Acquisition
of brownfield production assets from
Vanchem Vanadium Products Limited

1 May 2019
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The technical information contained within this presentation has been reviewed and approved by Professor Richard Viljoen. Professor Richard Viljoen has more than 30 years experience in the mining industry, including 15 years as chief consulting geologist for Gold Fields of South Africa. Notable past experience includes the development of significant mines including Northam Platinum and the Luedoorn and Tarkwa gold mines, identifying and developing a significant platinum deposit in the Bushveld Complex for Akanani Resources as well as acting as consultant for exploration and mining companies in Canada, Mexico, Venezuela, India and China in the fields of base metals, gold and platinum. Professor Richard Viljoen has extensive experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined under the JORC Code (2012). Professor Richard Viljoen consents to the inclusion in this presentation of the matters based on his information in the form and context in which it appears.
Executive Summary

The Vanchem acquisition is in line with our strategy of being a significant and vertically-integrated primary vanadium producer

• Bushveld Minerals Limited has conditionally agreed to acquire, through a South African subsidiary, from Vanchem Vanadium Products (Pty) Limited (“VVP”) the Vanchem Plant and the SAJV Business collectively referred to as (“the Vanchem Business”) and 100% of the outstanding shares of Ivanti Resources (Pty) Limited (“Ivanti”) from Duferco Participations Holding S.A for an aggregate cash consideration of US$68 million.

• The Vanchem Plant is a primary vanadium producing facility with a beneficiation plant capable of producing various vanadium oxides, ferrovanadium and vanadium chemicals.

• Bushveld Minerals has estimated a refurbishment capital amount of US$45 million, which will be incurred over a 5 year period to bring the Vanchem Plant to a steady state annual production of 4,200 mtVp.a.

• This acquisition will support Bushveld Minerals’ Mokopane Vanadium Project (“Mokopane”) development, which will be a primary supply of feedstock to the Vanchem Plant. Bushveld Minerals has allocated an additional US$20 million capital for the Mokopane development.

• The Vanchem-Mokopane model will create a fully integrated business in a shorter time frame and at a lower cost than building a new plant of the same capacity.

• This acquisition is consistent with Bushveld Minerals’ growth strategy of achieving a 10,000 mtVp.a. production platform capacity through targeting brownfield processing infrastructure in close proximity to its deposits.

• Bushveld Minerals carried out detailed Due Diligence on the Vanchem Plant, SAJV and Ivanti and has concluded the acquisition is value accretive.

The Vanchem acquisition is in line with our strategy of being a significant and vertically-integrated primary vanadium producer
Bushveld Minerals Integrated Vanadium Platform

The Vanchem acquisition is in line with our strategy of being a significant vertically-integrated primary vanadium producer

A growing, low cost, vertically integrated primary vanadium producer

• High-grade ore for primary vanadium mining & processing
• Largest primary vanadium resource base in the world

The Group is targeting a production capacity of 10,000 mtVpa in the medium term

An energy storage project developer and component manufacturer

• Electrolyte manufacturing
• Co-location in Vametco process => significantly lowering costs

Targeting initial 200MWh of electrolyte p.a.

• Vanadium Redox Flow Battery ("VRFB") Assembly & manufacturing

Targeting 1,000 MWh opportunities by 2020

• MW scale energy storage project development
• Deployment models include PPAs, leasing models
Bushveld Minerals

- The Company has a combined 440Mt high-grade resource base, which includes ~55Mt combined reserves.
- Our resource and processing facilities provide significant potential to expand production capacity to 10,000 mtVp.a.

1. Vametco
   - Low cost primary vanadium producer.
   - CY19e production volume > 2,560mtV (2018), guidance to be provided in Q1 2019 operational update.
   - 142.4 Mt Resource, 26 Mt reserve average in-magnetite grade of 1.96% V₂O₅.

2. Brits
   - Outcropping, strike extension of the Vametco mine.
   - Drilling confirms V in-magnetite grades for the lower seam of 1.66% V₂O₅.
   - Provides the potential for additional feed tonnages for Vametco and Vanchem.

