Column Flotation of Phosphate Ore

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Phosphate in Australia

So near yet so far

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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

- Eastern Limb (Queensland)
  - Paradise North and South
  - Phosphate Hill
  - Highland Plains

- Western Limb (Northern Territory)
  - Wonarah
  - Ammaroo
**Typical Mineralogy**

- 80% $\text{P}_2\text{O}_5$ liberation at $<106\mu\text{m}$
- Free silicates liberated at $<300\mu\text{m} >100\mu\text{m}$
- Interwoven silicates liberated at $<40\mu\text{m}$
- Fe oxides liberated at $<40\mu\text{m}$
- 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.)

- **Minimal upgrading**
  - scrub, screen, mill, thicken, pump
  - product to chemical plant
- Product grade is >24% but <30% $\text{P}_2\text{O}_5$
- Feed to downstream phosphate chemicals facility
Beneficiation options (Cont.)

- **Unconventional**
  - minimal upgrade
  - P$_2$O$_5$ product feeding Improved Hard Process

- Production of Super Phosphoric Acid (70% P$_2$O$_5$)
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
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 whereas internal gas in Queensland feeds LNG plants. Different price dynamics.
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