



From mine to farm, **integrated**  
fertiliser resource developments.



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[WWW.CENTREXMETALS.COM.AU](http://WWW.CENTREXMETALS.COM.AU)

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# Undervalued or Misunderstood?

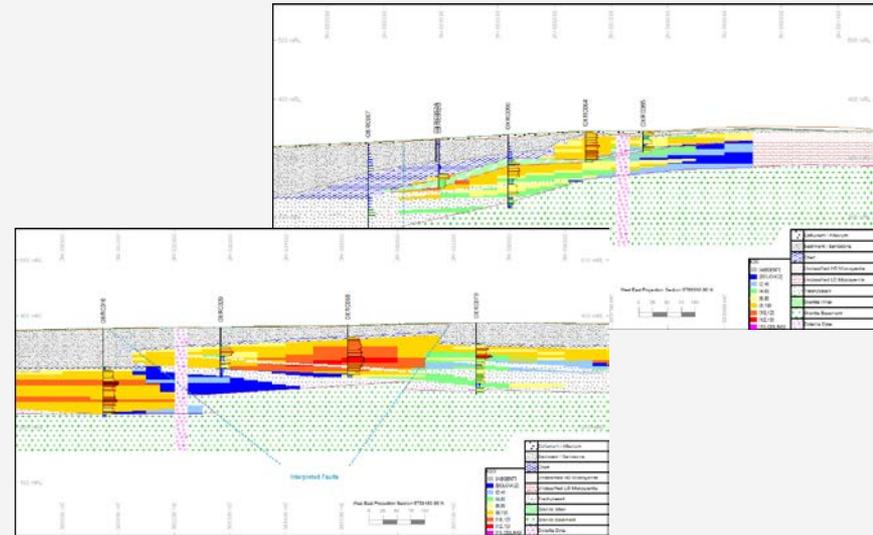
- 155 million tonne potassium Mineral Resource
- Only 3km of overall 32km striking deposit drilled for resources
- Positive Scoping Study for start-up high-value potassium nitrate fertiliser operation completed
- Huge expansion potential
- Prefeasibility Study started
- A\$ 27 million cash at bank
- Market Capitalisation @ A\$ 0.064 = A\$ 20 million
- Negative A\$ 7 million EV ???



# Oxley Potassium Project

# Oxley Potassium Deposit

- 32km striking globally rare ultrapotassic lava flow
- Dominantly composed of potassium feldspar
- Outcropping and shallow dipping meaning simple open cut mining
- Current **155 million tonne Inferred Resource** at 8.3 %  $K_2O$  (6% cut-off) over just 3km section of deposit
- Inferred Resource includes 38 million tonne at 10%  $K_2O$  (9% cut-off)
- Rock chips over entire 32km length shows consistent high potassium grades up to 14%  $K_2O$

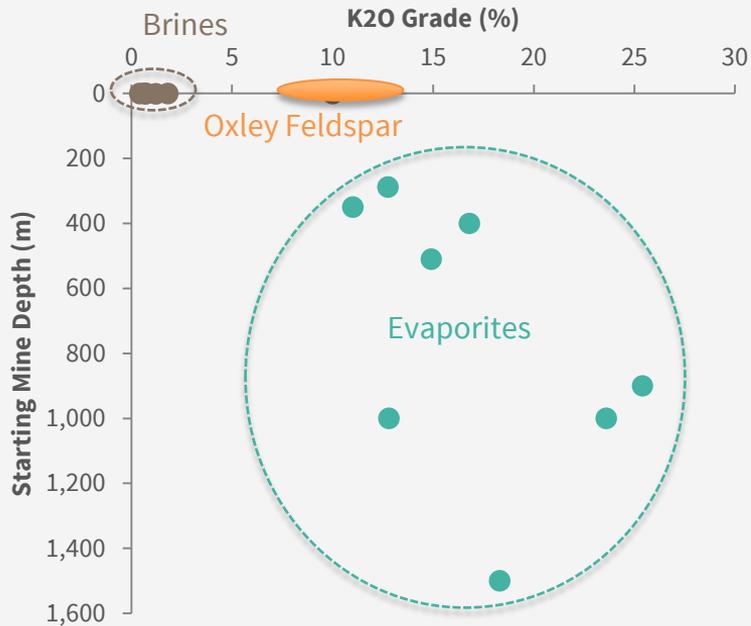


For full details of the Inferred Mineral Resource please see announcement 8<sup>th</sup> March 2016:

<http://www.asx.com.au/asxpdf/20160308/pdf/435nrchjm48mjm.pdf>

The results were reported under JORC 2012 and Centrex is not aware of any new information or data that materially affects the information contained within the release. All material assumptions and technical parameters underpinning the estimates in the announcement continue to apply and have not materially changed.

