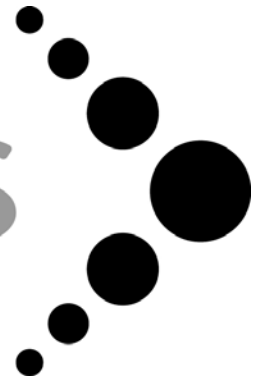


nexasolutions

Nuclear expertise intelligently applied



UK LLW Management Strategy

Determining the future for LLW disposition

Presented by : Alan Wareing

UK LLW Management Strategy

- **Introduction**

- What is LLW? - Sources, definitions and quantities
- Current disposition routes and processes
- Limitations of the LLWR at Drigg
- Disposition scenario analysis
- Defra public consultation
- Application of the waste hierarchy and 'problem' wastes
- The way forward

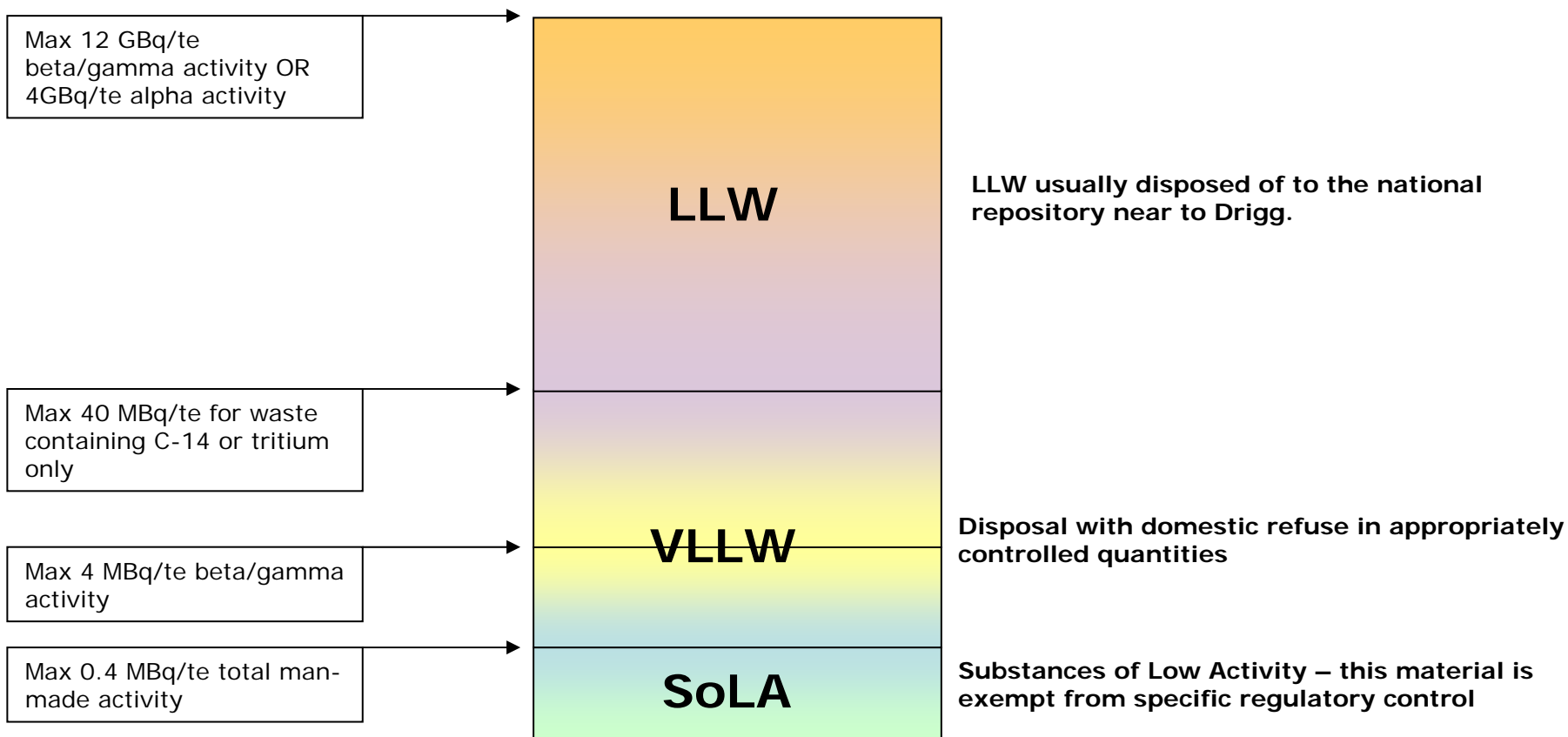
UK LLW Management Strategy

- What is LLW?



