DSRS Disposal - Current Practices and Issues in Member States

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Current disposal practices for DSRS

- Borehole disposal at “RADON” facilities in the former USSR
- Boreholes in South Africa
- Greater confinement boreholes at NTC
- Western Australia -Mt Walton “Intractable Waste Facility”
- Commercial disposal in US
- The Nevada test site and WIPP

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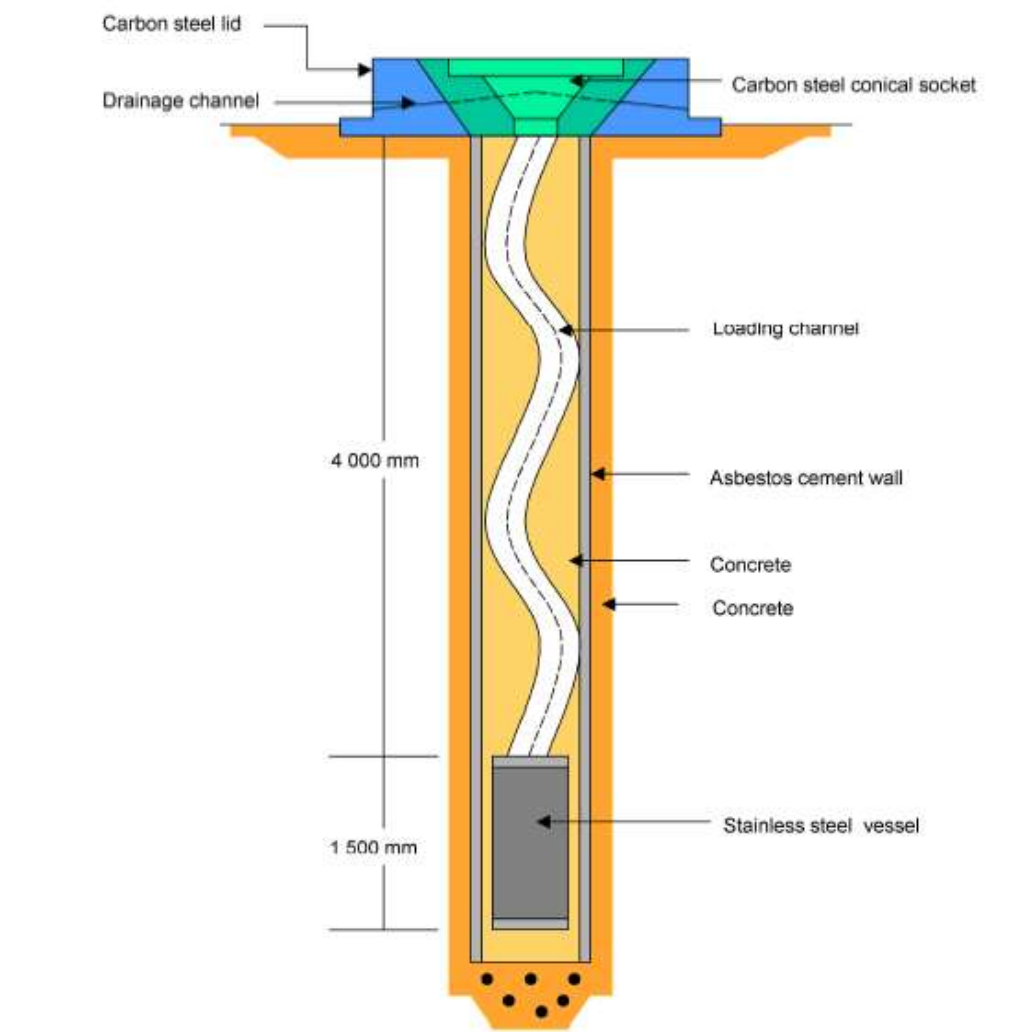
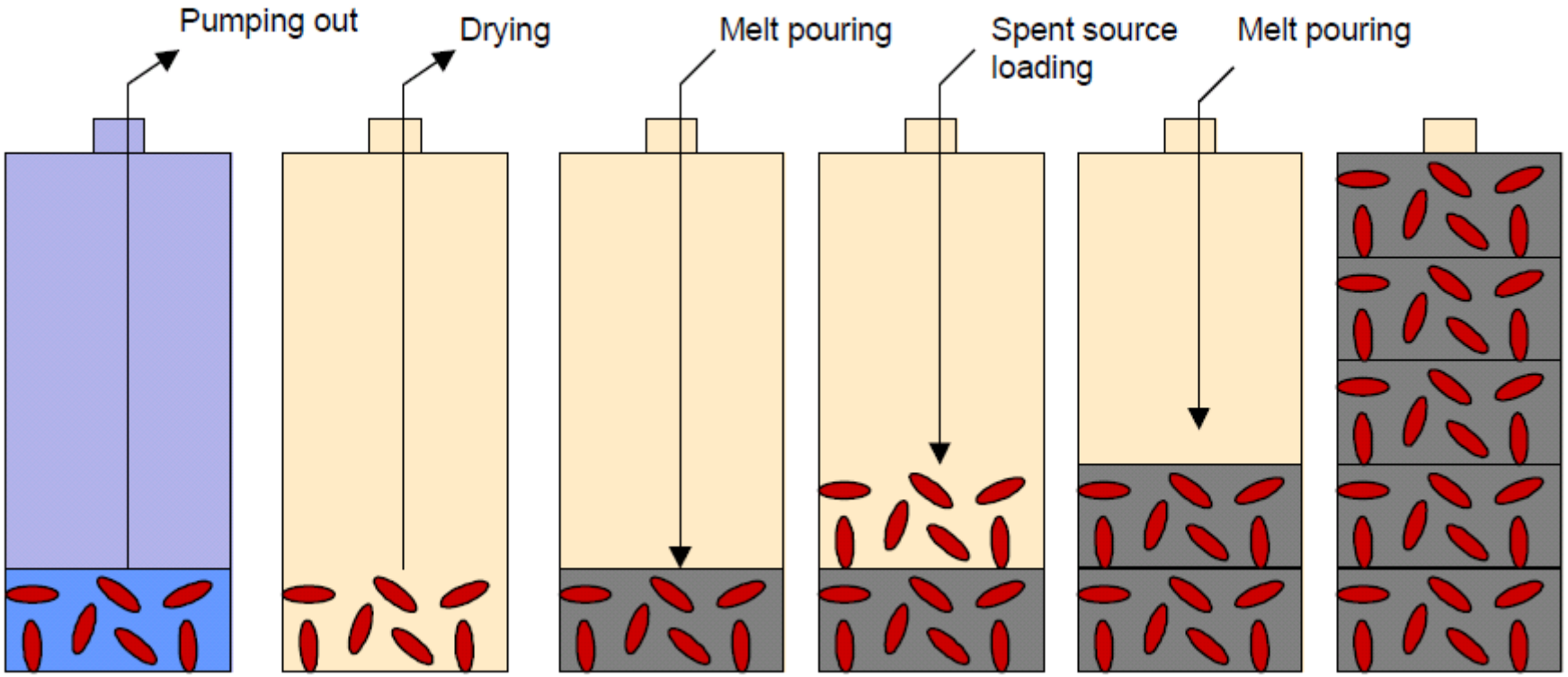
Concept for disposal of sources in the FSU



