



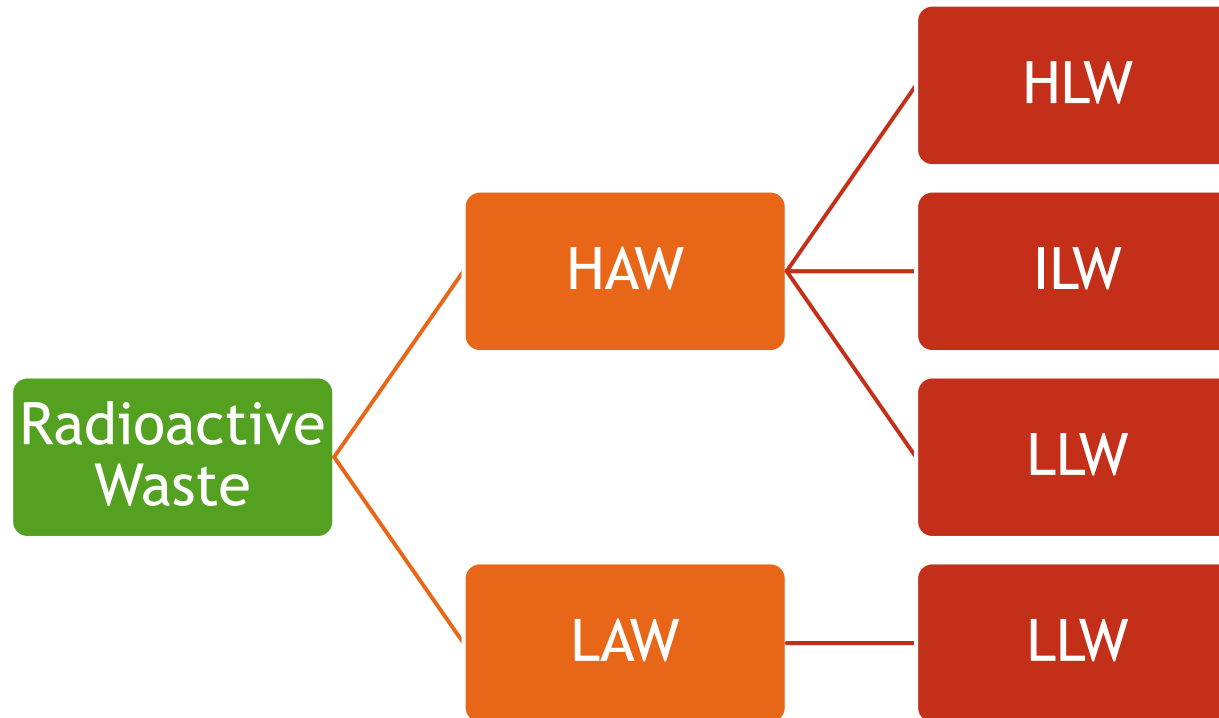
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# Co-Processing of Nuclear Waste

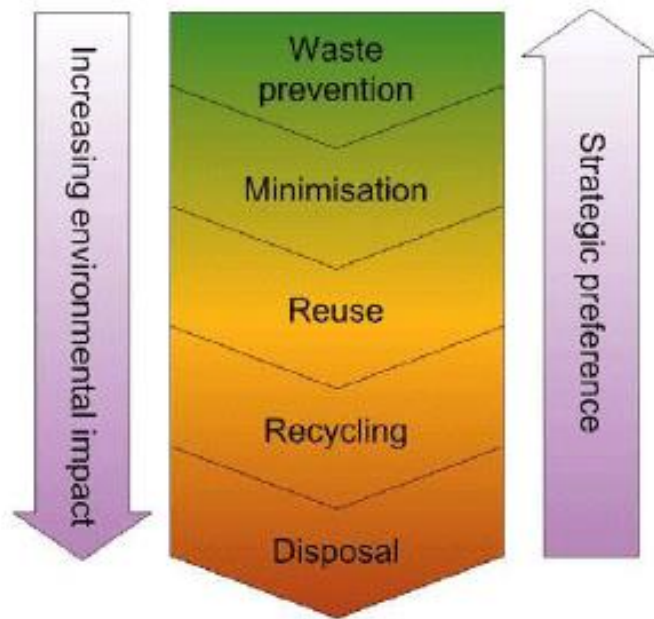
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# Higher Activity Nuclear Waste



