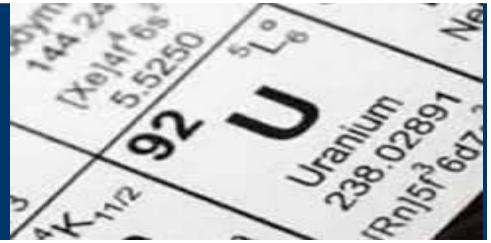
Governing Uranium:
Presentation to BAPE Commission of Inquiry

Cindy Vestergaard

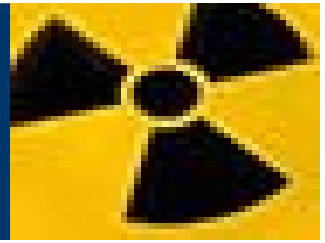
DIIS · DANISH INSTITUTE FOR INTERNATIONAL STUDIES

Outline



- Governing Uranium
- Historical development – U market and regulation
- Best Practices today
- Federal sharing of responsibilities – Australia and US
- Regulatory Timelines – from non-producer to producer
- Legacy Sites
- Social Licensing / Community consultation
- Nonproliferation
- Differences between NWS and NNWS
- Regulation overview at each stage of U production

Governing Uranium



- Governance of U production and trade
  - Safety, security and safeguards ("3S")
- 16 producing and consuming countries
  - NW possessors: CN, FR, RF, UK, US, IN, PK
  - NNWS – AUS, ARG, BRA, CDA, KZ, SA, MAL, NAM, TZ
  - ABACC, Euratom, IAEA
- Up to 25 researchers globally
- Interactive website (with CSIS)
- Greenland
- www.diis.dk

U3O8 Historical Spot Price

Total World Production to 2013 (OECD 2012, WNA 2012-2014)

World Total 2,761,699tU

1. Canada	474,095	16. Congo, DR	25,600
2. USA	371,832	17. Gabon	25,403
3. Kazakhstan	222,058	18. Hungary	21,059
4. Germany	219,653	19. Romania	18,826
5. Australia	189,605	20. Bulgaria	16,364
6. South Africa	158,977	21. India	11,028
7. Russia	155,862	22. Spain	5,028
8. Ukraine	128,964	23. Brazil	4,028
9. Niger	127,892	24. Malawi	3,850
10. Uzbekistan	125,191	25. Portugal	3,720
11. Namibia	116,660	26. Argentina	2,582
12. Czech Rep.	111,621	27. Pakistan	1,390
13. USSR -1991	102,886	28. Madagascar	785
14. France	76,011	29. Belgium	686
15. China,cont'l	37,784	30. Poland	650

Historical Development of Regulations

- Radium and U recovery for medical purposes and research (1895 – 1930s)
- U mining for military purposes (1940s)
- Military purposes and early research/power reactors (1947 to mid-1960s)
- Primarily for civilian reactors (mid-1960s – 1970s)
  - IAEA Comprehensive Safeguards Agreement (INFCIRC/153)
- Modern U mining facilities and evolving regulatory requirements (1980s – present)
- Evolving '3S' approach – safeguards, security, safety, and more focus on remediation (since mid 2000s to present)

