



**ERA** Energy Resources of Australia Ltd

# Rehabilitation Management

Andrea Sutton | Chief Executive | 27 August 2015





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A number of the rehabilitation activities described in this presentation remain subject to regulatory review and, where necessary, approval.

All currency mentioned in this presentation is in Australian dollars unless otherwise stated.



# Acknowledgement of Traditional Owners

The operations of Energy Resources of Australia Ltd (ERA) are located on Aboriginal land and are surrounded by, but separate from, Kakadu National Park

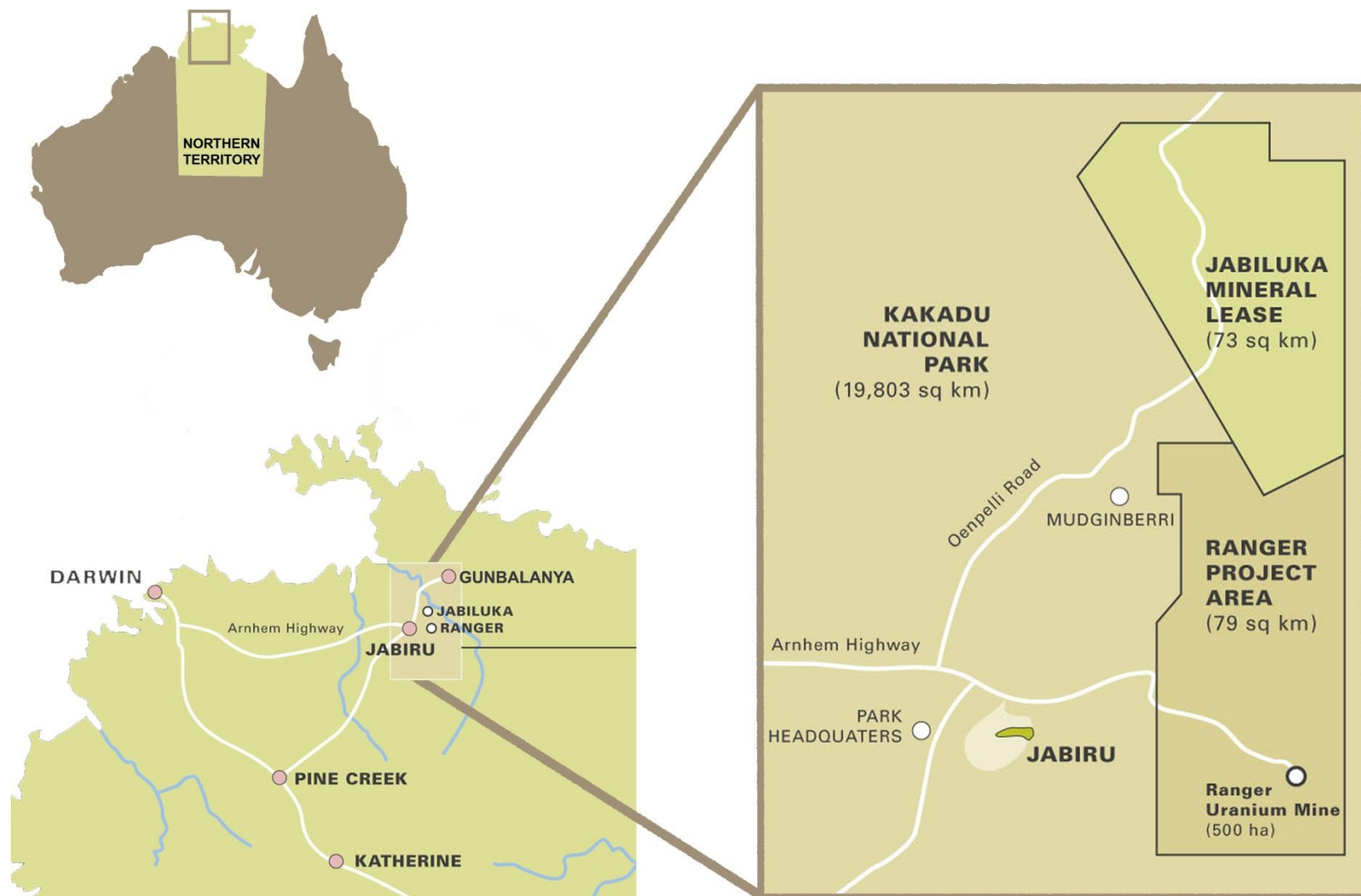
ERA respectfully acknowledges the Mirarr, Traditional Owners of the land on which the Ranger mine is situated and the Larrakia people, the traditional owners of the land in the Darwin region

