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Column Flotation of Phosphate Ore

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WorleyParsons EcoNomics™

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Phosphate in Australia

So near yet so far

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Beneficiation of Phosphates VII – Melbourne, 2015

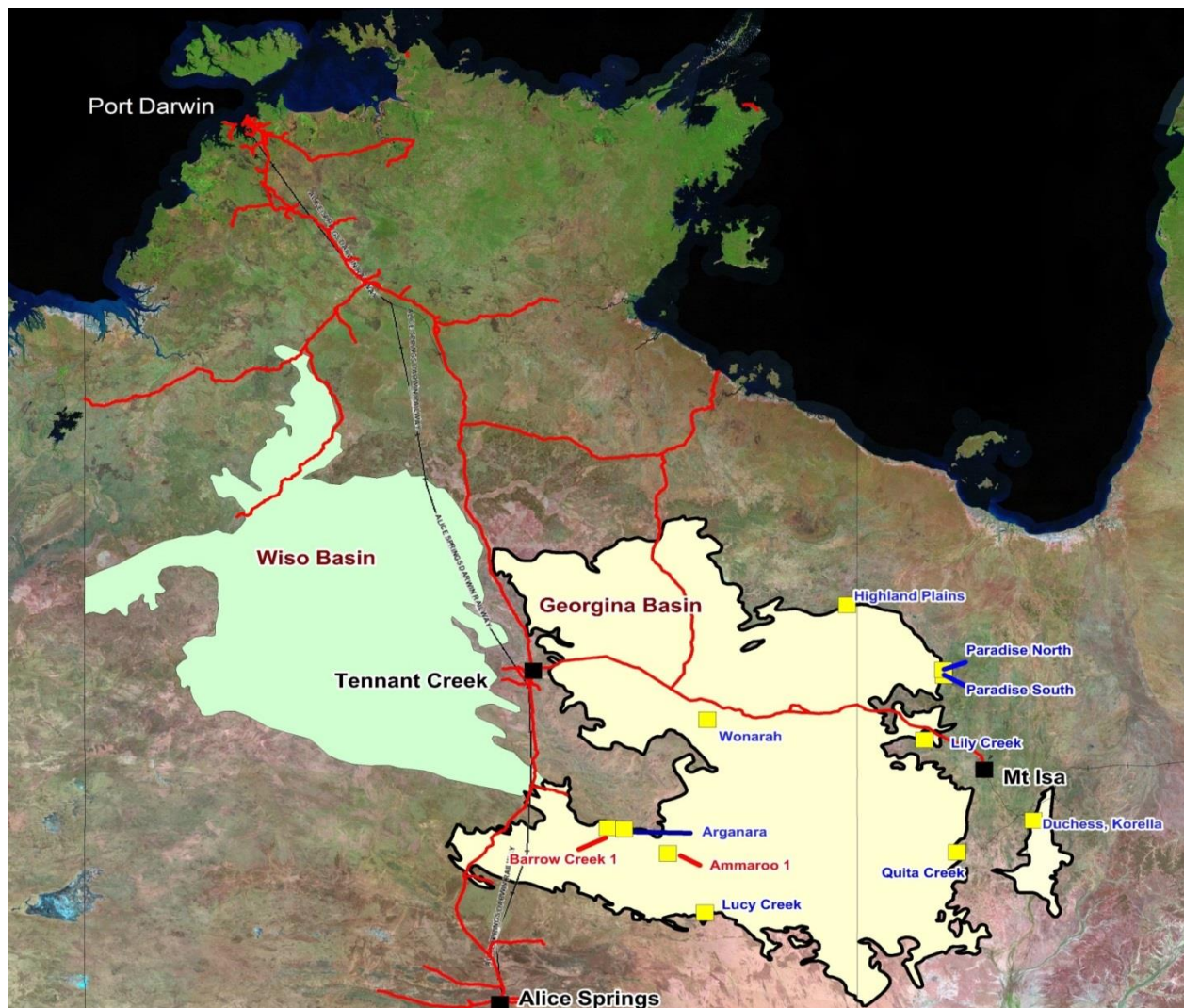


