

Discovery and development of high-grade Copper & Vanadium in Namibia Jon Dugdale, CEO

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Feeding the fast-growing, global battery metals market

# **Disclaimer & Declarations**



#### Overview

This presentation has been prepared by Golden Deeps Ltd ("GED") as a summary of the company's exploration and development activities, with particular reference to the exploration programs in Namibia at Khusib Springs and the Nosib Prospect and development and processing studies on the Abenab V-Pb-Zn Project in Namibia.

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#### **Competent Person Declaration**

The information in this report that relates to exploration results has been reviewed, compiled and fairly represented by Mr Jonathon Dugdale. Mr Dugdale is a consultant to Golden Deeps Limited and a Fellow of the Australian Institute of Mining and Metallurgy ('FAusIMM'). Mr Dugdale has sufficient experience, including over 34 years' experience in exploration, resource evaluation, mine geology and finance, relevant to the style of mineralisation and type of deposits under consideration to qualify as a Competent Person as defined in the 2012 Edition of the Joint Ore Reserves Committee ('JORC') Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves. Mr Dugdale consents to the inclusion in this presentation of the matters based on this information in the form and context in which it appears.

#### **Resource Estimate**

The resource estimate stated in this presentation was compiled by Mr Manie Swart of Shango Solutions and announced to the ASX on January 31, 2019. Mr Swart is a Member of the South African Council for Natural Scientific Professions and a full-time employee of Shango Solutions. Mr Swart has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity that is being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. The announcement is available for download from the GED website (http://goldendeeps.com/investors.php).

Mr Jon Dugdale, a consultant to GED and who is a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM), has reviewed the information provided in this presentation and considers that it is an accurate representation of the data and studies for the Abenab Project. Mr Dugdale 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 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'.

### Historical Exploration Results

Exploration Results for drilling, metallurgical testwork and other exploration at the Abenab Mine stated in this presentation have previously been reported by Avonlea Minerals Limited (Avonlea, now AVZ Minerals Ltd). The relevant public announcements made by Avonlea are available for download from the ASX website (www.asx.com.au) under the code AVZ.

This presentation was authorised for release by the Board of Directors.

# **Golden Deeps Snapshot**

## Namibia

- World-Class Otavi-Mountain-Land copper district:
  - Tsumeb produced 30Mt of @ 4.3% Cu, 10% Pb and 3.5% Zn<sup>3</sup>
  - Kombat produced 32Mt @ 2.21% Cu, 1.33% Pb, 4.4 g/t Ag<sup>2</sup>
- Brownfields Projects, drilling and development studies:
  - Khusib Springs high-grade copper-silver mine, 300,000t @ 10% Cu,
    584g/t Ag<sup>1</sup> produced, drilling and deeper targeting
  - Nosib Block high-grade copper-vanadium target drilling
  - Abenab high-grade vanadium project development studies and deeper targeting

## Australia

- World-Class Lachlan Fold Belt copper-gold district,
  - high-grade gold and copper-gold targets, drill planning in progress

<sup>1</sup> Melcher, F. et. al. 2005. Geochemical and mineralogical distribution of germanium in the Khusib Springs Cu-Zn-Pb-Ag sulphide deposit, Otavi Mountain Land, Namibia.

<sup>2</sup> Porter Geo Database: http://www.portergeo.com.au/database/mineinfo.asp?mineid=mn2905

<sup>3</sup> Tsumeb, Namibia. PorterGeo Database: www.portergeo.com.au/database/mineinfo.asp?mineid=mn290





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# **Key Namibian Projects**



## Khusib Springs copper project:

- Previous high-grade copper-silver mine
- Drilling of upper levels, results to come,
- Deeper repeats of high-grade targeted

## Nosib Block copper project:

- Historical copper-vanadium lode development
- GED thick, shallow, high-grade copper-leadvanadium Intersections, more results to come
- Open at depth and along strike copper-leadvanadium production target

## Abenab high-grade vanadium project:

- Mining study completed, positive outcomes for underground mine development
- Processing study in progress, to produce
  V2O5 and other metals on site
- Exploration Targets at depth