3. Mokopane
   - 298 Mt JORC, outcropping reserve and resource, vanadium in-magnetite grades of 1.75% V₂O₅.
   - Mokopane to become a primary source of feedstock for Vanchem and supply dry magnetic separated ore.

4. Vanchem
   - Low cost primary vanadium processing facility.
   - Uses the salt roast beneficiation process.
   - Currently producing circa 80mtV per month using 1 of the 3 kilns.
   - Production of 4,200 mtVpa to be achieved post completion of a 5 year refurbishment programme.

With the Vanchem acquisition, Bushveld Minerals will have another cash generating processing facility.
Vanchem Plant

A primary vanadium pure play processing facility
The Vanchem Plant History and Future Plans

The Vanchem Plant partially restated in Q3 2018 and it is currently producing ~80 mtV per month using a single kiln

• The Vanchem Plant is situated at Ferrobank Industrial Park in Emalahleni Local Municipality, Mpumalanga Province and has been operating since the 1970s.
• VVP entered into Business Rescue in November 2015 due to lack of feedstock, following cessation of operations at Highveld Steel & Vanadium ("Highveld") and the Mapochs Mine, which supplied both Highveld and Vanchem with ore.
• Parts of the Vanchem Plant have been recommissioned since Q3 2018 after VVP was able to procure magnetite ore from third parties.
• The Vanchem Business consists of integrated vanadium extraction and production facilities which can produce range of vanadium products. The plant comprises:
  - A core salt-roast processing plant, including 3 roasting kilns, that produces vanadium trioxide, vanadium pentoxide;
  - An electric smelting ferrovanadium converter, located at the Highveld Steel & Vanadium ("Highveld") site, situated approximately 10 km from the Vanchem Plant, which converts vanadium trioxide into ferrovanadium; and
  - An alumino-thermic smelting facility, also located at Highveld which converts vanadium pentoxide into ferrovanadium; and
  - A vanadium chemical plant producing various vanadium chemical products
  - A rail siding linking the plant with Bushveld deposits and additional potential supply sources through the national rail network
• The Vanchem Plant is currently producing circa 80 mtV per month using a single kiln.
• A US$45 million refurbishment programme, incurred over a 5 years period from completion of the Transaction, will allow Vanchem to reach a steady state production of 4,200 mtVp.a. from all 3 kilns.
• The refurbishment programme comprises three phases designed to:
  - Progressively bring the other 2 kilns and all associated production units into full production; and
  - Invest in appropriate environmental management infrastructure.
The ore is conveyed for milling and magnetic separation. The magnetite material is then dewatered through belt filters.

Vanchem Processing Steps

<table>
<thead>
<tr>
<th>Ore</th>
<th>Concentration</th>
<th>Salt Roasting</th>
<th>Leach Milling &amp; Purification</th>
<th>APV precipitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The magnetite is conveyed to the separate feed tables and ore sheds of the 3 kilns. A roasting process is employed at the three kilns where magnetite is mixed with sodium containing reagents and calcined in the kiln.</td>
<td></td>
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<td>Leach dams/vats are used to leach out the water soluble sodium vanadate as a pregnant solution. The waste calcine is transported by road to the remote calcine waste disposal facility.</td>
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</tr>
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<td>The pregnant solution is split between the Oxide Section and the Chemical Plant. At the former, an ammonium poly-vanadate (&quot;APV&quot;) batch precipitation process is employed. The product stream is then split between $V_2O_5$ flake and $V_2O_3$.</td>
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<td>The dried APV is pneumatically conveyed to the $V_2O_3$ reactors where ammonia gas is added from tanks to facilitate the reaction. The $V_2O_3$ is conveyed to a holding bin before being loaded into a tanker for transport to the FeV site.</td>
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Vanadium Chemicals production

- $V_2O_3$ Production
- $V_2O_5$ Production

Vanchem can produce various vanadium products, complementing Vametco’s Nitrovan™ offering

- Ore
- Concentration
- Salt Roasting
- Leach Milling & Purification
- APV precipitation

FeV production

- At the FeV furnace facility $V_2O_3$ is used to produce FeV using an electric smelting furnace.