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Introduction

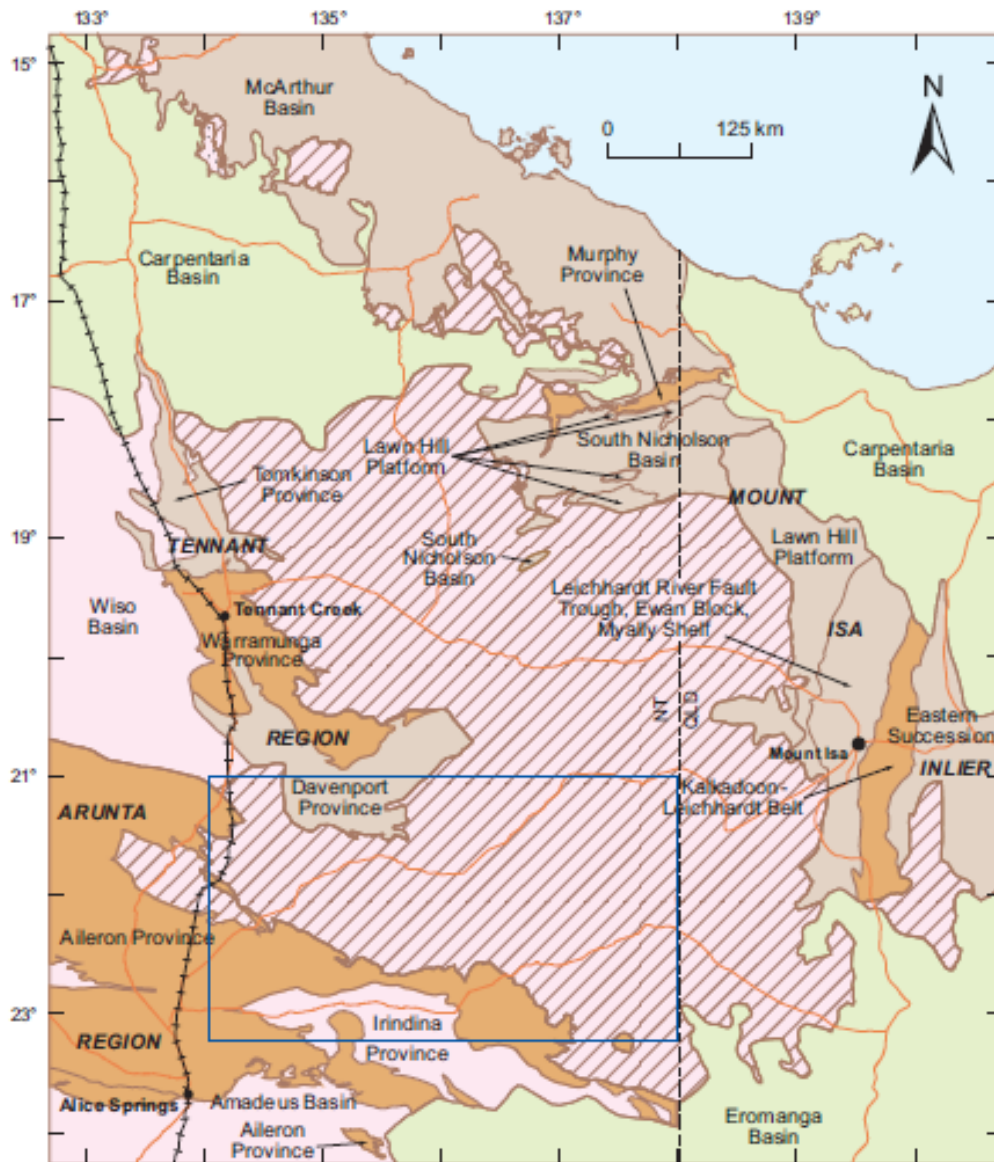


▶ The Georgina Basin

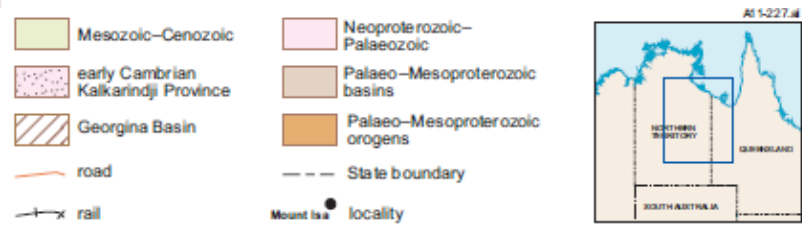
- 300,000km²
- Phosphate exploration targets
- Eastern Limb (Queensland)
- Western Limb (Northern Territory)

Note: The Barrow Creek 1 and Arganara deposits are now combined into a single contiguous resource