

# Annual General Meeting

22<sup>nd</sup> November 2007

Presentation by

**M.J. Turbott**

**Managing Director**

# Austpac's Development

- Ilmenite upgrading process (“ERMS SR”)
- Hydrochloric acid process (“EARS”)
- Demonstration Plant concept:
  - Synthetic rutile (“synrutile”) - 3,000 tpa capacity
  - Acid regeneration from iron chloride solutions
  - Iron oxide reduction
  - Fine titanium minerals agglomeration
  - HTR (high temp) & LTR (low temp) roasting
- BHP Billiton's \$5M investment

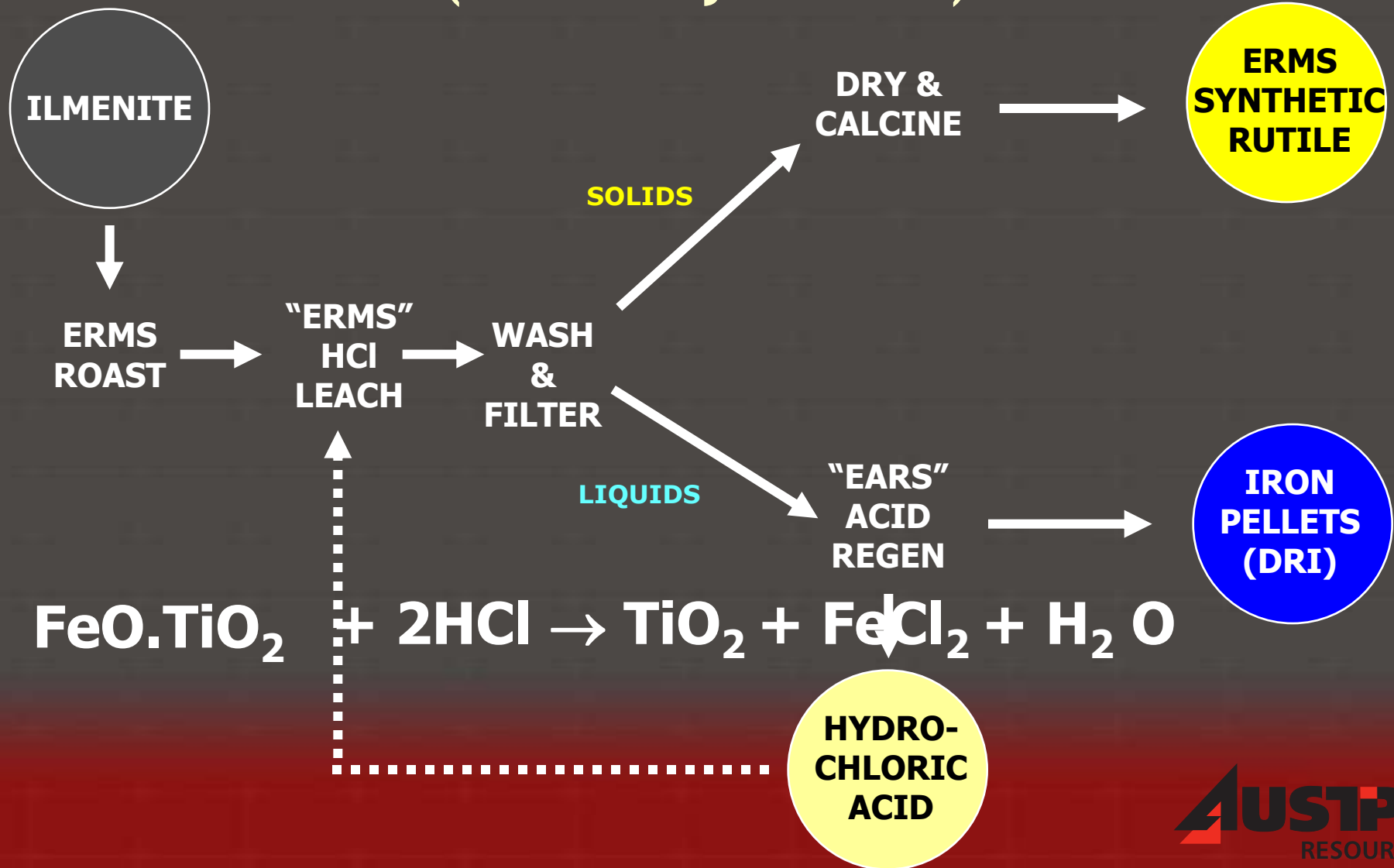
# Austpac's 2007 Focus: Commercialisation

- **Titanium industry - pigment & metal**
- Steel industry - waste treatment
- Iron ore industry - upgrading to DRI

# The Titanium Industry:

- 95% titanium dioxide pigment, 5% metal
- Two pigment processes - Chloride (60%) and Sulfate (40%)
- Chlorination needs high-grade feedstock
- Synrutile supplies ~25% of this market
- Growth in Ti metal production capacity
- Premium paid for quality

