NORM in Mining and Mineral Processing

Practical Considerations for Closure

Alice Jagger
NORM in Mining & Mineral Processing

Main industry sectors in Australia affected by NORM:
- Uranium
- Mineral Sands
- Rare Earths
- Oil and Gas

Other industry sectors:
- Phosphate and fertiliser
- Coal
- Other metals (e.g. tin, copper etc)
- Building and refractory materials
NORM in Decommissioning & Closure

NORM impacts considered in management of:
→ Health, safety and environment
→ Waste
→ Public perceptions

Key players:
→ Management
→ Planners
→ Radiation Safety Officer
→ Engineers
→ Contractors (project execution)

Final management ideally considered in design
(realistically this is rare)
1. Demolition of decommissioned component

→ Project Aspects:
  → Uranium mining and processing operation
  → Processing plant operational during project
  → Demolition undertaken by contractor
  → Radiation management assigned to contractor

→ Key Lessons:
  → Radiation is one of many hazards; controls should be commensurate with risk
  → Pre-characterisation of waste is critical in costing of projects
  → Site based personnel have a role to play, even when radiation management is contracted out
2. Remediation of site

→ Project Aspects:
  → Uranium mining and processing operation
  → Operation ceased 1989; initial remediation completed 1995
  → Residual contamination identified following completion of previous remediation
  → Legacy issue incumbent on new lease holder
  → Environmentally and culturally sensitive location
  → Radiation management directly contracted by current lease holder

→ Key Lessons:
  → Incomplete remediation creates a legacy burden for new operators
  → Remediation standards can change with time, requiring new owners to re-complete work
  → It’s a lot easier to do it right the first time around!
3. Demolition of processing plant

→ Project Aspects:
  → Mineral sands mining and processing operation
  → Operation ceased 2015
  → Fixed contamination identified bound to paint
  → Contaminated, but not SCO or radioactive material
  → Full demolition for remediation to pastoral use
  → Demolition undertaken by contractor
  → Radiation management assigned to contractor

→ Key Learnings:
  → Operational monitoring data can assist to manage contamination prior to demolition
  → Characterisation of waste during project planning enables disposal pathways to be established and resourced
4. Assessment of oil field infrastructure

Project Aspects:
- Decommissioned sub-sea oil fields
- Operations ceased 2009 and 2015
- Infrastructure partially decommissioned, recovered for salvage/disposal
- Tubulars with minor NORM accretion remain in place pending disposal
- Comparison of environmental impacts of disposal in situ vs. recovery for disposal on land
- Radiation assessment commissioned by infrastructure owner

Key Learnings:
- NORM impacts may be secondary to other impacts; management should be cognisant of other risks
NORM in Decommissioning & Closure

Points to consider:

→ Radiation is only one of many hazards associated with decommissioning and closure activities
→ Radiation management in house (where capacity exists) vs. outsourced
→ Waste management pathways are critical and may (will!) require early planning in most jurisdictions
→ Benefits of considering final closure in design phase
→ Flexible and responsive approach for radiation controls in demolition and decommissioning
→ Comparison of environmental impacts of disposal in situ vs. recovery for disposal on land
→ Radiation assessment commissioned by infrastructure owner
→ Controls must be commensurate with risk
→ Graded approach to regulation
NORM in Decommissioning & Closure

Summary

→ NORM management is an important consideration in costing and resourcing decommissioning/closure projects
→ Waste pathways should be identified and resourced early
→ Radiation management should be cognisant of other hazards