After – van Blerk et al (2000)

Process to load sources



After – van Blerk et al (2000)

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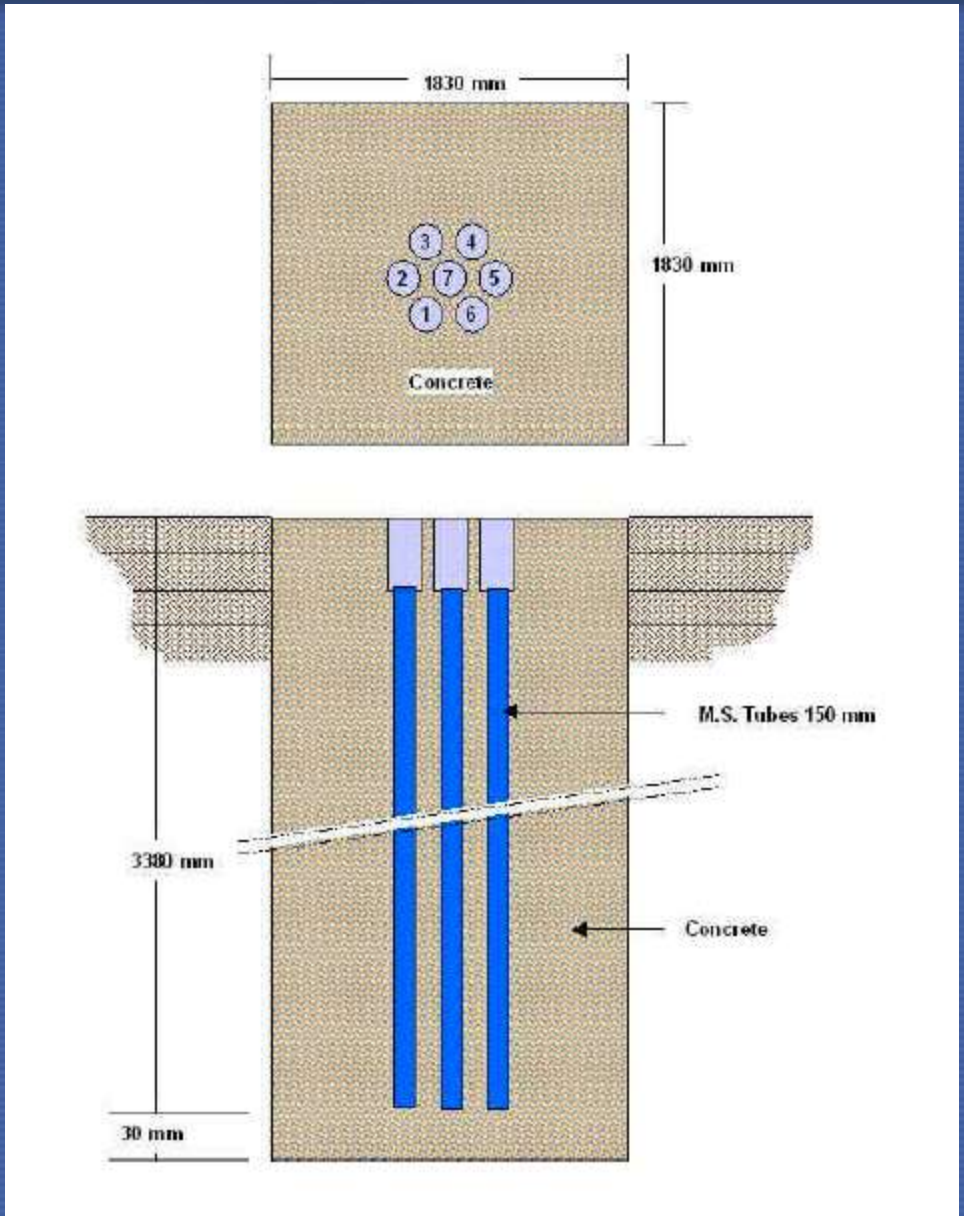
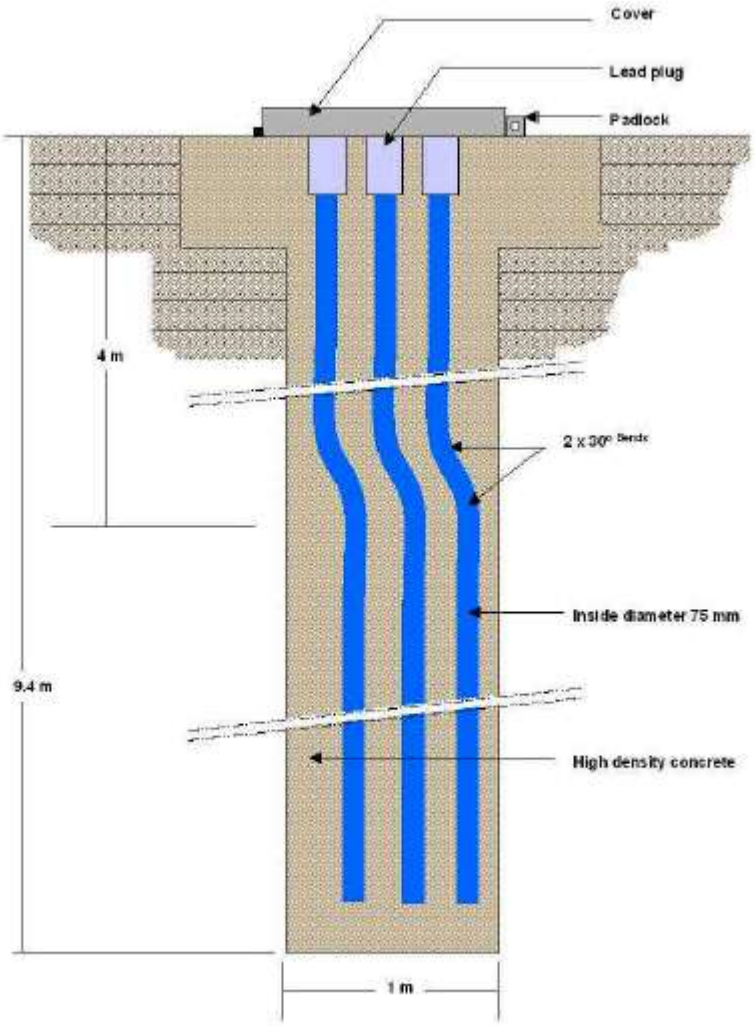
Tubular steel borehole facility SA