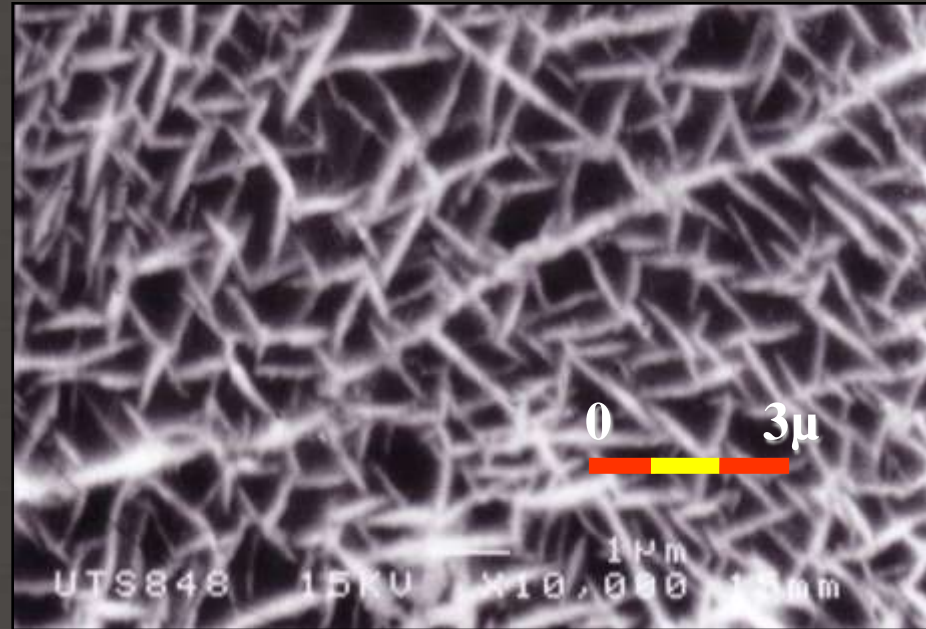
# Austpac's Synthetic Rutile Process ("ERMS Synrutile")



# ERMS Synrutile

World's highest quality synthetic rutile (>96% TiO<sub>2</sub>)

■ TiO <sub>2</sub>	97.0%
■ Fe <sub>2</sub> O <sub>3</sub>	0.55%
■ SiO <sub>2</sub>	0.57%
■ Al <sub>2</sub> O <sub>3</sub>	0.17%
■ Cr <sub>2</sub> O <sub>3</sub>	0.01%
■ CaO	<0.01%
■ MgO	0.02%
■ MnO	0.01%
■ U+Th	<10ppm



# Iron Metal Pellets

High purity feedstock for steelmaking and foundries

■ Fe	89.7%
■ FeO	6.00%
■ TiO <sub>2</sub>	0.16%
■ SiO <sub>2</sub>	0.18%
■ Cr <sub>2</sub> O <sub>3</sub>	0.08%
■ MgO	1.18%
■ MnO	2.29%
■ V <sub>2</sub> O <sub>5</sub>	0.84%
■ P <sub>2</sub> O <sub>5</sub>	0.007%



# ERMS Synrutile Process

The only process that can produce two valuable products

- Ultra-high grade synthetic rutile (for titanium pigment and titanium metal production)
- Iron metal for steel production

The most environmentally friendly process available

# BHP Billiton & ERMS SR

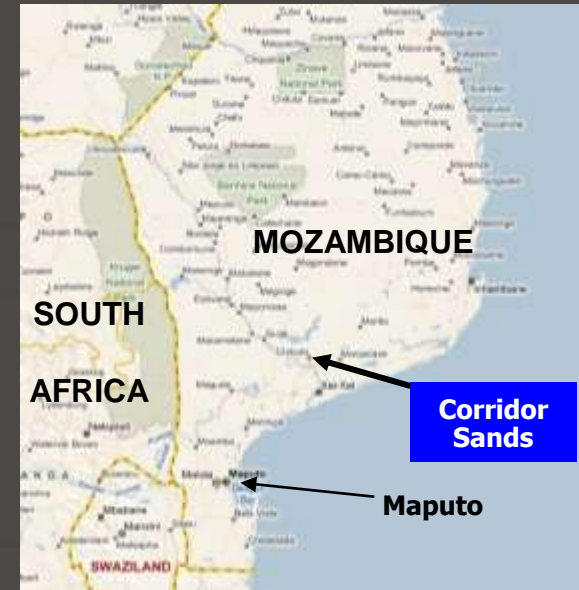
**Research Agreement (Sep. 2006 - Jan. 2007)**

**Commercialisation Agreement (May 2007)**

- BHPB share placement in June 2007; raised \$ 5M (25M shares; largest shareholder with 3.8%)
- Integrated ERMS SR synrutile Demonstration Plant at Newcastle (3,000 tpa)
- BHPB obtained licence to use technology in Africa (fee based on gross sales revenue)
- BHP Billiton: Corridor Sands deposit, Mozambique