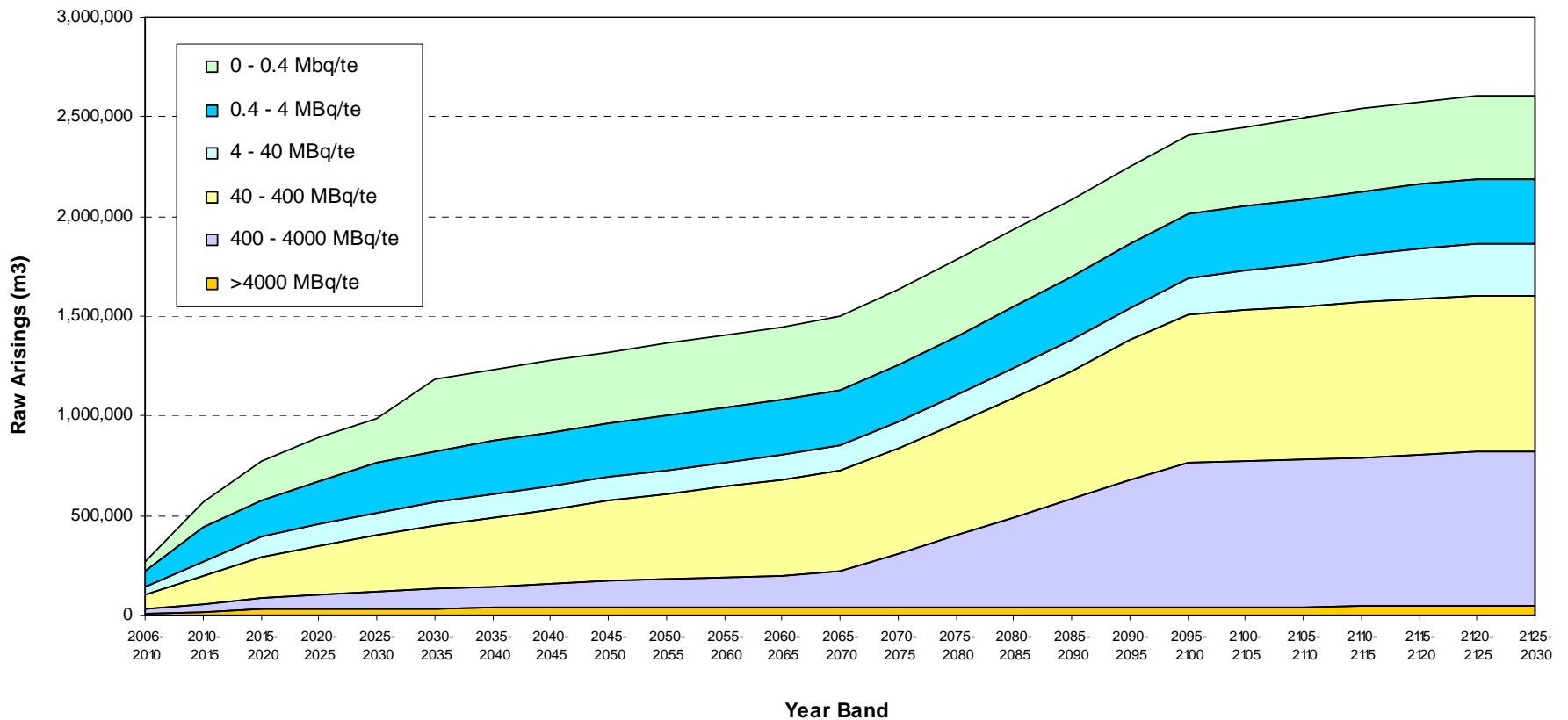
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• Definition of LLW