Removing ore 1930s

Port Radium, Great Bear Lake, mid-1930s

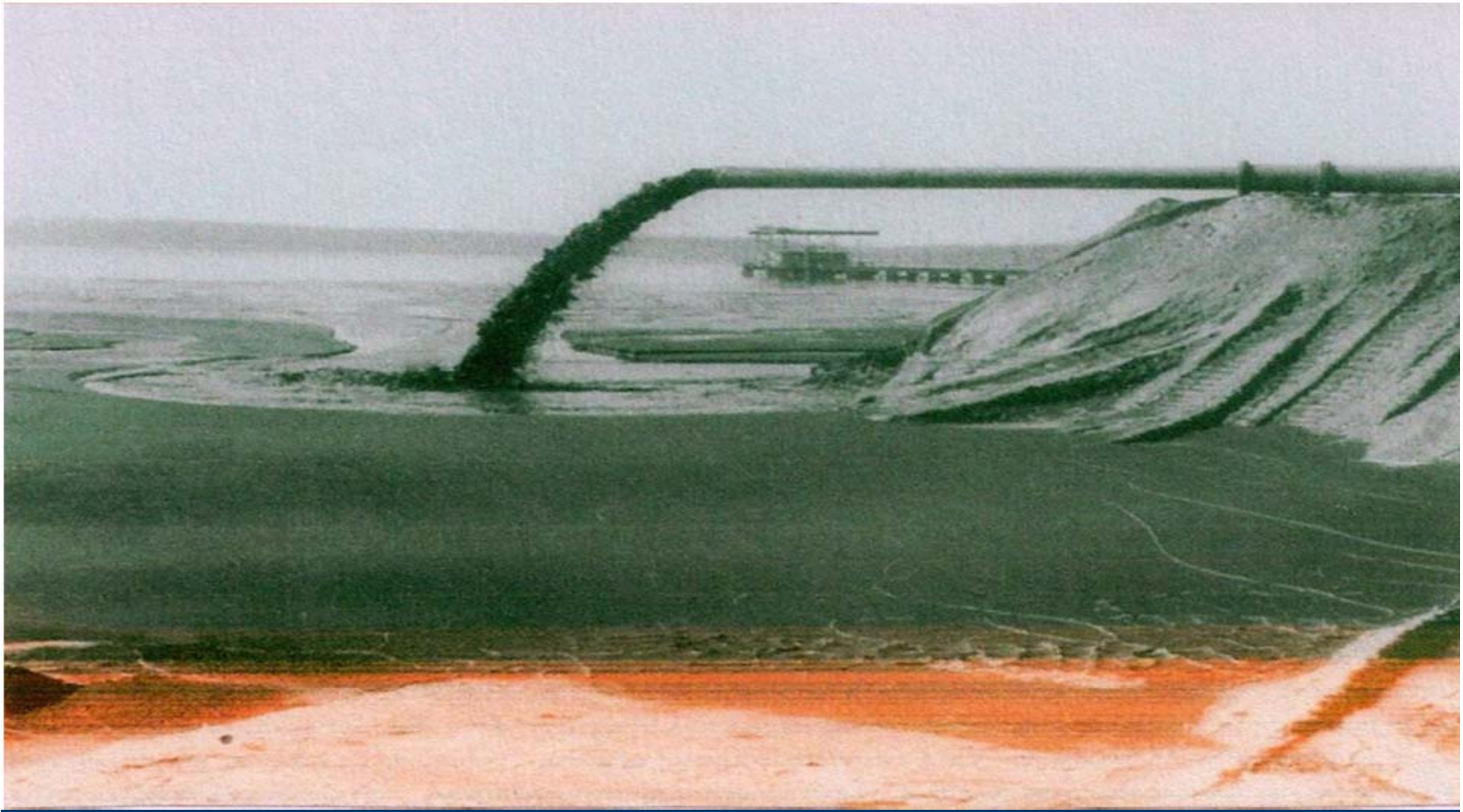
Pitchblende concentrate awaiting shipment, 1939

Port Radium, Great Bear Lake

Transport Today

UOC drum packing, courtesy of Energy Resourses of Australia

Tailings Then



McClean Lake tailings management facility (photo: CNSC)

Underground 1950s

Radium Hill 1950s, South Australia

Underground Today

McArthur River mine, Photo: Cameco

In-situ

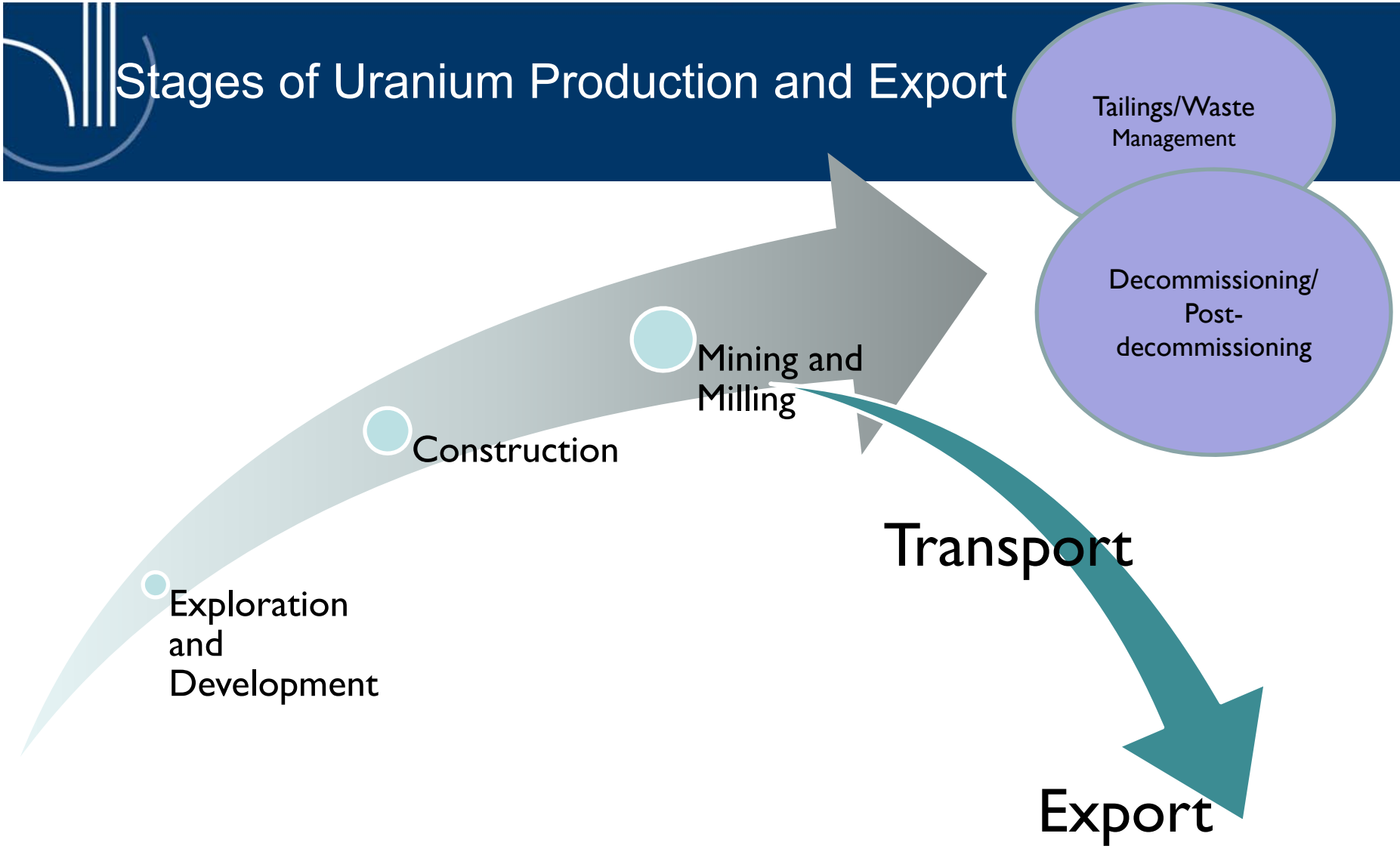
Beverley wellfield, Photo: World Nuclear Association.