# Corridor Sands

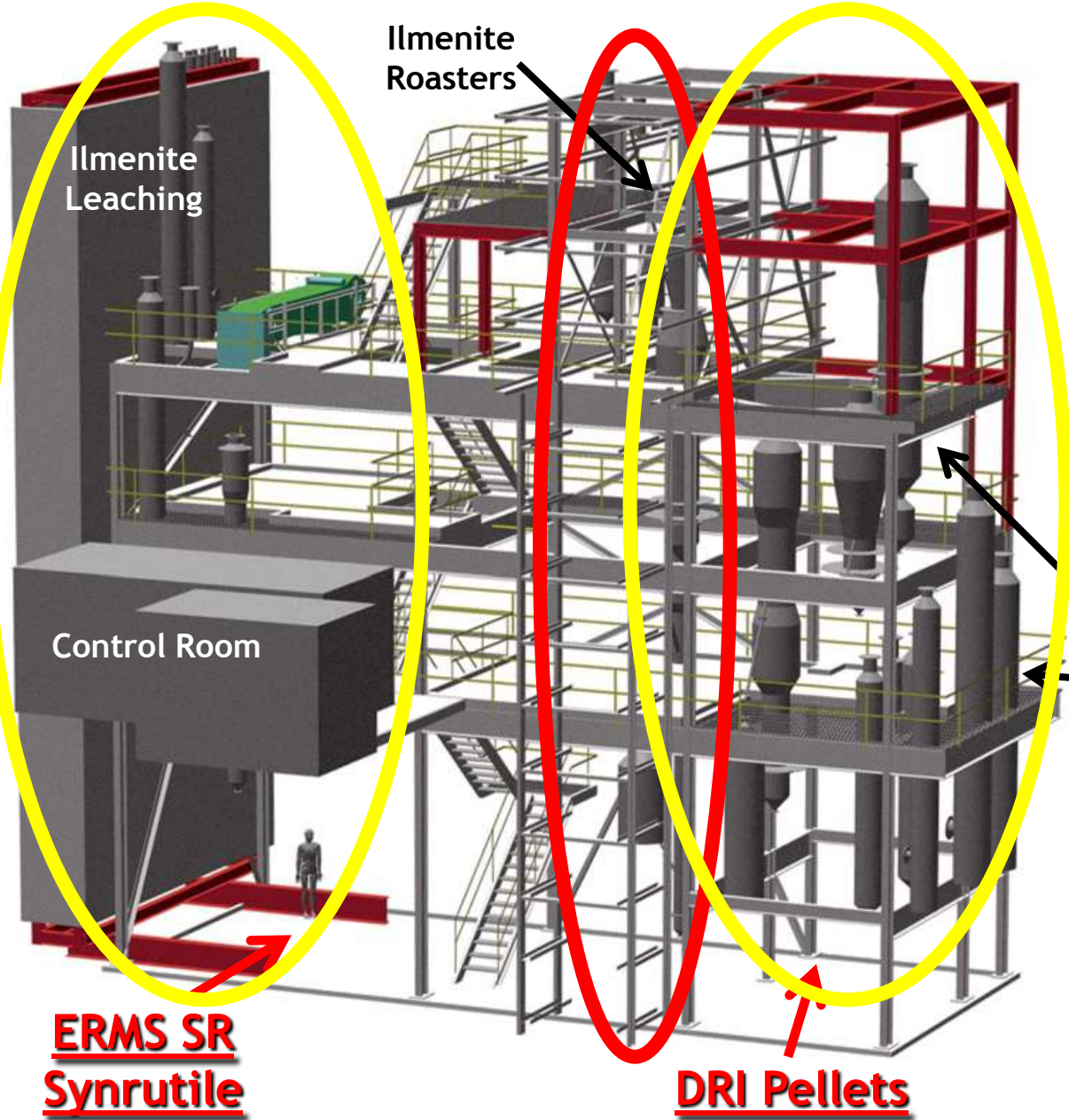
- Near Chibuto, Sth<sup>n</sup> Mozambique
- BHP Billiton 90%, IDC 10%
- World's largest heavy mineral sand ilmenite resource (>100MT, 100-year-plus asset)
- Project development options under review, focus on BHPB's Mozal complex near Maputo



**Titania Slag, ERMS SR option for future**

# ERMS SR Demonstration Plant:

- Project budget \$4.5M (excl. GST)
- Project commenced - mid July 2007
  - OH&S safety system implemented
  - 8 new Austpac team members
  - Expert consultants commissioned for process, electrical & mechanical engineering
  - Tradesmen and drafting contractors on site
  - Design & construction drawings 80% complete
  - EPA Operating Licence granted
- Phased construction schedule