# Agenda



- Ranger history
- Progressive rehabilitation overview
  - Jabiluka
  - Pit 1
  - Pit 3
  - Tailings Storage Facility
  - Water Management
- Stakeholder engagement
- Rehabilitation milestones

# Ranger Project Area





# Commitment to progressive rehabilitation

- Ranger is one of the most regulated mines in Australia
- The Ranger mine operates under the Atomic Energy Act 1953 (Cth)
- Stringent environmental requirements are prescribed
- Two open cut mines – Pit 1 and Pit 3 currently undergoing rehabilitation
- Approximately 10 km<sup>2</sup> of disturbed area will be rehabilitated
- Progressive rehabilitation projects have been ongoing since the commencement of backfilling of Pit 1 with tailings in August 1996
- Since 2012 ERA has spent \$392 million on rehabilitation and water management
- Traditional Owners have been consulted during progressive rehabilitation on aspects such as species for revegetation, land formation and other crucial rehabilitation issues



Ranger Mine 2015



# Rehabilitation of Jabiluka





# Jabiluka before and after rehabilitation



Jabiluka pre rehabilitation 2000



Jabiluka revegetation 2015

- Rehabilitation work at Jabiluka began in 2003
- Infrastructure was removed and the box-cut and decline were backfilled
- Revegetation of disturbed areas began in 2005 with the planting of 7,560 local native seedlings
- Interim water management pond deconstructed in 2013
- Land reshaped to pre-mining formation
- Erosion matting and rock drains laid to control erosion



# Jabiluka revegetation

- 8,600 saplings planted in 3 further stages between 2013 and 2015
- Traditional Owners consulted on native species, density and landforms
- 5 ERA Indigenous trainees and 8 Indigenous workers from Kakadu Native Plants were involved in the planting of saplings
- Seeds from native species within lease area were collected and germinated
- 22 species of native plants planted during revegetation
- Ongoing weed, fire and water quality management in place



December 2013



July 2015



# Jabiluka revegetation progress



2011



2013



2015



# Rehabilitation of Pit 1





# Rehabilitation of Pit 1

- Mining ceased in Pit 1 in 1994
- Tailings deposition commenced in 1996 and ceased in 2008
- 7,700 prefabricated vertical drains (wicks) installed in Pit 1 to improve water drainage and accelerate consolidation of tailings
- Geotextile layers placed over exposed tailings to enable placement of waste rock drainage layer (preload) to manage tailings water expressed from wicks
- The laterite cap placed on top of preload cap successfully converted process water catchment to pond water catchment
- Waste rock will be used to create final landforms



Pit 1 wick installation 2012



Pit 1 layered pre-load placement 2014 [www.energyres.com.au](http://www.energyres.com.au)



# Preparing for Pit 1 revegetation

- 30 years of dedicated research and revegetation trials on closure
- Revegetation trials have been ongoing using field testing and theoretical modelling to create optimal closure strategy
- Revegetation trials on 8 hectares of waste rock began in 2008 and fauna is colonising on the landform
- Trials have proven vegetation can be established on waste rock landform and is assessing erosion rates and run-off water quality
- Approximately 42 plant species will be used in the revegetation of Pit 1
- Seeds will be collected from within Kakadu National Park and germinated for planting at Ranger