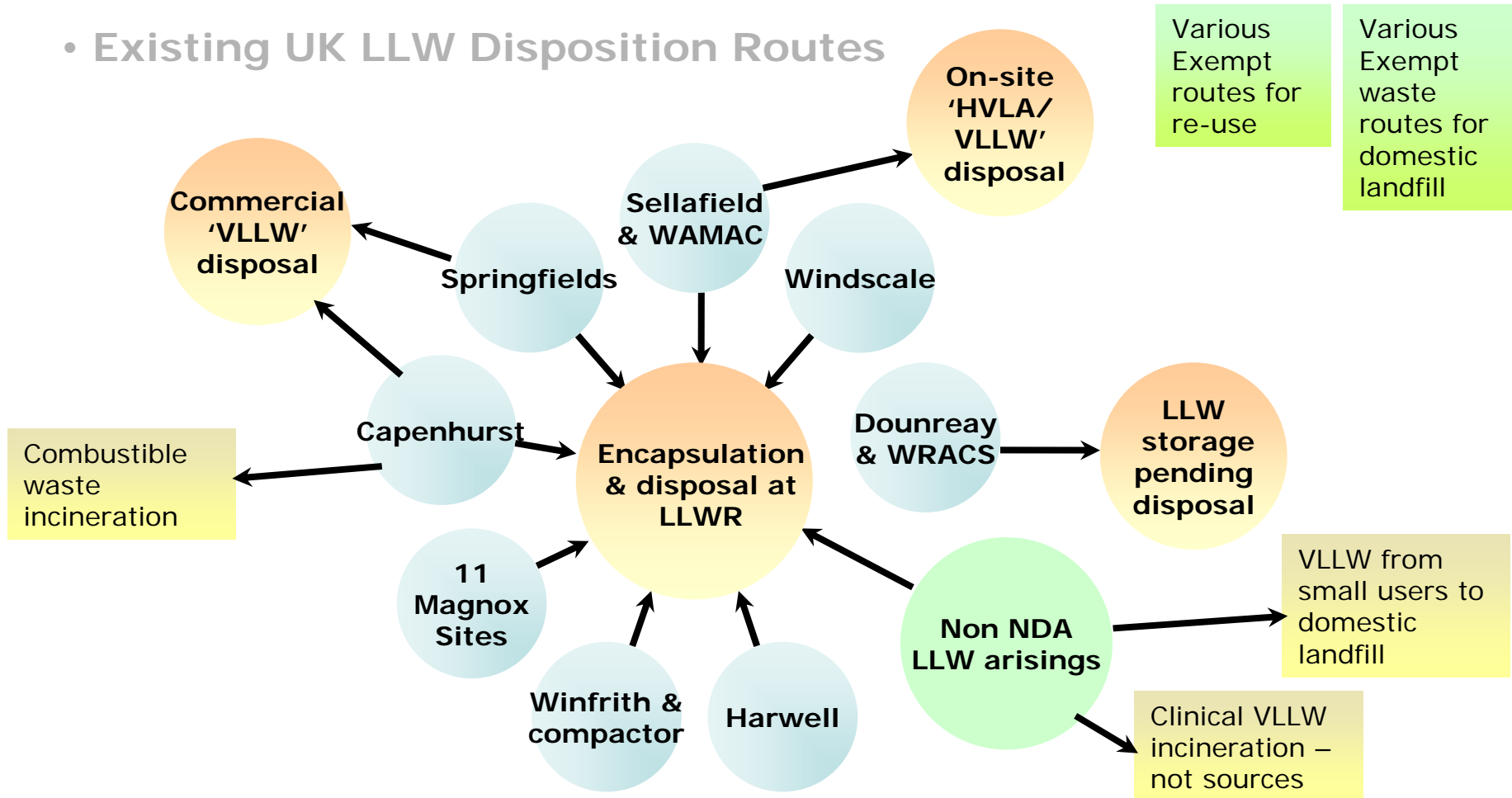
UK LLW Management Strategy

- Quantities of LLW forecast to arise (2004 UK National Inventory)



UK LLW Management Strategy

Existing UK LLW Disposition Routes



UK LLW Management Strategy

• Limitations of the LLWR at Drigg

- Remaining volumetric capacity of Vault 8 is approximately 20,000 m³, equivalent to around 1000 half-height ISO freight containers
- Planning permission for future vaults still to be obtained
- Potential future volumetric capacity is approximately 700,000 m³
- Annual limits restrict total activity of waste that can be consigned in a single year
- Site limits restrict total activity of waste that can be consigned overall
- Issues still to be resolved in demonstrating Post-Closure Safety Case

UK LLW Management Strategy

- Limitations of the LLWR at Drigg

Nuclide Group	Remaining Capacity (TBq)	Future Inventory (TBq)	Date Capacity Reached
Uranium	7.37	10.59	2029
Ra-226/Th-232	0.76	3.04	2060
Carbon-14	1.35	112.29	2011
Iodine-129	1.49	0.002	-
Tritium	284.58	129.73	-
Cobalt-60	54.92	59.81	2059
Other Betagamma	383.53	636.17	2019
Other Alpha	7.07	19.8	2028

UK LLW Management Strategy

- Assessed Scenarios

Scenario 1

<p>LLW1 $\alpha \geq 1$ MBq/te and/or $\beta\gamma \geq 40$ MBq/te</p> <p>LLW2 $\alpha + \beta\gamma \geq 0.4$ MBq/te</p> <p>Exempt Waste $\alpha + \beta\gamma < 0.4$ MBq/te</p>
--

