

WASTE STREAM	2X05/1	SEP Surface Drainage System Solids and Lagoon Sediment LLW
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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	= 5.2		
	1.4.2026 - 31.3.2027	= 5.2		
	1.4.2027 - 31.3.2028	= 5.2		
	1.4.2028 - 31.3.2029	= 5.2		
	1.4.2029 - 31.3.2030	= 5.2		
	1.4.2030 - 31.3.2031	= 5.2		
	1.4.2031 - 31.3.2032	= 5.2		
	1.4.2032 - 31.3.2033	= 5.2		
	1.4.2033 - 31.3.2034	= 5.2		
	1.4.2034 - 31.3.2035	= 5.2		
	1.4.2035 - 31.3.2036	= 5.2		
	1.4.2036 - 31.3.2037	= 5.2		
	1.4.2037 - 31.3.2038	= 5.2		
	1.4.2038 - 31.3.2039	= 5.2		
	1.4.2039 - 31.3.2040	= 5.2		
	1.4.2040 - 31.3.2041	= 5.2		
	1.4.2041 - 31.3.2042	= 5.2		
	1.4.2042 - 31.3.2043	= 5.2		
	1.4.2043 - 31.3.2044	= 5.2		
	1.4.2044 - 31.3.2045	= 5.2		
	1.4.2045 - 31.3.2046	= 5.2		
	1.4.2046 - 31.3.2047	= 5.2		
	1.4.2047 - 31.3.2048	= 5.2		
	1.4.2048 - 31.3.2049	= 5.2		
	1.4.2049 - 31.3.2050	= 5.2		
	1.4.2050 - 31.3.2051	= 5.2		
	1.4.2051 - 31.3.2052	= 5.2		
	1.4.2052 - 31.3.2053	= 5.2		
	1.4.2053 - 31.3.2054	= 5.2		
	1.4.2054 - 31.3.2055	= 5.2		
	1.4.2055 - 31.3.2056	= 5.2		
	1.4.2056 - 31.3.2057	= 5.2		
	1.4.2057 - 31.3.2058	= 5.2		
	1.4.2058 - 31.3.2059	= 5.2		
	1.4.2059 - 31.3.2060	= 5.2		
	1.4.2060 - 31.3.2061	= 5.2		
	1.4.2061 - 31.3.2062	= 5.2		
	1.4.2062 - 31.3.2063	= 5.2		
	1.4.2063 - 31.3.2064	= 5.2		
	1.4.2064 - 31.3.2065	= 5.2		
	1.4.2065 - 31.3.2066	= 5.2		
	1.4.2066 - 31.3.2067	= 5.2		
	1.4.2067 - 31.3.2068	= 5.2		
	1.4.2068 - 31.3.2069	= 5.2		
	1.4.2069 - 31.3.2070	= 5.2		
	1.4.2070 - 31.3.2071	= 5.2		
	1.4.2071 - 31.3.2072	= 5.2		
	1.4.2072 - 31.3.2073	= 5.2		
	1.4.2073 - 31.3.2074	= 5.2		
	1.4.2074 - 31.3.2075	= 5.2		
	1.4.2075 - 31.3.2076	= 5.2		
	1.4.2076 - 31.3.2077	= 5.2		
	1.4.2077 - 31.3.2078	= 5.2		
	1.4.2078 - 31.3.2079	= 5.2		
	1.4.2079 - 31.3.2080	= 5.2		
	1.4.2080 - 31.3.2081	= 5.2		
	1.4.2081 - 31.3.2082	= 5.2		
	1.4.2082 - 31.3.2083	= 5.2		
	1.4.2083 - 31.3.2084	= 5.2		
	1.4.2084 - 31.3.2085	= 5.2		
	1.4.2085 - 31.3.2086	= 5.2		
	1.4.2086 - 31.3.2087	= 5.2		
	1.4.2087 - 31.3.2088	= 5.2		
	1.4.2088 - 31.3.2089	= 5.2		
	1.4.2089 - 31.3.2090	= 5.2		
	1.4.2090 - 31.3.2091	= 5.2		
	1.4.2091 - 31.3.2092	= 5.2		

1.4.2092 - 31.3.2093	= 5.2		
1.4.2093 - 31.3.2094	= 5.2		
1.4.2094 - 31.3.2095	= 5.2		
1.4.2095 - 31.3.2096	= 5.2		
1.4.2096 - 31.3.2097	= 5.2		

Total future arisings: **373.4**
Total waste volume: **373.4**

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 Waste arises from cleanup and maintenance operations associated with the Separation Area Lagoon.

PHYSICAL CHARACTERISTICS

General description: The majority of waste generated will be silt, metal and concrete along with smaller quantities of other waste.

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

Bulk density (t/m³): = 1.3

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 (29.9%), Concrete/Rubble (22%), Soil (2%), Wood (1%), Rubber (1%), Halogenated Plastics (8.9%), Non-Halogenated Plastics (8.9%), Hydrocarbons (2.2%), Other Organics (22.5%), Asbestos (1.1%) and Other (0.5%).