17 year old trees on revegetation trial plot



Eight hectare revegetation trial landform



# Rehabilitation of Pit 3





# Innovation in Rehabilitation of Pit 3

- Mining ceased in November 2012
- 31 million tonnes of waste rock placed into void followed by mill tailings
- Innovative approach to backfilling Pit 3, engineered layers and drainage system created to maximise tailings consolidation and also enable brine storage within the waste rock voids
- Brine injection bores installed within Pit 3 for concentrated brine from water treatment to be securely injected into lower waste rock layer
- Tailings from the Tailings Storage Facility will be deposited directly into Pit 3 once dredging commences
- Layers of clay capping to separate waste rock and tailings
- Revegetation to commence after landform is created



Completion of Mining at Pit 3, November 2012

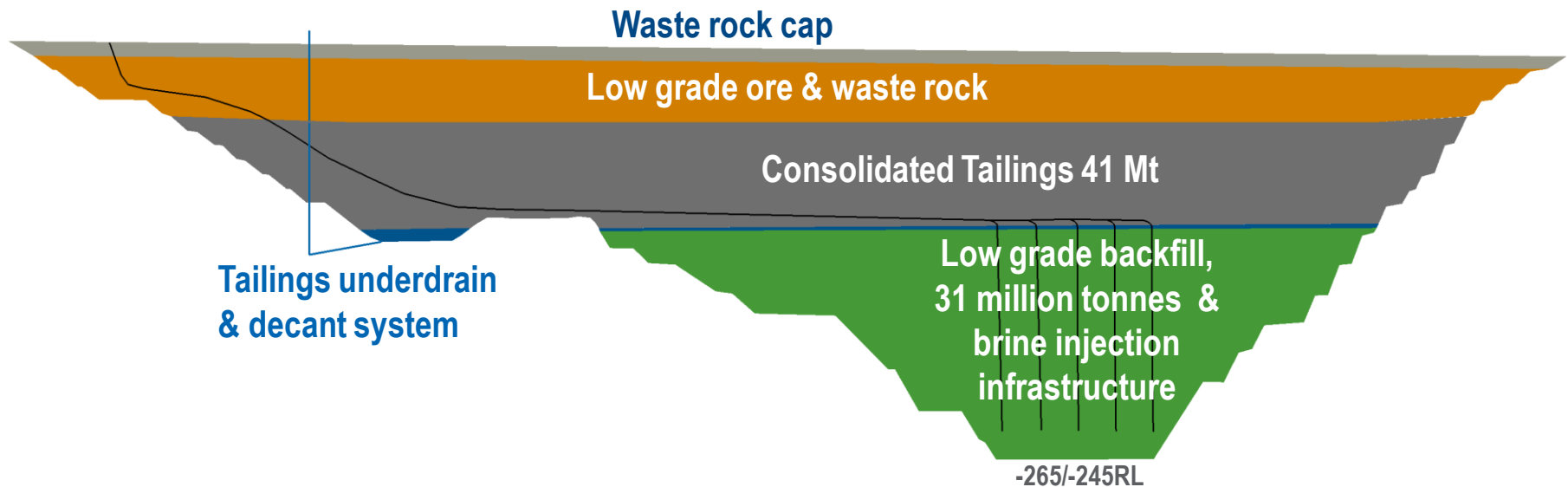


Placement of waste rock over Pit 3, July 2014

# Proposed Pit 3 Backfill Plan

## The current rehabilitation plan for Pit 3 includes:

- 31 million tonnes low grade ore placed (completed December 2012 to August 2014)
- Approximately 41 million tonnes tailings: Mill (14Mt), Tailings Storage Facility (27Mt)
- Approximately 62 million tonnes waste rock placed in pit
- Unsalvageable plant and infrastructure