called Ammaroo. Ammaroo 1 is now known as Ammaroo South. Lucy Creek is also known as Patanella.

Geology



- 300,000km²
- Eastern Limb (Queensland)
- Western Limb (Northern Territory)
- Host rock Middle Cambrian sedimentary rocks

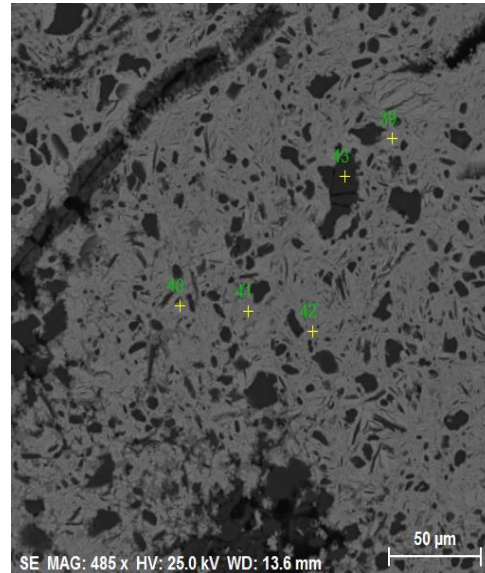
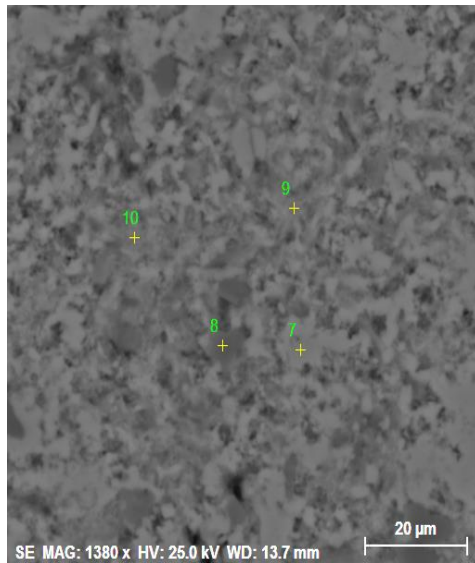
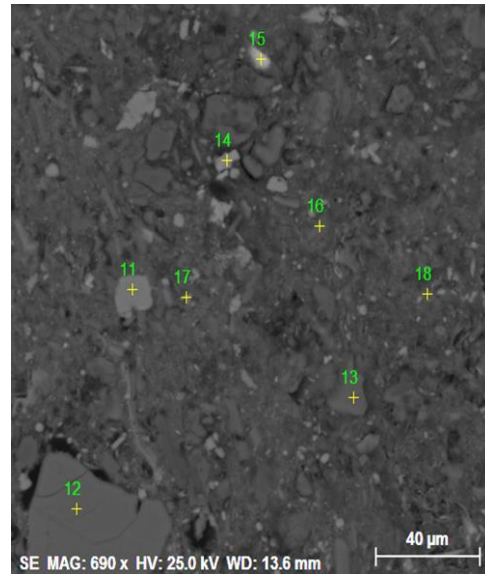
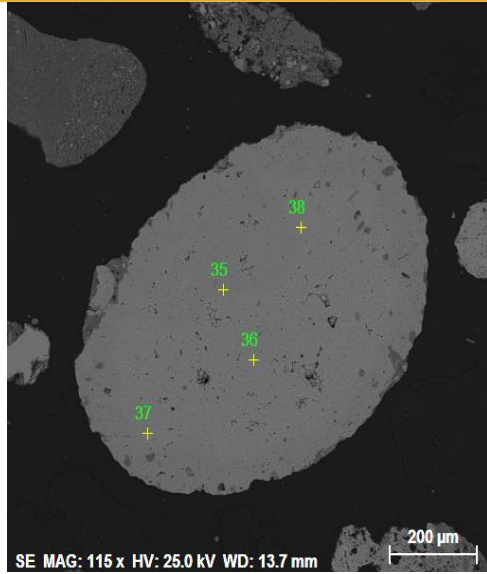