Stainless steel boreholes SA



After – van Blerk et al (2000)

Conditioning and loading station

Mt Walton East, Australia – Intractable Waste

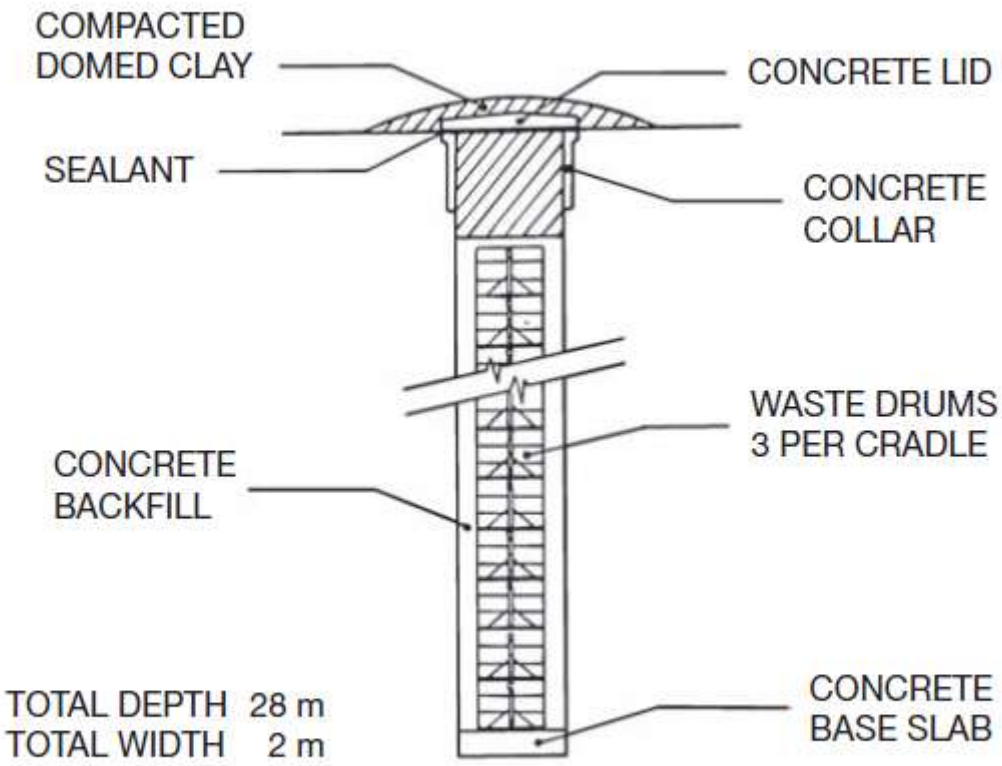


FIG. A–4. Borehole disposal at Mt Walton East, Australia [A–3].