# ERMS SR Demonstration Plant

EARS  
HCl acid  
regeneration

Stage 1 - Roasting

Stage 2 - Leaching &  
Acid Regeneration

ERMS SR  
Synrutile

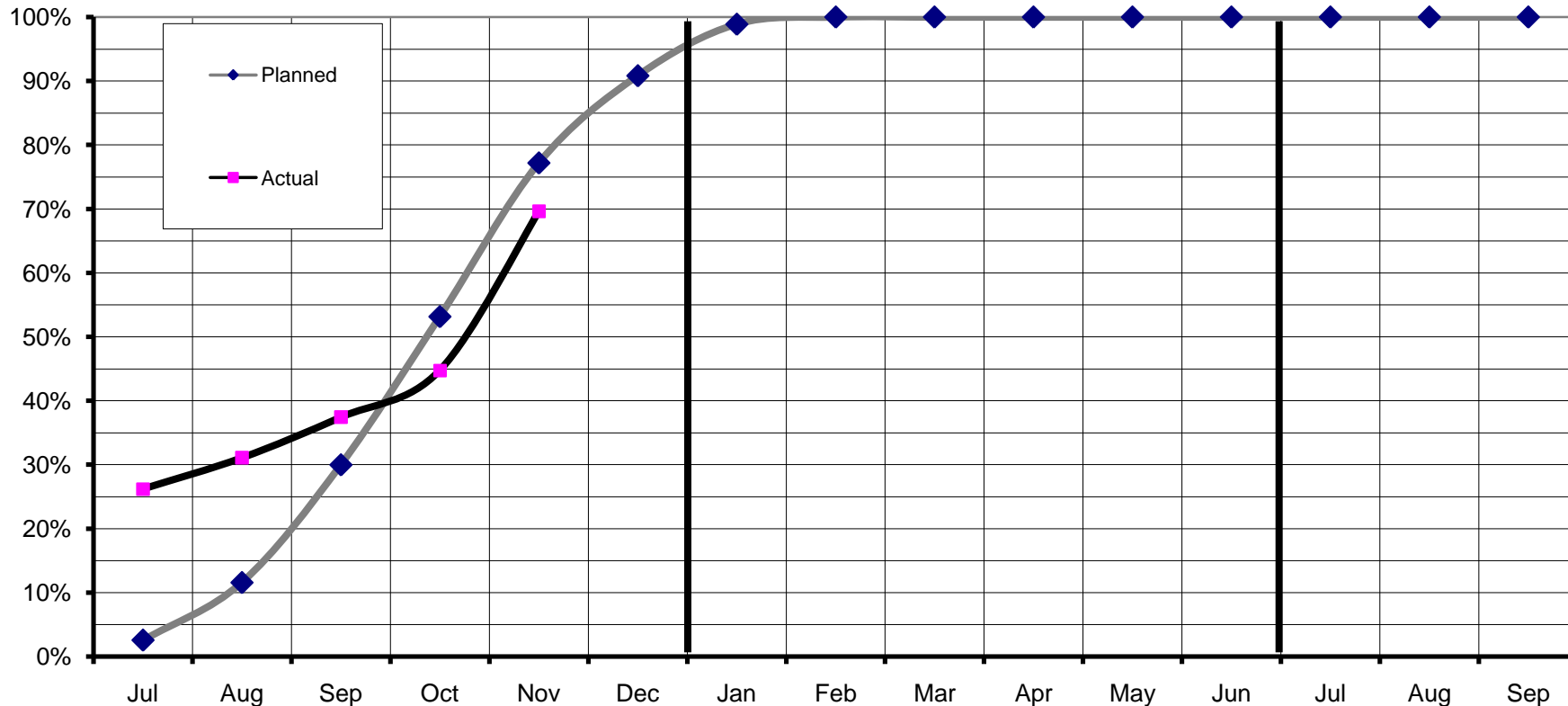
DRI Pellets

# Demonstration Plant - site office



# Stage 1 Progress (Nov 2007)

Stage 1 - S-Curve - Physical % Complete  
Roasting



# Stage 1 : Services

Power – Transformer Upgrade

Water – Ø50 Gal. Steel connection to mains

Cooling Water – cooling tower installed

Gas – Upgraded Cu pipe connection to tower & supplies to burners

High Pressure Air – New screw compressor & dryer (instrument air)

