Uranium mine remediation in Australia's Northern Territory

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NT and Uranium

• NT has a long association with uranium
  • Early days – 1912 Goyder’s discoveries, etc
  • Rum Jungle – 1949 White’s discovery; 1954-71 - Cu & U mining
  • Adelaide River - 1955-64 – Minor deposits
  • South Alligator Valley - 1955-64: 13 mines producing ~850t U₃O₈

• Recent & Current activities
  • Nabarlek- 1980-89; ~11,800t U₃O₈
  • Jabiluka – 1980s discovery; EIS; Development decline ~1700 m; closure in C&M and revegetation
  • Ranger – Longest currently operating U mine in Australia

• Other prospects
  • Koongarra; Angela/Pamela; Biglyri; Angularli, etc
NT and Uranium mining
Concentrated in the Pine Creek Geosyncline, especially ARR

- Currently only Ranger Uranium Mine operating
  - Unique location surrounded by WH dual-listed Kakadu National Park
  - Scheduled to cease processing in January 2021
  - Completion of remediation due by January 2026
  - Jabiluka prospect under LT C&M

- Previously production at:
  - Rum Jungle – remediation (3dr attempt) underway
  - South Alligator - remediated
  - Nabarlek – remediated

- Exploration continues
  - Three operators
  - 5 projects
Ranger Uranium Mine

- Discovered by airborne survey 1969
- Two public inquiries 1977 & 1978
- Began operations 1980
- Open pit mining from 2 pits
  - #1 1980-1995
  - #3 1997-2013
  - Underground resource (R3D) only explored c.2500m decline and 400m crosscut
- Processing to end January 2021
- Remediation to complete January 2026

Production
- Lifetime $\text{U}_3\text{O}_8$ production to date c.128,000 t

Remediation
Progressing at Jabiluka and Ranger sites
Uranium Mine Remediation

Three “phases of production”

- **Rum Jungle** 1949 to 1964
  - Site remediated in 1976 and 1986
  - New program underway since 2008

- **South Alligator Valley** 1959 to 1965
  - Hazard reduction works 1991-2
  - Sites remediated 2006 & 2007

- **“Modern production”**
  - **Nabarlek** 1979 -1988; production ~ 10,800t $U_3O_8$; remediation in 1995
  - **Ranger** 1980 to present; progressive remediation has begun
Rum Jungle

- Operated 1949 to 1964, uranium and copper production
- No initial remediation
- Simple clean up 1976
- Remediation 1986; $18.6 m;
- Report of failure of covers to maintain specification 2000
- Review of situation 2003-4
- New project devised 2004/5
- New National Partnership Agreement with Commonwealth 2007
  - New studies and designs; ATO consultation
  - Issues of AMD; Aboriginal Land; adjacent mining activity
  - Renewal of agreements
  - Work on going with final designs being completed after agreements with TOs
Rum Jungle
Production ~ 850t U₃O₈ from 13 small mines
Area designated as Stage 3 of Kakadu National Park
  • WH dual listed
Survey & inventory 1986
Hazard reduction (radiological and physical) 1995
  • Dose constraint of 0.3mSv/y met due to limited residence times
Comprehensive planning process commenced 2000
Studies and plan development 2002–2004
Finance & implementation 2006–7
  • Radiological sign off achieved with no problems
Monitoring and surveillance ongoing
Sign off being considered by stakeholders
South Alligator Valley

1956

1992

2015
Jabiluka

• Discovered 1971 (I) and 1973 (II)
  • Total resource 163,000t U3O8 @ 0.53%
• Never mined due to government changes
• Ownership changes, then government changes
• Underground exploration & development 1998
  • 1.8 km decline and cross cut; vent raise; workshops etc; water management pond
• Closed out in 2003
  • Backfill decline; remove infrastructure; clean pond; partial revegetation
  • Removal of pond in 2013
• Under long term C&M
• Revegetation underway since 2005
Jabiluka

2013 – removal of the interim water management pond

2015 – central area planting

April 2019 – recent inspection
Koongarra

- Discovered by Noranda in 1970
  - Resource of 14,540 t U₃O₈ @ 0.8%
- Only exploration bores and a camp
- Never mined
- Site handed back to Traditional Owner in 2013 and now part of KNP
- Titles ceased in 2019
- Site clean up and remediation commencing this year
- 2 dry seasons at least for work
Recent - Nabarlek

- Discovered: 1970; proved up 1971
- Ore body mined in 1979 dry season (546,437t @ 1.84% U₃O₈)
- Operated 1979-1988 producing 11,084 t U₃O₈
- Mothballed in 1989
- Remediation commenced and completed 1995/6 wet season
  - Tailings had been milled directly to the pit
  - Relatively little waste rock
  - Pond and pit filling and landscaping
  - Water management
- Revegetation on-going
Current remediation - Ranger

Pit 1
Backfill in progress

Pit 3
Tailings deposition
Ranger - Tailings

Dredge on Tailings dam - current

Underfill going into Pit 3, 2014

Pit 3 looking East - 2019
Ranger - Revegetation

Trial Land form at Ranger
Summary and Conclusions

- NT has a long uranium mining history
- Early sites simply abandoned
- Some remediation failed to last
- Historic legacies are being remediated
- Recent remediation operations showing signs of success
- Ranger mine remediating progressively as operations wind down

Lessons learned:
- Stakeholder communications
- Financing
- Prior planning and regular updates
Thank You

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