

<b>WASTE STREAM</b>	<b>9H929</b>	<b>Incinerator Building - LLW</b>
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**SITE** Wylfa  
**SITE OWNER** Nuclear Decommissioning Authority  
**WASTE CUSTODIAN** Magnox Limited  
**WASTE TYPE** LLW  
 Is the waste subject to Scottish Policy: No

**WASTE VOLUMES**

		Reported
Stocks:	At 1.4.2022.....	0 m <sup>3</sup>
Future arisings -	1.4.2024 - 31.3.2026.....	36.9 m <sup>3</sup>
Total future arisings:		36.9 m <sup>3</sup>
Total waste volume:		36.9 m <sup>3</sup>

Comment on volumes: -  
 Uncertainty factors on volumes:  
 Stock (upper): x Arisings (upper) x 1.3  
 Stock (lower): x Arisings (lower) x 0.7

**WASTE SOURCE** -

**PHYSICAL CHARACTERISTICS**

General description: -  
 Physical components (%vol): Metal (96% vol), plastic (1% vol), glass (2% vol) and miscellaneous materials (1% vol). Types of metal have not yet been identified.  
 Sealed sources: The waste does not contain sealed sources.  
 Bulk density (t/m<sup>3</sup>): 1.4  
 Comment on density: Bulk density is based on that used in the 2015 WIF.

**CHEMICAL COMPOSITION**

General description and components (%wt): -  
 Chemical state: -  
 Chemical form of radionuclides:  
 H-3: The chemical form of tritium has not been determined.  
 C-14: The chemical form of carbon-14 has not been determined.  
 Cl-36: Chemical form of chlorine 36 has not been determined.  
 Se-79: The chemical form of selenium-79 has not been determined.  
 Tc-99: The chemical form of technetium-99 has not been determined.  
 Ra: The chemical form of radium isotopes have not been determined.  
 Th: The chemical form of thorium isotopes have not been determined.  
 U: The chemical form of uranium isotopes have not been determined.  
 Np: The chemical form of neptunium isotopes have not been determined.  
 Pu: The chemical form of plutonium isotopes have not been determined.  
 Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	0		
Other ferrous metals.....	96.0		
Iron.....			
Aluminium.....	0		
Beryllium.....	0		
Cobalt.....			
Copper.....	0		
Lead.....	0		

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Magnox/Magnesium..... 0  
 Nickel.....  
 Titanium.....  
 Uranium..... 0  
 Zinc..... 0  
 Zircaloy/Zirconium..... 0  
 Other metals..... 0

Organics (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	0		
Paper, cotton.....	0		
Wood.....	0		
Halogenated plastics .....	1.0		
Total non-halogenated plastics.....	0		
Condensation polymers.....	0		
Others.....	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.....	1.0		

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.....			
Glass/Ceramics.....	2.0		
Graphite.....	0		
Desiccants/Catalysts.....			
Asbestos.....	0		
Non/low friable.....			

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Moderately friable.....

Highly friable.....

Free aqueous liquids..... 0

Free non-aqueous liquids..... 0

Powder/Ash..... 0

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.....

Corrosive materials..... 0

Pyrophoric materials..... 0

Generating toxic gases..... 0

Reacting with water..... 0

Higher activity particles.....

Soluble solids as bulk chemical

compounds.....

Hazardous substances / non hazardous pollutants: -

(%wt) Type(s) and comment

Acrylamide.....

Benzene.....

Chlorinated solvents.....

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Formaldehyde.....  
 Organometallics.....  
 Phenol.....  
 Styrene.....  
 Tri-butyl phosphate.....  
 Other organophosphates.....  
 Vinyl chloride.....  
 Arsenic.....  
 Barium.....  
 Boron..... 0  
     Boron (in Boral).....  
     Boron (non-Boral).....  
 Cadmium.....  
 Caesium.....  
 Selenium.....  
 Chromium.....  
 Molybdenum.....  
 Thallium.....  
 Tin.....  
 Vanadium.....  
 Mercury compounds.....  
 Others.....  
 Electronic Electrical Equipment (EEE)  
     EEE Type 1.....  
     EEE Type 2.....  
     EEE Type 3.....  
     EEE Type 4.....  
     EEE Type 5.....

