- Located ~40kms from the mining town of Meekatharra for existing services;
- Stakeholders supportive of mining and exploration activity;
- No significant environmental impediments identified for future mining activity;
- Processing routes and product selection will be the key to development.



# Magnetic Separation Test Work

## *Initial Results Encouraging*

Sample Details	Fraction	Wt. Distrib %	V <sub>2</sub> O <sub>5</sub>		Fe		SiO <sub>2</sub>		TiO <sub>2</sub>	
			Grade %	Distrib %	Grade %	Distrib %	Grade %	Distrib %	Grade %	Distrib %
<b>GRC 53 HG Fresh Massive</b>	Calc Feed	100	1.27	100	54.8	100	2.04	100	13.20	100
	Conc	<b>90.8</b>	<b>1.37</b>	<b>97.6</b>	<b>58.0</b>	<b>96.1</b>	<b>0.58</b>	<b>25.8</b>	<b>12.30</b>	<b>84.7</b>
	Tail	9.2	0.33	2.4	23.0	3.9	16.40	74.2	21.80	15.3
<b>GRC 53 Fresh LG Dissem HW</b>	Calc Feed	100	0.58	100	29.3	100	23.80	100	7.70	100
	Conc	<b>22.4</b>	<b>1.59</b>	<b>61.3</b>	<b>57.8</b>	<b>44.2</b>	<b>1.64</b>	<b>1.5</b>	<b>10.30</b>	<b>30.0</b>
	Tail	77.6	0.22	38.7	21.1	55.8	30.20	98.5	6.90	70.0
<b>GRC 54C high Fe Scree</b>	Calc Feed	100	0.89	100	46.4	100	11.00	100	9.04	100
	Conc	13.5	1.04	15.8	56.0	16.3	3.45	4.2	8.12	12.2
	Tail	86.5	0.87	84.2	44.9	83.7	12.20	95.8	9.20	87.8
<b>GRC 63 Transition Massive</b>	Calc Feed	100	1.17	100	51.0	100	4.22	100	12.50	100
	Conc	<b>35.9</b>	<b>1.34</b>	<b>41.2</b>	<b>56.3</b>	<b>39.6</b>	<b>0.87</b>	<b>7.4</b>	<b>12.10</b>	<b>34.8</b>
	Tail	64.1	1.07	58.8	48.0	60.4	6.10	92.6	12.70	65.2

- Modified Davis Tube testwork (2009) – samples crushed to 500 micron;
- Oxide and transitional ores behave differently;
- Further metallurgical testing is required to develop optimised beneficiation and magnetic separation parameters.

# Gabanintha Vanadium Project Cont'd

## *Initial Concept Study Shows The Potential*

- **Historic Focus**

- Concept studies conducted in 2009 demonstrated a vanadium operation to produce ferro-vanadium ( $\text{FeV}_{80}$ ) via a roast-leach process at Gabanintha is technically and commercially feasible;
- Lower Capex options to produce high purity  $\text{V}_2\text{O}_5$ , vanadium electrolyte or a high-grade concentrate from high grade material for delivery to third party operations were not considered;
- Lower Capex DSO options were focused on Iron Ore production;

- **Current Focus**

- Further targeted metallurgical investigation of specific ore types and specific high grade locations from within the resource to unlock potential;
- Engineering scoping study to evaluate the production of  $\text{V}_2\text{O}_5$  for energy storage applications;
- Engineering scoping study to define the most economical start-up mining and product combination that minimises capital expense and maximises value;
- Demonstrate that transport costs as a percentage of revenue per load are minimal for high value vanadium products;
- Engineering scoping study to develop a staged expansion model that extracts value from the large resource whilst minimising risk during the start-up phase.



