Achieving Regional Sustainability: The Evolution of Mine Closure Planning in the Saskatchewan Uranium Industry

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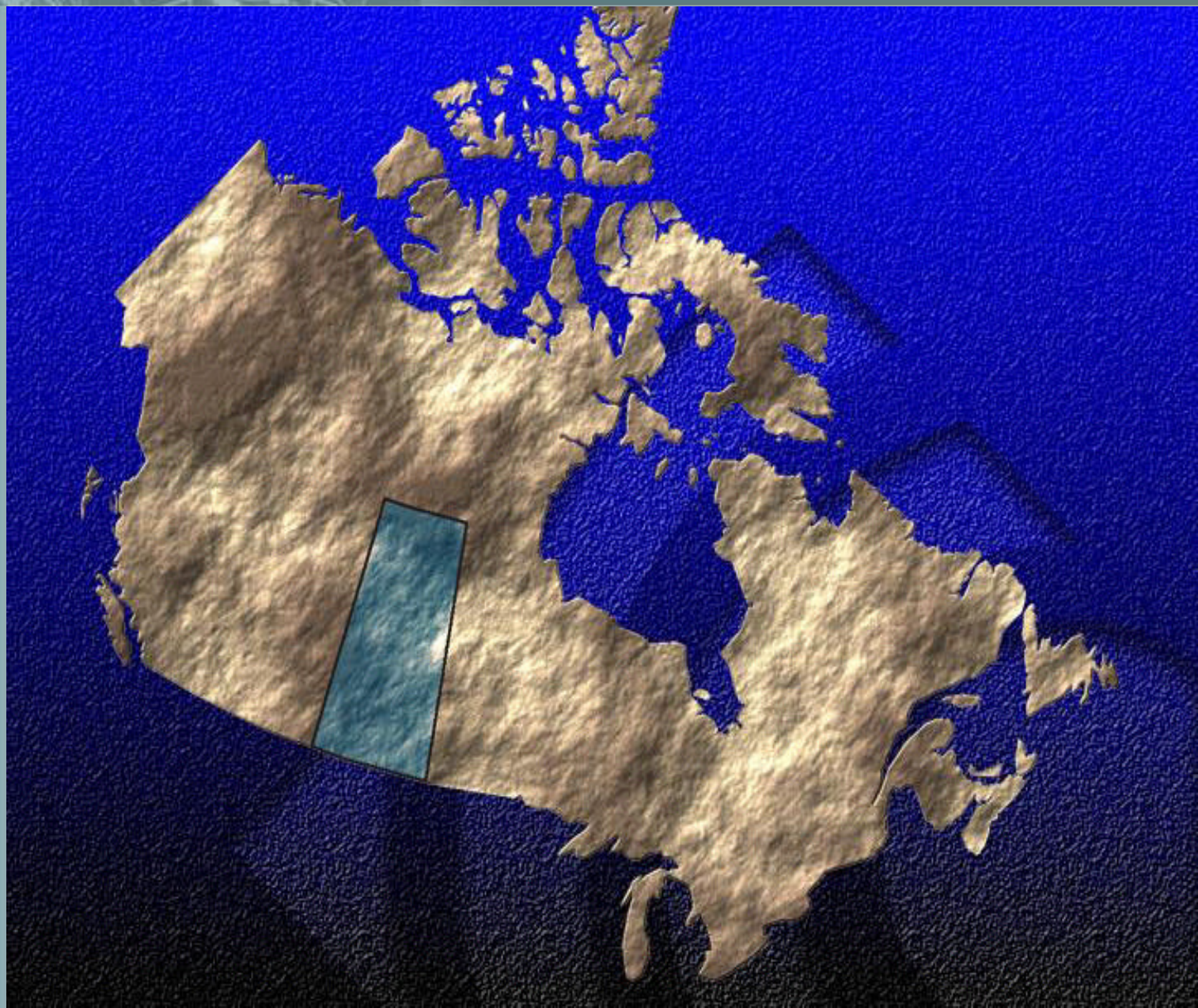
Saskatchewan