FeV is produced from $V_2O_5$ flake using an alumina-thermic reaction process.

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<td>The processing plant at Vanchem is fed ore. Vanchem has access to a rail siding for delivery of ore to the plant.</td>
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- At the FeV furnace facility $V_2O_3$ is used to produce FeV using an electric smelting furnace.

FeV is produced from $V_2O_5$ flake using an alumina-thermic reaction process.
The acquisition reinforces the Company’s growth strategy to become a globally leading and vertically integrated primary vanadium producer.

The acquisition represents a low-cost increase in Bushveld Minerals existing vanadium production capacity.

The acquisition will generate multiple synergies between the Bushveld Mineral’s assets.
The acquisition reinforces the Company’s growth strategy to become a globally leading and vertically integrated primary vanadium producer

- Increases exposure to vanadium, a commodity with compelling fundamentals anchored by demand from the steel sector.
- Supports the Company’s target production capacity of 10,000 mtVp.a.
- Diversifies the Company’s mining and production footprint within South Africa.
- Expedites the development of Mokopane - identified as a primary source of feedstock - creating a fully integrated business.
- Enhances the Company's ambitions in the global energy storage and vanadium redox flow battery space by leveraging Vanchem’s existing chemical plant in the manufacture of vanadium electrolyte.
The acquisition represents a low-cost increase in Bushveld Minerals existing vanadium production capacity

- Collectively, the US$68 million consideration, the US$45 million refurbishment capital expenditure and US$20 million capital spend for Mokopane represent c. 40% of the cost of the greenfield development of Mokopane and on a tighter timescale.

- Total investment is potentially on more favorable terms to Bushveld than the acquisition of an effective 74% shareholding in Vametco.

- The acquisition will be cash generative and earnings accretive.

- The acquisition will also provide significant NPV uplift to Bushveld.

- Vanadium supply-side increase risk will be limited: Vanchem historically produced in excess of 4,300 mtVp.a before it was forced into Business Rescue.
The Vanchem acquisition underscores Bushveld’s brownfield growth strategy

**Mokopane Integrated Project PFS Metrics (2016)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Value</th>
<th>Development priorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>Mt/yr</td>
<td>5,500</td>
<td>3 Options under consideration:</td>
</tr>
<tr>
<td>Mineral Resource</td>
<td>Mt</td>
<td>298</td>
<td>• Supply ore to China</td>
</tr>
<tr>
<td>Ore Reserve</td>
<td>Mt</td>
<td>28.5</td>
<td>• Supply ore to other brownfield plants</td>
</tr>
<tr>
<td>Grade (in-situ)</td>
<td>%</td>
<td>1.4%</td>
<td>• Develop greenfield integrated mine &amp; processing plant producing 5 500 mtVp.a. V₂O₅ flake product</td>
</tr>
<tr>
<td>Grade (in-magnetite)</td>
<td>%</td>
<td>1.7%</td>
<td></td>
</tr>
<tr>
<td>Assumed Vanadium</td>
<td>US$/kg</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>FeV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Capital Costs</td>
<td>US$/ m</td>
<td>298</td>
<td></td>
</tr>
<tr>
<td>NPV @ 9% real</td>
<td>US$/ m</td>
<td>418</td>
<td></td>
</tr>
<tr>
<td>IRR real</td>
<td>%</td>
<td>25%</td>
<td></td>
</tr>
</tbody>
</table>

1. The Mokopane Vanadium Project PFS, completed by MSA Group was based on the MML only which is 63Mt even though the overall project resource is 298 Mt.

