

WASTE STREAM	9B105	Deferral LLW
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SITE Bradwell

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE LLW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025	= 0		
Future arisings:	1.4.2025 - 31.3.2030	17.0		
	1.4.2030 - 31.3.2040	28.4		
	1.4.2040 - 31.3.2070	85.2		
	1.4.2070 - 31.3.2073	8.5		
Total future arisings:		139.2		
Total waste volume:		139.2		

Number of waste packages in stock: At 1.4.2025..... - packages

Comment on arising rates: Bradwell entered Deferral during 2018, however this stream only started to arise during 2019.

Additional information on quantities: Arisings are assumed at a nominal 2.84 m3 per year of deferral

Uncertainty factors on volumes: Stock (upper): x - Arisings (upper): x 1.20
Stock (lower): x - Arisings (lower): x 0.80

WASTE SOURCE Wastes from the safe store and Interim Storage Facility (ISF) during the deferral period

PHYSICAL CHARACTERISTICS

General description: Principally secondary waste arisings, including mixed plastic sheeting, wipes, and protective clothing. There will be some secondary waste arisings potentially contaminated with asbestos or drain sludge.

Changes since waste generated: -

Bulk density (t/m³): ~ 0.19

Comment on density: The density is an estimate based on 1 x bag weighing 15kg and holding 80 litres of waste.

CHEMICAL COMPOSITION

General description and components (%wt): Principally plastic and cloth (95 %wt), others (5 %wt).

Chemical state: Neutral

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	= 0	-	
Other ferrous metals.....	= 5.0	-	
Iron.....	-	-	
Aluminium.....	= 0	-	
Beryllium.....	0	-	
Cobalt.....	-	-	
Copper.....	= 0	-	
Lead.....	= 0	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....	-	-	
Titanium.....	-	-	
Uranium.....	-	-	
Zinc.....	= 0	-	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	= 0	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulotics.....	~ 25.0	-	
Paper, cotton.....	~ 24.0	-	
Wood.....	~ 1.0	-	
Halogenated plastics.....	~ 24.0	-	
Total non-halogenated plastics.....	~ 46.0	-	
Condensation polymers.....	= 0	-	
Others.....	~ 46.0	-	
Organic ion exchange materials.....	= 0	-	
Total rubber.....	= 0	-	
Halogenated rubber.....	= 0	-	
Non-halogenated rubber.....	= 0	-	
Hydrocarbons.....		-	
Oil or grease.....		-	
Fuel.....		-	
Asphalt/Tarmac (cont.coal tar).....		-	
Asphalt/Tarmac (no coal tar).....		-	
Bitumen.....		-	
Others.....		-	
Other organics.....	= 0	-	

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials.....	= 0	-	
Inorganic sludges and flocs.....	= 0	-	
Soil.....	= 0	-	
Brick/Stone/Rubble.....	= 0	-	
Cementitious material.....	= 0	-	
Sand.....	= 0	-	
Glass/Ceramics.....	= 0	-	
Graphite.....	= 0	-	
Desiccants/Catalysts.....	= 0	-	
Asbestos.....	= 0	-	
Non/low friable.....		-	
Moderately friable.....		-	
Highly friable.....		-	
Free aqueous liquids.....	= 0	-	
Free non-aqueous liquids.....	= 0	-	
Powder/Ash.....	= 0	-	

COMPONENTS OF MATERIALS, WASTE PROPERTIES, MATERIALS NOT CONTRIBUTING TO MASS

Inorganic anions (%wt):

	(%wt)	Type(s) and comment
Fluoride.....	= 0	-
Chloride.....	= 0	-
Iodide.....	= 0	-
Cyanide.....	= 0	-
Carbonate.....	= 0	-
Nitrate.....	= 0	-
Nitrite.....	= 0	-
Phosphate.....	= 0	-
Sulphate.....	= 0	-
Sulphide.....	= 0	-

Materials of interest for waste acceptance criteria:

	(%wt)	Type(s) and comment
Combustible metals.....	= 0	-
Low flash point liquids.....	= 0	-
Explosive materials.....	= 0	-
Phosphorus.....	= 0	-
Hydrides.....	= 0	-
Biological etc. materials.....	= 0	-
Biodegradable materials.....	= 0	-
Putrescible wastes.....	= 0	-
Non-putrescible wastes.....	= 0	-
Corrosive materials.....	= 0	-
Pyrophoric materials.....	= 0	-
Generating toxic gases.....	= 0	-
Reacting with water.....	= 0	-
Higher activity particles.....	= 0	-
Soluble solids as bulk chemical compounds.....	= 0	-

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Boron.....	0
Boron (in Boral).....	
Boron (non-Boral).....	

Not yet determined

Total complexing agents.....	NE
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	Number	Type(s) and comment
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EEE Type 1.....	
EEE Type 2.....	
EEE Type 3.....	
EEE Type 4.....	
EEE Type 5.....	

Planned on-site / off-site treatment(s):

Size reduction	Off-site	~ 99.0
Decay storage		
Low force compaction		
Supercompaction (HFC)		
Incineration		
Drying/dewatering/liquid separation		
Tie down/fixatives/strippable coating/painting application		
Decontamination		
Metal treatment		
Recycling / reuse		
Thermal treatment, including vitrification		
Encapsulation		
Polymer encapsulation		
Other physical treatment		
Other chemical treatment		
Containerisation	< 1.0	
Treatment not yet determined		
None		

Waste is expected to be transferred to Sizewell A Site for streaming, processing and packaging for disposal.

Dates for deferral are under review.