- Area of 651,900 km^2
- Population approx 1 million
- Established mining history
  - Coal
  - Gold
  - Base metals
  - Industrial minerals
  - World leader in potash and uranium



Evolution of Uranium Development

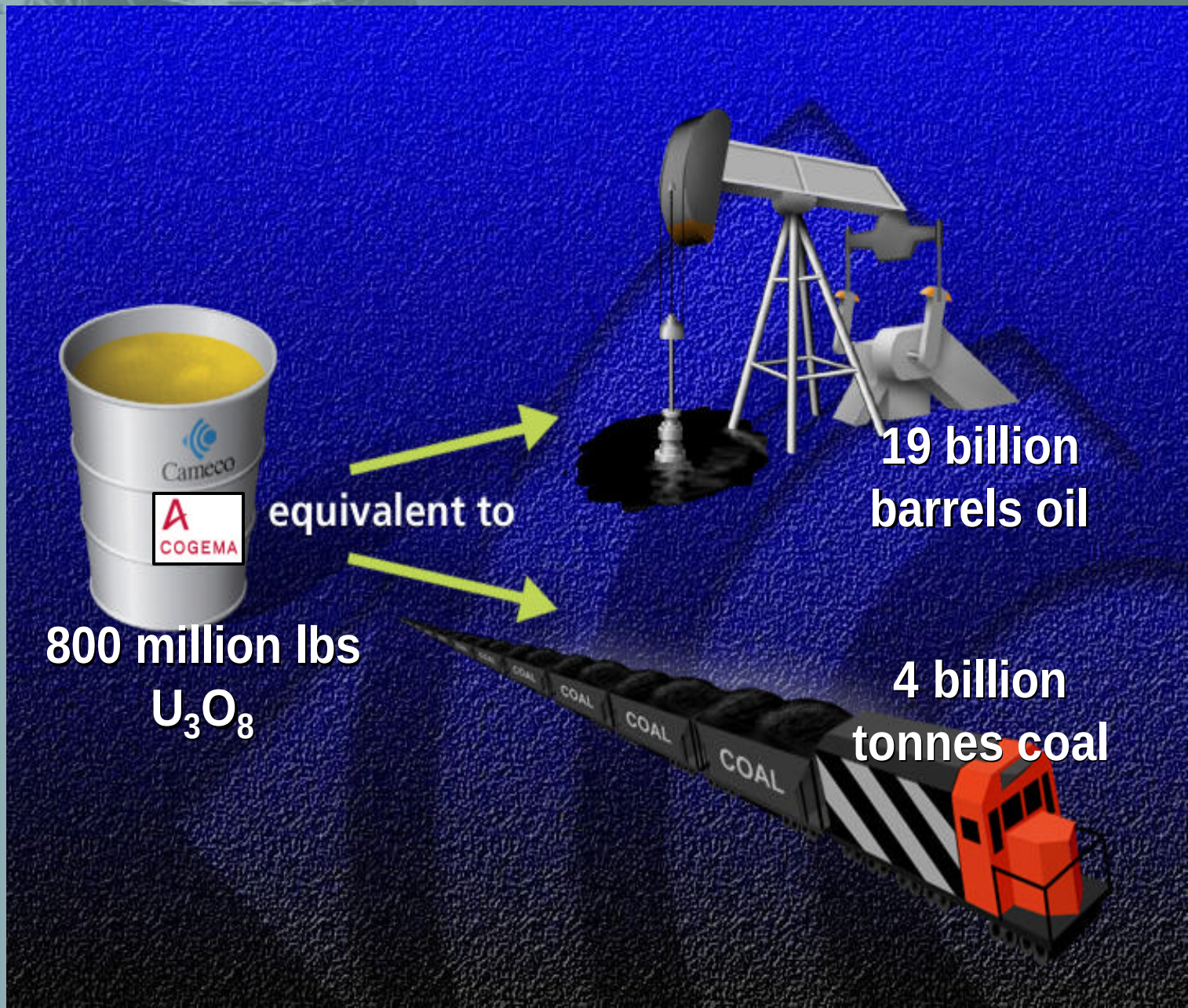
- Uranium mining, milling and waste management technology has evolved over 50+ years in Northern Saskatchewan
- Limited control on mill or mine discharges until 1974
- 3 major phases of uranium development:
  - Focus on production
  - Initial assessment / Containment of wastes
  - Full assessment / Designing for closure
- Progressive reduction in environmental and social impacts