**Mokopane – Vanchem Integrated Project**

1. The Vanchem business case is robust at lower prices (US$33/kgV) than current vanadium prices (~US$50/kgV); …

2. … brings forward the Mokopane project development by several years; and …

3. … the refurbishment capital and Mokopane development capex (US$130m) is less than 50% of the cost of a greenfield development of Mokopane.
The Vanchem acquisition, at US$68m is comparable to the acquisition of a 74% interest in Vametco for >US$48

Vametco Acquisition

- Salt roast processing method.
- Single kiln with AMV precipitation and 1 Nitrovan shaft furnace.
- Produces Modified Vanadium Oxide ("MVO") and Nitrovan™.
- Plant located at mine which supplies all ore requirements.
- Ore supply – 1.96% $V_2O_5$ in magnetite grade.
- Production in 2018: 2,560mtV, plans to increase production to 3,400 mtVp.a in the near term.
- Target production nameplate capacity of 5,000 mtVp.a. post expansion capex.

Acquired 74% for combined sum of at least US$48m

Vanchem Acquisition

- Salt roast processing method.
- 3 kilns with APV precipitation, vanadium chemicals plant and 2 ferrovanadium smelters.
- Produces $V_2O_3$, $V_2O_5$, vanadium chemicals and FeV.
- Plant not located with mine, but with a rail siding connecting it to several ore sources.
- Ore supply – Mokopane ~1.75% $V_2O_5$ with scope to source ore from other higher grade deposits.
- Current production rate of 80 mtV per month (annualised rate: ~960 mtVp.a).
- Target production post refurbishment capex of 4,200 mtVp.a.

Acquiring 100% of Vanchem for US$68m

1 The total acquisition interest will include an additional residual deferred payment calculated on the basis of a 4.5x multiple applied to 5.9% of Vametco's 2020 EBITDA.
The acquisition will generate multiple synergies between the Bushveld Minerals’ assets

Bushveld Minerals, with a complementary portfolio of high-grade vanadium deposits, is the natural buyer for this low-cost, scalable and cash generating asset.

- The acquisition enables operational and business case synergies between Vametco, Vanchem and Mokopane.
- A rail siding at Vanchem, linking the plant, through the national rail network, to the various Bushveld Minerals and other deposits supports the supply of ore to Vanchem from Bushveld’s deposits.
- Surplus concentrate production capacity at Vametco could be shipped to Vanchem as kiln feed, providing the opportunity to accelerate the development of the Brits deposit.
- Optimal product diversification as Vanchem can produce various vanadium oxides, ferrovanadium and vanadium chemicals.
- Mokopane’s development will additionally allow the Company to sell massive vanadiferous magnetite ore to primary or secondary producers worldwide.
- Vanchem’s three-kiln configuration and multiple downstream plant flexibility allows it to scale production upward or downward without significantly increasing unit production costs.
- Annual Vametco kiln shutdowns can now be optimally managed group-wide.
- Vanchem has significant surplus ferrovanadium smelting capacity that will enable surplus MVO at Vametco to be converted to ferrovanadium at Vanchem.
- Provides the Group with critical mass in the world-wide marketing of vanadium (with significant product diversification).
- Cross-pollination of in-depth vanadium expertise and experience.
Vanadium Market Fundamentals Remain Robust

Recent vanadium price reductions driven by temporary drivers ...

- New rebar standard in China introduced in November 2018 not immediately enforced as initially envisaged.
- Significant reduction in VRFB deployments in H2 2018 owing to high vanadium prices.
- Increased niobium imports into China suggesting greater substitution of vanadium in rebar in an environment of >US$100/kgV vanadium prices.
- Seasonality and short term de-stocking in China at end 2018/beginning 2019 also a factor in the short term vanadium price reductions.
- Sustainability of supply additions in the short term mainly from high-cost opportunistic producers, questionable:
  - Stone coal suppliers in China limited (~4,000 mtV over 2018); and
  - Some limited secondary supply introduced to take advantage of high V prices (e.g. Canada).

.... while structural longer term factors on supply & demand continue to support a structural deficit thesis ...

- Incentive to substitute vanadium with niobium diminished by recent price reductions.
- Longer term, vanadium continues to have several advantages to niobium in steel applications.
- Increasing enforcement of new rebar standard expected to support demand growth going forward.
- Vanadium consumption in energy storage applications, through VRFBs, poised to enjoy greater competitiveness at current V prices.
- Longer term, supply will continue to be impacted by grade and capital access limitations:
  - Price volatility not helpful to debt capital availability;
  - Reduction in vanadium price not conducive for high-cost, low-grade primary production (including stone coal production);
  - Co-production still primarily driven by steel market dynamics rather than vanadium; and
  - Significant new supply from existing brownfield primary production expansions expected mainly from 2021 onwards.