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.....	= 2.2	-	
Other ferrous metals.....	= 13.4	-	
Iron.....	= 6.7	-	
Aluminium.....	= 2.2	-	
Beryllium.....		-	
Cobalt.....		-	
Copper.....	= 2.2	-	
Lead.....	= 0.45	-	
Magnox/Magnesium.....		-	
Nickel.....		-	
Titanium.....		-	
Uranium.....		-	
Zinc.....	= 0.18	-	
Zircaloy/Zirconium.....		-	
Other metals.....	= 2.6	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	= 1.0	-	
Paper, cotton.....		-	
Wood.....	= 1.0	-	
Halogenated plastics.....	= 8.9	-	
Total non-halogenated plastics.....	= 8.9	-	
Condensation polymers.....		-	
Others.....		-	
Organic ion exchange materials.....		-	
Total rubber.....	= 1.0	-	
Halogenated rubber.....		-	
Non-halogenated rubber.....		-	
Hydrocarbons.....	= 2.2	-	
Oil or grease.....		-	
Fuel.....		-	
Asphalt/Tarmac (cont.coal tar).....	= 1.1	-	
Asphalt/Tarmac (no coal tar).....	= 1.1	-	
Bitumen.....		-	
Others.....		-	
Other organics.....	= 22.5	-	

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials.....		-	
Inorganic sludges and flocs.....		-	
Soil.....	= 2.0	-	
Brick/Stone/Rubble.....	= 22.0	-	
Cementitious material.....		-	
Sand.....		-	
Glass/Ceramics.....	= 0.45	-	
Graphite.....		-	
Desiccants/Catalysts.....		-	
Asbestos.....	= 1.1	-	
Non/low friable.....	= 0.45	-	
Moderately friable.....	= 0.45	-	
Highly friable.....	= 0.22	-	
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.....	= 23.0	-
Putrescible wastes.....	= 22.0	-
Non-putrescible wastes.....	= 1.0	-
Corrosive materials.....		-
Pyrophoric materials.....		-
Generating toxic gases.....		-
Reacting with water.....	= 2.4	-
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.....	-	-
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.....	50 items every 5 years.	-
EEE Type 3.....	30 items every 5 years.	-
EEE Type 4.....	30 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 Off-site	= 5.5 = 9.8
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		= 84.7
Other physical treatment		
Other chemical treatment		
Containerisation		
Treatment not yet determined		
None		

Comments on planned treatments:

For inventory purposes, it is assumed that super-compaction will continue after 2028. Incineration will take place off site. Waste not requiring treatment is VLLW 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)	7.5	10.0	18.3	3	-
	1/2 Height WAMAC IP-2 ISO (TC08)	5.5	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)			
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	= 13.1	= 0.75	2025
Expected to be consigned to a Landfill Facility	= 63.2	= 1.5	2025
Expected to be disposed On-Site	= 13.9	= 1.5	2025
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility	= 9.8	= 0.13	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: 17 01 01, 20 02 01, 17 03 01*, 17 05 03*, 17 05 04, 17 09 04, 17 09 03*

Opportunities for alternative disposal routing: No

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

RADIOACTIVITY

Source: The activity arises from the contamination associated with the treatment of effluents/liquors on the Sellafield site.

Uncertainty: The uncertainty associated with the derived fingerprint is likely to be relatively 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 a 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		2X05/1		SEP Surface Drainage System Solids and Lagoon Sediment 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			=	2.82E-07	C C 2	Gd 153														
Be 10																				
C 14													=	1.69E-07	C C 2	Ho 163				
Na 22																				
Al 26																				Tm 170
Cl 36																				Tm 171
Ar 39																				Lu 174
Ar 42																				Lu 176
K 40																				Hf 178n
Ca 41																				Hf 182
Mn 53																				Pt 193
Mn 54																				Tl 204
Fe 55																				Pb 205
Co 60																				Pb 210
Ni 59																				Bi 208
Ni 63																				Bi 210m
Zn 65																				Po 210
Se 79																				Ra 223
Kr 81																				Ra 225
Kr 85																				Ra 226
Rb 87	Ra 228																			
Sr 90	Ac 227																			
Zr 93	=	2.96E-04	C C 2	Th 227																
Nb 91																				
Nb 92								Th 228												
Nb 93m								Th 229												
Nb 94								Th 230												
Mo 93								Th 232												
Tc 97								Th 234												
Tc 99								Pa 231												
Ru 106								Pa 233												
Pd 107								U 232												
Ag 108m								U 233												
Ag 110m								U 234												
Cd 109								U 235												
Cd 113m								U 236												
Sn 119m								U 238												
Sn 121m								Np 237												
Sn 123								Pu 236												
Sn 126								Pu 238												
Sb 125								Pu 239												
Sb 126								Pu 240												
Te 125m								Pu 241												
Te 127m	Pu 242																			
I 129	Am 241																			
Cs 134	Am 242m																			
Cs 135	Am 243																			
Cs 137	Cm 242																			
Ba 133	Cm 243																			
La 137	Cm 244																			
La 138	Cm 245																			
Ce 144	Cm 246																			
Pm 145	Cm 248																			
Pm 147	Cf 249																			
Sm 147	Cf 250																			
Sm 151	Cf 251																			
Eu 152	Cf 252																			
Eu 154	Unsp a																			
Eu 155	Unsp b/g																			
	Total a	0	*	3.48E-05	*															
	Total b/g	0	*	5.29E-04	*															

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