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Boreholes at NTS

DOE Transuranic (TRU) Waste Disposal Facilities – Greater Confinement Boreholes

- Constructed at Nevada Test Site and received TRU waste (Pu-239) and high-activity low-level radioactive waste (200 cubic meters) from 1983-1989
- 13 boreholes constructed, 9 nine of which received waste (no longer actively receiving waste)
- Range from 3 to 3.6 meters in diameter, and extend to a depth of 36 meters
- Waste packages were placed in the boreholes from the bottom to approximately 21 meters from the surface
- Detailed performance assessment validated that the disposal facility meets quantitative regulatory requirements for TRU waste disposal
- Used from 1984 to 1989

Drilling a Large Diameter Borehole with a Corrugated Metal Surface Casing

Interior view of borehole

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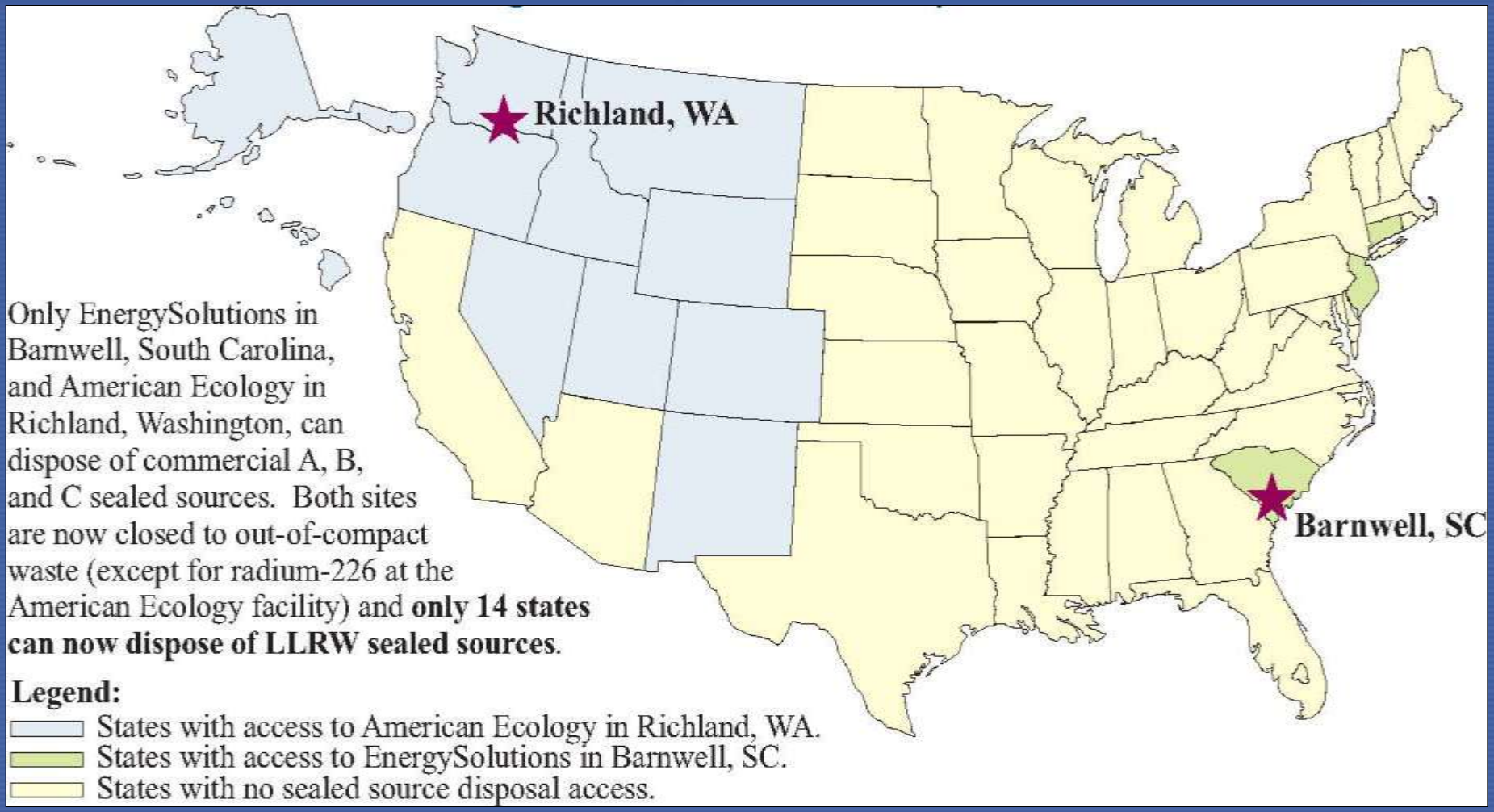
Borehole Capabilities

	Min depth of disposal		
RADON small source (Storage)	4 m	PBq Cs-137 Co-60	Storage
W Australia	8 m	GBq Cs-137 GBq Am-241	Type of near-surface disposal
Greater Confinement (Nevada Test Site)	21 m	PBq TRU	Intermediate depth disposal