Uranium Mines in Northern Saskatchewan

- Uranium discovered 1934
- Beaverlodge Operations 1949
- Gunnar 1955
- Lorado 1957
- Rabbit Lake 1975
- Cluff Lake 1980
- Key Lake 1982
- McClean Lake 1999
- McArthur River 1999
- Cigar Lake 2006

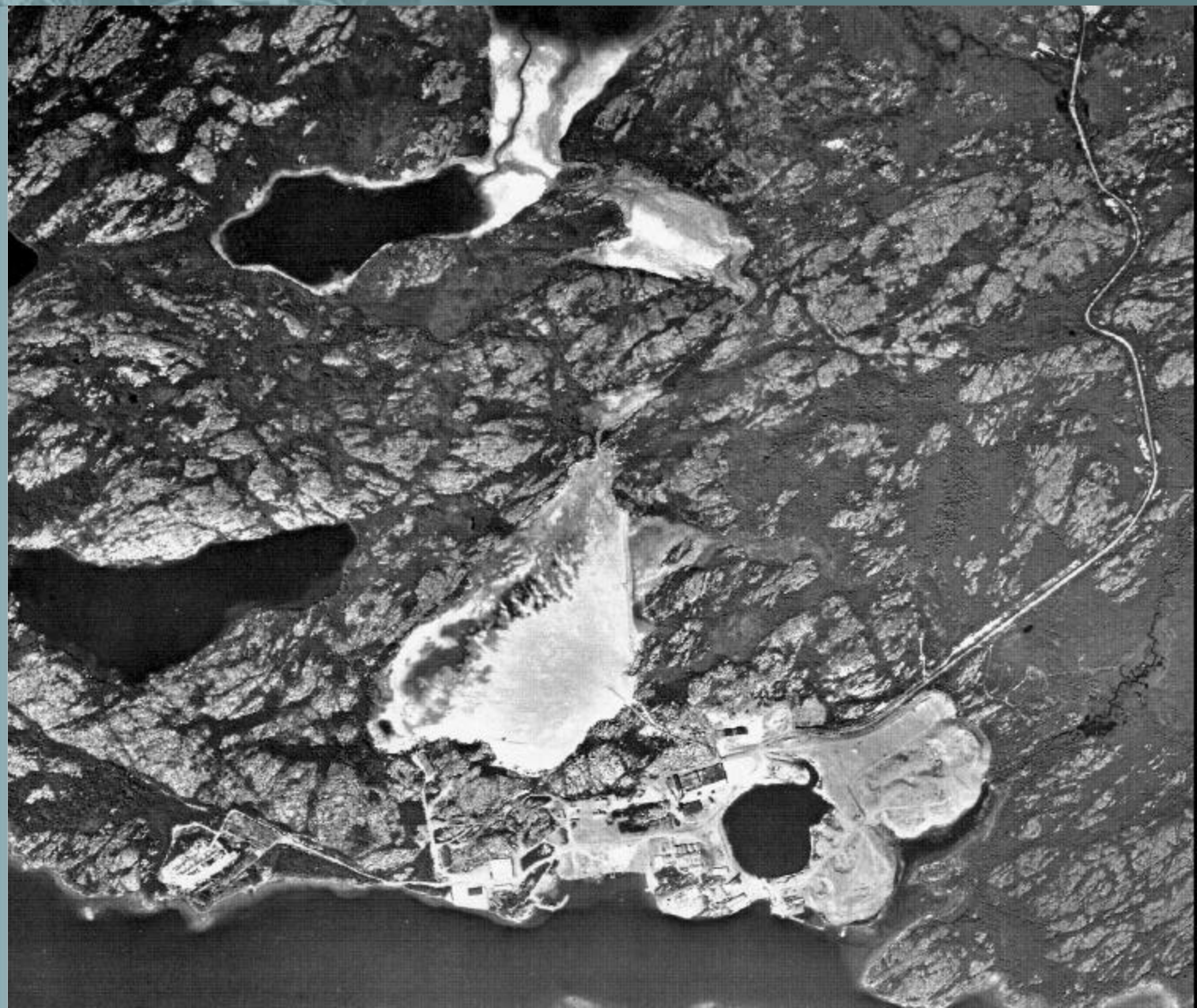
Saskatchewan's Uranium Reserves

- $3.5 Billion investment to date
- 35% of world supply
- Original sites 0.05%
- Modern sites 21%
- Known deposits will take us beyond 2030
- Rich exploration potential



Focus on Production

- Self contained production centre
- Established town sites
- Uncontrolled discharge of tailings
- No closure plan – Walk Away
- Legacy to the North



Initial Assessment/Surface Containment

- Cluff Lake Assessment first in 1977
- Full baseline, initial environment assessment
- No new towns – Fly in facilities
- Mine & Mill at each site
- Engineered containment
- Above ground tailings storage
- Limited closure planning

Integrated Assessment

- Environment & social assessment
- Multiple ore bodies
- Regional mill
- In-pit disposal for tailings and waste rock
- CDP & financial assurance
- Stakeholder involvement

Designing for Closure

Mining – Minimal Footprint

McArthur River

- Small Footprint

  116 ha
- Offsite Milling
- No TMF
- “When all is said and done, all of the environmental implications will be gone”

Selective Mining

McArthur River

- Remote mining
- Excellent radiation protection
- Minimal special waste
- Contaminated waste rock to off site disposal