Plant Name	Location

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Waste Packaging:

Likely container type:	Container	Waste packaged (vol%)	Waste loading (m³)	Payload (m³)	Number of packages	Estimated start date for packaging
	1/2 Height IP-2 Disposal/Re-usable ISO (TC01/TC02)	1.0	10.0	18.3	1	-

Range in container waste loading: -

Other information on packaging and conditioning: -

Conditioned density (t/m³): -
Conditioned density comment: -**Management Routes:**

Disposal Route	Stream volume %	Raw density t/m³	Start date
Expected to be consigned to a Near Site, Near Surface Disposal Facility (Scotland)			
Expected to be Non-NSD HAW managed under Scottish Government's policy			
Expected to be disposed to LLW Vaults NRS Dounreay			
Expected to be consigned to the Geological Disposal Facility			
Expected to be consigned to a Near Surface Disposal Facility			
Expected to be consigned to the LLW Repository	< 1.0	0.19	
Expected to be consigned to a Landfill Facility			
Expected to be disposed On-Site			
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility	~ 99.0	0.19	
Expected to be consigned to a Metal Treatment Facility			
Expected to be Out of Scope			
Expected to be recycled / reused			
Disposal route not known			

Classification codes for waste expected to be consigned to a landfill facility:

Opportunities for alternative disposal routing: No

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Opportunity Confidence	Comment
-	-	-	-	-

RADIOACTIVITY

Source: Contamination of materials.

Uncertainty: Activity values are current best estimates. Specific activity is a function of site operating history. The values quoted are indicative of the activities that would be expected.

Measurement of radioactivities: The specific activities have been developed using 9B910 and 9B951 as the basis with a suitable decay period.

Chemical form of radionuclides:

H-3: Tritium present as surface contamination of waste by tritiated liquor.

C-14: Contamination in the form of graphite dust.

Cl-36: Chlorine 36 may be present as a contaminant of graphite dust.

Se-79: -

Tc-99: -

I-129: -

Ra: -

Th: -

U: -

Np: -

Pu: The chemical form of plutonium isotopes has not been determined but may be plutonium oxides.

WASTE STREAM 9B105 Deferral LLW									
Nuclide	Mean radioactivity, TBq/m³				Nuclide	Mean radioactivity, TBq/m³			
	Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code		Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code
H 3			5.03E-07	C C 2	Gd 153				8
Be 10				8	Ho 163				8
C 14			9.80E-07	C C 2	Ho 166m				8
Na 22				8	Tm 170				8
Al 26				8	Tm 171				8
Cl 36			2.78E-07	C C 2	Lu 174				8
Ar 39				8	Lu 176				8
Ar 42				8	Hf 178n				8
K 40				8	Hf 182				8
Ca 41				8	Pt 193				8
Mn 53				8	Ti 204				8
Mn 54				8	Pb 205				8
Fe 55			1.93E-06	C C 2	Pb 210				8
Co 60			3.40E-06	C C 2	Bi 208				8
Ni 59				8	Bi 210m				8
Ni 63			1.56E-06	C C 2	Po 210				8
Zn 65				8	Ra 223				8
Se 79				8	Ra 225				8
Kr 81				8	Ra 226				8
Kr 85				8	Ra 228				8
Rb 87				8	Ac 227				8
Sr 90			1.69E-05	C C 2	Th 227				8
Zr 93				8	Th 228				8
Nb 91				8	Th 229				8
Nb 92				8	Th 230				8
Nb 93m				8	Th 232				8
Nb 94			4.82E-08	C C 2	Th 234			1.46E-08	C C 2
Mo 93				8	Pa 231				8
Tc 97				8	Pa 233				8
Tc 99				8	U 232				8
Ru 106				8	U 233				8
Pd 107				8	U 234			6.71E-09	C C 2
Ag 108m			3.86E-08	C C 2	U 235				8
Ag 110m				8	U 236				8
Cd 109				8	U 238			1.46E-08	C C 2
Cd 113m				8	Np 237				8
Sn 119m				8	Pu 236				8
Sn 121m				8	Pu 238			9.39E-06	C C 2
Sn 123				8	Pu 239			1.47E-06	C C 2
Sn 126				8	Pu 240			1.92E-06	C C 2
Sb 125			2.66E-09	C C 2	Pu 241			2.43E-05	C C 2
Sb 126				8	Pu 242				8
Te 125m				8	Am 241			7.85E-06	C C 2
Te 127m				8	Am 242m				8
I 129				8	Am 243				8
Cs 134			2.25E-09	C C 2	Cm 242				8
Cs 135				8	Cm 243				8
Cs 137			2.86E-05	C C 2	Cm 244			9.54E-09	C C 2
Ba 133			2.15E-08	C C 2	Cm 245				8
La 137				8	Cm 246				8
La 138				8	Cm 248				8
Ce 144				8	Cf 249				8
Pm 145				8	Cf 250				8
Pm 147			2.35E-08	C C 2	Cf 251				8
Sm 147				8	Cf 252				8
Sm 151				8	Unsp a				
Eu 152			6.27E-08	C C 2	Unsp b/g				
Eu 154			1.47E-07	C C 2	Total a	0	*	2.07E-05	*
Eu 155			2.21E-08	C C 2	Total b/g	0	*	7.88E-05	*

Bands (Upper and Lower)

A a factor of 1.5
B a factor of 3
C a factor of 10
D a factor of 100
E a factor of 1000

Note: Bands quantify uncertainty in the mean radioactivity.

Code

1 Measured activity
2 Derived activity (best estimate)
3 Derived activity (upper limit)
4 Not present
5 Present but not significant
6 Likely to be present but not assessed
7 Present in significant quantities but not determined
8 Not expected to be present in significant quantity
* Total calculated from the 114 declared radionuclides