Site Groupings	Activity Level	LLWR at Drigg	LLWR at Dounreay	Clifton Marsh	On Site/Local LLW facility.
Sellafield	LLW1	2004 – end	X	X	X
	LLW2	X	X	X	2004 – end
	Exempt	X	X	X	X
Capenhurst & Springfields	LLW1	2004 – end	X	X	X
	LLW2	X	X	2004 - end	X
	Exempt	X	X	X	X
Magnox Reactor Sites	LLW1	2004 – end	X	X	X
	LLW2	2004 – end	X	X	X
	Exempt	X	X	X	X
UKAEA (excl. Dounreay)	LLW1	2004 – end	X	X	X
	LLW2	2004 – end	X	X	X
	Exempt	X	X	X	X
UKAEA Dounreay	LLW1	X	2004 - end	X	X
	LLW2	X	2004 - end	X	X
	Exempt	X	X	X	X
British Energy	LLW1	2004 – end	X	X	X
	LLW2	2004 – end	X	X	X
	Exempt	X	X	X	X
Ministry of Defence	LLW1	2004 – end	X	X	X
	LLW2	2004 – end	X	X	X
	Exempt	X	X	X	X
Others	LLW1	2004 – end	X	X	X
	LLW2	2004 – end	X	X	X
	Exempt	X	X	X	X