Underground Milling

McArthur River

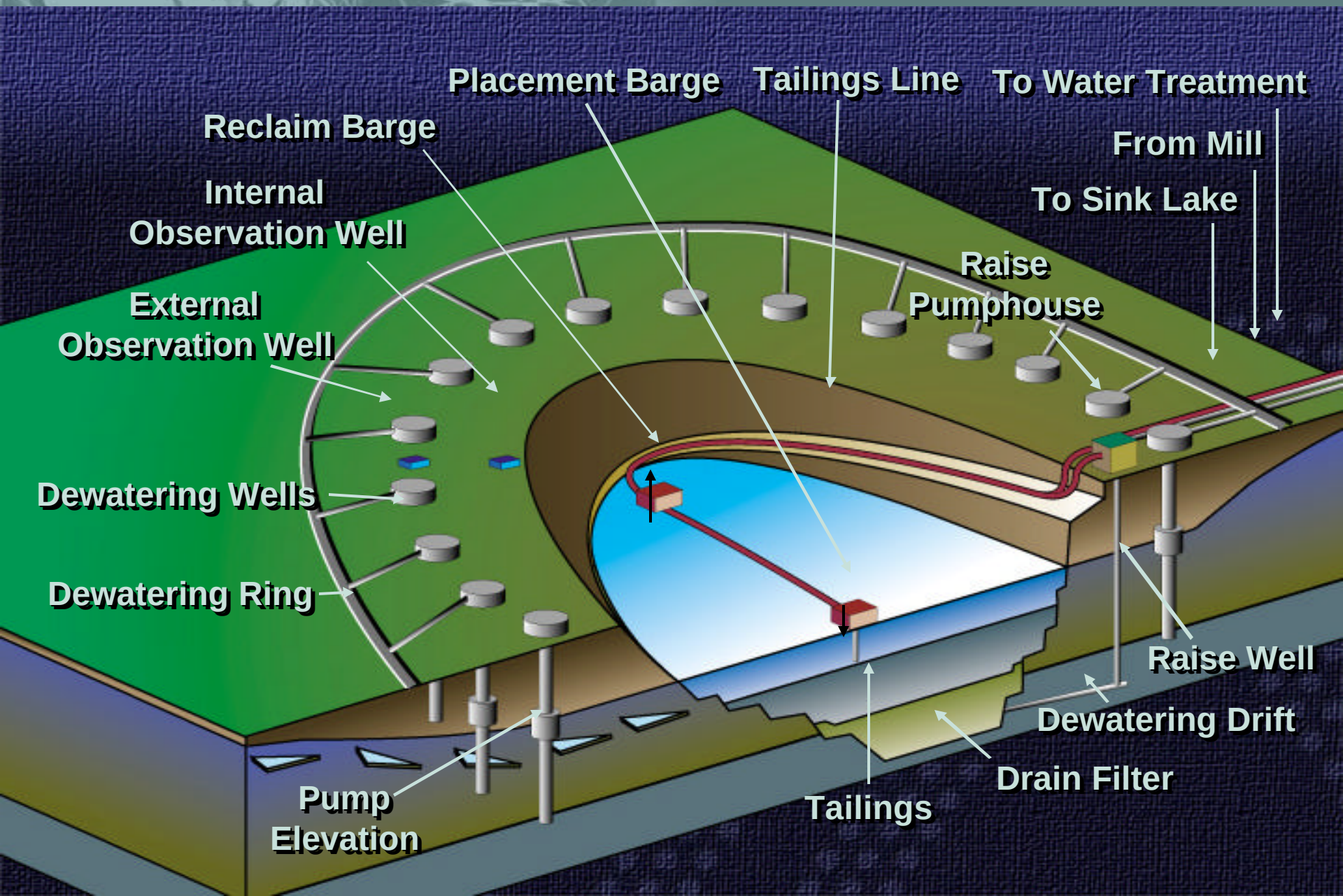
- Underground Grinding to Produce Ore Slurry

Milling – Integrated Facility

McClean Lake