# Higher Activity Waste Management

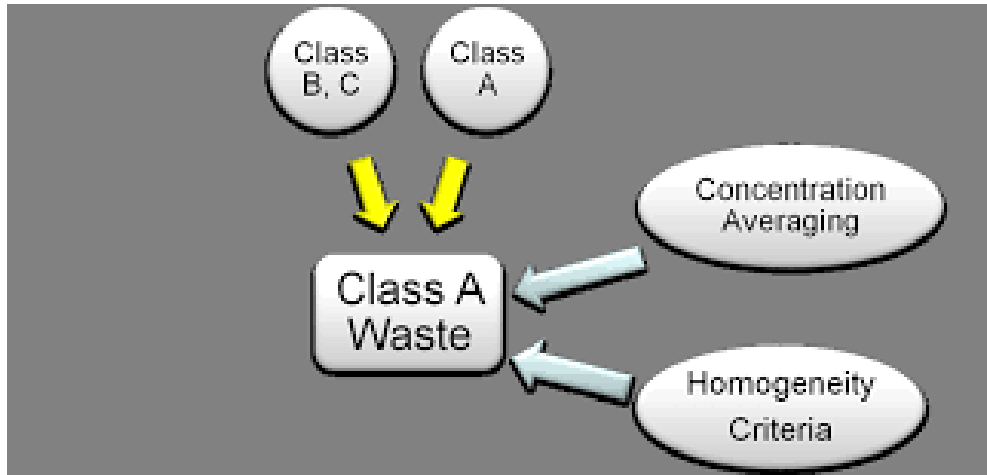


NDA Inventory Reports, 2013



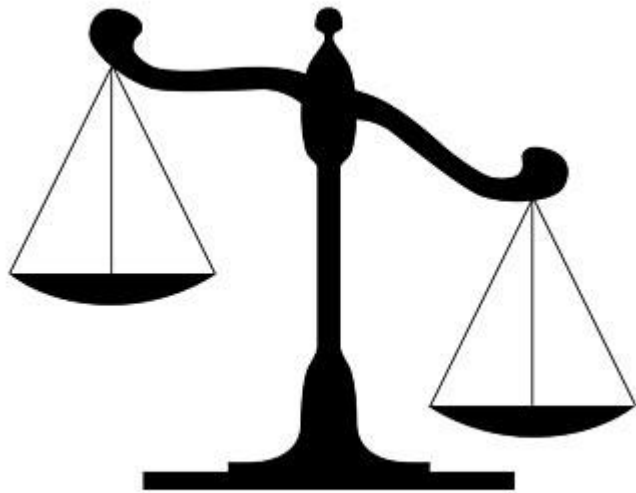
# Co-processing

- ▶ Mixing or blending radioactive waste
- ▶ Storing two or more waste streams in one container
- ▶ Decommissioning waste streams are of predominant interest