Retired well heads at Uranium One's Christensen Ranch operation in Johnson County, Wyoming.
Photo: Dan Cepeda/Star-Tribune

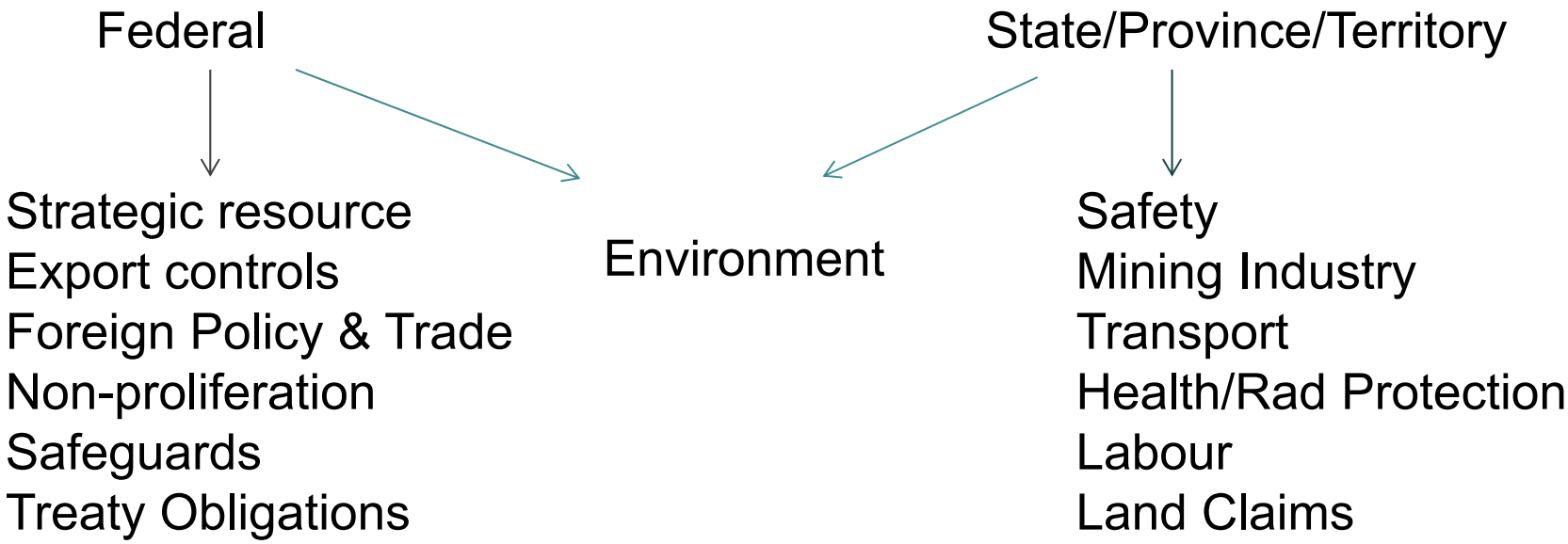
Best Practice Regulation Today

- Regulatory powers by legislative Act
  - regulations, standards and licences
- Regulator - independent agency that reports to head of state or parliament
- Comprehensive 'cradle to remediation' licensing system
- EIAs and SIAs
- Public consultation
- Compliance/verification programmes

Stages of Uranium Production and Export



Federal Sharing of Responsibilities



*Some systems share more authorities down the list (i.e. land claims)

Australia


Jabiluka
Nabarlek
Ranger
Rum Jungle
Koongarra
South Alligator
Westmoreland
NT
Valhalla
Ben Lomond
Mary Kathleen
Kintyre
Manyingee
Angela
QLD
WA
SA
Yeelirrie
Beverley
Olympic Dam
Honeymoon
NSW
Radium Hill
VIC
TAS
Operational Mine
Major Deposit
Former Mine

Australia permit system

- **Setting standards in permits (rather than regulations)**
- **provides necessary flexibility to set tailored security requirements and be responsiveness to legislative and policy changes**
- **– performance-based approaches accommodates changes in operational requirements**
- **Arrive at security standards though consultative rather than a prescriptive process**