U.S. LLRW Disposition Policy Since 1985



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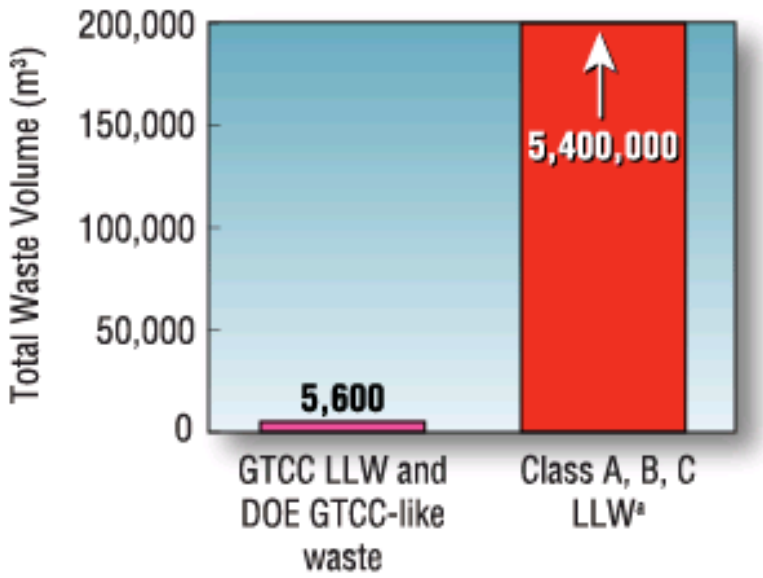
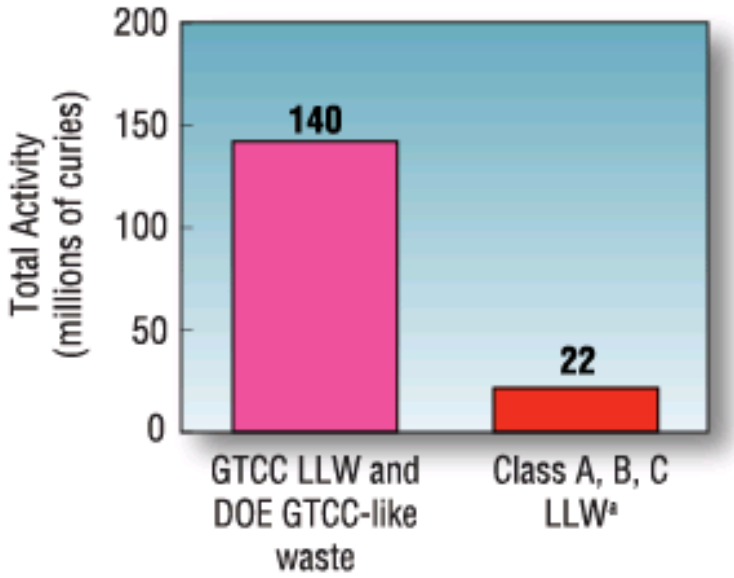
GTCC Volumes & Activities USA





[a]Class A, B, C LLW volumes and activities were obtained from the DOE MIMS database, and are projected to 2062.

