

# Iluka Resources Limited



South Australia Mining and Exploration Conference

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# Disclaimer – Forward Looking Statements



## Forward Looking Statements

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- changes in product pricing assumptions;
- major changes in mine plans and/or resources;
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Iluka’s Ore Reserves and Mineral Resources information in this document have been prepared in accordance with JORC 2012. Refer to Iluka’s Ore Reserves and Mineral Resources Statement 2013, Iluka Annual Report, Page 133-135 and ASX Release on 30 April 2014 , “Addendum to 2013 Annual Report”.



## Discovery of Jacinth-Ambrosia

# History of Discovery

- Discovered in 2004
- Good old fashioned exploration
- Patience
  - 4 years to get tenements granted
- Persistence: some encouraging intercepts and one more hole beyond the program
  - 45m of up to 80 per cent HM and 50 per cent Zircon
- First HMC produced in November 2009
- Opened a new significant HM mineral province of global significance

# Jacinth-Ambrosia Project Overview

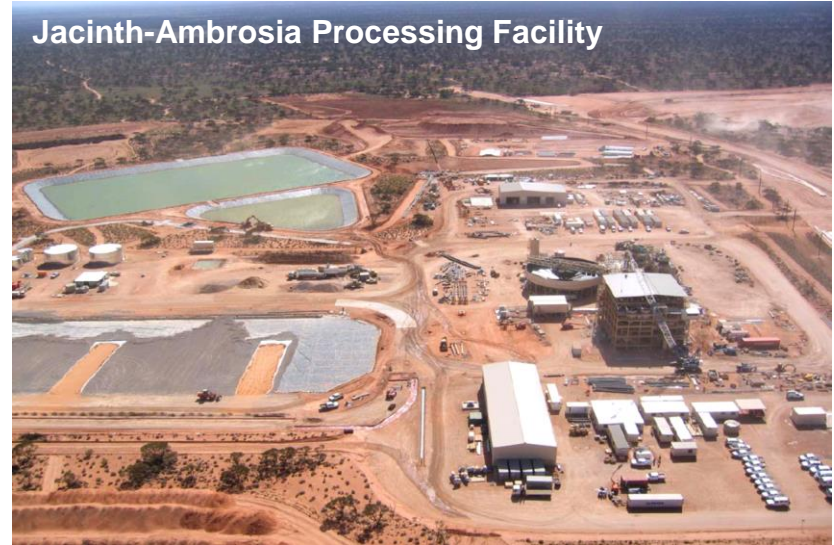
## Operational

- Ore body 900m wide by 5 km long
- Low in moisture, no groundwater, strip ratio 0.5:1
- Ore at average thickness of 20 metres
- Mining unit plant in-pit ~1,300tph
- Wet Concentrator ~1,000tph
- HMC transported 270km by sealed road to Thevenard
- Triple road trains - 96 tonne capacity
- 40kt storage bunker at Port of Thevenard

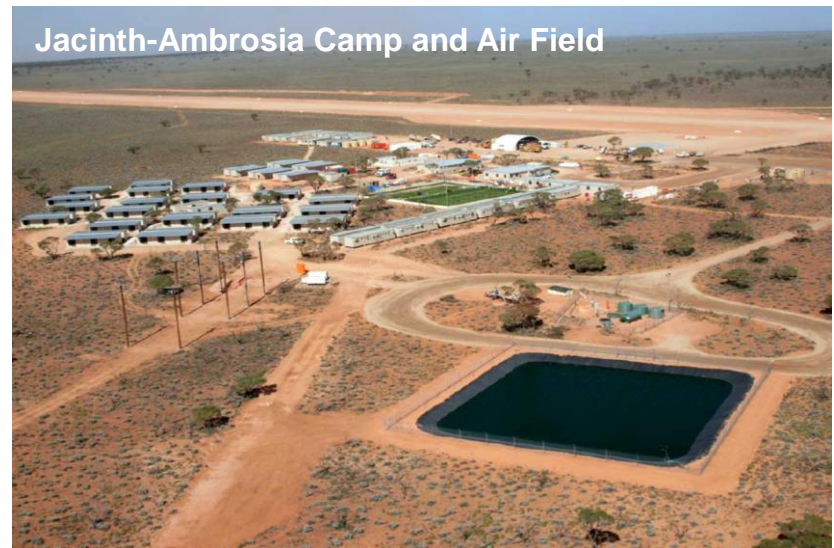
## Support

- Accommodation village - 160 persons
- Sealed airstrip landing 33 seater SAAB 340 aircraft
- Water from borefield to site 32 km
- Off-grid diesel power station (6.8 MW)
- SA Ambulance accredited medical facilities
- Reverse osmosis fresh water generation plant

