

WASTE STREAM**9D925****Ponds & Magnox Vault ILW Scabblings**

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.....	2.8 m ³
Total future arisings:		0 m ³
Total waste volume:		2.8 m ³

Comment on volumes: Following the completion of the ponds decontamination project a total of 2.75m³ of concrete shavings has been produced and is now a stock contained in 11 drums in the NCAW. Under the current LTP strategy no further ILW shavings are planned to be generated, therefore future arisings will be 0m³.

Uncertainty factors on volumes:	Stock (upper):	x 1.1	Arisings (upper)	x
	Stock (lower):	x 0.9	Arisings (lower)	x

WASTE SOURCE Concrete wastes from scabbling of fuel ponds and Magnox vault walls & floor. The waste stream includes both ponds, both Magnox Wet Vaults and both Splitter Vane Vaults. The scabbling technique removed both the surface coating (paint) and a thickness of underlying concrete. The wall thickness removed was ~5 mm.

PHYSICAL CHARACTERISTICS

General description: Concrete that has been in contact with fuel pond water, with items held in the pond and in the Magnox Vaults (both wet and dry). There are no large items.

Physical components (%wt): Concrete (~99%wt), paint (~1%wt).

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): ~1.5

Comment on density: The density is of the waste as prepared for packaging.

CHEMICAL COMPOSITION

General description and components (%wt): Concrete (~99%), paint (~1%).

Chemical state: Alkali

Chemical form of radionuclides: H-3: Any tritium is expected to be present as water, but some may be in the form of other inorganic compounds or as organic compounds.
 C-14: Chemical form of carbon 14 has not been determined but may be graphite.
 Cl-36: The chemical form of chlorine 36 has not been determined.
 Se-79: The selenium content is insignificant.
 Tc-99: The technetium content is insignificant.
 Ra: Radium isotope content is insignificant.
 Th: The thorium content is insignificant.
 U: Chemical form of uranium has not been determined but may be uranium oxides.
 Np: The neptunium content is insignificant.
 Pu: Chemical form of plutonium has not been determined but may be plutonium oxides.

Metals and alloys (%wt): There are no metal items.

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

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Cobalt.....	
Copper.....	0
Lead.....	0
Magnox/Magnesium.....	TR
Nickel.....	
Titanium.....	
Uranium.....	
Zinc.....	0
Zircaloy/Zirconium.....	0
Other metals.....	0

Organics (%wt): None expected.

	(%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.....	TR		

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.....	~99.0		
Sand.....			
Glass/Ceramics.....	0		
Graphite.....	0		

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Desiccants/Catalysts.....	
Asbestos.....	0
Non/low friable.....	
Moderately friable.....	
Highly friable.....	
Free aqueous liquids.....	0
Free non-aqueous liquids.....	0
Powder/Ash.....	0

Inorganic anions (%wt): Carbonates, phosphates, silicates and alumino-silicates are expected to be present in the waste but their % weight is not known.

	(%wt)	Type(s) and comment
Fluoride.....	NE	
Chloride.....	NE	
Iodide.....	NE	
Cyanide.....	0	
Carbonate.....	NE	
Nitrate.....	NE	
Nitrite.....	NE	
Phosphate.....	NE	
Sulphate.....	NE	
Sulphide.....	NE	

Materials of interest for waste acceptance criteria: Magnox metal is expected to be present but in such small quantities as to not pose a hazard.

	(%wt)	Type(s) and comment
Combustible metals.....	TR	
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.....		

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Hazardous substances /
non hazardous pollutants: None expected

	(%wt)	Type(s) and comment
Acrylamide.....		
Benzene.....		
Chlorinated solvents.....		
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	

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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)

PACKAGING AND CONDITIONING

Conditioning method: Gravel and particulate conditioning plant (PCF or tumble mix TBC)

Plant Name: -

Location: -

Plant startup date: -

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	~2.75	5.8	< 1

Likely container type comment: -

Range in container waste volume: -

Other information on containers: -

Likely conditioning matrix:

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 paint and concrete from walls and floors in the fuel ponds.

Uncertainty: The values quoted were derived by calculation and are indicative of the activities that are expected - activities have been extrapolated from waste stream 9D918 and multiplied by a factor of 10. More accurate data will be applied once physical characterisation of this waste stream has taken place

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'.

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Measurement of radioactivities:

The specific activities have been estimated from waste stream fingerprint normalised to measurements of the Cs137 activity.

Other information:

Activity estimates are as shown in the table.

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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	5.40E-06	BC 2			Gd 153			8	
Be 10		8			Ho 163			8	
C 14	7.00E-06	BC 2			Ho 166m			8	
Na 22		8			Tm 170			8	
Al 26		8			Tm 171			8	
Cl 36	2E-05	BC 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	3.39E-06	BC 2			Pb 210			8	
Co 60	1.60E-06	BC 2			Bi 208			8	
Ni 59		8			Bi 210m			8	
Ni 63	6.67E-06	BC 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	5.92E-03	BC 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			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		8			U 235			8	
Ag 110m		8			U 236			8	
Cd 109		8			U 238			6	
Cd 113m		8			Np 237			8	
Sn 119m		8			Pu 236			8	
Sn 121m		8			Pu 238	6.62E-05	BC 2		
Sn 123		8			Pu 239	1.00E-04	BC 2		
Sn 126		8			Pu 240	1.00E-04	BC 2		
Sb 125		8			Pu 241	1.43E-03	BC 2		
Sb 126		8			Pu 242			8	
Te 125m		8			Am 241	3.87E-05	BC 2		
Te 127m		8			Am 242m			8	
I 129		8			Am 243			8	
Cs 134	6.69E-07	BC 2			Cm 242			8	
Cs 135		8			Cm 243			8	
Cs 137	2.55E-02	BC 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			Other a				
Eu 152		8			Other b/g				
Eu 154	5.69E-06	BC 2			Total a	3.05E-04	BC 2		0
Eu 155	3.69E-06	BC 2			Total b/g	3.29E-02	BC 2		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 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