Australia - Authorities

- Commonwealth
  - AEA - U and Th ownership
  - 1999 EPBC Act - 'national significance of U'
    - assessed at state and federal level
  - Mining policy - Ministry of Industry (formerly DRET)
  - 1987 Safeguards Act
  - Treaties
- State and Territory government agencies
  - administer mining, health and safety regulations and legislation relevant to the mining industry.
  - responsible for granting exploration and mining tenements and for collecting royalty payments

Australia Federal Actors

- Federal Actors
  - Department of Environment – EPBC Act
  - Department of Industry (formerly DRET) – export permits
  - ASNO – Australia Safeguards and Nonproliferation Office
  - AMSA – Australian Maritime Safety Association (AMSA) – packaging
  - ARPANSA
  - Office of Transport Security (OTS) - port authority
  - Office of Supervising Scientist (OSS) – Alligator Rivers

Northern Territory

- DME
  - administers Mining Management Act
    - Ranger and Nabarlek, plus 40+ exploration authorisations (not all active)
  - 3 U Mining Officers (plus Director) – approx $400K
  - Monthly inspections Ranger
    - Reps from DME, GAC, NLC, SS
  - Inspections in Alligator Rivers Region carried out jointly with OSS and NLC
  - Elsewhere inspected by DME
- Supervising Scientist (AUS$9.2m annually)

Western Australia

- U mining ban prior to 2008
- EPA –assessment per *Environmental Protection Act 1986*
- DMP - assesses exploration and mining under

Mining Act 1978

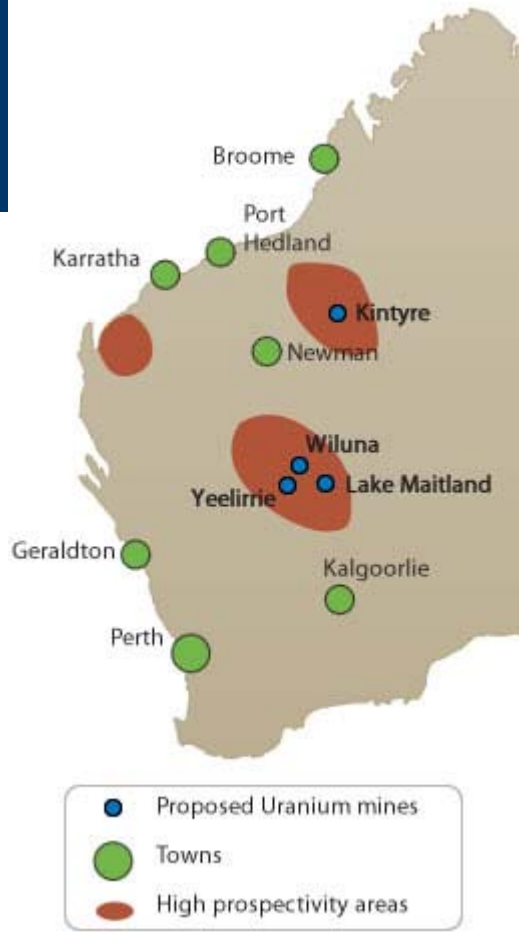
- DEC Works Approvals & Licences

Emissions/discharges regulation

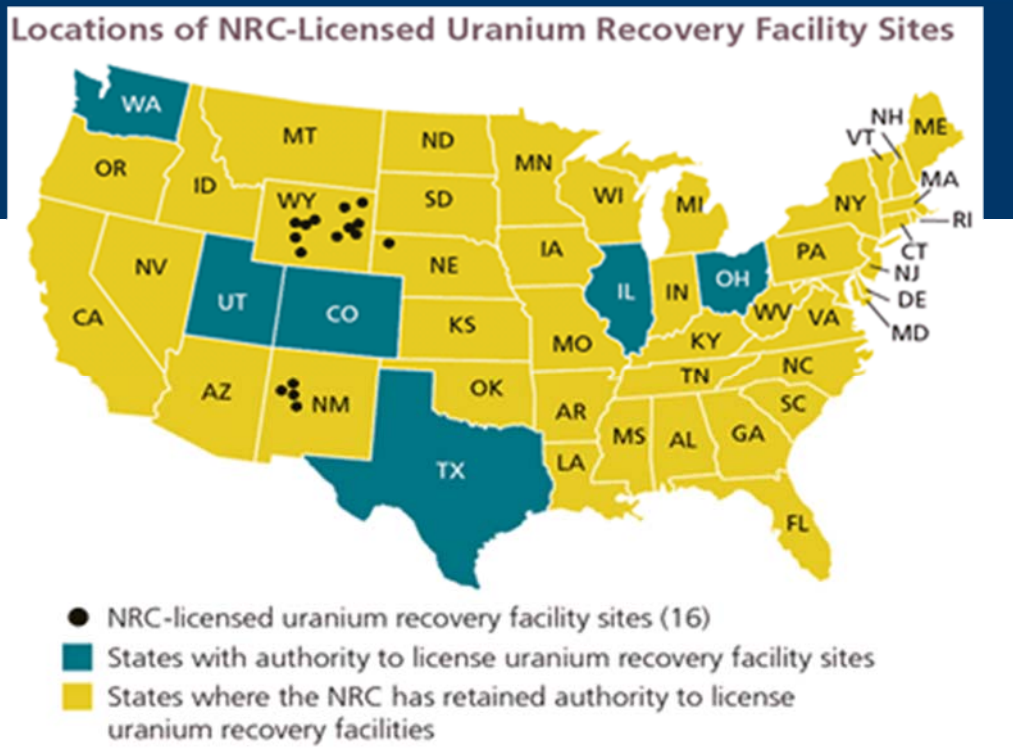
- DoW Licences to take water –Part V of the EP Act
- Radiation safety approvals –RMP's, RWMP's