Prospects and producers



- Prospects and Producers
- Eastern Limb (Queensland)
 - Paradise North and South
 - Phosphate Hill
 - Highland Plains
- Western Limb (Northern Territory)
 - Wonarah
 - Ammaroo

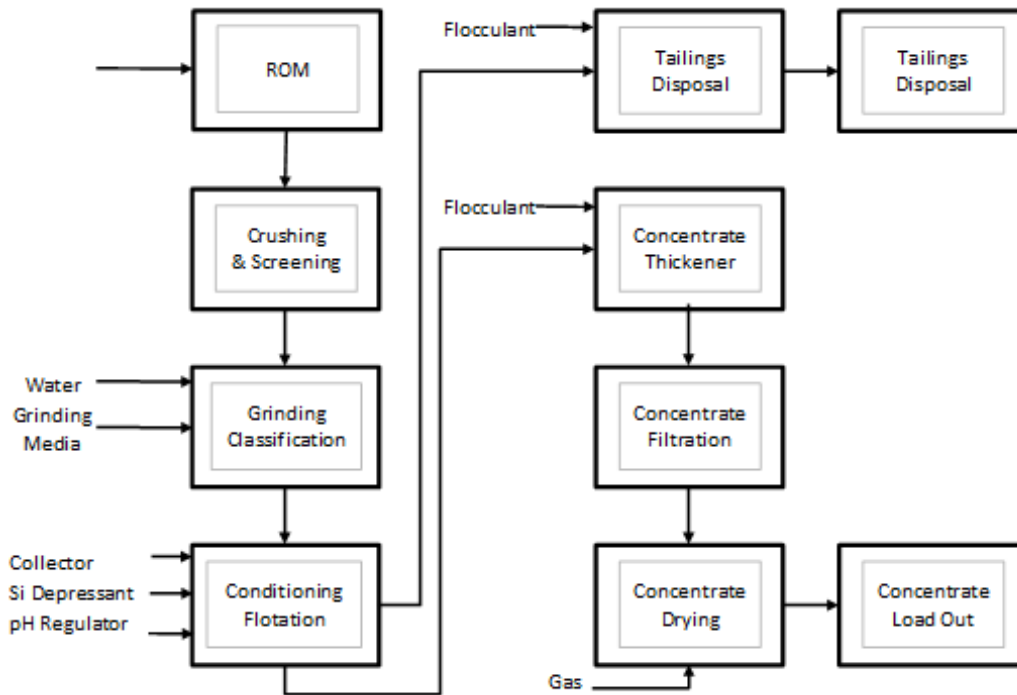
Mineralogy



► Typical Mineralogy

- 80% P_2O_5 liberation at $<106\mu$ m
- Free silicates liberated at $<300\mu$ m $>100\mu$ m
- Interwoven silicates liberated at $<40\mu$ m
- Fe oxides liberated at $<40\mu$ m
- Coronadite (Pb oxide)
- Small amounts of Crandallite