UK LLW Management Strategy

• Assessed Scenarios

Scenario 2

LLW1

$\alpha \geq 1$ MBq/te and/or
 $\beta\gamma \geq 40$ MBq/te

LLW2

$\alpha + \beta\gamma \geq 0.4$ MBq/te

Exempt Waste

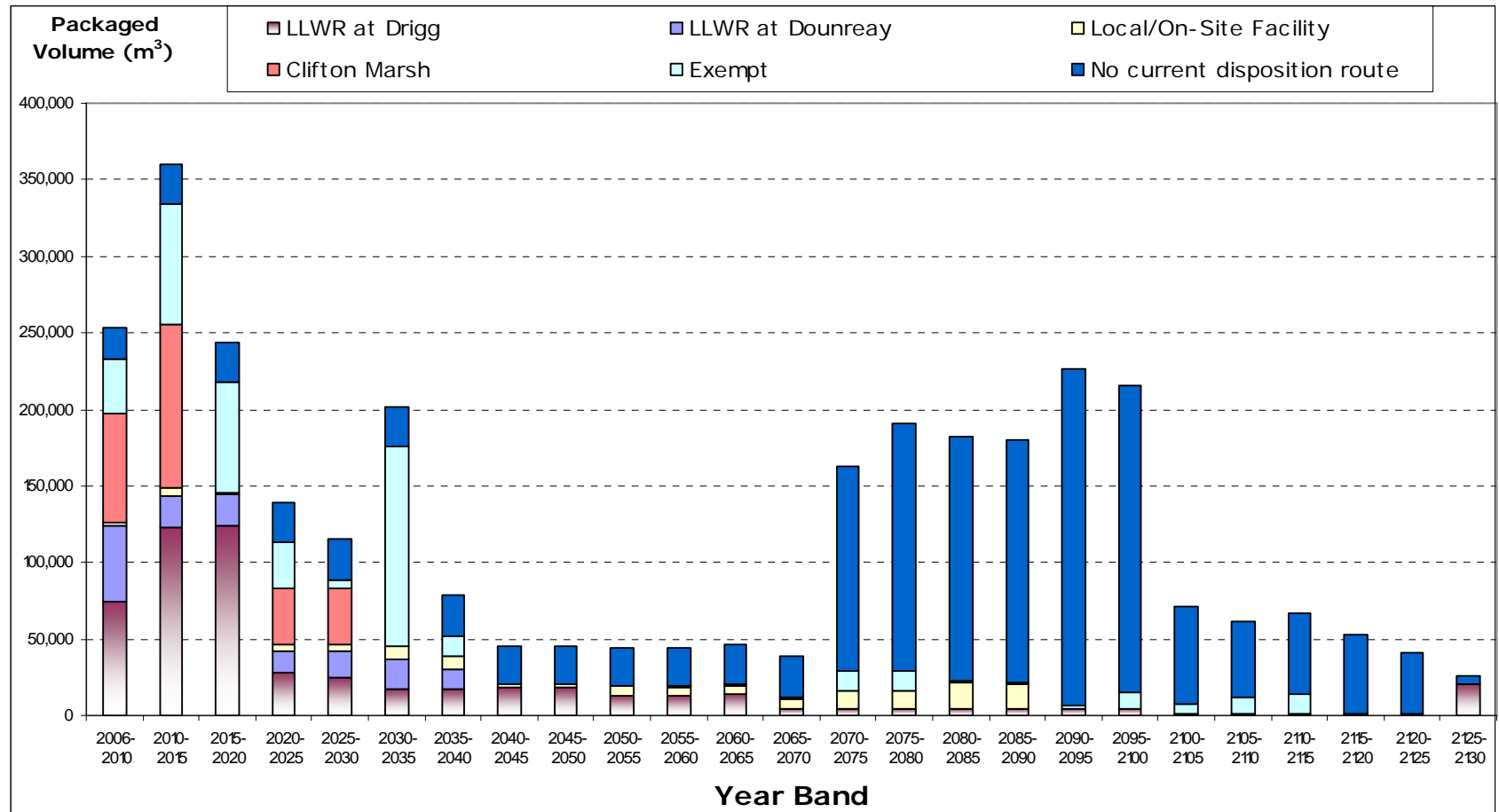
$\alpha + \beta\gamma < 0.4$ MBq/te

Site Groupings	Activity Level	LLWR at Drigg	LLWR at Dounreay	Clifton Marsh	On Site/Local LLW facility.
Sellafield	LLW1	2004 – 2020	X	X	2020 – end
	LLW2	X	X	X	2004 – end
	Exempt	X	X	X	X
Capenhurst & Springfields	LLW1	2004 – end	X	X	X
	LLW2	X	X	2004 – end	X
	Exempt	X	X	X	X
Magnox Reactor Sites	LLW1	2004 – end	X	X	X
	LLW2	2004 – *	X	X	* – end