Vanadium demand remains underwritten by the steel market. Existing demand from steel and chemicals implies a demand CAGR for vanadium of 2.5% from 2017 to 2027. The high dependence of VRFBs on vanadium may increase the demand CAGR up to 8.4%.
Mokopane as a Primary Source of Feedstock

The Mokopane-Vanchem model will create a fully integrated business

Mokopane Vanadium Project

• Mokopane has been identified as a primary source of feedstock for the Vanchem Plant as a result of its large mineral reserve.
• Mokopane is located approximately 200 km by road from the Vanchem Plant.
• There is established road and railway infrastructure between Mokopane and the Vanchem Plant.

Mokopane-Vanchem Model

• Secure mining right.
• Development spend of approximately US$20 million:
  - Set up mobile crushing, screening & dry magnetic separation facilities; and
  - Supply a dry magnetic separated ore to the Vanchem Plant.
• The Mokopane-Vanchem model will create a fully integrated business in a shorter timeline and with reduced costs than developing it as a greenfield operation.

The option remains to develop Mokopane into a integrated mine & processing plant.
The Acquisition Enhances Bushveld’s Compelling Investment Case

1. Market structural deficit remains, (Vanchem returning production that historically was in the market)

2. The largest primary vanadium resource base (439.6Mt combined resource) with ~2% in-magnetite V₂O₅ amongst the highest in the world
   1st quartile cost curve position
   (Vanchem increases processing capacity to complement large high-grade primary resource)

3. Brownfield infrastructure create scope for low capex and quick scale-up of production capacity
   (Vanchem is the most developed brownfield V primary production project in the world & to complement one of the best greenfield primary V project in the world, Mokopane)

4. Vertical integration with high quality, low-cost production base allows us to be a key player in the multibillion-dollar energy storage industry through VRFBs
   (Scope to leverage Vanchem’s chemicals production to enhance company’s vanadium electrolyte manufacturing capacity)

5. Concentrated global supply with South Africa as the largest host of high-grade primary vanadium resources
   (Vanchem located in close proximity of the Bushveld Complex, the largest host of high-grade primary V resources)

6. Management team combines more than decades experience
   (Vanchem’s technical team to complement already existing Vametco expertise & experience)

7. Shareholder Return Committed to delivering attractive returns to shareholders
   (Vanchem’s low-cost production base will enhance group cash generation and shareholder returns)
Deal Timetable

- **30 April 2019**: Sign Definitive Agreements
- **31 July 2019**: Transaction Close Short Stop Date
  - Fulfilment of CP’s to Short stop date 31/07/2019 and the Transaction Closes
  - If Transaction doesn’t close by 31/07/2019, fulfilment of CP’s to Long stop date 31/10/2019 and the Transaction Closes
  - Takeover the operations of the Vanchem Plant
- **31 October 2019**: Transaction Close Long Stop Date
  - Take over the operations of the Vanchem Plant

**Ivanti Profit Share**
- Short stop date Completion: Ivanti Sellers to share in Ivanti profits for 12 months from Completion
- Long stop Date: Ivanti Sellers to share in Ivanti profits for 12 months from Completion

**Flow of Funds (US$)**
- Pay US$6.8m into Escrow account
- Short Stop date Transaction Close
- Long Stop date Transaction Close

Pay US$61.2m
Bushveld Minerals Corporate Video: https://www.brrmedia.co.uk/broadcasts/5a5626af9ed50c2f9b04679c/bushveld-minerals-an-emerging-integrated-vanadium-producer
Vanadium 101 Webinar: https://edge.media-server.com/m6/p/i2wo6bk9
Energy Storage 101 Webinar: http://webcasting.brrmedia.co.uk/broadcast/5bd2eae5b01efb6b20c2f9eb/5bd348eba21632633b00003d