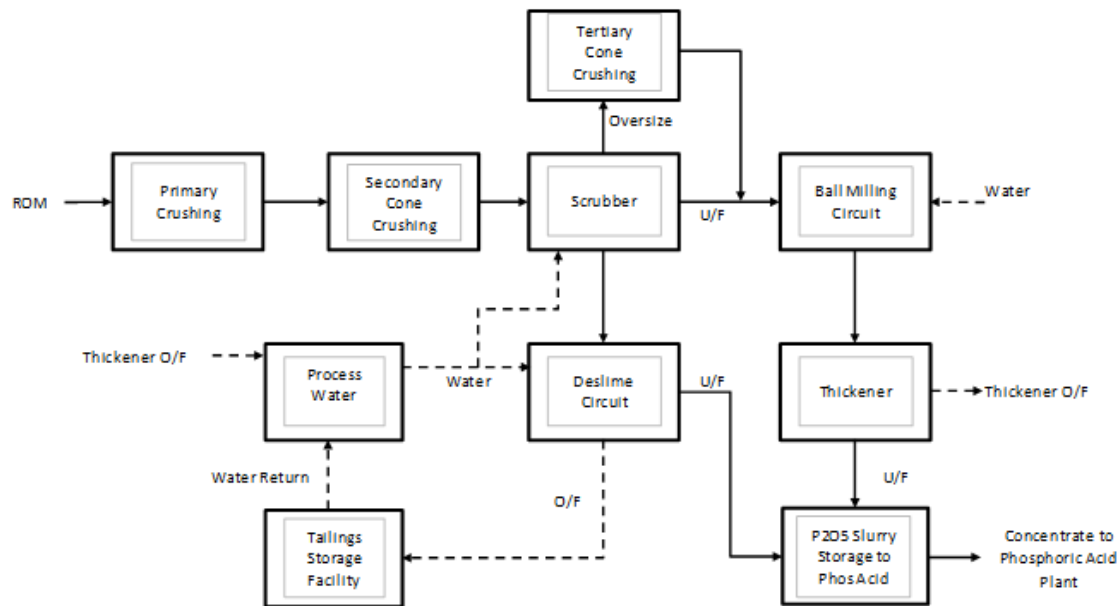
Beneficiation options



► Flowsheets

- Conventional crush, mill, float, thicken, filter, dry and sell final P_2O_5 concentrate
- Product grade is $>30\% P_2O_5$

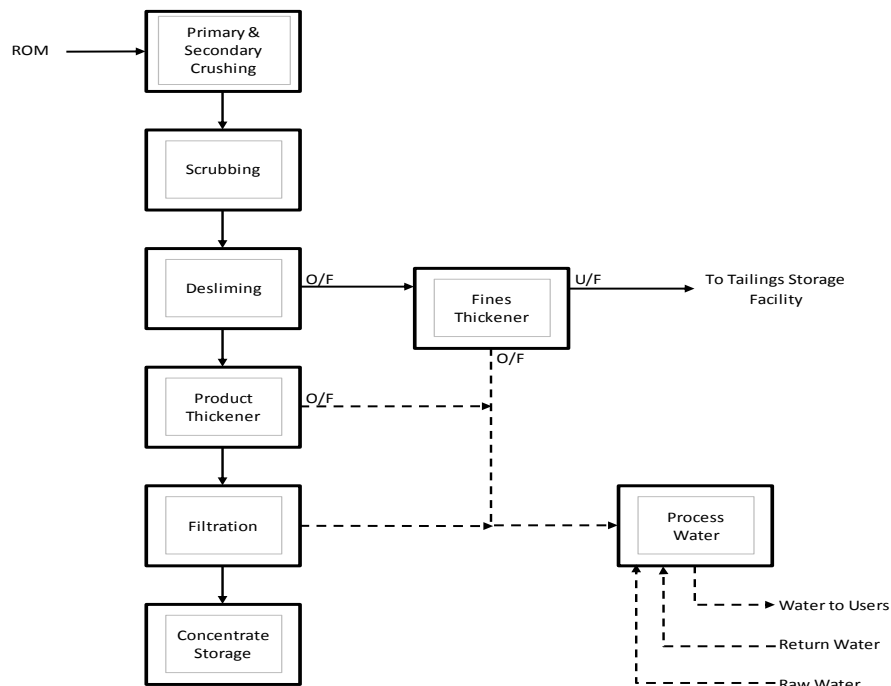
Beneficiation options (Cont.)