DMP Mines Safety and Inspection Regulations 1995

- Radiological Council –RMP's, RWMP's and transport



United States



- Federal
  - Atomic Energy Act (AEA)
  - UMTRCA – NRC/DOE
  - Export/Import
  - Nuclear waste
  - DoT
  - Office of Surface Mining (OC, UG)
  - U.S. Department of the Interior (OC, UG)
- Agreement States
  - State regulatory functions as NRC, biannually reviewed by NRC
  - Must conform to NRC, DoT regs
  - 4-5 year process

From non-nuclear to U producer

	Ban lifted	Applications	Consultations	Approvals
Western Australia	Nov 2008 State Cabinet Meeting Feb 2009 Working Group review regs Sept 2009 law proclaimed	Oct 09 Toro submits referral to EPA and Federal DEWHA June 2010 ESD public review Sept 2010 EPA approves ESD, go-ahead for ERMP	June 2011 ERMP public consultation for 14 weeks	May 2012 EPA recommends project approval Oct 2012 WA Minister for Environ grants approval, subject to conditions April 2013 Fed Environ minister grants federal approval, subject to conditions
NSW, Australia	April 2012 (mining ban still in place)	Sept 2012 – Expressions of Interest		
Queensland	Oct 2012 cabinet decision UMIC est.			
Greenland	October 2013			

From discovery to exploitation

Mine	Discovered	Mining Licence	Operations/ Production	Current Status
Ranger, NT, Australia	1969	1978	1980	Pit 1 & 3 completed Processing stockpiled ore
Beverley, SA, Australia	1969	hydrogeological tests & op of field leach trial '97-98	2000	Care and Maintenance
Four Mile, SA,	2005	May 2008 applied/ Mining lease April 2012 environ approval Aug 2013	Sept 2011	Operating
Honeymoon, SA	1972	2008	1988	Care and maintenance April 2014
Trekkopje, Namibia	1970s	June 2008/Feb 2009	2009	Start-up suspended Oct 2012
Kayelekera, Malawi	Early 1980s	April 2007	----	Suspended Feb 2014
Mkuju River Project	2010	April 2013	---	Start-up suspended
Cigar Lake, Canada	1981	2005 Renewed licence June 2013	March 2014	Operating

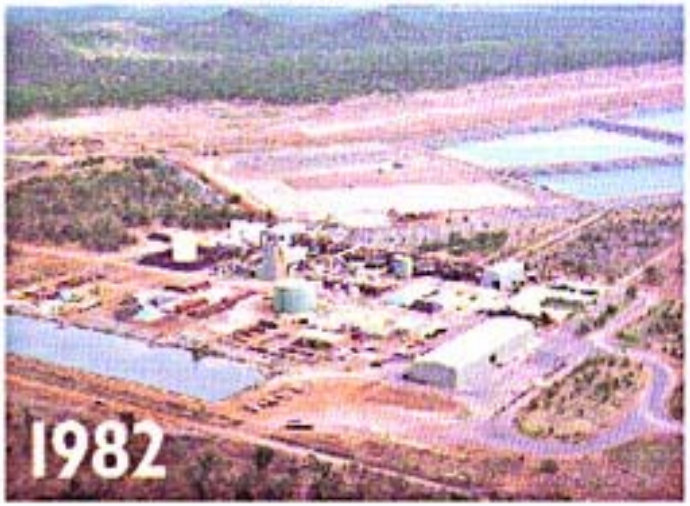
Legacy Sites

- Mines operational before environmental considerations
- Many still require remediation
- Environmental legacy
- Financial legacy
- Legacy in public consciousness
- UMREG

Source: World Nuclear Association

Above: Nabarlek pit in 1980 and the pit and evaporation ponds after rehabilitation in 1996.

Below: Treatment plant, ore stockpile, evaporation ponds and air strip in 1982 and after rehabilitation in 1996.