<sup>1</sup> Melcher, F. et. al. 2005. Geochemical and mineralogical distribution of germanium in the Khusib Springs Cu-Zn-Pb-Ag sulphide deposit, Otavi Mountain Land, Namibia. 2 Porter Geo Database: http://www.portergeo.com.au/database/mineinfo.asp?mineid=mn290





Khusib Springs Decline – closed 2003, accessible



## Nosib Block – High-grade Copper-Vanadium



- Historical copper-vanadium mine, developed on three shallow levels but not mined
- Channel sampling of drives returned results including:
  - 6m at 9.3% Cu, 4.72% Pb, 7.92% Ag<sup>6</sup>
  - 6m at 1.51% Cu, 10.6% Pb, 7.15% Ag, 1.12% V<sub>2</sub>O<sub>5</sub><sup>6</sup>
- Four traverses of 15 RC holes for 958m tested main mineralised zone and parallel zones in the footwall.
- Results from first 8 holes produced exceptional Copper, Lead, Vanadium intersections, including<sup>7</sup>:
  - 24m @ 1.33% Cu, 4.77% Pb, 1.37% V<sub>2</sub>O<sub>5</sub> from 3m
    incl. 10m @ 2.65% Cu, 10.7% Pb, 3.12% V<sub>2</sub>O<sub>5</sub>
    incl. 6m @ 3.67% Cu, 14.9% Pb, 4.40% V<sub>2</sub>O<sub>5</sub>
  - 18m @ 2.01% Cu, 3.37% Pb, 0.43% V<sub>2</sub>O<sub>5</sub>, from 13m incl. 7m @ 3.73% Cu, 3.39% Pb, 0.14% V<sub>2</sub>O<sub>5</sub>, incl. 1m @ 7.72% Cu, 1.06% Pb, 0.14% V<sub>2</sub>O<sub>5</sub>
- Results to come from NSBRC010 intersected 5m of semimassive copper sulphides from only 10m
- Thick mineralisation open at depth and along strike, further drilling being planned



<sup>6</sup> Golden Deeps Pty Ltd announcement 26 August 2013 "High-grade copper and lead at Nosib Block
 <sup>7</sup> Golden Deeps Pty Ltd announcement 15 June 2021 "Nosib Exceptional Copper, Lead & Vanadium Intersections"

# **Khusib Springs – High-grade Copper-Silver**



- High-grade copper-silver mine, closed
  2003 (300kt @ 10% Cu, 584 g/t Ag<sup>1</sup>)
- Previous drilling of shallow levels produced intersections that included:
  - 4.5m at 35.19% Cu, 2091g/t Ag<sup>8</sup>
  - 14.0m at 8.12% Cu, 385g/t Ag<sup>8</sup>
- Structural modelling by Shango Solutions (RSF) highlighted shallow targets around previous mining and deeper extensions
- Initial drilling program of 10 RC holes for 338m tested shallow target, intersecting visible copper mineralisation in 6 holes with results to come
- Subsequent drill-targeting will focus on finding a repeat of this very high-grade copper-silver ore-body at relatively shallow depth



<sup>1</sup> Melcher, F. et. al. 2005. Geochemical and mineralogical distribution of germanium in the Khusib Springs Cu-Zn-Pb-Ag sulphide deposit, Otavi Mountain Land, Namibia.

<sup>8</sup>King C M H 1995. Motivation for diamond drilling to test mineral extensions and potential target zones at the Khusib Springs Cu-Pb-Zn-Ag deposit. Unpublished Goldfields Namibia report.

## Abenab – High-grade Vanadium

- Operated from 1921 to 1947, highest-grade deposit of vanadate ore in the world
- Breccia pipe mined to only 215m closed by water-inflow rendered further mining uneconomic
- Drilling by Avonlea<sup>9</sup> and GED<sup>10</sup> defined an Inferred Resource below the mine of:
  - 2.80Mt @ 0.66% V<sub>2</sub>O<sub>5</sub>, 2.35% Pb, 0.94% Zn<sup>10</sup>
- Mining Study by Bara Consulting (RSA) established potential for new high-margin Vanadium (Lead-Zinc) underground mining operation<sup>11</sup>
- Previous processing studies indicate exceptionally high-grade gravity concentrate grades achievable:
  - 21% V<sub>2</sub>O<sub>5</sub>, 14% Zn and 53% Pb<sup>9</sup>
- Studies underway to produce V2O5, Zn & Pb on site
- Potential for repeat of Abenab ore-body at depth below fault with Pb, Zn and possibly Cu increasing