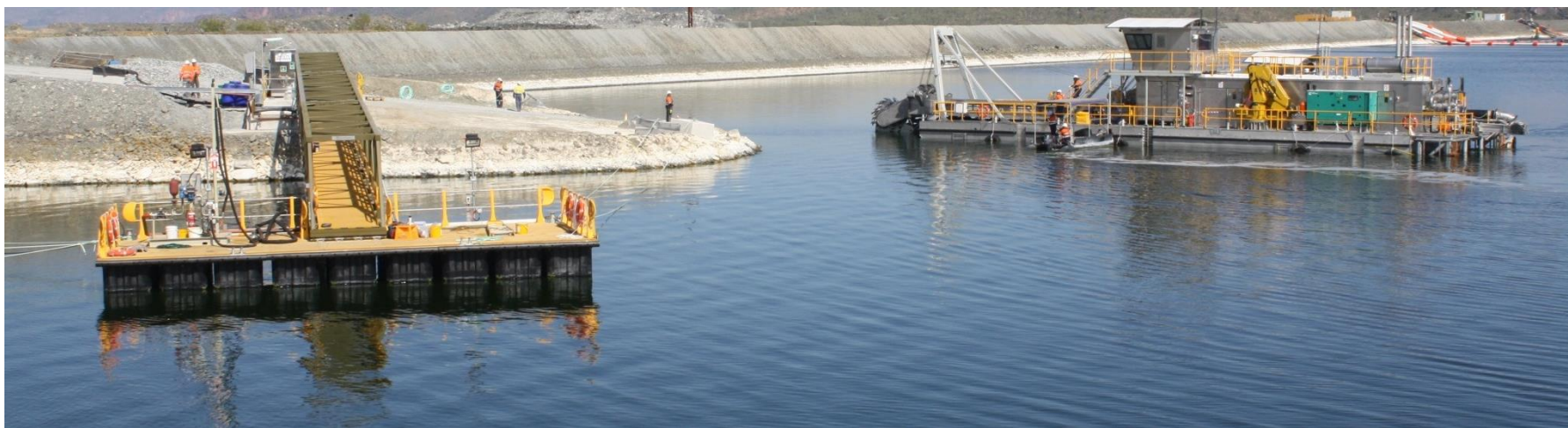


# Tailings Storage Facility



# Tailings Storage Facility Management

- 27 metre stainless steel purpose built dredge and maintenance craft were launched in August 2015
- Dredging of approximately 27 million tonnes of tailings for reclamation and final deposition into Pit 3
- Dredging of Tailings Storage Facility is expected to take approximately 6 years
- Tailings Storage Facility will be maintained as process water solar evaporation while tailings are reclaimed
- Tailings Storage Facility will be deconstructed and reshaped as part of the final landform





# Water Management



# Water Management

- Brine concentrator treats process water to produce a distillate (clean water) and a brine (concentrated waste stream)
- Distilled water is discharged to the environment during the wet season
- Brine will be injected for permanent containment in the bottom of Pit 3



Brine concentrator



# Stakeholder engagement

- The Supervising Scientist provides independent oversight of the Ranger operations.
- The Supervising Scientist continues to report in its Annual Report that its monitoring and research projects confirm “that the environment has remained protected”
- The Environmental Research Institute of the Supervising Scientist conducts research into the effects of uranium mining in the Alligator Rivers Region often in collaboration with ERA
- ERA regularly engages with all key stakeholders including the Gundjeihmi Aboriginal Corporation which represents the Traditional Owners (the Mirarr) on rehabilitation
- Minesite Technical Committee meets six times a year. Consisting of the Department of Mines and Energy (NT), Gundjeihmi Aboriginal Corporation, ERA, Northern Land Council and Supervising Scientist. Representatives of the Department of Industry and Science also participate
- Alligator Rivers Region Technical Committee and Alligator Rivers Regional Advisory Committee



Ranger Project Area 2015

# Milestones Achieved in Rehabilitation

- **Jabiluka**
  - Rehabilitation at Jabiluka and comprehensive revegetation programme
- **Pit 1**
  - Completed pre-load capping
  - Final landform to be constructed
- **Pit 3 and Tailings Storage Facility**
  - Completed underfill
  - Completed under drain
  - Completed brine injection and disposal system
  - Commenced tailings transfer from mill
  - Dredge commissioning underway
- **Revegetation Trials**
  - Constructed trial landforms to optimise revegetation strategy
- **Water Management**
  - Water treatment plant for pond water installed and operational
  - Brine concentrator built and commissioned



Pit 1, 2000



Pit 1, 2014