# Why a Potassium Feldspar Deposit?



- Potassium fertilisers traditionally sourced from either mixed evaporite salt deposits deep underground, or very low potassium grade natural brines at surface
- The existing operations are not direct ship ores and require significant processing
- Oxley is the happy medium between low mining costs and reasonable grades
- Oxley has existing roads and rail to the Port of Geraldton just 125km to northwest, order of magnitude less export logistics than a lot of current producers e.g. Canada, Russia
- Limited potassium mining exists in Asia outside China giving Oxley a large freight advantage over the majority of producers

# What is Unique About Oxley

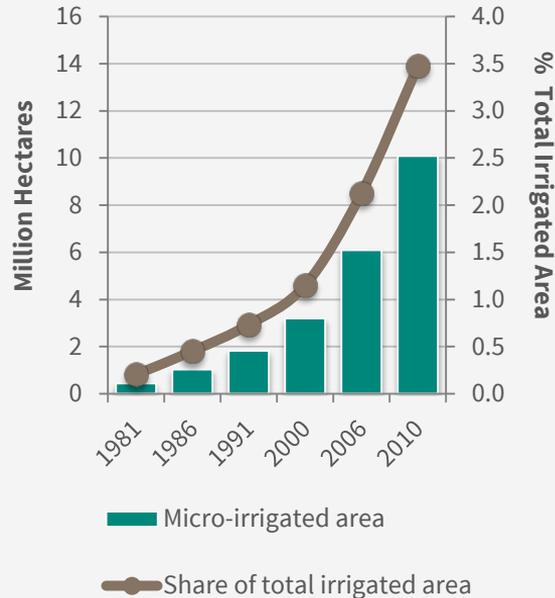
- Lot's of ultrapotassic potash feldspar rich deposits exist but they are generally small scale circa 1 to 10 million tonne pipelike intrusives such as pegmatites
- Oxley is an ultrapotassic microsyenite lava flow that formed from a failed continental rift
- It is flat lying, outcropping and two orders of magnitude larger than these other potash feldspar deposits, so it has the scale required to achieve commercial fertiliser production
- A similar deposit exists in Brazil but it is >1,000km inland
- Oxley is not only a rare deposit but it happens to be close to an existing port (125km) and near plenty of infrastructure (gas, power, roads, rail)
- This makes it very hard to replicate

# Scoping Study Basis

- Start-up primary producer NOP operation
- Ultrapotassic lava mined open cut in a series of shallow to selectively mine higher grade with small fleet 90 tonne trucks
- Crush & dry grind ore to P80 150 $\mu$ m
- Blend ore with salt and roast to convert to soluble potassium chloride (MOP)
- Hot water leach (order of magnitude higher potassium than natural brines) and filter
- Solar evaporation to crystallise and float potassium chloride
- Reacted with nitric acid produced on site to make NOP



# Why NOP?



Graph Source: ICID; Potassium Sulphates & Potassium Nitrate Market Outlook, 2015, CRU

- External analysis for Centrex for NOP exports from Geraldton in 1t bulka bags within containers showed achievable average long-term pricing of \$US 870/t FOB
- Three times the price of MOP, but NOP for smaller horticulture market as chloride free and highly soluble
- Potassium sulphate (SOP) another chloride free mid-range price and scale option but much less soluble than NOP
- Growth in micro-irrigation due to water scarcity driving accelerated NOP use globally
- Smaller scale NOP start-up means lower capital entry point
- Large scale of Oxley deposit means no constraints on MOP or SOP expansions after start-up NOP operation
- Low cost Western Australian gas nearby for competitive nitrate production



## NOP Market

- Global NOP production is from four dominant countries; Chile, Israel, Jordan and China
- Chile and Far Western China the only primary potassium production operations (brines)
- Dominant supply to Asia and Australasia is from secondary production in Israel (external MOP feedstock, ammonia import)
- China is a large consumer and producer but minimal exports due to majority high-cost secondary production and lower quality
- Australia itself a significant NOP importer >30,000tpa



# Roasting Testwork



- Centrex has completed around 70 bench scale roast tests including static, rotary kiln, and fluid bed
- Testwork has demonstrated >90% leach extraction of potassium
- Primary reaction is ion exchange
- $\text{KAlSi}_3\text{O}_8 + \text{NaCl} + \text{Heat} = \text{KCl} + \text{NaAlSi}_3\text{O}_8$
- Small-scale continuous pilot trial of furnace to be undertaken in Prefeasibility Study
- Pilot plant to be commissioned in Bankable Feasibility Study

# Oxley Regional Infrastructure



- A sealed main road runs straight past the project site connecting through to the Port of Geraldton
- Start-up operation to haul bulk in road trains to 3<sup>rd</sup> party storage facilities where product will be bagged and containerised for export
- Gas to be piped to site from connection into Western Australia gas network in the Perth Basin
- Gas to be used for onsite power generation as well as furnace operations, and potentially ammonia production
- Centrex holds adjacent tenement to Oxley covering a brine deposit for salt make-up and potentially process water
- Additional local aquifers currently being assessed

## Where to From Here?

- Prefeasibility Study has commenced, targeted for completion in 2017
- Further engineering reviews underway by multiple global experts in each key field
- Crushing and grinding – CITIC SMCC
- Roasting Circuit – HATCH
- Hydrometallurgical Circuit – Novopro
- Review to provide go-forward option to underpin small-scale pilot test to start first half of 2017
- Drilling in 2017 to expand resource area and convert Inferred to Indicated Resources to allow publishing of cost estimations
- Prefeasibility Study to consider start-up NOP operation and expansion into bulk potassium fertilisers (e.g. MOP and SOP)
- Centrex able to self-fund project development through to project financing



# UniSA Research

- Western Australian & South Australian Governments providing grant funds for molten salt mineral processing research at UniSA
- Research to be undertaken as an extension to UniSA's existing molten salt solar thermal storage systems facility
- UniSA also contributing cash funds with A\$ 390,000 of external funding conditionally committed in total from all three parties
- Research to consider potential for a second generation process circuit at Oxley undertaking all processing steps in a molten salt environment