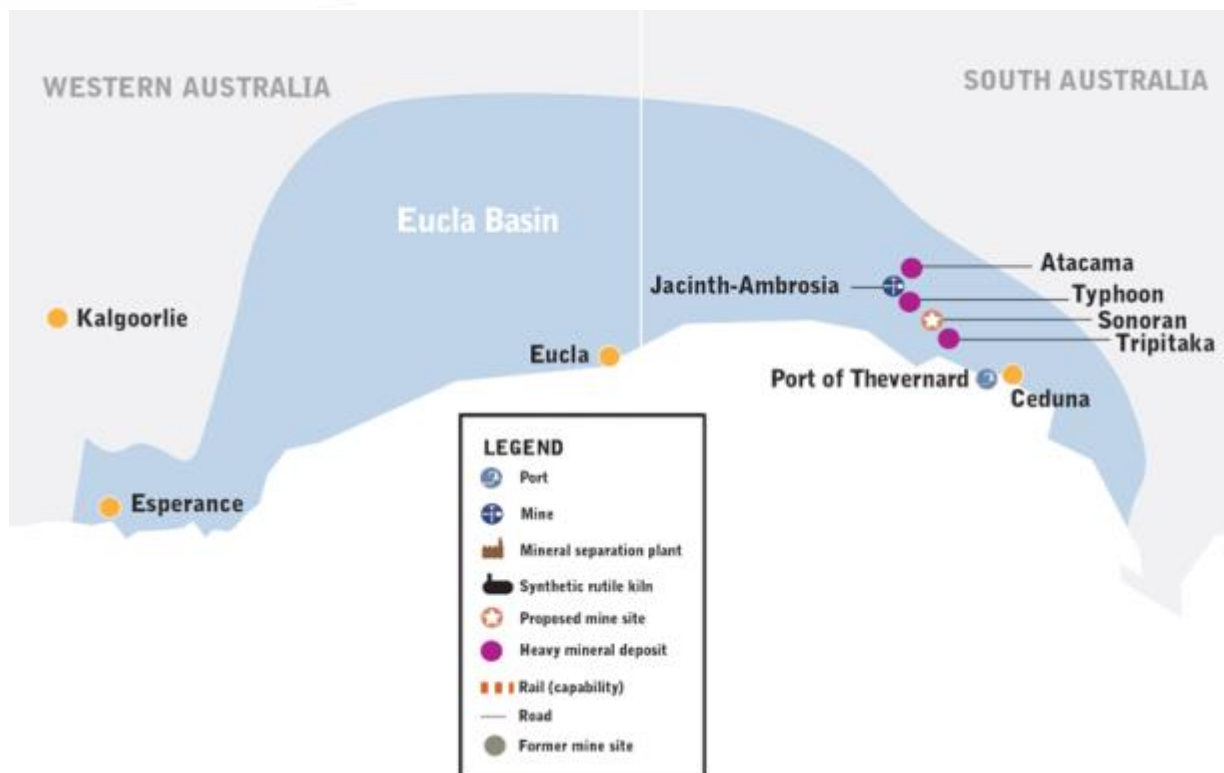
Jacinth-Ambrosia Processing Facility



Jacinth-Ambrosia Camp and Air Field



# Jacinth-Ambrosia Ore Reserves



JORC 2012 Status (Dec-13)	Ore (Mt)	HM In-Situ (Mt)	Zircon (%)	Ilmenite (%)	Rutile (%)
Ore Reserve - proved	119.7	5.1	51	27	4
Ore Reserve - probable	3.4	0.1	51	20	5
<b>Total</b>	<b>123.1</b>	<b>5.2</b>	<b>51</b>	<b>27</b>	<b>4</b>

Note: Refer to Iluka's Ore Reserves and Mineral Resources Statement 2013, Iluka Annual Report, Page 133-135 and ASX Release on 30 April 2014, "Addendum to 2013 Annual Report".