► Flowsheets

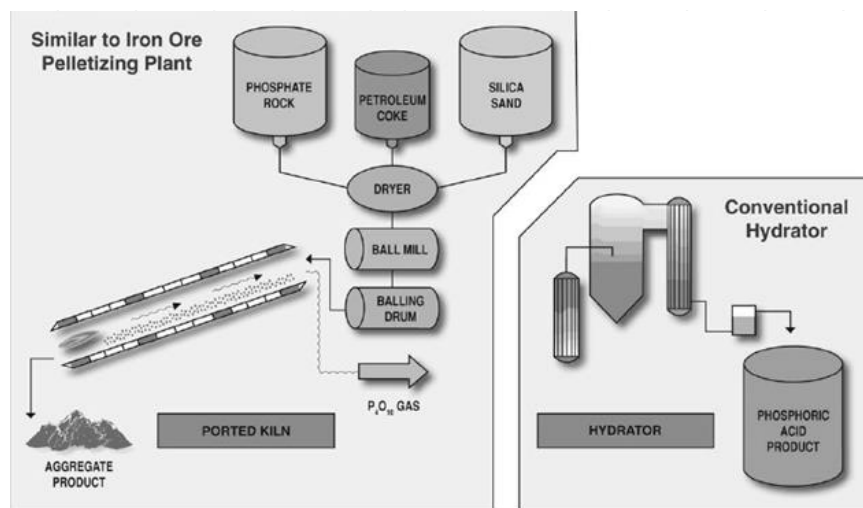
- Minimal upgrading scrub, screen, mill, thicken, pump product to chemical plant
- Product grade is >24% but <30% P_2O_5
- Feed to downstream phosphate chemicals facility

Beneficiation options (Cont.)



► Flowsheets

- Unconventional minimal upgrade P_2O_5 product feeding Improved Hard Process
- Production of Super Phosphoric Acid (70% P_2O_5)



Georgina Basin Infrastructure



▶ Road

- Eastern Limb
 - Mount Isa to Townsville
- Western Limb
 - Darwin to Adelaide
 - Tennant Creek to Mount Isa

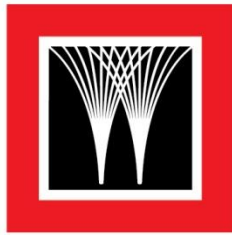
▶ Rail

- Eastern Limb
 - Mount Isa to Townsville
- Western Limb
 - Darwin to Adelaide



So where to from here.....

- ▶ Australia needs a second operational source of phosphate and downstream granular fertiliser production
- ▶ Infrastructure exists both in Queensland and the Northern Territory
- ▶ Water supply is available via subterranean aquifers
- ▶ Power will need to be generated on-site....if a sulphuric acid plant is included then there is ample cogenerated power available to the site
- ▶ Will allow for both construction jobs and long term operational employment
- ▶ Gas is available in the Northern Territory and Queensland
- ▶ Gas in Northern Territory is stranded where as internal gas in Queensland feeds LNG plants. Different price dynamics.



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