Nitrogen – BOC to deliver a 3000L tank and vaporiser on 10 Dec 07

Steam – ready for delivery, construction of base and enclosure underway



Water Supply



Cooling Tower Installation



Air Blowers

# Stage 1 : Raw materials handling



# Stage 1 : Ilmenite Roasting



Ilmenite Pre-heater



Reduction Roaster



Process Control Room



Oxidation Roaster



Anaerobic Cooler

# Stage 1: Magnetic Separation



Rare Earth Drum Magnet



Platform Scales

# Stage 2: Magnetic Separation



Rare Earth Roll Magnet

# Laboratory Facilities



Rare Earth Drum Magnets



Leaching Bench and Fume Hood



Muffle Furnace and Drying Oven



Rare Earth Roll Magnet



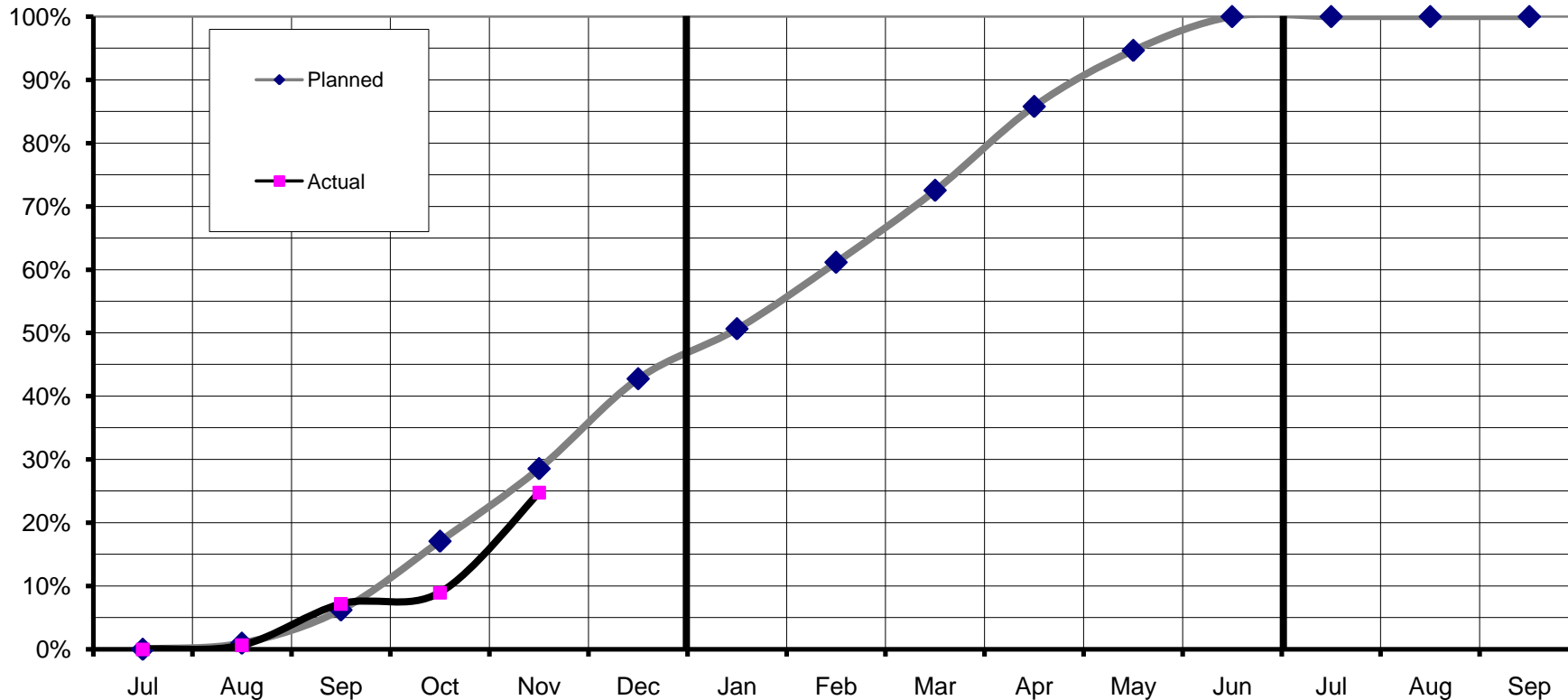
Titration Bench



Safety Shower

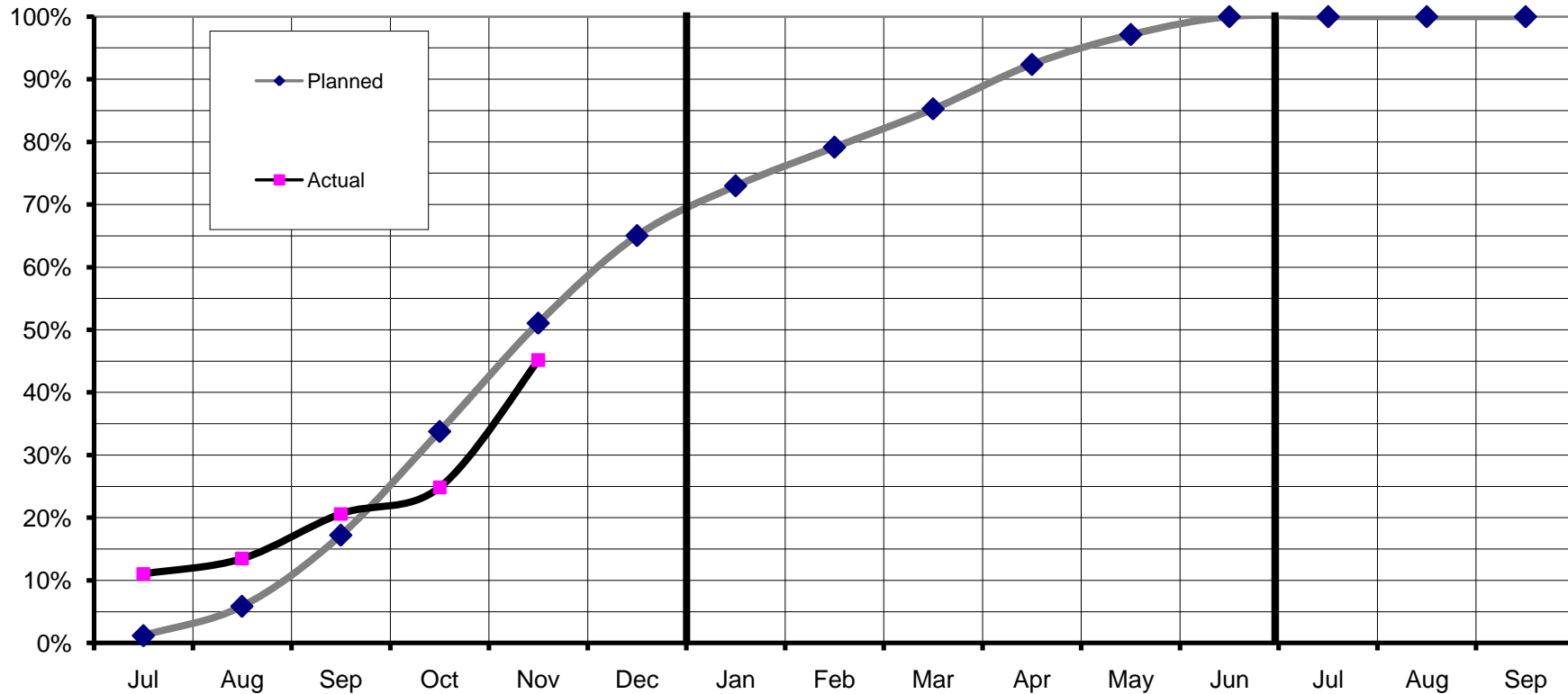
# Stage 2 Progress (Nov 2007)

Stage 2 - S-Curve - Physical % Complete  
Leaching



# Total Project (Nov 2007)

Combined Stage 1 & 2 - Physical % Complete



# BHP Billiton & ERMS SR

Next step is 60,000 tpa commercial ERMS SR plant:

- BFS to commence once synrutile testwork complete (August 2008)
- If BHP Billiton participates, BHPB & APG will jointly seek opportunities to apply ERMS SR process elsewhere in the world

# Commercial ERMS Synrutile Plant

- 60,000 tpa ERMS SR synrutile plant (+ 45,000 tpa iron pellets)
- Economically attractive:
  - Capital cost: ~\$ 85M
  - EBITDA: > \$ 35M p.a.
  - IRR: > 30%, Payback: < 3 years





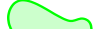
**S.E. Australia possible site for first plant**

# Murray Basin Mineral Sand Developments



- 2006 - two new mineral sand mines commenced production in the Murray Basin
- Ilmenite contains high chrome & U+Th

