

WASTE STREAM	9C915	LLAW Plant
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SITE Dungeness A
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 ³
Future arisings -	1.4.2025 - 31.3.2026.....	196.4 m ³
Total future arisings:		196.4 m ³
Total waste volume:		196.4 m ³
Comment on volumes:	-	
Uncertainty factors on volumes:	Stock (upper): x	Arisings (upper) x 1.2
	Stock (lower): x	Arisings (lower) x 0.8

WASTE SOURCE Concrete wastes from dismantling building. Glass, wood, metals and plastics.

PHYSICAL CHARACTERISTICS

General description: A wide variety of concrete and reinforced concrete items.
 Physical components (%vol): -
 Sealed sources: The waste does not contain sealed sources.
 Bulk density (t/m³): 1.4
 Comment on density: Density updated in line with WIF assumptions

CHEMICAL COMPOSITION

General description and components (%wt): Concrete (30%) some of the concrete may include iron shot. Glass (5%), wood (5%) metals (50%) and plastics (10%) (percentages of constituents very uncertain)
 Chemical state: Alkali
 Chemical form of radionuclides: -
 Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....			
Other ferrous metals.....	~50.0		
Iron.....			
Aluminium.....			
Beryllium.....			
Cobalt.....			
Copper.....			
Lead.....			
Magnox/Magnesium.....			
Nickel.....			
Titanium.....			
Uranium.....			
Zinc.....			

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Zircaloy/Zirconium.....

Other metals.....

Organics (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	5.0		
Paper, cotton.....			
Wood.....	~5.0		
Halogenated plastics			
Total non-halogenated plastics.....	10.0		
Condensation polymers.....			
Others.....	~10.0		
Organic ion exchange materials....			
Total rubber.....	0		
Halogenated rubber			
Non-halogenated rubber.....			
Hydrocarbons.....			
Oil or grease			
Fuel.....			
Asphalt/Tarmac (cont.coal tar)...			
Asphalt/Tarmac (no coal tar)....			
Bitumen.....			
Others.....			
Other organics.....			

Other materials (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..			
Inorganic sludges and flocs.....			
Soil.....			
Brick/Stone/Rubble.....			
Cementitious material.....	~30.0		
Sand.....			
Glass/Ceramics.....	~5.0		
Graphite.....			
Desiccants/Catalysts.....			
Asbestos.....	0		
Non/low friable.....			
Moderately friable.....			
Highly friable.....			
Free aqueous liquids.....			
Free non-aqueous liquids.....			
Powder/Ash.....			

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

0

Hazardous substances / non hazardous pollutants: None expected

(%wt) Type(s) and comment

- Acrylamide.....
- Benzene.....
- Chlorinated solvents.....
- Formaldehyde.....
- Organometallics.....
- Phenol.....
- Styrene.....
- Tri-butyl phosphate.....

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- 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):

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

Potential for the waste to contain discrete items:

Not yet determined. Large Concrete Items (LCIs) may be DIs; drummed (ungouted)/"rubbleised" wastes assumed NOT DIs. Large Metal Items (LMIs)/"substantial" thickness items considered "durable" assumed DIs; Stainless items assumed DIs. Although n/a as DI concept applies only to Disposal at LLWR; by definition LLWR will not accept VLLW materials and 100% of this stream is expected to be disposed via VLLW disposal routes.

TREATMENT, PACKAGING AND DISPOSAL

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

Treatment	On-site / Off site	Stream volume %
Low force compaction Supercompaction (HFC) Incineration Solidification Decontamination Metal treatment Size reduction Decay storage Recycling / reuse Other / various None		100.0

Comment on planned treatments:

It is expected that 100% of this waste stream will be sent for VLLW disposal

Disposal Routes:

Disposal Route	Stream volume %	Disposal density t/m3
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	100.0	1.4

Classification codes for waste expected to be consigned to a landfill facility: 17 04 05, 17 01 01, 17 02 01, 17 02 03

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: (Not applicable to this waste stream)

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Container	Stream volume %	Waste loading m ³	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			

Other information: -

Waste Planned for Disposal at the LLW Repository: (Not applicable to this waste stream)

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: The radionuclide fingerprint for this waste stream has been updated using an engineering assessment based on 2% of the total activity from waste streams 9C911 and 9C912.

Other information: -

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Nuclide	Mean radioactivity, TBq/m ³				Nuclide	Mean radioactivity, TBq/m ³			
	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			1.89E-06	CC 2	Gd 153				8
Be 10				8	Ho 163				8
C 14			8.2E-07	CC 2	Ho 166m				8
Na 22				8	Tm 170				8
Al 26				8	Tm 171				8
Cl 36			2.54E-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			1.88E-06	CC 2	Pb 210				8
Co 60			1E-06	CC 2	Bi 208				8
Ni 59				8	Bi 210m				8
Ni 63			1.59E-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			1.09E-05	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			2.85E-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			9.82E-09	CC 2	U 233				8
Pd 107				8	U 234		3.21E-09	CC 2	8
Ag 108m			6.76E-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		3.62E-08	CC 2	8
Sn 123				8	Pu 239		3.31E-08	CC 2	8
Sn 126			6.1E-09	CC 2	Pu 240		3.36E-08	CC 2	8
Sb 125			3.54E-08	CC 2	Pu 241		2.25E-06	CC 2	8
Sb 126				8	Pu 242				8
Te 125m			8.88E-09	CC 2	Am 241		9.49E-08	CC 2	8
Te 127m				8	Am 242m		1.19E-07	CC 2	8
I 129				8	Am 243				8
Cs 134			1.87E-08	CC 2	Cm 242		9.77E-08	CC 2	8
Cs 135				8	Cm 243				8
Cs 137			2.47E-05	CC 2	Cm 244		7.84E-09	CC 2	8
Ba 133			2.71E-08	CC 2	Cm 245				8
La 137				8	Cm 246				8
La 138				8	Cm 248				8
Ce 144			1.47E-09	CC 2	Cf 249				8
Pm 145				8	Cf 250				8
Pm 147			1.89E-07	CC 2	Cf 251				8
Sm 147				8	Cf 252				8
Sm 151			2.1E-09	CC 2	Other a				8
Eu 152			1.09E-07	CC 2	Other b/g				8
Eu 154			1.76E-07	CC 2	Total a	0	3.07E-07	CC 2	8
Eu 155			7.55E-08	CC 2	Total b/g	0	4.84E-05	CC 2	8

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