# Strategic Partners

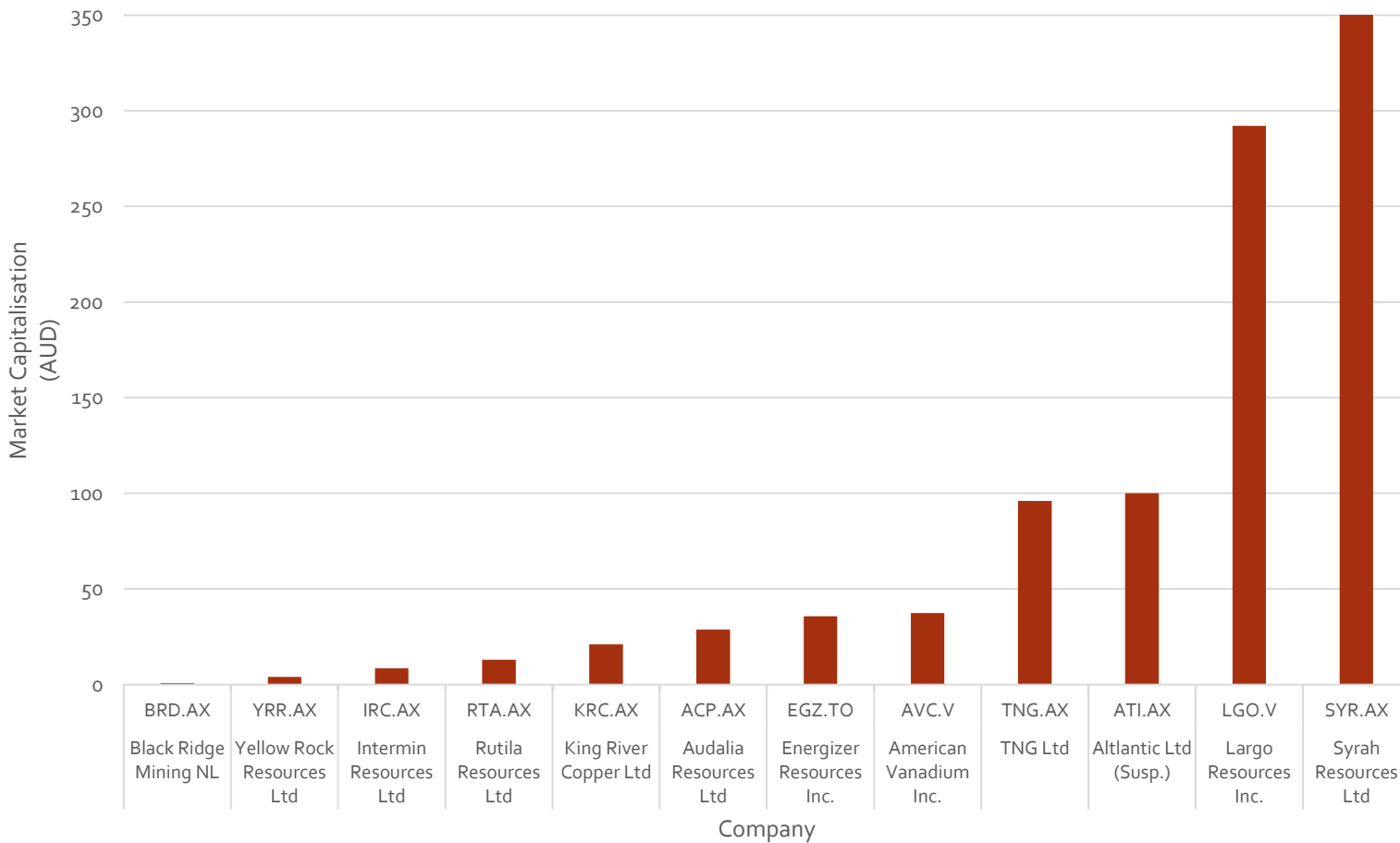
## *Industry tie-ups with end users*

- Yellow Rock recognises the importance of partners to assist with the advancement of the Gabanintha Vanadium Project and has commenced engagement and technical information sharing with potential strategic groups within the Vanadium industry;
- These strategic groups are numerous, varied and include participants from the steel, chemicals and energy storage industries worldwide;
- Of particular importance is the geographical location of Geraldton Port to potential customers and end-users from within the Asia and Middle Eastern Regions. This is a fast growing area eager to expand existing industries and develop new ones embracing technological advancements to support their burgeoning populations;
- Yellow Rock has commenced membership and participation with Vanitec to better assimilate with vanadium consumers and producers;
- Who are Vanitec?
- Vanitec is based in London and is a technical and scientific committee which brings together representatives of companies and organisations involved in the mining, processing, manufacture, research and use of vanadium and vanadium-containing products. <http://vanitec.org/>;
- Current Board members of Vanitec are;
  - Vanitec President – Mr Malcolm Curror (Evraz Group)
  - Vanitec Vice President – Mr Zhang Dade (Pangang Group)
  - Mr Rainer Schmidtmayer – (Treibacher AG)
  - Mr Allan Orr (Gulf Chemical and Metallurgical Corporation)
  - Vanitec CEO – Mr David Milbourn

# Publicly Listed Peers

## *Undervalued Compared to Peers*

Emerging Vanadium Company Market Capitalisations



# Next Steps

## *Strong News Flow*

- Complete Shortfall Placement by 8th August 2014;
- Finalise scope and tender process for an updated metallurgical testwork program targeting specific ore types and specific high grade locations within resource to unlock potential - 8th August 2014;
- Finalise scope to complete an updated engineering scoping study to define the most economical start-up mining and product combination that minimises capital expense and maximises value – Q1 2015;
- Commence application process for a Mining Lease over the Gabanintha Resource including EIS Baseline and Stakeholder consultation – Q1 - 2015;
- Complete updated metallurgical testwork program – Q2 – 2015;
- Review results and determine next steps – Q2 – 2015;
- Name change to reflect company focus – Q2- 2015;
- Continue to engage with potential strategic investors from the vanadium industry - ongoing;
- Advance non-core projects toward commercial outcomes - ongoing.