	Exempt	X	X	X	X
UKAEA (excl. Dounreay)	LLW1	2004 – end	X	X	X
	LLW2	2004 – end	X	X	X
	Exempt	X	X	X	X
UKAEA Dounreay	LLW1	X	2004 – end	X	X
	LLW2	X	2004 – end	X	X
	Exempt	X	X	X	X
British Energy	LLW1	2004 – end	X	X	X
	LLW2	2004 – end	X	X	X
	Exempt	X	X	X	X
Ministry of Defence	LLW1	2004 – end	X	X	X
	LLW2	2004 – end	X	X	X
	Exempt	X	X	X	X
Others	LLW1	2004 – end	X	X	X
	LLW2	2004 – end	X	X	X
	Exempt	X	X	X	X

* Date variable, dependent on reactor site

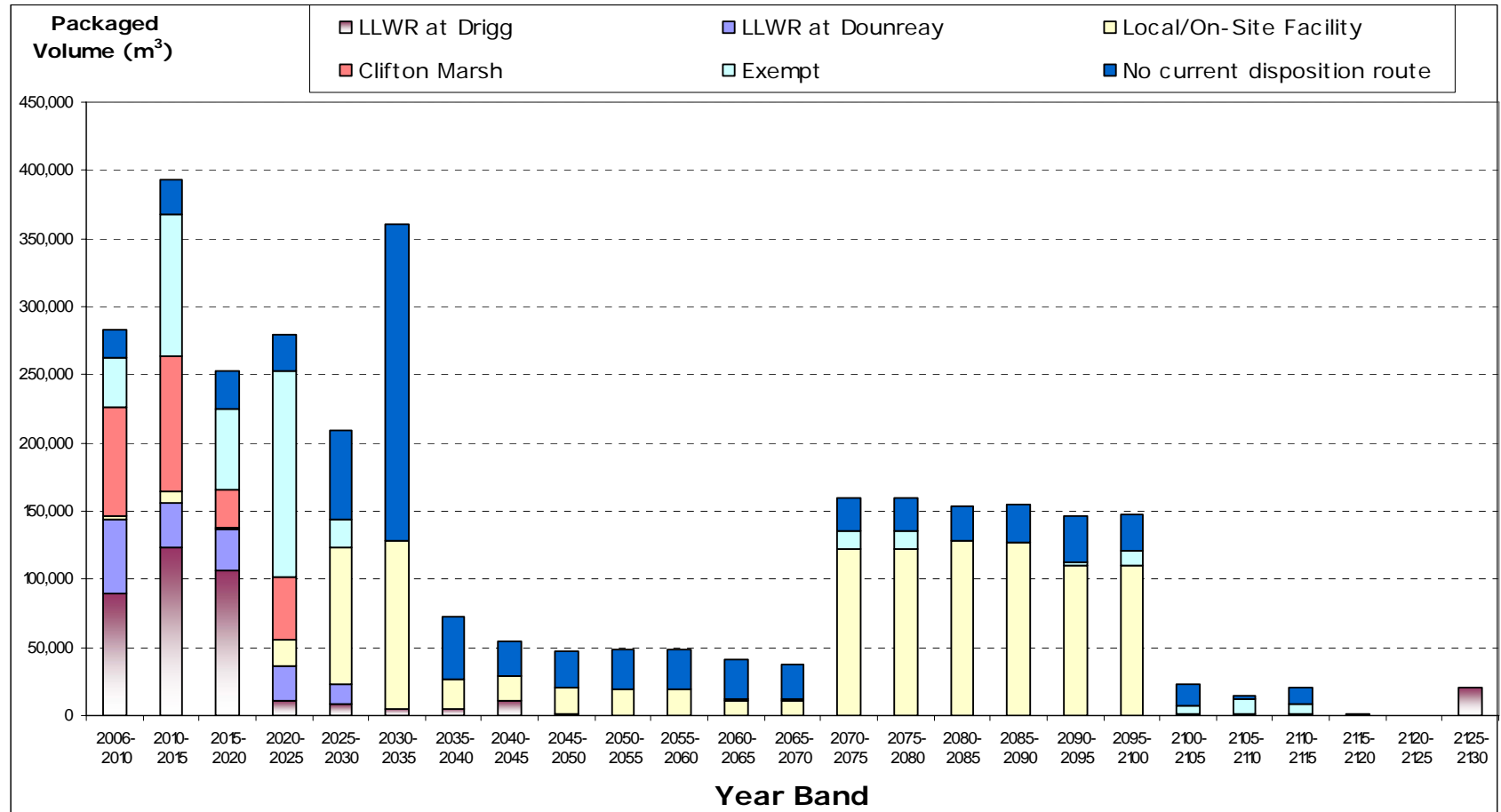
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- Scenario 1 disposition route by packaged volume