# Operational and Project Implementation - What Worked



*'Focused on what we control – safety, environment, costs, capital, inventory & stakeholders'*

## Culture

- Adaptive cultural change in 2009 based on leadership, accountability and flexibility
- Focused on *'setting high standards and achieving them'* - safety, environment, costs, planning and execution
- Maintained a lean flexible cost culture when times are good pays dividends in tough times
- Underpinned new culture with *'Game Plan'* alignment at all levels of the organisation

## Planning

- Maintained internal confidentiality while developing response options
- Evaluated all available external and internal intelligence regarding market conditions
- Options analysis included impacts on margins, costs, inventory, people and stakeholders
- Options structured to respond to a wide range of possible market conditions
- All plans had to maintain organisational and operational readiness to respond quickly to rebound market
- Focused and achieved rapid integrated analysis, planning and execution - this is now done continuously



## Execution

- Strong technical groups in geology, metallurgy, mine planning and project management
- Collaborative approach between disciplines at all levels of the organisation
- Commercial thinking in regards to project costs vs operational costs and performance

# Satellite Deposits – Discovery Timeline

- Jacinth-Ambrosia – 2004
- Tripitaka – 2005
- Typhoon – 2006
- Atacama – 2011
- Sonoran – 2011
- Atacama extension – 2012

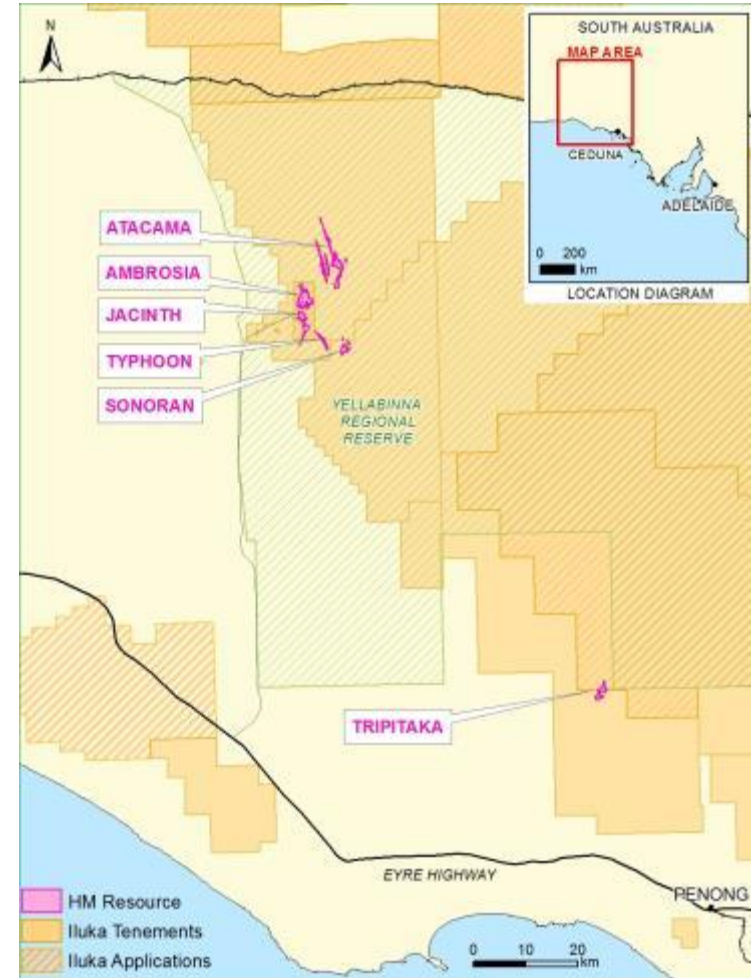
JORC 2012 Status (Dec-13)	Ore (Mt)	HM In-Situ (Mt)	Zircon (%)	Ilmenite (%)	Rutile (%)
Typhoon – measured	23.7	1.5	13.2	62.7	0.9
Sonoran – indicated	27.0	1.9	17.1	64.2	2.3
Sonoran – inferred	0.5	0.1	35.4	49.4	4.7
Atacama – inferred	110.0	9.9	13.2	68.9	1.8

Note: Refer to Iluka's Ore Reserves and Mineral Resources Statement 2013, Iluka Annual Report, Page 133-135 and ASX Release on 30 April 2014, "Addendum to 2013 Annual Report".