# For Further Information Contact

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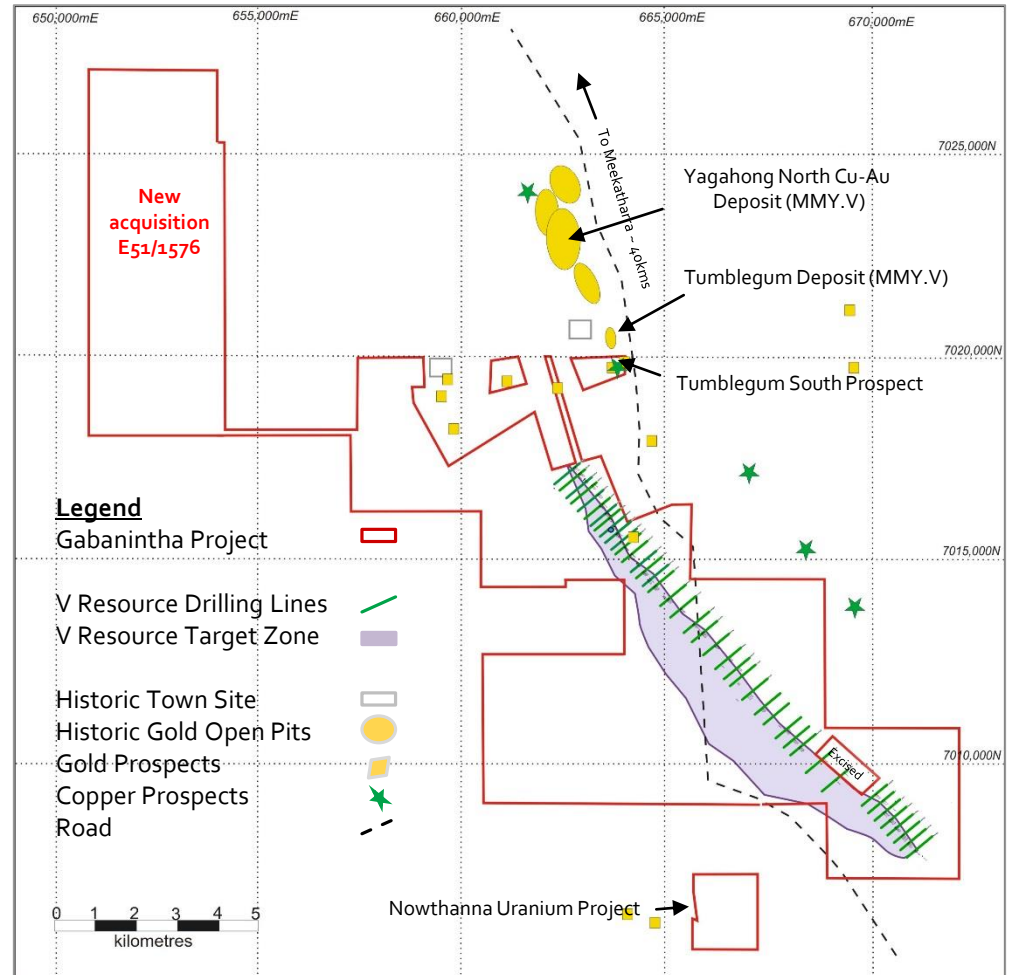
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# Appendix

