

WASTE STREAM	9D51	Ion Siv Unit Post Filters
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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.....	0.4 m ³
Total future arisings:		0 m ³
Total waste volume:		0.4 m ³
Comment on volumes:	A total of 7 post filters have been used. Each post filter has a volume of 0.053 m3.	
Uncertainty factors on volumes:	Stock (upper): x 1.1	Arisings (upper) x
	Stock (lower): x 0.9	Arisings (lower) x

WASTE SOURCE Filtration of cooling pond water.

PHYSICAL CHARACTERISTICS

General description: Spent post filters that form part of the submersible caesium removal unit. The size of the post filters will not influence the choice of treatment process or disposal container.

Physical components (%wt): Post filters (100%). Stainless steel (~100%), IONSIV material (<1%) and EPDM seal material (<1%). (EPDM is ethylene diene terpolymer).

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): ~0.53

Comment on density: The density of 0.53 t/m3 assumes that each post filter will contain 20g of IONSIV material, giving a total mass of 28.1kg for each post filter.

CHEMICAL COMPOSITION

General description and components (%wt): The waste is spent post filters, which are composed principally of stainless steel with a little organic material. Post filters will typically hold a maximum of 20g of IONSIV material. Stainless steel (~100%), IONSIV material (<1%) and EPDM seal material (<1%). (EPDM is ethylene diene terpolymer).

Chemical state: Neutral

Chemical form of radionuclides:
H-3: Any tritium is likely to be present as water.
C-14: The carbon 14 content is insignificant.
Cl-36: The chlorine 36 content is insignificant.
Se-79: The selenium content is insignificant.
Tc-99: The technetium content is insignificant.
Ra: The radium isotope content is insignificant.
Th: The thorium isotope content is insignificant.
U: The uranium isotope content is insignificant.
Np: The neptunium content is insignificant.
Pu: The chemical form of plutonium isotopes may be plutonium oxides.

Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	~100.0	The stainless steel is SS316L; nickel and chromium will be major constituents of the stainless steel post filter construction material.	
Other ferrous metals.....	NE		
Iron.....			
Aluminium.....	NE		
Beryllium.....	TR		

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

Only the stainless steel content of the waste has been assessed.

Organics (%wt): EPDM seal material (<1%wt) is present. Halogenated plastics and rubbers are not expected in the waste.

	(%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	<1.0		
Halogenated rubber	0		
Non-halogenated rubber	<1.0	EPDM (ethylene diene terpolymer) seal material	
Hydrocarbons			
Oil or grease			
Fuel			
Asphalt/Tarmac (cont.coal tar)			
Asphalt/Tarmac (no coal tar)			
Bitumen			
Others			
Other organics	NE		

Other materials (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials	<1.0	IONSIV material	
Inorganic sludges and flocs	0		
Soil	0		
Brick/Stone/Rubble	0		
Cementitious material	0		
Sand			
Glass/Ceramics	0		

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

Inorganic anions (%wt): The inorganic anion content of the waste has not been assessed.

	(%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: There are no hazardous materials present in the waste. Free water may be associated with the retained IONSIV material.

	(%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.....		

WASTE STREAM**9D51****Ion Siv Unit Post Filters**Hazardous substances /
non hazardous pollutants:

If any, present in trace quantities only.

(%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): Yes

(%wt) Type(s) and comment

EDTA.....

DPTA.....

NTA.....

Polycarboxylic acids.....

Other organic complexants.....

Total complexing agents..... TR

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Potential for the waste to contain discrete items: Yes. Stainless Steel so DI by definition

PACKAGING AND CONDITIONING

Conditioning method: Direct grout encapsulation of solids into 196 litre drums, grout 16 drums into RCB.

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	0.37	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: Spent post filters from the submersible caesium removal unit, used for the removal of caesium isotopes from cooling pond water. Contamination by fission products, actinides and activation products.

Uncertainty: Specific activity is a function of Station operating history. The values quoted are indicative of the activities that might be 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'.

WASTE STREAM**9D51****Ion Siv Unit Post Filters**Measurement of
radioactivities:

Six post filters were sampled. Data taken from M/EF/HPA/REP/0011/19 - Issue 1

Other information:

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WASTE STREAM

9D51

Ion Siv Unit Post Filters

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	4.84E-06	CC 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	5.35E-06	BB 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	3.5E-07	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	2.92E-05	CC 2			Pb 210		8		
Co 60	2.33E-05	CC 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	1.34E-04	CC 2			Po 210		8		
Zn 65		8			Ra 223		8		
Se 79	3.74E-09	CC 2			Ra 225		8		
Kr 81		8			Ra 226		8		
Kr 85	4.22E-05	CC 2			Ra 228		8		
Rb 87		8			Ac 227		8		
Sr 90	8.88E-03	CC 2			Th 227		8		
Zr 93	2.05E-08	CC 2			Th 228	6.51E-09	BB 2		
Nb 91		8			Th 229		8		
Nb 92		8			Th 230		8		
Nb 93m	1.04E-08	CC 2			Th 232		8		
Nb 94		8			Th 234	7.02E-07	CC 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233	5.17E-09	BB 2		
Tc 99	1.61E-07	CC 2			U 232	6.37E-09	CC 2		
Ru 106	1.98E-07	CC 2			U 233		8		
Pd 107		8			U 234	6.15E-07	CC 2		
Ag 108m		8			U 235	1.5E-08	CC 2		
Ag 110m		8			U 236	1.08E-07	CC 2		
Cd 109		8			U 238	7.02E-07	CC 2		
Cd 113m	1.12E-07	BB 2			Np 237	5.21E-09	BB 2		
Sn 119m		8			Pu 236		8		
Sn 121m	2.33E-07	BB 2			Pu 238	4.34E-04	CC 2		
Sn 123		8			Pu 239	4.35E-04	CC 2		
Sn 126	7.5E-09	BB 2			Pu 240	4.45E-04	CC 2		
Sb 125	1.05E-07	CC 2			Pu 241	1.04E-02	CC 2		
Sb 126	1.05E-09	BB 2			Pu 242	1.68E-06	CC 2		
Te 125m	2.62E-08	CC 2			Am 241	1.22E-03	CC 2		
Te 127m		8			Am 242m	5.00E-08	BB 2		
I 129	7.23E-07	CC 2			Am 243		8		
Cs 134	1.56E-07	BB 2			Cm 242	4.11E-08	CC 2		
Cs 135	9.55E-09	CC 2			Cm 243	1.51E-06	CC 2		
Cs 137	2.13E-03	BB 2			Cm 244	1.49E-05	CC 2		
Ba 133		8			Cm 245		8		
La 137		8			Cm 246		8		
La 138		8			Cm 248		8		
Ce 144	2.73E-08	CC 2			Cf 249		8		
Pm 145		8			Cf 250		8		
Pm 147	1.36E-05	CC 2			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151	5.04E-06	CC 2			Other a				
Eu 152	9.26E-08	BB 2			Other b/g				
Eu 154	7.36E-06	CC 2			Total a	2.55E-03	CC 2	0	
Eu 155	1.37E-06	CC 2			Total b/g	2.17E-02	CC 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