**ERMS SR is the only process suitable  
for upgrading the ilmenite**

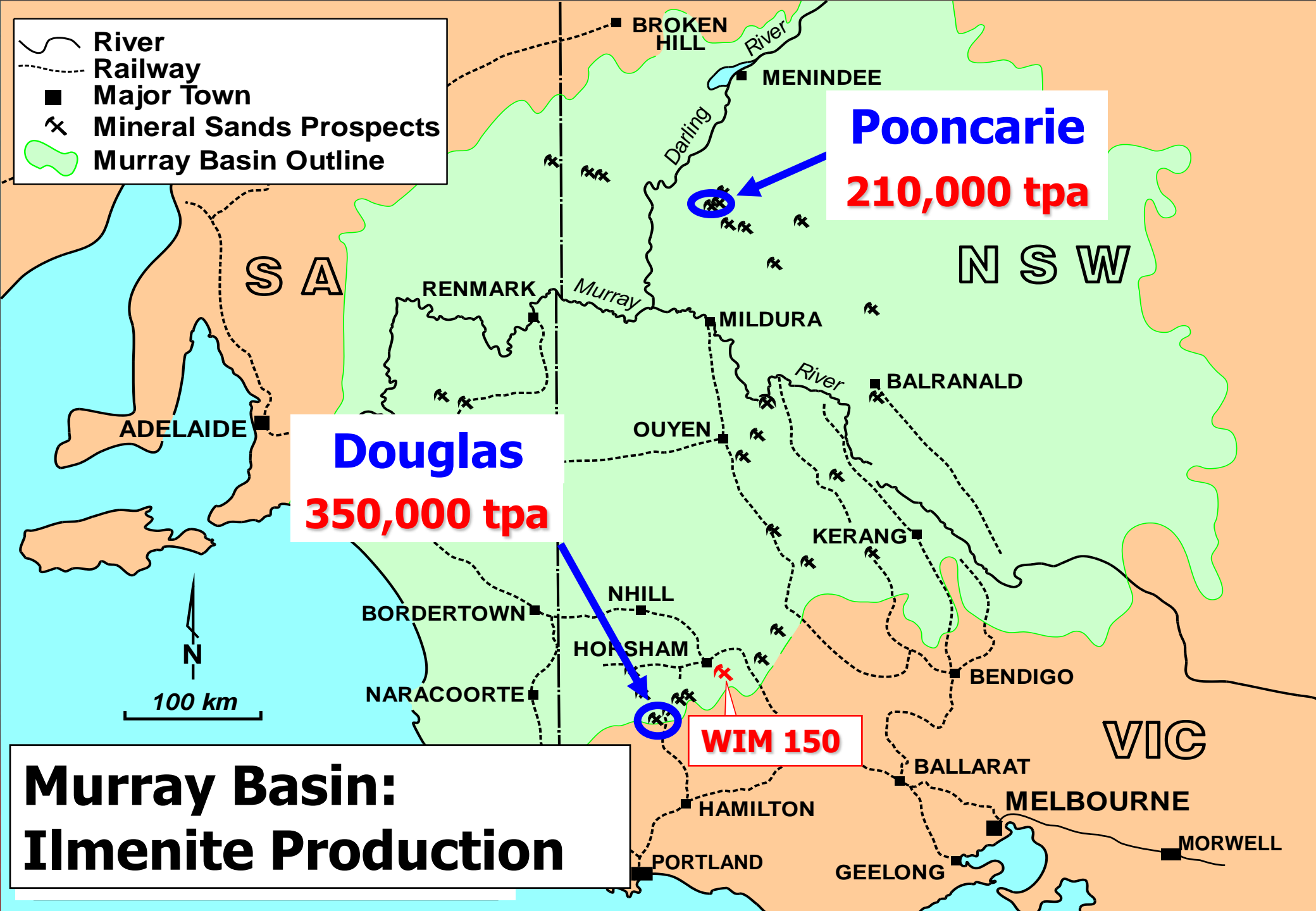
-  River
-  Railway
-  Major Town
-  Mineral Sands Prospects
-  Murray Basin Outline

**Pooncarie**  
**210,000 tpa**

**Douglas**  
**350,000 tpa**

**WIM 150**

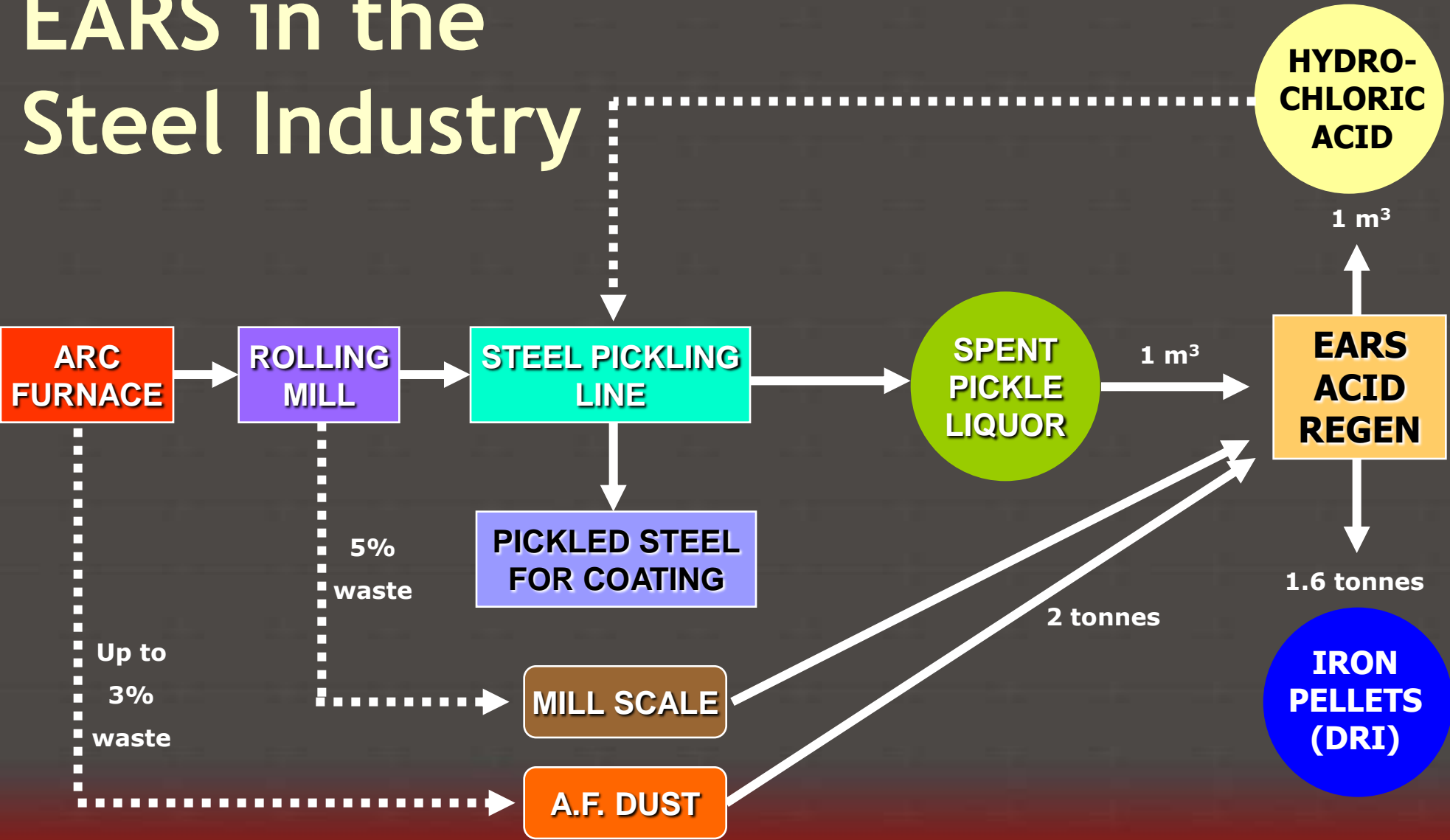
**Murray Basin:  
 Ilmenite Production**