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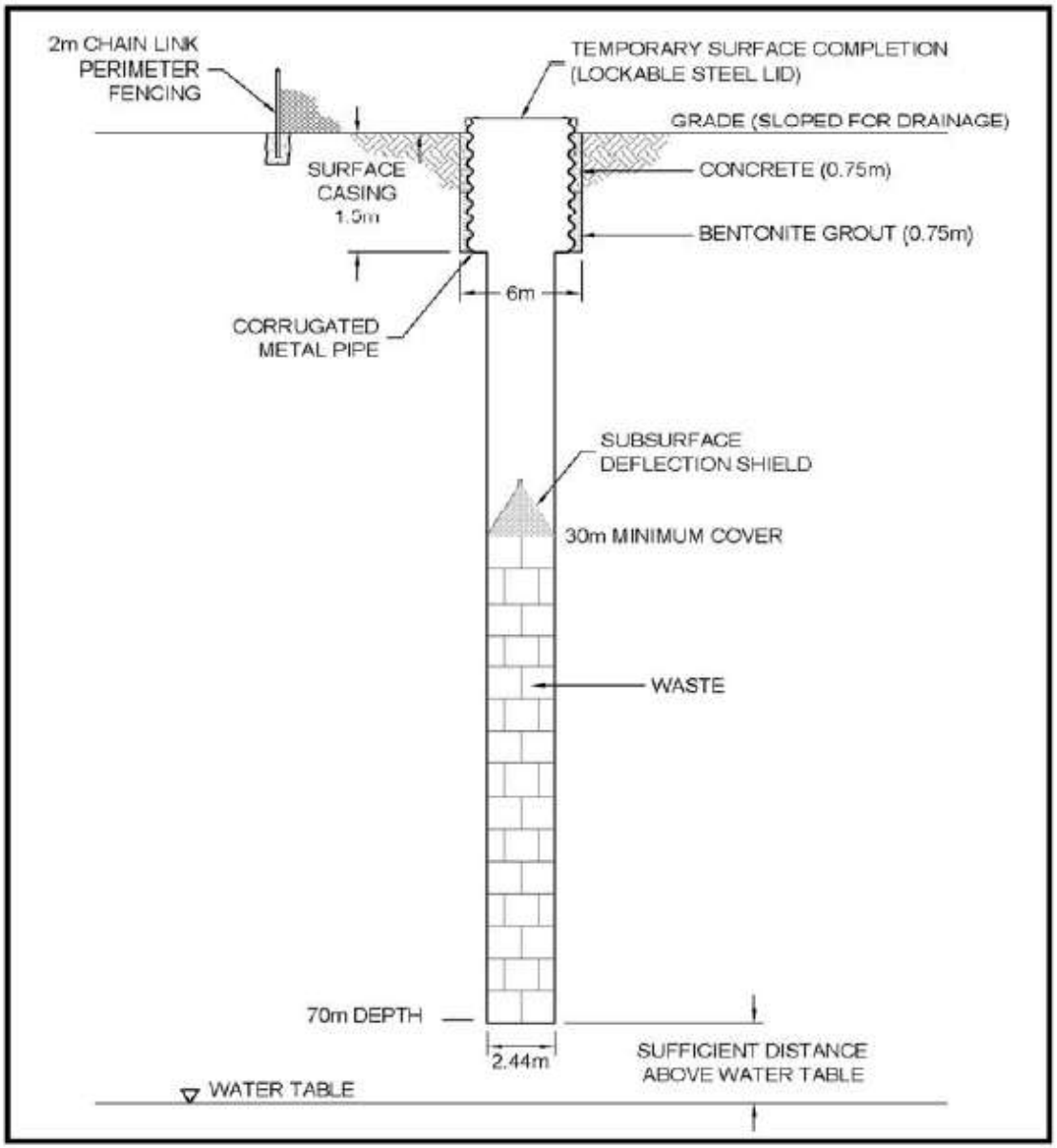
Concept GTCC borehole



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Potential disposal locations

Potential DOE locations for disposal facilities evaluated in the GTCC LLRW EIS. Generic commercial locations will also be evaluated.

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New work in the Russian Federation

• Since 1997 MosSIA “Radon” has started testing of large diameter borehole (LDB) as low and intermediate level waste (LILW) repository. In this case wastes are placed below the frost zone where damage of engineered barriers due to climatic factors is practically impossible.

• Additionally, construction of the repository by means of drilling prevents large disturbances of the hosting rocks, as happens during excavation work.

• The project is developed for construction of 9 boreholes with diameter from 1.9 to 4 m and with depths from 40 to 50 m. The boreholes are planned to be drilled in a 7.2 × 7.2 m grid.

• Additionally 16 boreholes for radiation and geological monitoring are supposed to be constructed (some of them are already constructed and used for monitoring purposes).

S. Dmitriev et al, Lille, France (2007)

Issues for better control of DSRS

- Liability of extended storage
- Sustainability of that storage a serious issue
- Difficulties with returning sources to the supplier (expense, complex, containers)
- High “disposal” fees in supplier countries
- Poor or no regulatory control in certain countries
- Limited expertise WRT sources
- Limited disposal pathways

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Conclusion

- **Boreholes are widely used in radioactive waste management throughout the world but mainly for storage or as a variant of near-surface disposal**
- **The long waiting time for deep geological disposal has forced countries to once again look at borehole technologies that were last explored in the 70’s and 80’s**

The time for borehole disposal is now!!

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