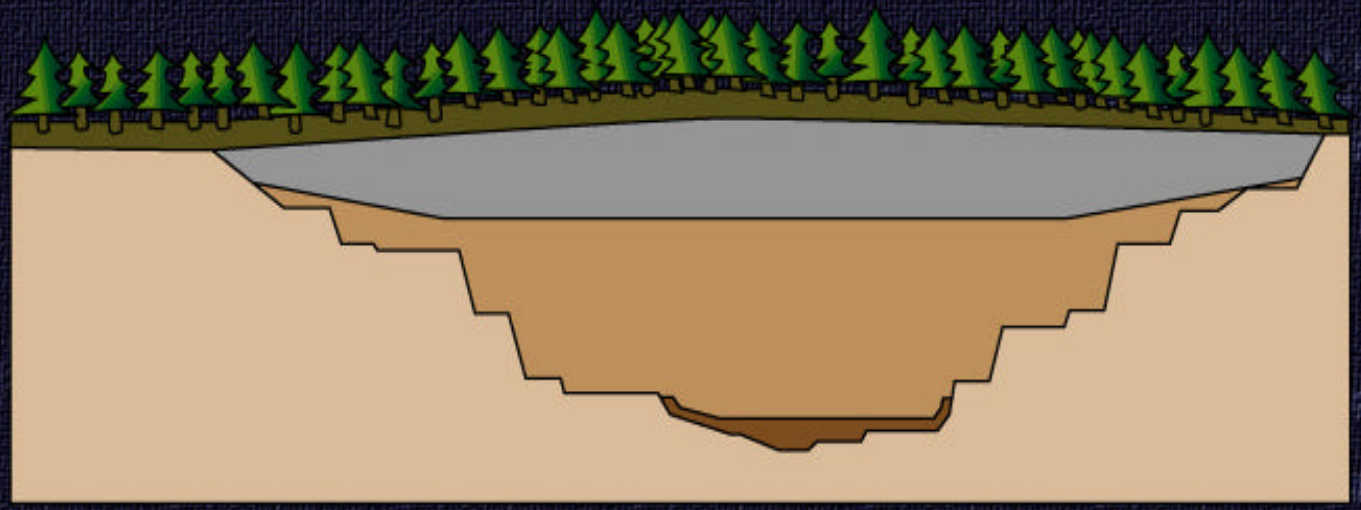
- Radiation Protection Mill & TMF
- Engineered Tailings
  - -Geochemical
  - -Geotechnical
- TOVP
- Closure Plan objective of site design