Complexing agents (%wt):      No

(%wt)      Type(s) and comment

EDTA.....  
 DPTA.....  
 NTA.....  
 Polycarboxylic acids.....  
 Other organic complexants.....  
 Total complexing agents..... 0

Potential for the waste to contain discrete items:      No. In & of itself not a DI; waste stream may include DIs (notably any stainless steel components)

**TREATMENT, PACKAGING AND DISPOSAL**

**WASTE STREAM 9H929 Incinerator Building - LLW**

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

Treatment	On-site / Off site	Stream volume %
Low force compaction		
Supercompaction (HFC)		
Incineration		
Solidification		
Decontamination		
Metal treatment		96.0
Size reduction		
Decay storage		
Recycling / reuse		
Other / various		
None		4.0

Comment on planned treatments:

-

**Disposal Routes:**

Disposal Route	Stream volume %	Disposal density t/m3
Expected to be consigned to the LLW Repository	4.0	1.4
Expected to be consigned to a Landfill Facility		
Expected to be consigned to an On-Site Disposal Facility		
Expected to be consigned to an Incineration Facility		
Expected to be consigned to a Metal Treatment Facility	96.0	1.4
Expected to be consigned as Out of Scope		
Expected to be recycled / reused		
Disposal route not known		

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

-

**Upcoming (2022/23-2024/25) Waste Routing (if expected to change from above):**

Disposal Route	Stream volume %		
	2022/23	2023/24	2024/25
Expected to be consigned to the LLW Repository			
Expected to be consigned to a Landfill Facility			
Expected to be consigned to an On-Site Disposal Facility			
Expected to be consigned to an Incineration Facility			
Expected to be consigned to a Metal Treatment Facility			
Expected to be consigned as Out of Scope			
Expected to be recycled / reused			
Disposal route not known			

**Opportunities for alternative disposal routing:**

-

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Estimated Date that Opportunity will be realised	Opportunity Confidence	Comment
-	-	-	-	-	-

**Waste Packaging for Disposal:**

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Container	Stream volume %	Waste loading m <sup>3</sup>	Number of packages
1/3 Height IP-1 ISO 2/3 Height IP-2 ISO 1/2 Height WAMAC IP-2 ISO 1/2 Height IP-2 Disposal/Re-usable ISO 2m box (no shielding) 4m box (no shielding) Other	4.0	10	< 1

Other information: -

**Waste Planned for Disposal at the LLW Repository:**

Container voidage: -

Waste Characterisation Form (WCH): -

Waste consigned for disposal to LLWR in year of generation: -

**Non-Containerised Waste for In-Vault Grouting:** (Not applicable to this waste stream)

Stream volume (%): -

Waste stream variation: -

Bounding cuboidal volume:

Inaccessible voidage: -

Other information: -

**RADIOACTIVITY**

Source: -

Uncertainty: -

Definition of total alpha and total beta/gamma: Where totals are shown on the table of radionuclide activities they are the sums of the listed alpha or beta/gamma emitting radionuclides plus 'other alpha' or 'other beta/gamma'.

Measurement of radioactivities: Activity profile is based on 9H13 as this is the source of the contamination, decayed by eight years to the time of first arising (01/04/2024) and then reduced by 90%

Other information: -

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Nuclide	Mean radioactivity, TBq/m <sup>3</sup>				Nuclide	Mean radioactivity, TBq/m <sup>3</sup>			
	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3				8	Gd 153				8
Be 10				8	Ho 163				8
C 14			7.28E-06	CC 2	Ho 166m				8
Na 22				8	Tm 170				8
Al 26				8	Tm 171				8
Cl 36			2.46E-06	CC 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	Tl 204				8
Mn 54				8	Pb 205				8
Fe 55			3.08E-05	CC 2	Pb 210				8
Co 60			8.15E-06	CC 2	Bi 208				8
Ni 59				8	Bi 210m				8
Ni 63			5.65E-06	CC 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			2.21E-06	CC 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			4.11E-08	CC 2	Th 234				8
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				8
Ag 108m			4.72E-08	CC 2	U 235				8
Ag 110m				8	U 236				8
Cd 109				8	U 238				8
Cd 113m				8	Np 237				8
Sn 119m				8	Pu 236				8
Sn 121m				8	Pu 238		1.19E-07	CC 2	
Sn 123				8	Pu 239		1.17E-07	CC 2	
Sn 126				8	Pu 240		1.53E-07	CC 2	
Sb 125			9.8E-09	CC 2	Pu 241		9.41E-06	CC 2	
Sb 126				8	Pu 242			8	
Te 125m			2.46E-09	CC 2	Am 241		4.24E-07	CC 2	
Te 127m				8	Am 242m			8	
I 129				8	Am 243			8	
Cs 134			2E-08	CC 2	Cm 242			8	
Cs 135				8	Cm 243			8	
Cs 137			9.97E-06	CC 2	Cm 244		8.47E-09	CC 2	
Ba 133			2.65E-08	CC 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			6.77E-07	CC 2	Cf 251			8	
Sm 147				8	Cf 252			8	
Sm 151				8	Other a				
Eu 152			6.83E-08	CC 2	Other b/g				
Eu 154			1.01E-07	CC 2	<b>Total a</b>	<b>0</b>	<b>8.21E-07</b>	<b>CC 2</b>	
Eu 155			3.7E-08	CC 2	<b>Total b/g</b>	<b>0</b>	<b>7.70E-05</b>	<b>CC 2</b>	

**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 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