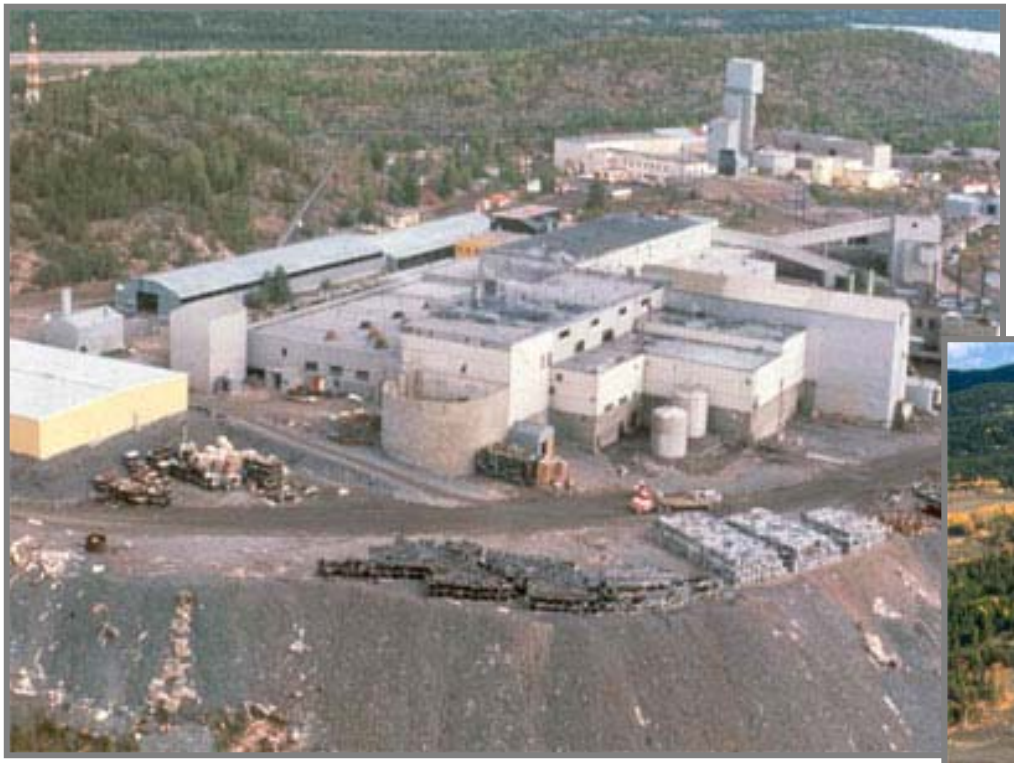
Beaverlodge Decommissioning

Before

After

Source: SENES Consultants and Cameco

Beaverlodge Decommissioning



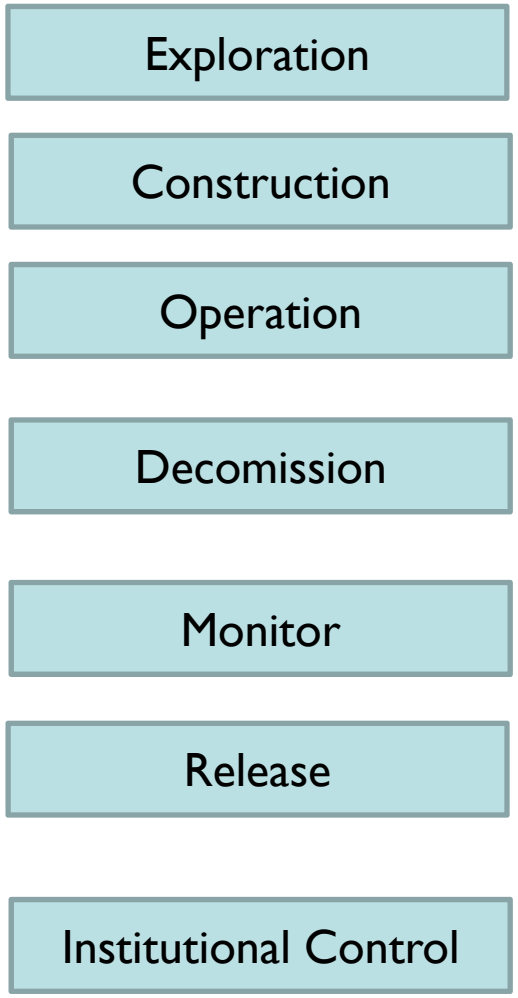
Before

After

Source: SENES Consultants and Cameco

Mine Closure Regs

- US UMTRCA Act
- NT Remediation Security
- Sask Institutional Care Program



Social Licensing

- Involves public dialogue and interested parties to take into account questions, views, concerns and opinions - not just information programme
- Public knowledge and support facilitate timely review and licensing of new mines - public fear and resistance do opposite
- Many regulators now require SIA/IBA

Public Consultation – Foundation of Best Practice

- Target audience identified in early stages of new mine project
- May involve:
  - proponent-led public consultation sessions in the project area;
  - regulator-led public consultation sessions;
  - public licence hearing sessions
- Must continue through all licensing steps
- When monitoring data made available - companies and regulators discuss results

Athabasca Working Group

- Community-based environmental monitoring programme
- Local residents assist in determining sampling points; collection of samples and the interpretation of data
- Provincial government established and supports Environmental Quality Committees staffed by local residents to improve communication between industry, government and local residents
- Increase understanding of uranium mining activities

Nonproliferation and Safeguards

- 1957 – IAEA and Euratom est
- 1972 – INFCIRC/153
  - Exports/imports of UOC
- 1997 Additional Protocol
  - Mines, mills, purity, capacity, production
- 2003 – Policy Paper 18 – uranyl nitrate
- 201? – Policy Paper 21 – UOC?

