

The CoRWM Inventory

Loughborough

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Basis of the Baseline Inventory

- Includes all HLW, ILW and LLW that does not meet the acceptance criteria for Drigg
- Takes into account that the present and future holdings of UK plutonium, uranium and spent nuclear fuel may be managed as if they were waste.

Assumptions (1)

- HLW, ILW and LLW
 - Draft 2004 UK Radioactive Waste Inventory
 - Includes about 19,000 m³ of ILW that waste producers plan to decontaminate or decay store with the intention of disposing the waste to Drigg as LLW.
 - 12.5% increase in HLW relative to the 2001 NRI
 - 20% increase in LLW unsuitable for Drigg

Assumptions (2)

- Nuclear power reactors
 - All operating Magnox reactors are shut-down by 2010
 - AGRs operate for up to 35 years with the last shutdown in 2023
 - Sizewell 'B' PWR operates for 40 years and is shutdown in 2035
 - No new nuclear power stations are constructed

Assumptions (3)

- Spent fuel reprocessed
 - All Magnox fuel (55,000 TeU)
 - AGR fuel covered by existing contracts (5,000 TeU)
 - Oversees LWR fuel covered by existing contracts (4,500 TeU)
 - Return of overseas Pu, U and HLW with ILW and LLW substitution

Assumptions (4)

- Radioactive materials to be managed as wastes
 - All UK stockpile of plutonium (102 Te)
 - All UK stockpile of uranium (153,000 Te)
 - AGR fuel not covered by existing contracts (3,500 TeU)
 - Sizewell 'B' fuel (1,200 TeU)

Conditioning and Packaging

- Plutonium: convert to ceramic and encapsulate in glass (Nirex N/085)
- Uranium: compact as an oxide in 500litre drums or 3m³ boxes (Nirex N/085)
- Spent nuclear fuel: encapsulate in copper canisters as in Sweden

Baseline Inventory of Higher Activity Wastes

Type	Packaged volume (cubic meters)	Radioactivity (terabecquerels)
HLW	1,290	39,000,000
ILW	353,000	2,400,000
LLW (non-Drigg)	37,200	<100
Plutonium	3,270	4,000,000
Uranium	74,950	3,000
Spent nuclear fuel	8,150	33,000,000
Total	477, 860	78,000,000

Other Radioactive Wastes

Waste Stream	Packaged Volume (m3)
Waste that meets the Drigg acceptance criteria	2,480,000
Site Clean-up waste (VLLW –Sellafield only)	18,000,000
NORM/year	14,000,000 Teq

Example Affect of New Build (1)

- 10 AP 1000 reactors
- No reprocessing
- Use stocks of separated Pu and U in MOX fuel

Additions/Deletions from Baseline

Material	Volume (m3)
HLW	0
ILW	+9000
Spent Fuel	+31,900
Plutonium	-3270
Uranium	-6840

Affect of New Build (3)

- Volume increases
 - Total 8%
 - ILW 2.5%
 - Spent fuel 400%
 -
- Activity increases
 - Total 265%
 - Spent fuel 400%

Uncertainties in HLW (1,290 m³)

- Potential for increase
 - +250 Reprocess remaining AGR fuel
 - +90 Reprocess Sizewell 'B' fuel
 - +60 No substitution for overseas wastes
- Potential for decrease
 - Up to -160 Early closure of Magnox reprocessing/reactors
 - Up to -250 Early closure of THORP

Uncertainties in ILW (353,000 m³)

- Potential for increase
 - +7,000 Reprocess remaining AGR fuel
 - +2,000 Reprocess Sizewell 'B' fuel
 - +4,100 Extend AGR life by 5 years (No rep)
 - +170 Extend Sizewell life by 10 years (N rp)
 - +17,580 Early decommissioning of stations
 - +<10 Unaccounted for sealed sources
 - +9,000 10 new AP 1000 reactors

Uncertainties in ILW (353,000 m³)

- Potential for decrease
 - -8,800 Early closure of Magnox reprocessing/reactors
 - -5,000 Return of ILW from overseas fuel
 - -19,000 Decay storage/decontamination (Producers plans)
 - -4,500 Segregation of mixed ILW and LLW

Uncertainties in Pu (3,270 m³)

- Potential for increase
 - +580 Reprocess remaining AGR fuel
 - +450 Reprocess Sizewell 'B' fuel
- Potential for decrease
 - -640 Early closure of Magnox reprocessing/reactors
 - -580 Early closure of THORP
 - Up to -3,270 Use Pu in new reactors

Uncertainties in U (74,950 m³)

- Potential for increase
 - +1,660 Reprocess remaining AGR fuel
 - +550 Reprocess Sizewell 'B' fuel
- Potential for decrease
 - Up to -3,390 Early closure of Magnox reprocessing/reactors
 - Up to -1,660 Early closure of THORP
 - Up to -6,840 Use U in new reactors (up to 14,000 Te)

Uncertainties in Spent Fuel (8,150m³)

- Potential for increase
 - +840 Extend AGR life by 5 years
 - +680 Extend Sizewell 'B' life by 10 years
 - +31,900 10 AP1000 reactors
- Potential for decrease
 - -5,410 Reprocess remaining AGR fuel
 - -2,740 Reprocess Sizewell 'B' fuel

Alternative Scenarios

Scenario	Packaged Volume (m3)
Baseline	477,860
No substitution of ILW	472,920
Decontam etc of ILW	454,360
Life extensions + AP1000s	514,440
Early closure and decom	483,490