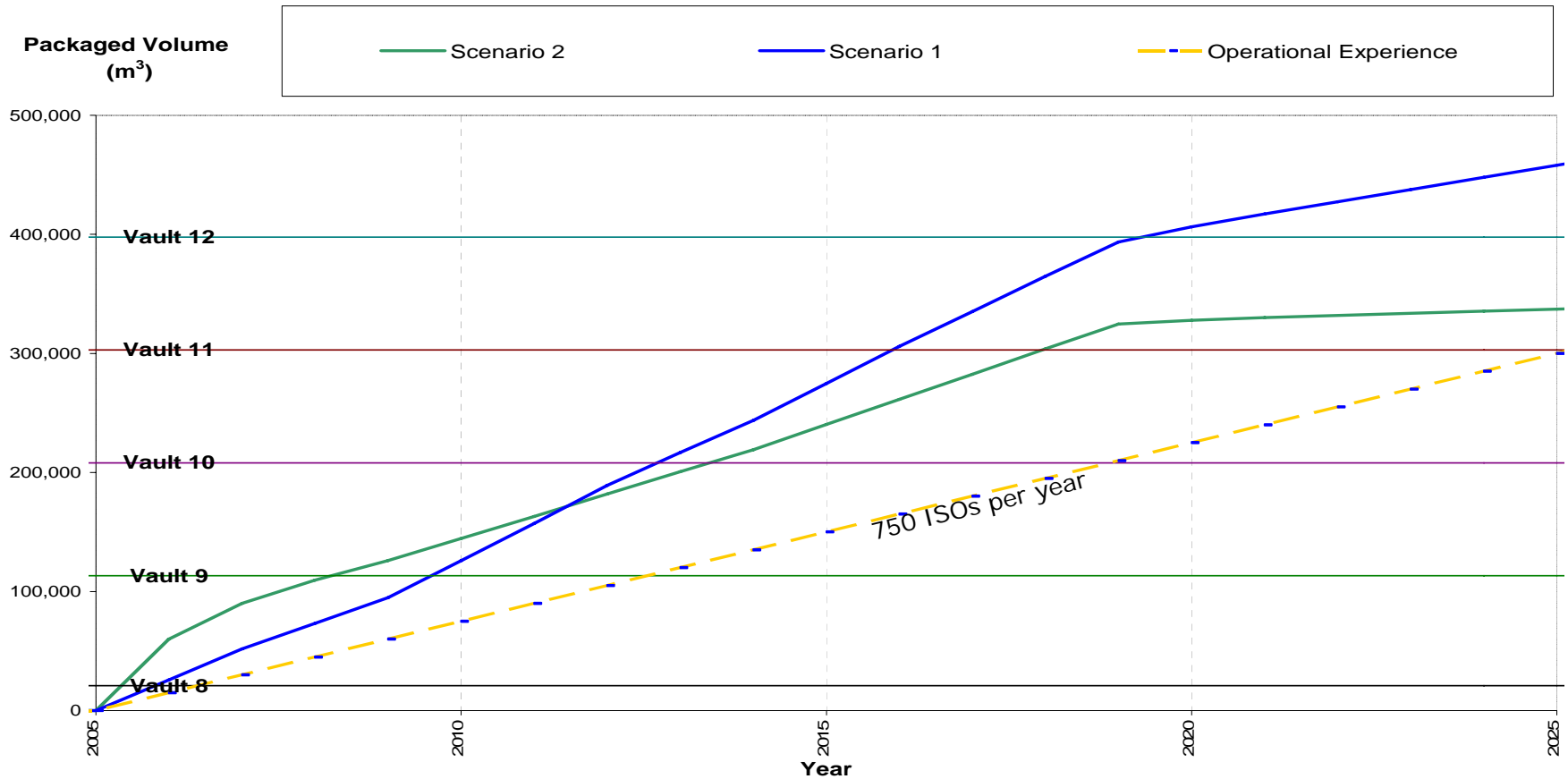
UK LLW Management Strategy

- Scenario 2 disposition route by packaged volume



UK LLW Management Strategy

- Impact of arisings on LLWR at Drigg

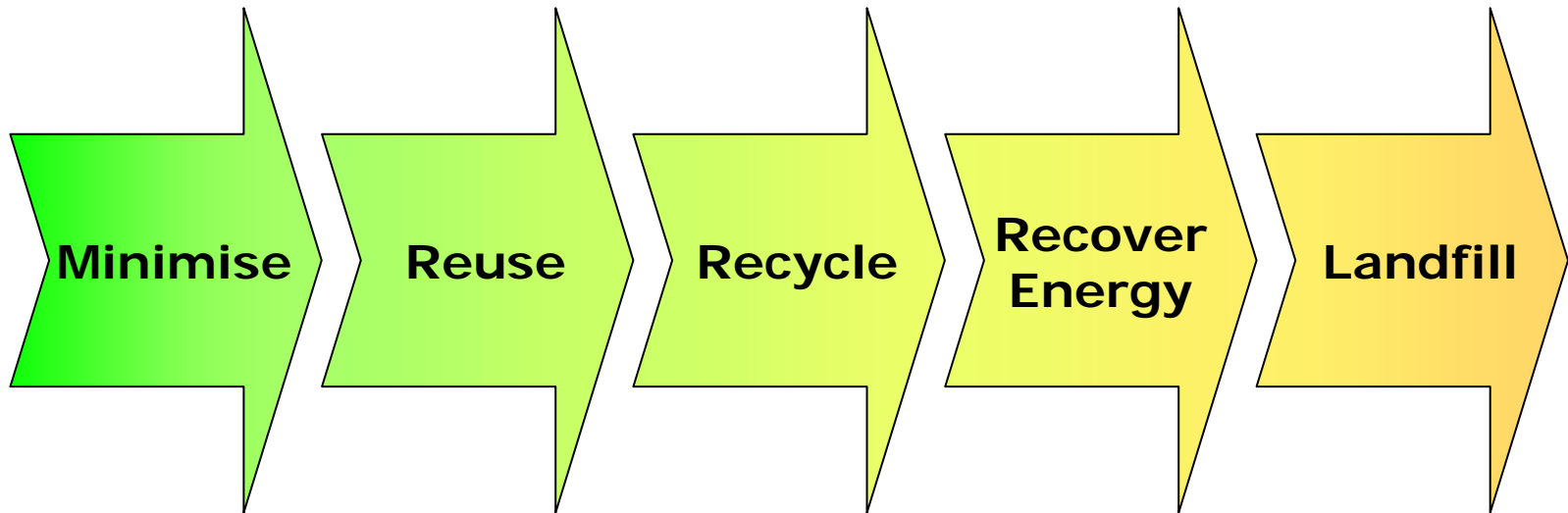


UK LLW Management Strategy

- DEFRA public consultation on long-term management of LLW
- Public consultation process from April 2005 through to May 2006
- Final policy statement still awaited, pending analysis of comments
- Summary of proposed policy:
 - Increased flexibility
 - Use of risk-informed approach
 - Balance of proximity principle and transport
 - Redefinition of VLLW
 - Consideration of all practicable options
 - Continued minimisation of waste arisings
 - Continued regulation under HSE and Environment Agencies

