

WASTE STREAM	9D921	Sludge Canning Building Plant Items
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SITE Hinkley Point A

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Magnox Limited

WASTE TYPE ILW

Is the waste subject to Scottish Policy: No

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2022.....	0 m ³
Future arisings -	1.4.2025 - 31.3.2027.....	6.2 m ³
Total future arisings:		6.2 m ³
Total waste volume:		6.2 m ³

Comment on volumes: -

Uncertainty factors on volumes:	Stock (upper): x	Arisings (upper) x 1.2
	Stock (lower): x	Arisings (lower) x 0.9

WASTE SOURCE The waste will consist of solid waste generated from the de-planting of the Sludge Canning Building that cannot be decontaminated down to LLW levels. Principally, this waste contains the Lamella Thickener, Sludge Canning Cell Drain and Sludge Canning Unit Metering Pump.

PHYSICAL CHARACTERISTICS

General description: The three principal items are: the Lamella Thickener (388 kg), Sludge Canning Cell Drain (8.5 kg per m) and Sludge Canning Unit Metering Pump (60 kg).

Physical components (%wt): Lamella Thickener (388 kg), Sludge Canning Cell Drain (8.5 kg per m) and Sludge Canning Unit Metering Pump (60 kg). Principally ferrous metals (~95%) and stainless steel (~5%).

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): ~1

Comment on density: The assumption of the bulk density at 1 t/m³ may be subject to revision

CHEMICAL COMPOSITION

General description and components (%wt): Principally ferrous metals (~95%) and stainless steel (~5%).

Chemical state: Neutral

Chemical form of radionuclides: Cl-36: The chlorine 36 content is insignificant.

Metals and alloys (%wt): The Sludge Canning Cell Drain is stainless steel (~3mm thick) with a mass of 8.5 kg per m. The Lamella Thickener (388 kg) is a large box with stainless steel ~6mm thick. The Sludge Canning Unit Metering Pump (60 kg) is a large item.

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	~5.0	Not yet determined.	
Other ferrous metals.....	~95.0	Not yet determined.	
Iron.....			
Aluminium.....	NE		
Beryllium.....	0		
Cobalt.....			
Copper.....	NE		
Lead.....	NE		
Magnox/Magnesium.....	0		

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Nickel.....

Titanium.....

Uranium..... NE

Zinc..... NE

Zircaloy/Zirconium..... NE

Other metals..... NE

Organics (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	0		
Paper, cotton.....	0		
Wood.....	0		
Halogenated plastics	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.....	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.....	0		
Graphite.....	0		
Desiccants/Catalysts.....			
Asbestos.....	0		
Non/low friable.....			
Moderately friable.....			

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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: None expected

(%wt) Type(s) and comment

Acrylamide.....

Benzene.....

Chlorinated solvents.....

Formaldehyde.....

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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: Yes. Large Metal Items (LMIs)/"substantial" thickness items considered "durable" assumed DIs; Stainless items assumed DIs

PACKAGING AND CONDITIONING

Conditioning method: Direct grout encapsulation of solids into 200 litre drums, grout 16 drums into RCB.
 Plant Name: -
 Location: -
 Plant startup date: -

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Total capacity (m³/y incoming waste): -

Target start date for packaging this stream: -

Throughput for this stream (m³/y incoming waste): -

Other information: -

Likely container type:	Container	Waste packaged (%vol)	Waste loading (m ³)	Payload (m ³)	Number of packages
	6m ³ concrete box (SD)	100.0	6.2	5.8	1

Likely container type comment: -

Range in container waste volume: -

Other information on containers: -

Likely conditioning matrix: Not specified

Other information: -

Conditioned density (t/m³): -

Conditioned density comment: -

Other information on conditioning: -

Opportunities for alternative disposal routing: -

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

RADIOACTIVITY

Source: Contamination of steel pipework, vessels and concrete structure.

Uncertainty: The values quoted were derived by measurement and calculation, and are indicative of the activities that are expected.

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 measurements are reported in the radiological characterisation of plant located within the sludge canning building at Hinkley Point A (October 2005).

Other information: Activity estimates are as shown in the table.

WASTE STREAM 9D921 Sludge Canning Building Plant Items

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			1.45E-06	CC 2	Gd 153				8
Be 10				8	Ho 163				8
C 14			3E-06	CC 2	Ho 166m				8
Na 22				8	Tm 170				8
Al 26				8	Tm 171				8
Cl 36			<6E-04	C 3	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			<3.7E-08	C 3	Pb 210				8
Co 60			1.81E-07	CC 2	Bi 208				8
Ni 59				8	Bi 210m				8
Ni 63			3.65E-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			2.20E-03	CC 2	Th 227				8
Zr 93				8	Th 228			3.57E-08	CC 2
Nb 91				8	Th 229				8
Nb 92				8	Th 230				8
Nb 93m				8	Th 232				8
Nb 94				8	Th 234			6E-07	CC 2
Mo 93				8	Pa 231				8
Tc 97				8	Pa 233			1.18E-08	CC 2
Tc 99				8	U 232			<3.51E-08	C 3
Ru 106				8	U 233			<1E-06	C 3
Pd 107				8	U 234			9.13E-07	CC 2
Ag 108m				8	U 235			3E-08	CC 2
Ag 110m				8	U 236			6.03E-08	CC 2
Cd 109				8	U 238			6E-07	CC 2
Cd 113m				8	Np 237			1.19E-08	CC 2
Sn 119m				8	Pu 236				8
Sn 121m				8	Pu 238			3.61E-04	CC 2
Sn 123				8	Pu 239			1.00E-03	CC 2
Sn 126				8	Pu 240			9.99E-04	CC 2
Sb 125				8	Pu 241			5.35E-03	CC 2
Sb 126				8	Pu 242			<8E-06	C 3
Te 125m				8	Am 241			3.09E-03	CC 2
Te 127m				8	Am 242m				8
I 129			<5E-06	C 3	Am 243				8
Cs 134				8	Cm 242				8
Cs 135				8	Cm 243			1.48E-05	CC 2
Cs 137			6.67E-04	CC 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			6.46E-07	CC 2	Cf 251				8
Sm 147				8	Cf 252				8
Sm 151				8	Other a				
Eu 152				8	Other b/g				
Eu 154			1.75E-05	CC 2	Total a	0		5.48E-03	CC 2
Eu 155			1.56E-06	CC 2	Total b/g	0		8.85E-03	CC 2

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