Tailings Management



Post Closure

McClean Lake



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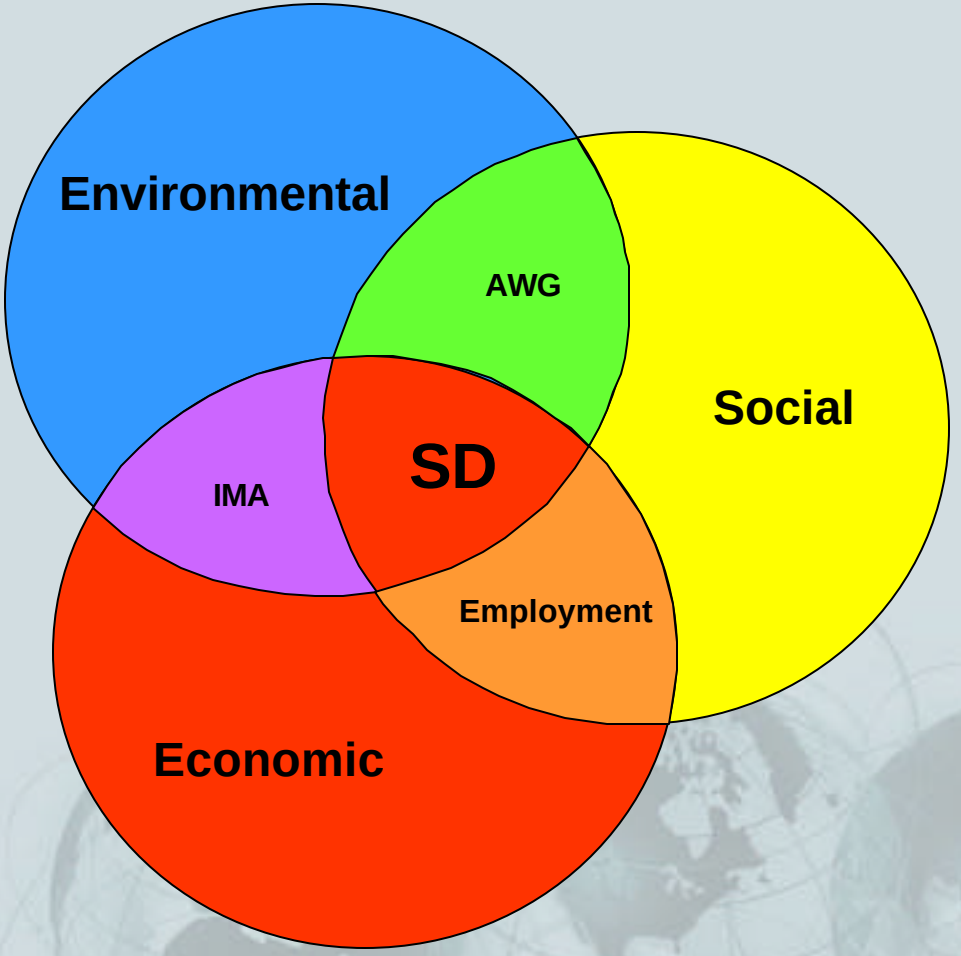
Future Challenges

- SD in practice since early 80’s
- Regional context
- Industry social partnerships



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