IAEA
International Atomic Energy Agency

Euratom

Material Management/Inventory

- In Australia - Permits set Material Accountancy requirements includes establishment of accounting area, material measurements, record keeping, preparation/submission of accounting reports
- production, quantities exported and destination are provided to the IAEA under the CSA/AP
- Permits set Physical Protection requirements at mine, transport from mine to Port, at Port facilities, and international shipping to destination
- Includes establishment of a security plan for mines, interim storage and transport

Differences btwn NWS and NNWS

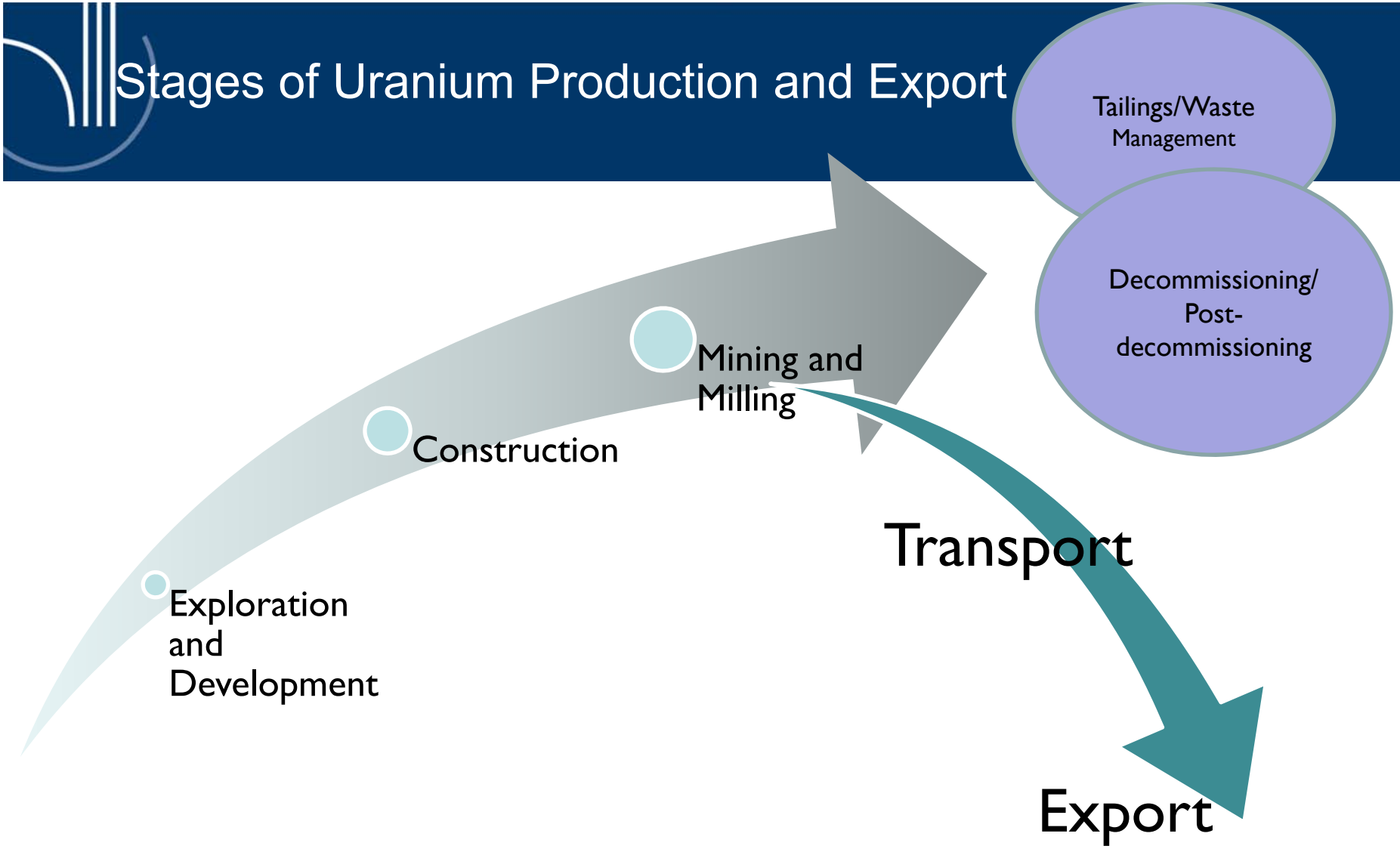
- UOC usually excluded from national nuclear security and tracking in NWS
  - Safety focus – on spill rather than diversion
- NWS facilities on Voluntary Offer
- Many U producers have no indigenous NPPs

