

WASTE STREAM	2X28	Waste disposal from Wet Inlet Facility
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SITE Sellafield

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Sellafield Ltd

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 - 31.3.2026	= 4.8		
	1.4.2026 - 31.3.2027	= 4.8		
	1.4.2027 - 31.3.2028	= 4.8		
	1.4.2028 - 31.3.2029	= 4.8		
	1.4.2029 - 31.3.2030	= 4.8		
	1.4.2030 - 31.3.2031	= 4.8		
	1.4.2031 - 31.3.2032	= 4.8		
	1.4.2032 - 31.3.2033	= 4.8		
	1.4.2033 - 31.3.2034	= 4.8		
	1.4.2034 - 31.3.2035	= 4.8		
	1.4.2035 - 31.3.2036	= 4.8		
	1.4.2036 - 31.3.2037	= 4.8		
	1.4.2037 - 31.3.2038	= 4.8		
	1.4.2038 - 31.3.2039	= 4.8		
	1.4.2039 - 31.3.2040	= 4.8		
	1.4.2040 - 31.3.2041	= 4.8		
	1.4.2041 - 31.3.2042	= 4.8		
	1.4.2042 - 31.3.2043	= 4.8		
	1.4.2043 - 31.3.2044	= 4.8		
Total future arisings:	90.6			
Total waste volume:	90.6			

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

Comment on arising rates: Arisings are based on 5 years of forecasts, with the final year extrapolated to the end of the lifetime of the waste stream.

Additional information on quantities: Uncertainty information is notional.

Uncertainty factors on volumes: Stock (upper): x - Arisings (upper): x 1.50
Stock (lower): x - Arisings (lower): x 0.50

WASTE SOURCE The waste arises as a result of routine operations and maintenance within the facility.

PHYSICAL CHARACTERISTICS

General description: The majority of waste is metallic, associated with redundant plant items.

Changes since waste generated: The waste has not undergone any change since it was generated.

Bulk density (t/m³): = 0.21

Comment on density: The total bulk density has been calculated based on the 5 year forecast and relevant waste characterisation document.

CHEMICAL COMPOSITION

General description and components (%wt): Metals (81.3%), Concrete/Rubble (1%), Wood (1%), Rubber (1%), Halogenated Plastics (6.8%), Non-Halogenated Plastics (6.8%), Hydrocarbons (0.7%), Other Organics (1%), Asbestos (0.1%) and Other (0.3%).

Chemical state: Neutral

Sheet metal proportion / thickness: Metal thickness not specified.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	= 68.1	-	
Other ferrous metals.....	= 4.5	-	
Iron.....	= 4.5	-	
Aluminium.....	= 0.91	-	
Beryllium.....		-	
Cobalt.....		-	
Copper.....	= 0.23	-	
Lead.....	= 0.45	-	
Magnox/Magnesium.....		-	
Nickel.....		-	
Titanium.....		-	
Uranium.....		-	
Zinc.....	= 0.05	-	
Zircaloy/Zirconium.....		-	
Other metals.....	= 2.6	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulotics.....	= 1.0	-	
Paper, cotton.....		-	
Wood.....	= 1.0	-	
Halogenated plastics.....	= 6.8	-	
Total non-halogenated plastics.....	= 6.8	-	
Condensation polymers.....		-	
Others.....		-	
Organic ion exchange materials.....		-	
Total rubber.....	= 1.0	-	
Halogenated rubber.....		-	
Non-halogenated rubber.....		-	
Hydrocarbons.....	= 0.68	-	
Oil or grease.....	= 0.68	-	
Fuel.....		-	
Asphalt/Tarmac (cont.coal tar).....		-	
Asphalt/Tarmac (no coal tar).....		-	
Bitumen.....		-	
Others.....		-	
Other organics.....	= 1.0	-	

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials.....		-	
Inorganic sludges and flocs.....		-	
Soil.....		-	
Brick/Stone/Rubble.....	= 1.0	-	
Cementitious material.....		-	
Sand.....		-	
Glass/Ceramics.....	= 0.23	-	
Graphite.....		-	
Desiccants/Catalysts.....		-	
Asbestos.....	= 0.14	-	
Non/low friable.....	= 0.05	-	
Moderately friable.....	= 0.05	-	
Highly friable.....	= 0.05	-	
Free aqueous liquids.....		-	
Free non-aqueous liquids.....		-	
Powder/Ash.....		-	

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

Inorganic anions (%wt):

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

Materials of interest for waste acceptance criteria:

	(%wt)	Type(s) and comment
Combustible metals.....		-
Low flash point liquids.....		-
Explosive materials.....		-
Phosphorus.....		-
Hydrides.....		-
Biological etc. materials.....		-
Biodegradable materials.....	= 1.0	-
Putrescible wastes.....		-
Non-putrescible wastes.....	= 1.0	-
Corrosive materials.....		-
Pyrophoric materials.....		-
Generating toxic gases.....		-
Reacting with water.....	= 0.95	-
Higher activity particles.....		-
Soluble solids as bulk chemical compounds.....		-

Hazardous substances / non hazardous pollutants:

	(%wt)	Type(s) and comment
Acrylamide.....		-
Benzene.....		-
Chlorinated solvents.....		-
Formaldehyde.....		-
Organometallics.....		-
Phenol.....		-
Styrene.....		-
Tri-butyl phosphate.....		-
Other organophosphates.....		-
Vinyl chloride.....		-
Arsenic.....		-
Barium.....		-
Boron.....		-
Boron (in Boral).....		-
Boron (non-Boral).....		-
Cadmium.....		-
Caesium.....		-
Selenium.....		-
Chromium.....		-
Molybdenum.....		-
Thallium.....		-
Tin.....	= 0.23	-
Vanadium.....		-
Mercury compounds.....		-
Others.....		-

Complexing agents (%wt):

Yes		
	(%wt)	Type(s) and comment
EDTA.....	< 0.01	-
DPTA.....		-
NTA.....		-
Polycarboxylic acids.....		-
Other organic complexants.....		-
Total complexing agents.....	< 0.01	-

Physical components:

	Number	Type(s) and comment
Sources.....	= 0	-
Electronic & Electrical Equipment (EEE)		-
EEE Type 1.....		50 items every 5 years
EEE Type 2.....		100 items every 5 years
EEE Type 3.....		50 items every 5 years
EEE Type 4.....		50 items every 5 years
EEE Type 5.....		30 items every 5 years

TREATMENT, PACKAGING AND DISPOSAL

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

Treatment	On-site / Off-site	Stream volume %
Size reduction	On-site	= 15.5
Decay storage		
Low force compaction	Off-site	= 77.7
Supercompaction (HFC)		
Incineration	Off-site	= 1.5
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		
Treatment not yet determined		
None		= 5.3

Comments on planned treatments:

For inventory purposes, it is assumed that supercompaction will continue after the closure of WAMAC in 2028. Incineration and metal treatment will take place off-site. Waste not requiring treatment is mostly 'out of scope' metal and non compactable LLW for direct disposal to LLWR.

Conditioning method:

-

Conditioning plants:

Plant Name	Location

Likely conditioning matrix:

-

Further information on the conditioning matrix:

-

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)	4.4	10.0	18.3	1	-
1/2 Height WAMAC IP-2 ISO (TC08)	15.5	59.3	18.8	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)	= 19.9	= 0.37	2025
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	= 77.7	= 0.14	2025
Expected to be consigned to a Landfill Facility			
Expected to be disposed On-Site	= 1.5	= 1.4	2025
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility	= 0.9	= 1.4	2025
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: The activity originates from the storage and handling of spent fuel. The waste has become contaminated during routine operations.

Uncertainty: The uncertainty associated with the fingerprinting analysis is likely to be low, however the volumes and total activity information (and possibly some other assumptions) are likely to be more notional and thus more uncertain.

Measurement of radioactivities: Specific activity data is based on data in the corresponding WCH, which in turn maps an estimated total activity to an analytically derived radionuclide fingerprint.

Chemical form of radionuclides: H-3: -
C-14: -
Cl-36: -
Se-79: -
Tc-99: -
I-129: -
Ra: -
Th: -
U: -
Np: -
Pu: -

WASTE STREAM		2X28		Waste disposal from Wet Inlet Facility						
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			=	1.58E-08	C C 2	Gd 153				
Be 10										Ho 163
C 14			=	1.09E-06	C C 2	Ho 166m				
Na 22						Tm 170				
Al 26						Tm 171				
Cl 36						Lu 174				
Ar 39						Lu 176				
Ar 42						Hf 178n				
K 40						Hf 182				
Ca 41						Pt 193				
Mn 53						Tl 204				
Mn 54						Pb 205				
Fe 55			=	1.17E-06	C C 2	Pb 210				
Co 60			=	1.24E-05	C C 2	Bi 208				
Ni 59						Bi 210m				
Ni 63			=	6.41E-06	C C 2	Po 210				
Zn 65						Ra 223				
Se 79						Ra 225				
Kr 81						Ra 226				
Kr 85						Ra 228				
Rb 87				Ac 227						
Sr 90	=	2.04E-08	C C 2	Th 227						
Zr 93				Th 228						
Nb 91				Th 229						
Nb 92				Th 230						
Nb 93m				Th 232						
Nb 94				Th 234						
Mo 93				Pa 231						
Tc 97				Pa 233						
Tc 99	=	4.82E-10	C C 2	U 232						
Ru 106				U 233						
Pd 107				U 234						
Ag 108m				U 235						
Ag 110m				U 236						
Cd 109				U 238						
Cd 113m				Np 237						
Sn 119m				Pu 236						
Sn 121m				Pu 238						
Sn 123				Pu 239						
Sn 126				Pu 240						
Sb 125	=	1.58E-08	C C 2	Pu 241						
Sb 126				Pu 242						
Te 125m				Am 241						
Te 127m				Am 242m						
I 129				Am 243						
Cs 134				Cm 242						
Cs 135				Cm 243						
Cs 137	=	1.48E-06	C C 2	Cm 244						
Ba 133				Cm 245						
La 137				Cm 246						
La 138				Cm 248						
Ce 144				Cf 249						
Pm 145				Cf 250						
Pm 147				Cf 251						
Sm 147				Cf 252						
Sm 151				Unsp a						
Eu 152				Unsp b/g						
Eu 154				Total a						
Eu 155				Total b/g						
					0	*	1.64E-08	*		
					0	*	2.26E-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