<sup>&</sup>lt;sup>9</sup>Avonlea Minerals Limited (ASX:AVZ) 8/3/12: Positive Vanadium Gravity Separation Test Work <sup>10</sup>Golden Deeps Ltd ASX 31/1/19: Golden Deeps confirms major Resource Upgrade at Abenab <sup>11</sup>Golden Deeps Ltd 11/6/21: Abenab Vanadium Project Positive Results of Mining Study

# **The Abenab Difference**



 Ore type is different to (all) other primary vanadium projects - simple to beneficiate and concentrates to a very high level for further processing either on-site or by other off-takers

Comparison	Abenab Ore	Typical Vanadium Source
Ore Type	Descloizite	Titano-magnetite
Concentrate	3-18% V <sub>2</sub> O <sub>5</sub>	1-2% V <sub>2</sub> O <sub>5</sub>
Crushing and Concentrating	Crushing circuit with gravity separation Provides for high upgradeability	Complex multi stage grinding, regrinding with magnetic separation
Refinery Process	Concentrate to be refined in partnership with third party refineries or processed on site	Typically salt roast/leach in more complex pyro/hydro processes with reagent losses
Additional products	Pb and Zn (and Cu?) recoverable	Low grade magnetite Iron Ore and TiO <sub>2</sub>
Plant	Low cost plant, particularly for gravity concentrate production	High-capital plant and higher operating cost for pyro-metallurgical processes

- Test-work in progress looking at leaching and differential precipitation for V<sub>2</sub>O<sub>5</sub> and Zinc production with flotation of other products e.g. Lead and possibly copper from the residue
- May open up processing pathways for not only Abenab but also Nosib Cu-Pb-V<sub>2</sub>O<sub>5</sub> ore and Khusib high-grade Cu-Ag driving exploration for new high-grade ore sources feeding a centralised processing plant

# **NSW Lachlan Fold Belt Projects**

- Near major copper-gold projects including Cadia-Ridgeway, North Parkes and Lake Cowal
- Tuckers Hill:
  - EL9014 surrounds Hargraves deposit, part of the Hill End Goldfield total Mineral Resource of 4.6Mt @ 3.3 g/t Au (0.5Moz Au)<sup>12</sup>
  - Previous high-grade (**38 g/t Au**) production from high-grade quartz "reefs" and veins
  - Rockchip samples produced peak "Leachwell", coarse gold, result of 15.6 g/t Au<sup>13</sup>
  - Diamond drilling program planned to test plunging "saddle-reef" system across anticline for Fosterville, Bonanza, Swan-Lode target
- Havilah Project:
  - Borders Silvermines' Bowdens Project with a Resource of 128Mt @ 40g/t Ag, 0.38% Zn<sup>14</sup>
  - Includes historical Cheshire Copper mine and 1km mineralised trend to the south targeted

<sup>12</sup>Peak Minerals Ltd (ASX:PUA) 29/5/20: Hargraves Mineral Resource estimate update.

<sup>13</sup>Golden Deeps Ltd ASX 08/4/21: Resampling of rock samples from Tuckers Hill return higher gold grades with approvals for drilling progressing.

<sup>14</sup>Silver Mines Ltd (ASX:SVL) 30/5/18: Maiden ore reserve – Bowdens Silver Mine.olden Deeps Ltd





## Why Invest?



- Under-explored tenements in world-class copper belt, with previous high-grade production of copper, vanadium, lead, zinc and silver
- Key battery metals targeted, with a very positive price outlook – feeding the growing EV market
- Thick, shallow and high-grade copper-leadvanadium intersections from Nosib prospect, with results to come from both Nosib and Khusib Springs
- Brownfields exploration within major mine environments - only developed to shallow levels with extensions already indicated
- Portfolio of tenements in world-class Lachlan
  Fold Belt, with drill ready targets
- Management team with a track record of Brownfields discovery in these environments

# "We've done it before, and we'll do it again"



# Contact Us:

Email: jdugdale@goldendeeps.com

**Phone:** Jon Dugdale +61 8 9481 7833



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