

WASTE STREAM	5C323	LETP Land Remediation VLLW and LA-LLW
--------------	-------	---------------------------------------

SITE Harwell

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE VLLW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025	= 136.6		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		136.6		

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

Comment on arising rates: VLLW and LA-LLW soil and rubble arising from LETP Land remediation

Additional information on quantities: Volumes updated for 2016 RWI to reflect SMART Inventory Review. This waste was originally part of 5C300 but this has been split to provide greater clarity

Uncertainty factors on volumes: Stock (upper): x 1.10 Arisings (upper): x -
Stock (lower): x 0.90 Arisings (lower): x -

WASTE SOURCE -

PHYSICAL CHARACTERISTICS

General description: Predominantly soil. There should be no large items in this waste stream.

Changes since waste generated: Land and buildings on the Harwell site, contaminated as a result of past operations.

Bulk density (t/m³): ~ 1.4

Comment on density: Average density for soil.

CHEMICAL COMPOSITION

General description and components (%wt): Soil ~82%; concrete/rubble, ~15%, plastics ~1%, metal ~1%, Others ~1%

Chemical state: -

Sheet metal proportion / thickness: There should be no sheet metal or bulk metal items present in the waste stream.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	NE	-	
Other ferrous metals.....	TR	Rebar and small pipework	
Iron.....	-	-	
Aluminium.....	NE	-	
Beryllium.....	NE	-	
Cobalt.....	-	-	
Copper.....	NE	-	
Lead.....	TR	Within the tarmac and bitumen	
Magnox/Magnesium.....	NE	-	
Nickel.....	-	-	
Titanium.....	-	-	
Uranium.....	NE	-	
Zinc.....	TR	Within the tarmac and bitumen	
Zircaloy/Zirconium.....	NE	-	
Other metals.....	~ 1.0	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	NE	-	
Paper, cotton.....	NE	-	
Wood.....	NE	-	
Halogenated plastics.....	~ 1.0	Plastic PPE for incineration route	
Total non-halogenated plastics.....	NE	-	
Condensation polymers.....	NE	-	
Others.....	NE	-	
Organic ion exchange materials.....	NE	-	
Total rubber.....	NE	-	
Halogenated rubber.....	NE	-	
Non-halogenated rubber.....	NE	-	
Hydrocarbons.....		-	
Oil or grease.....		-	
Fuel.....		-	
Asphalt/Tarmac (cont.coal tar).....		-	
Asphalt/Tarmac (no coal tar).....	TR	Road covering (solid)	
Bitumen.....	TR	Solid bituminous paint and tank liner material	
Others.....		-	
Other organics.....	NE	-	

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials.....	NE	-	
Inorganic sludges and flocs.....	NE	-	
Soil.....	~ 82.0	-	
Brick/Stone/Rubble.....	~ 15.0	-	
Cementitious material.....		-	
Sand.....		-	
Glass/Ceramics.....	NE	-	
Graphite.....	NE	-	
Desiccants/Catalysts.....		-	
Asbestos.....	TR	-	
Non/low friable.....	TR	Mixed asbestos: amosite, chrysotile within cemented materials. Trace asbestos was discovered across the site (<0.1-0.2%). Most of the asbestos will be disposed via Out Of Scope hazardous waste routes. However, it's recognised that small amounts (<500kg) may be disposed within VLLW/LA-LLW consignments.	
Moderately friable.....		-	
Highly friable.....		-	
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.....	NE	-
Chloride.....	NE	-
Iodide.....	NE	-
Cyanide.....	NE	-
Carbonate.....	NE	-
Nitrate.....	NE	-
Nitrite.....	NE	-
Phosphate.....	NE	-
Sulphate.....	NE	-
Sulphide.....	NE	-

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.....	0	-
Putrescible wastes.....		-
Non-putrescible wastes.....		-
Corrosive materials.....		-
Pyrophoric materials.....		-
Generating toxic gases.....		-
Reacting with water.....		-
Higher activity particles.....		-
Soluble solids as bulk chemical compounds.....		-

—

Boro

No

Total

11

1

DISPOSAL

114

Inc

It is in

therefore no waste containers will be produced.

—

11/11/2019

11/11/2019

—

—

Waste Packaging:

Likely container type:	Container	Waste packaged (vol%)	Waste loading (m³)	Payload (m³)	Number of packages	Estimated start date for packaging
	-	-	-	-	-	-

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			
Expected to be consigned to a Landfill Facility	= 99.9	1.4	
Expected to be disposed On-Site			
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility	= 0.1	0.40	
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 05 03*, 17 05 04, 17 01 01

Opportunities for alternative disposal routing: No

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

RADIOACTIVITY

Source: Contamination as a result of past operations.

Uncertainty: -

Measurement of radioactivities: -

Chemical form of radionuclides:

H-3: -

C-14: -

Cl-36: -

Se-79: -

Tc-99: -

I-129: -

Ra: -

Th: -

U: -

Np: -

Pu: -

WASTE STREAM 5C323 LETP Land Remediation VLLW and LA-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	1.32E-08	C C 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	1.61E-09	C C 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36		8			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	1.54E-09	C C 2			Pb 210		8		
Co 60		8			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	4.88E-09	C C 2			Po 210		8		
Zn 65		8			Ra 223		8		
Se 79		8			Ra 225		8		
Kr 81		8			Ra 226	1.77E-09	C C 2		
Kr 85		8			Ra 228		8		
Rb 87		8			Ac 227		8		
Sr 90	1.61E-08	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		8			Th 234	1.36E-09	C C 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233		8		
Tc 99	1.29E-09	C C 2			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234		8		
Ag 108m		8			U 235		8		
Ag 110m		8			U 236		8		
Cd 109		8			U 238	1.36E-09	C C 2		
Cd 113m		8			Np 237		8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	1.78E-09	C C 2		
Sn 123		8			Pu 239	5.72E-09	C C 2		
Sn 126		8			Pu 240	5.72E-09	C C 2		
Sb 125		8			Pu 241	4.95E-09	C C 2		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241	5.24E-09	C C 2		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134		8			Cm 242		8		
Cs 135		8			Cm 243		8		
Cs 137	3.92E-08	C C 2			Cm 244		8		
Ba 133		8			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		8			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151		8			Unsp a				
Eu 152		8			Unsp b/g				
Eu 154		8			Total a	2.16E-08	*	0	*
Eu 155		8			Total b/g	8.41E-08	*	0	*

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