## Copper and Gold

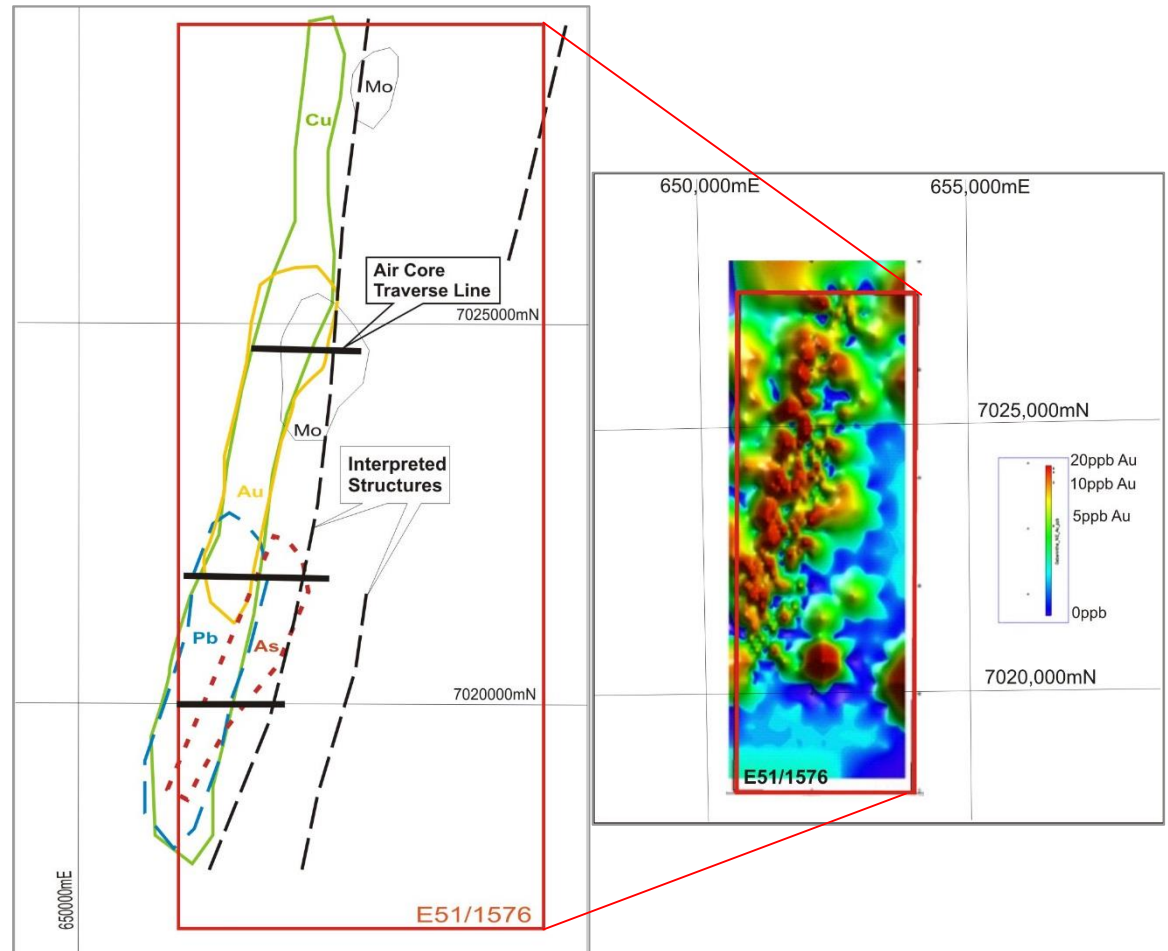
- Highly prospective package of mafic/ ultramafic volcanics and intrusives of the Gabanintha Formation;
- Recent RC drilling discovered significant new copper and gold mineralisation at the Tumblegum South Prospect including;
  - 5m @ 8.72g/t Au and 3.05% Cu from 31m downhole in GRC1158 and;
  - 5m @ 9.64g/t Au and 0.18% Cu from 58m downhole in GRC1159 (see ASX announcement dated 26<sup>th</sup> November 2013);
- Located ~ 500m south along strike of the Tumblegum Cu-Au pit and which is part of the Yagahong North Cu-Au Deposit owned by Monument Mining (MMY.V);
- Mineralisation is open in all directions to the tenement boundary;
- Currently conducting a comprehensive technical review of entire tenement package to assist with target definition for follow up drilling;
- **Expanded presence from newly acquired E51/1576 which contains part of the Federal Bassett Shear Zone which is known to host gold mineralisation;**
- Significant competitor activity in region including DRM.AX, MTH.AX and MMY.V.



# Appendix

## Copper and Gold

- Located along strike from the Burnakara Gold Project (MMY.V);
- Highly prospective >5km long Au in soil anomaly over the Federal Bassett Shear Zone;
- First –pass aircore drilling by EMU Nickel produced best results of;
  - Hole WKAC98 intersected anomalous gold (42m @ 78ppb Au) from surface including 8m @ 0.23g/t Au from 4m;
  - Adjacent hole WKAC99 intersected anomalous gold (4m @ 61ppb Au from 32m) at EOH;
- Hosted in a sequence of weathered mafic volcanics, sediments and felsic rocks;
- **These highly anomalous intersections in wide-spaced, shallow drilling have not been followed up;**
- High priority targets to be followed up upon access.



Geochemical Contour Plot for Soil Au, Cu, Pb, As and Mo on E51/1576 from historical data by Emu Nickel NL. Contours are areas above background levels for the listed elements.