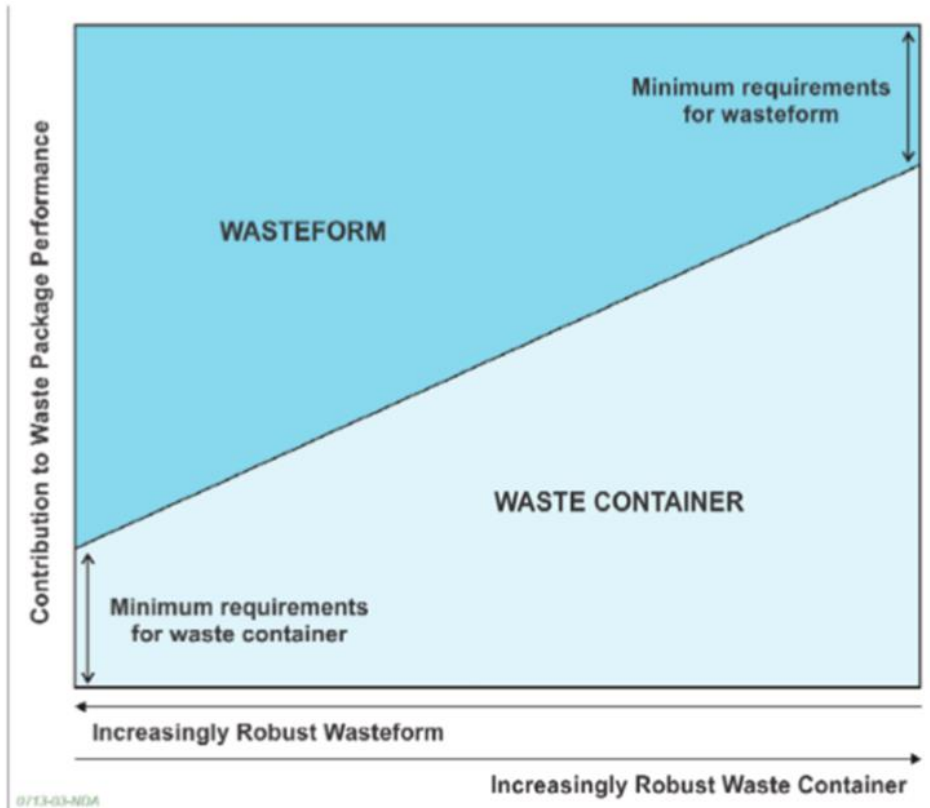
NRC, 2011

# Benefits and Barriers



Opportunities	Constraints
Overall volume reduction.	Principles of segregation
Reduction of reliance on the GDF	Cultural Perspective
Potential to open up other routes for disposal and management	Waste streams have to be generated alongside each other

# Method of Approach



NDA, 2013

- ▶ Major objective is to achieve hazard reduction or Volume reduction.
- ▶ Considering properties in combination
- ▶ Then considering how the mixed waste stream will affect the requirements on the waste package.

## Example Matrix

Typical waste types		Desirable characteristic of waste					
		Lack of particulate	Low surface contamination	Dry	Strength	Corrosion resistant	Inert
Stainless steel	Chemical plant pipe work	✓	(✓)	✓	✓	✓	✓
	Irradiated reactor components	✓	✓	✓	✓	✓	✓
Other metals (aluminium, lead etc.)		✓	✓	✓	✓	(✓)	✓
Building rubble (concrete etc.)		x	x	✓	x	✓	✓
Glass and ceramics		✓	✓	✓	x	✓	✓
Graphite	AGR sleeves	x	✓	✓	x	✓	✓
	Reactor core	✓	✓	✓	✓	✓	✓

# Properties In Combination

# Waste Streams

Solid Waste Streams	Aqueous Streams	Solid and Aqueous Streams
Concrete cement and sand with metals (D) [V]	Tritium Contaminated oil with bulk oil (P) [H]	Bulk fines and inorganic ion exchange resins (P) [V]
Activated metals and Contaminated metals (D) [V]	Contaminated solvents with Sludge (P) [H]	Asbestos with sludge (P) [H]
Soil and rubble with concrete and sand (D) [V]	Pond Sludges with Floccs (D) [V]	<b>Key:</b> (P) Problematic (D) Decommissioning [V] Volume reduction [H] Hazard Reduction
Cellulose waste with Asbestos (P) [H]	Ion exchange resins (D) [V]	



# Requirements

Waste Package	Waste Package
Gross Mass	External Dose Rate
Activity Control	Gas generation
Heat Output	Criticality Safety
Surface Contamination	Stackability
Accident Performance	Identification



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# Co-Processing of Nuclear Waste Questions?

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Nuclear  
Decommissioning  
Authority

# References

- ▶ “*An Overview of NDA Higher Activity Waste*”. [online] NDA. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/479225/Overview\\_of\\_Higher\\_Activity\\_Waste\\_November\\_2015.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/479225/Overview_of_Higher_Activity_Waste_November_2015.pdf). [Accessed 4 Mar. 2016].
- ▶ “*Inventory reports 2013*” | UKRWI. [online] Nda.gov.uk. Available at: <http://www.nda.gov.uk/ukinventory/the-2013-inventory/2013-inventory-reports/> [Accessed 10 Feb. 2016].