# Atacama / Sonoran / Typhoon

- New production options in the Eucla Basin
  - Sonoran-Typhoon; and
  - Atacama.
- Immediately adjacent to Jacinth-Ambrosia mine:
  - can use existing infrastructure;
  - provide production flexibility;
  - can be developed sequentially; or
  - in parallel to boost production.



# Operational Improvements

## Tails Management Issues

- Significant tailing swell resulting:
  - in higher volumes stored in off-path TSF;
  - insufficient mining void available for backfill;
- Tails infiltration losses approaching bore field capacity
- Groundwater mounding risks around impermeable basement areas

## Revised Tails Management Techniques

- De-water and dry stack variable portion of sands fractions:
  - stacked sands have flexibility of placement (reduced volumes into constructed cells)
  - stacked sands can be used as wall construction material;
  - higher recovery of water through lower infiltration losses.
- Balance of sands continue to be dewatered in cells with clays:
  - lower infiltration loss with higher proportion of clay
  - higher consolidated tails densities at improved clay : sand ratio – lower swell factor

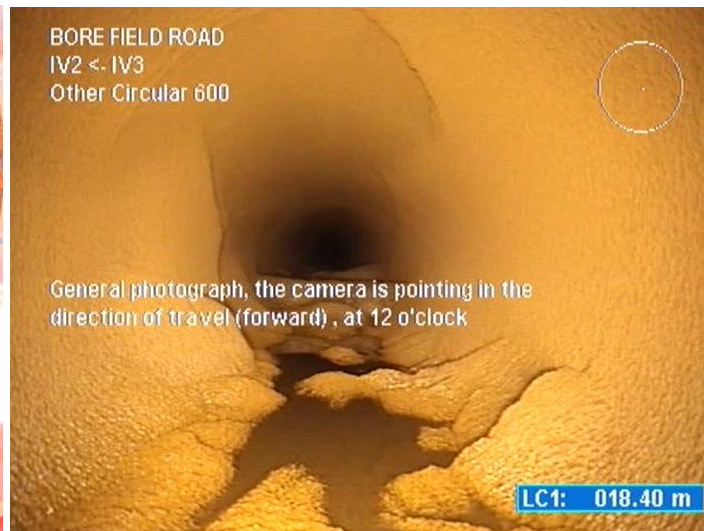
## Benefits beyond the immediate

- Bore field capacity unlocked for satellite mine development

# Operational Improvements

## Borefield Transfer Pipeline Sustainability

- 31km long 644mm ID glass reinforced plastic pipe, buried for entire length, +70 metre  $\Delta$ RL
- Significant accretion of ferrihydrite on internal walls of pipeline occurring since commissioning in 2009
  - not anticipated
- Accretion oxidised to hematite and goethite and solidified
- >25 per cent reduction in pipeline capacity, 25 per cent increase in unit power demand
  - accretion up to 100mm over first 5km, 50 per cent reduction in X-Area
- Further accumulation risks total blockage rendering pipeline unserviceable



# Operational Improvements

## Pipeline Restoration

- characterisation of accretion and inspection
- video footage
- options analysis – selected pigging as only viable option
- manage risk of failure

## Attempt Number 1

- Pigged jammed at 250m with solidified accretion

## Attempt Number 2

- 750m to 1500m sectors for first 5km
- 26km in 8hrs for remainder
- Approximately 1000 cubic metres of scale removed from the 31km pipeline
- Mass of Scale remove: Approximately 2500-3000t of material