# Austpac's 2007 Focus: Commercialisation

- Titanium industry - pigment & metal
- **Steel industry - waste treatment**
- Iron ore industry - upgrading to DRI

# EARS in the Steel Industry



# Steel Waste Processing:

- Austpac's EARS process treats steel industry waste liquors generated from steel pickling and galvanising operations and recovers hydrochloric acid
- The Austpac process is unique: it produces reusable high-purity iron pellets from mill scale and EAF dust
- It also recovers the zinc from EAF dust (pat. pend.)
- Successful pilot trials using OneSteel wastes

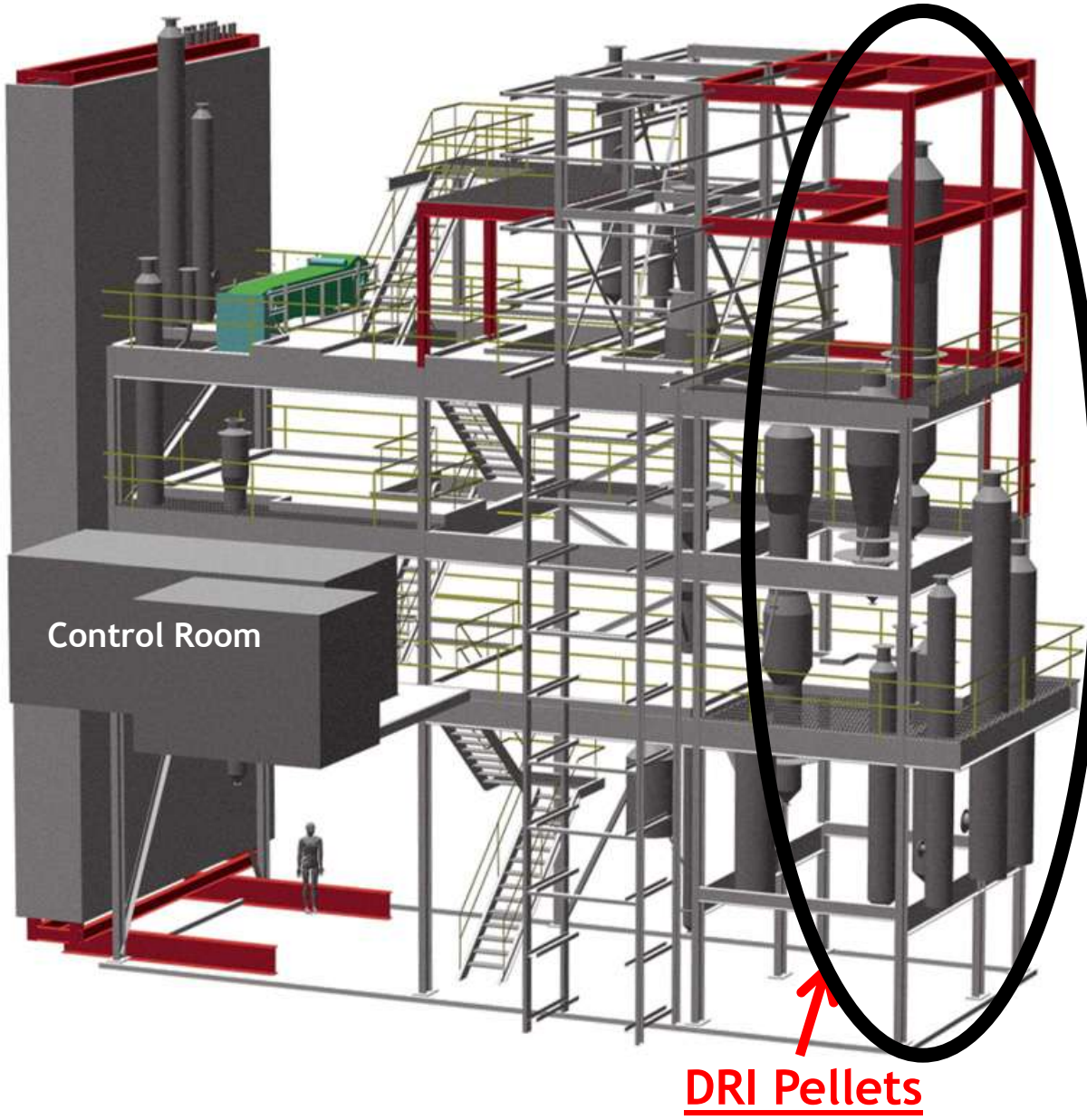
**Very environmentally friendly process as all the waste is treated and the constituents recovered**

# Commercial EARS Plant

## “Build-Own-Operate” Steel Waste Plant

- Capital cost of 50 tpd plant ~ A\$ 6M
- Opex \$130/t, Value >\$750/t, **Profit = \$620/t**
- Generates > \$ 10M profit/year
- Plus zinc recovery upside

**EARS section of DP has 40 tpd capacity!**



DRI Pellets

# ERMS SR Demonstration Plant

← EARS PLANT  
40 tpd capacity

EPA has licensed  
the Plant to treat  
steel wastes

# Commercial Plants for Steel Waste

- H2 2008 - Bulk test of OneSteel's Newcastle waste
- By end 2008 - Proven at commercial scale
- DP capable of handling all Newcastle wastes as a commercial operation
- Stand-alone plants will generate high returns
- Three potential plants needed in Australia
- Developing opportunities for global application