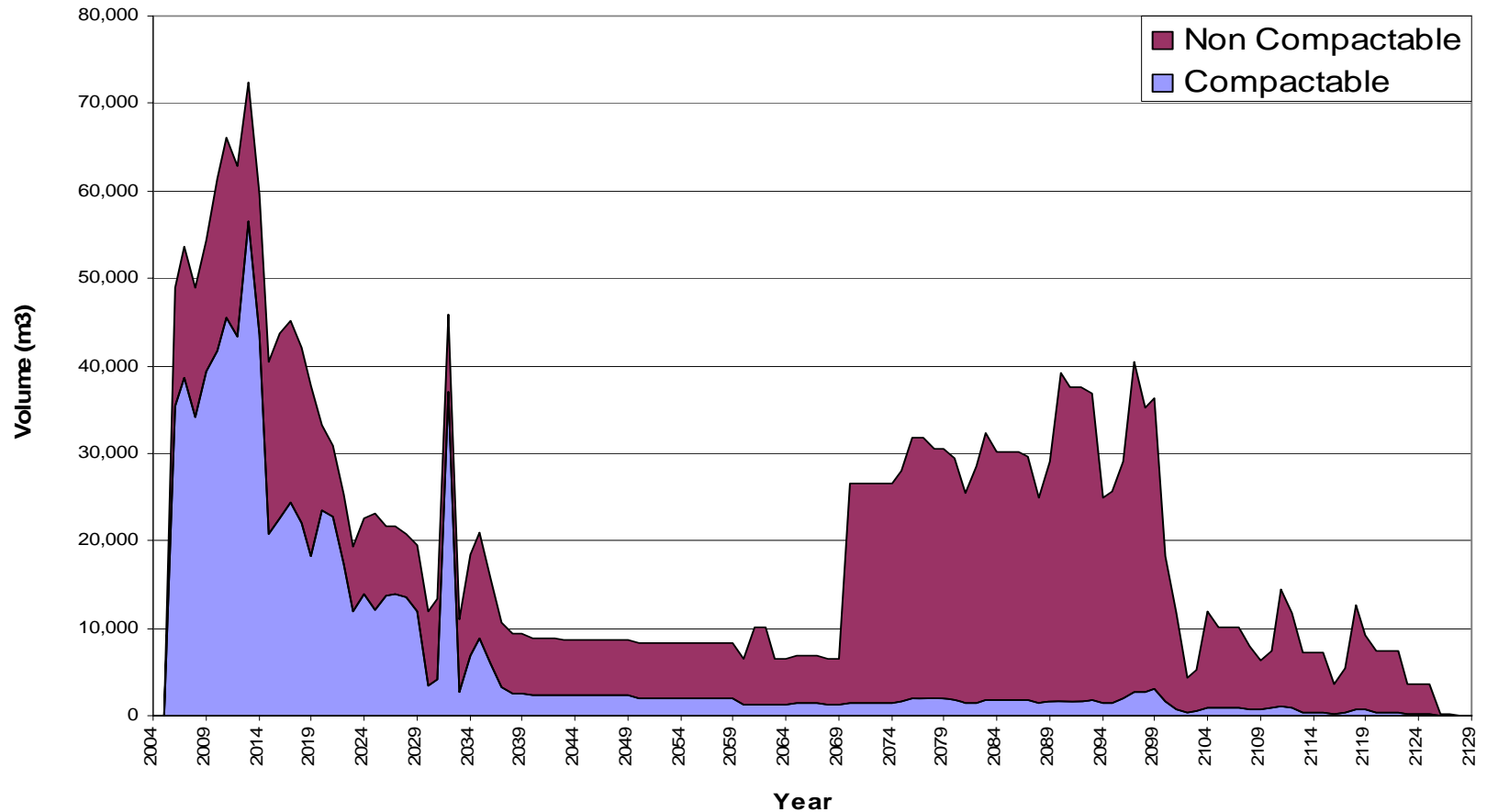
UK LLW Management Strategy

- Application of the waste hierarchy



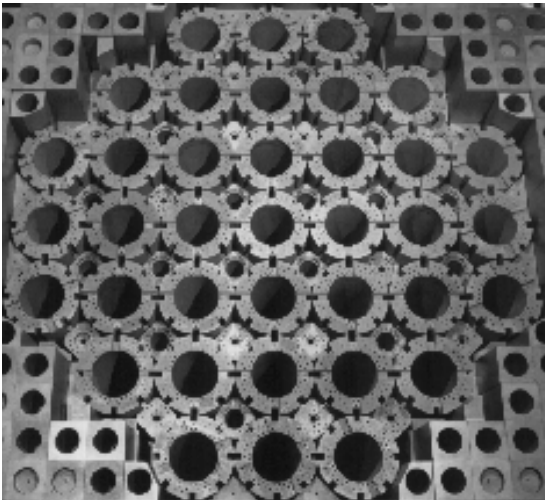
UK LLW Management Strategy

- Physical makeup of UK LLW

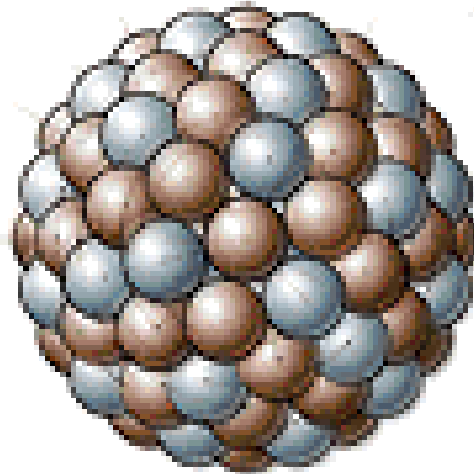


UK LLW Management Strategy

- Problem LLW types



Reactor graphite



Long-lived species



Contaminated land

UK LLW Management Strategy

• The way forward

- LLWR at Drigg requires at least 4 new vaults based on LLW arisings up to 2020 to ensure continuous disposal option until replacement LLWR commissioned
- LLWR at Drigg should be protected operationally to ensure remaining radiological capacity not achieved prior to availability of alternative LLWR
- Ensure strict application of the waste hierarchy to minimise burden on existing disposal facilities
- Develop local/in-situ disposal facilities (e.g. at Magnox sites) for low-active wastes
- Develop specific treatment and disposal routes for 'problem' waste streams
- Improve quality of inventory data and waste tracking systems to reduce uncertainty in estimates and modelling results