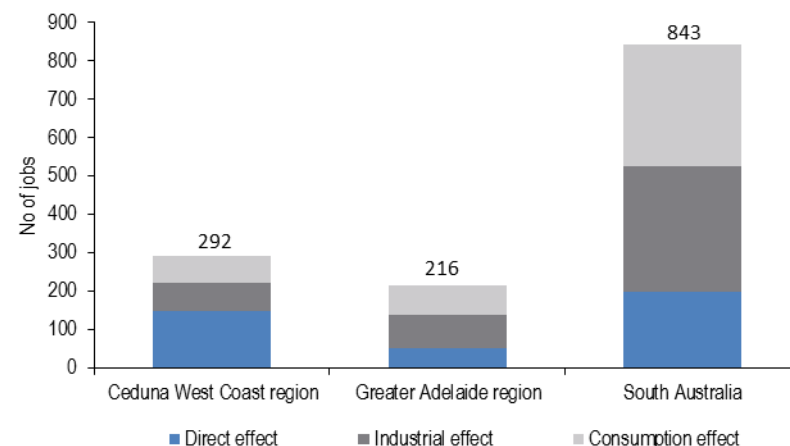


# South Australian Regional Contribution

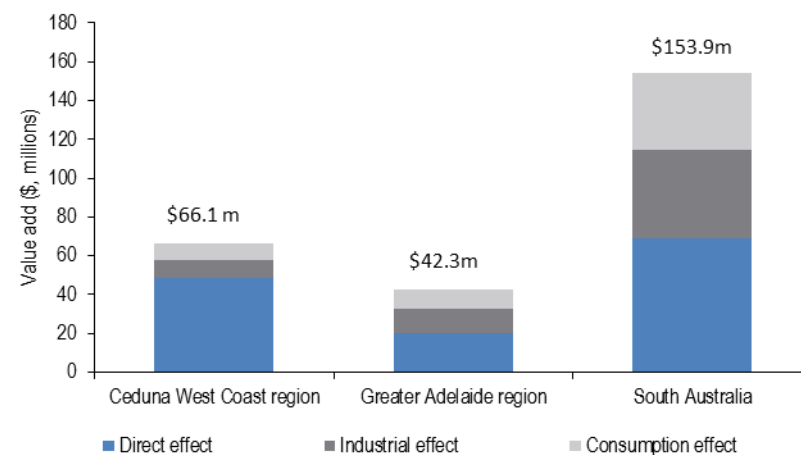
- Jacinth-Ambrosia sole mining operation in region
  - Iluka: 67 employees, 48 per cent local
  - Contractors: 89 employees (mining, logistics and services)
- Economic contribution\*:
  - 292 jobs and \$66.1 million in value add to region
  - additional 646 jobs and \$85 million value add to State
- Community investment
  - \$200 thousand since 2009 (e.g. RFDS, Oysterfest)
  - education, business and career development programs
  - Indigenous training, mentoring and workforce participation



Direct and Indirect Employment



Direct and Indirect Value Add



\* Data from Ernst & Young based on 2011 Census

# Environmental Management

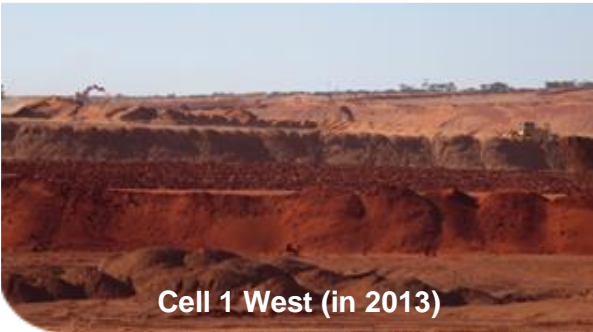


- Jacinth-Ambrosia mine was the first project in South Australia permitted to be developed in a regional reserve
- Iluka strives for environmental and rehabilitation standards that go beyond compliance - proactivity
- Research partnerships with leading educational institutions to develop best practice rehabilitation outcomes
- Site based rehabilitation specialist manage in situ research trials to inform rehabilitation management
  - gaining a broader understanding of revegetation in saline and arid environments
- Awarded the South Australia Premier's Award for Environmental Excellence 2014
- Proposed upgrade of approvals instrument to PEPR in 2015:
  - improve economic outcomes for mine (preserve and increase reserves)
  - reduce closure costs
  - reduce ongoing operating expenditure
  - create operational flexibility
  - research efforts have facilitated the technical findings support revision

## Award for Environmental Excellence

**Iluka Resources Ltd** for its *Pro-Activity-Beyond Compliance* initiative and research work with the Adelaide Botanic Gardens and local universities on its rehabilitation activities which have far reaching benefits for many other companies and industries in the future.

# Jacinth-Ambrosia Land Rehabilitation





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# Iluka Resources Limited



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