# Austpac's 2007 Focus: Commercialisation

- Titanium industry - pigment & metal
- Steel industry - waste treatment
- **Iron ore industry - upgrading to DRI**

# Austpac Iron Ore DRI Process

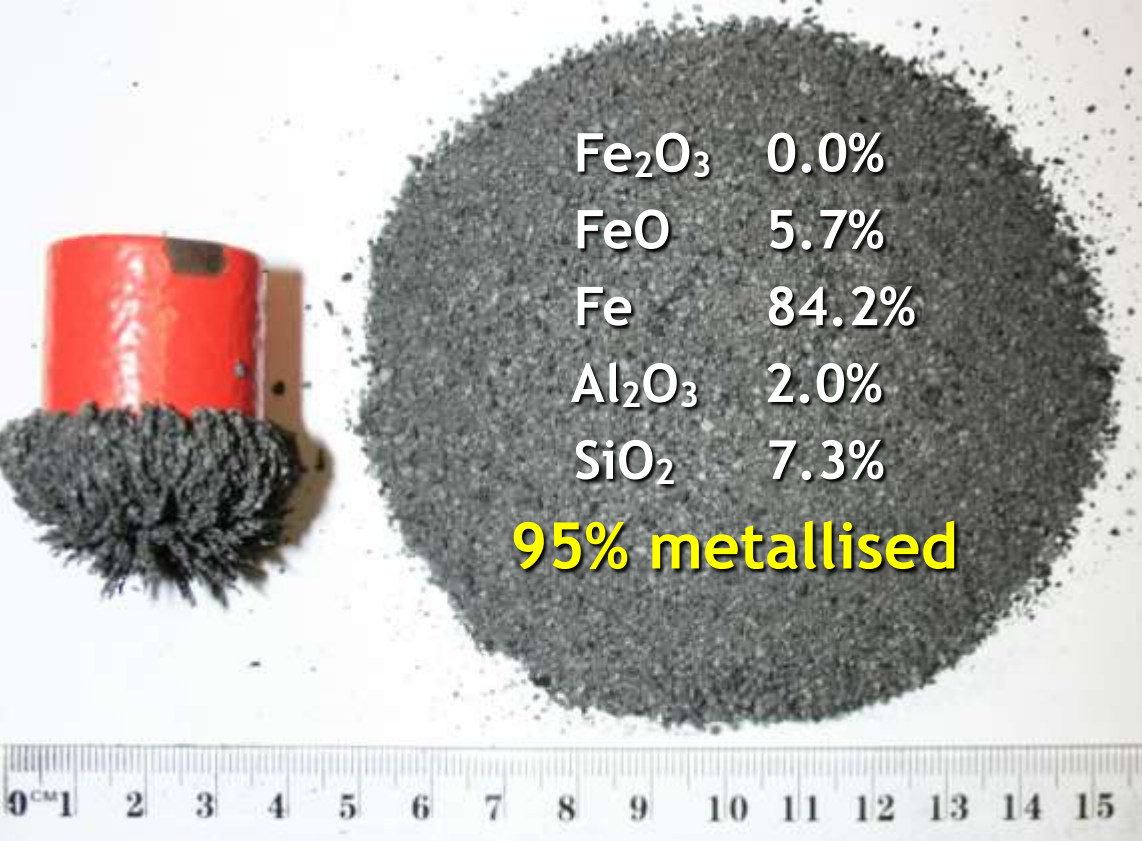
- Converts magnetite ores to iron metal
- Low value iron ore fines to iron metal
- Continuous pilot DRI unit successfully tested on EARS iron oxide pellets
- Demonstrated on Pilbara iron ore fines



# Pilbara Iron Ore to DRI



Fe <sub>2</sub> O <sub>3</sub>	83.5%
FeO	0.2%
Fe	0.0%
Al <sub>2</sub> O <sub>3</sub>	1.3%
SiO <sub>2</sub>	4.6%



Fe <sub>2</sub> O <sub>3</sub>	0.0%
FeO	5.7%
Fe	84.2%
Al <sub>2</sub> O <sub>3</sub>	2.0%
SiO <sub>2</sub>	7.3%

**95% metallised**

0<sup>CM</sup> 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

# Austpac Iron Ore DRI Process

- Produces high purity, high value electric arc furnace feed
- Demonstration Plant will be used to process bulk iron ore samples
- Interest from iron ore producers
- Licensing strategy



# Project Timelines (Australia only)

## (Fiscal Years)

Project	2007-08	2008-09	2009-10	2010-11	2011-12
3,000 tpa SynRutile Demonstration Plant					
60,000 tpa SR Plant - S.E. Australia					
Waste Plant #1 (Newcastle Dem. Plant)					
Waste Plant #2 (Australia)					
DRI from iron ore fines (licences)					

 Cash Flow

# Cash Generation Potential

(Australia only; EBITDA, Fiscal Years)

Projects	2007-08	2008-09	2009-10	2010-11	2011-12
60,000 tpa SR Plant - S.E. Australia	-	-	-	\$30M	\$35M
Newcastle Waste Plant	-	\$4M	\$10M	\$10M	\$10M
Waste Plant #2 (Australia)	-	-	\$3M	\$10M	\$10M
<b>Projects EBITDA (Annual totals)</b>		<b>\$4M</b>	<b>\$13M</b>	<b>\$50M</b>	<b>\$55M</b>

Plus: Worldwide steel industry waste  
Iron ore to metal (DRI Process)

# Austpac's Forward Program:

- Synthetic rutile production (SE Australia, BHP Billiton's Corridor Sands, other deposits)
- Waste treatment for the Steel Industry
- Licensing DRI process to iron ore miners
- **Commercialisation commences in 2008**



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