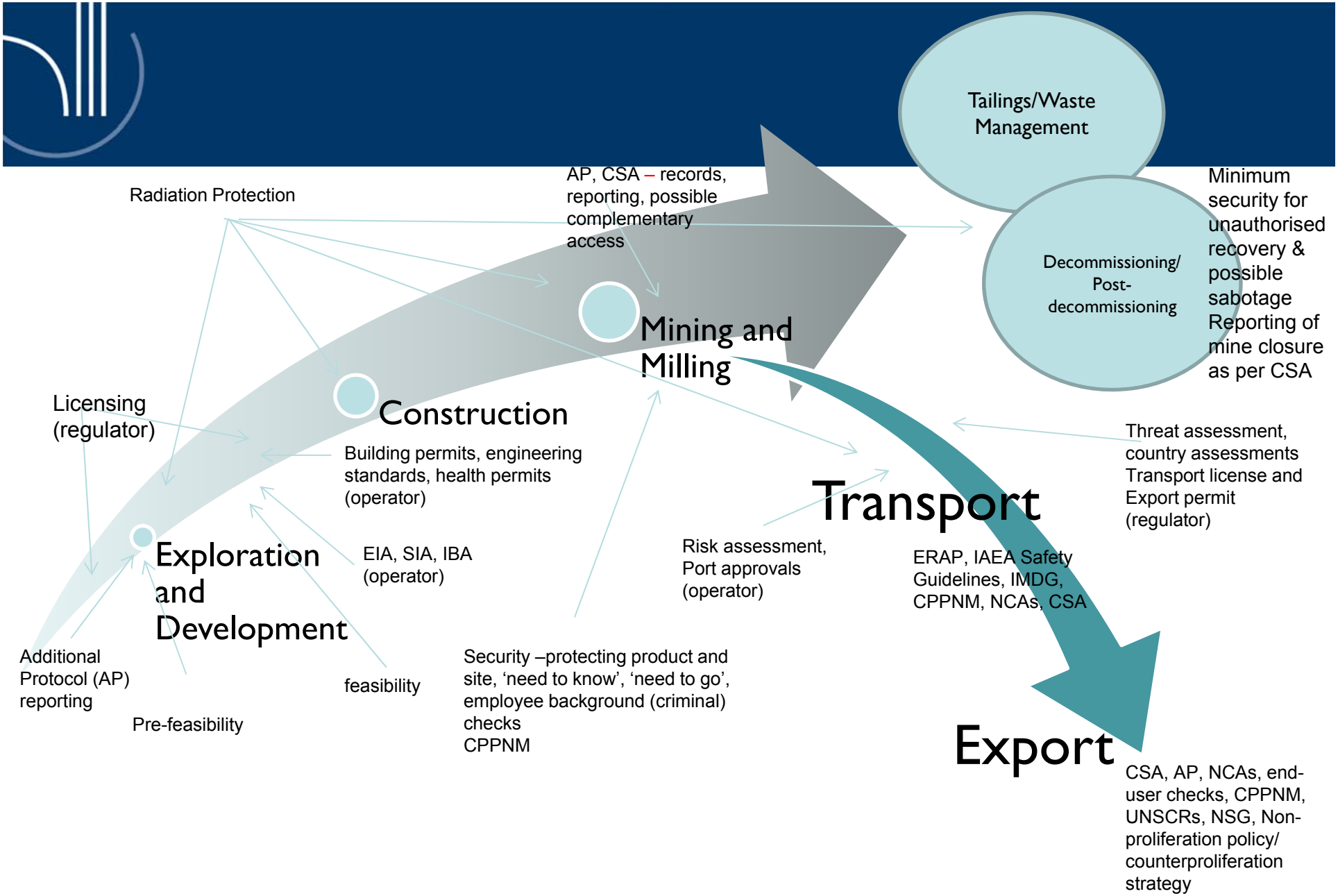
Transport

- US – no security plan for yellowcake or ore
  - Safety focus – on spill rather than diversion
- Aus – security plan
- Brazil – security plan
- India – security plan

Olympic Dam Drum courtesy of BHP Biliiton

Stages of Uranium Production and Export





Operator and regulator responsible for public outreach on safety, security, safeguards and IBA throughout all stages
Inspections by relevant regulatory authorities at each stage

Thank you!

Bibliography for Governing Uranium Presentation to BAPE Public Inquiry

The references used for the presentation are based on information from the published (and yet to be published) country reports part of the Governing Uranium project. This also includes interviews with government, industry and international/multilateral organisations.

Governing Uranium in France
Cécile Padova and Bruno Tertrais (July 2014)

Governing Uranium in China
Tamara Patton Schell (March 2014)

Governing Uranium in China: Unclear Legislation
Mark Hibbs & Tamara Patton Schell (March 2014)

Governing Uranium in the United States
Sharon Squassoni, Stephanie Cooke, Robert Kim, and Jacob Greenberg (March 2014)

Uranium from Niger: A key resource of diminishing importance for France
By Bruno Tertrais (March 2014)

Governing Uranium in the United Kingdom
Molly Berkemeier, Wyn Q. Bowen, Christopher Hobbs and Matthew Moran (Feb 2014)

Africa and the Global Market in Natural Uranium: From Proliferation Risk to Non-proliferation Opportunity
Ian Anthony and Lina Grip (November 2013)

The global market in natural uranium - from proliferation risk to non-proliferation opportunity
By Ian Anthony and Lina Grip (April 2013)

Forthcoming:

Governing Uranium in Russia, Anton Khlopkov

Governing Uranium in India, Rajiv Nayan

Governing Uranium in Pakistan, Maria Sultan

Governing Uranium in Australia, C. Vestergaard

Governing Uranium in Canada, C. Vestergaard

Governing Uranium in Brazil, C. Vestergaard

Governing Uranium in Kazakhstan, Gry Thomasen