

WASTE STREAM	9C43	Ion Siv Unit Post Filters
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SITE Dungeness 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.....	0.8 m ³
Total future arisings:		0 m ³
Total waste volume:		0.8 m ³
Comment on volumes:	The volume of each post filter is 0.053 m ³ , volume is based on 15 filters in stock. The station ceased generation on 31/12/2006.	
Uncertainty factors on volumes:	Stock (upper): x 1.2	Arisings (upper) x
	Stock (lower): x 0.8	Arisings (lower) x

WASTE SOURCE Spent Ion Siv post-filters from the fuel pond caesium removal unit

PHYSICAL CHARACTERISTICS

General description: Spent post filters that form part of the submersible caesium removal unit.

Physical components (%wt): Post filters (100%). The waste is spent post filters, which are composed principally of stainless steel supports with glass fibre/polyester filter elements and some organic materials. 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).

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): Post filters will typically hold 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.
 Cl-36: The chlorine 36 content is insignificant.
 Th: The thorium isotope 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.....	~98.0	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		
Cobalt.....			
Copper.....	NE		
Lead.....	NE		

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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 also 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	EPDM seal material	
Halogenated rubber	0		
Non-halogenated rubber.....	<1.0	EPDM 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		
Inorganic sludges and flocs.....	0		
Soil.....	0		
Brick/Stone/Rubble.....	0		
Cementitious material.....	0		
Sand.....			
Glass/Ceramics.....	0		
Graphite.....	0		
Desiccants/Catalysts.....			
Asbestos.....	0		

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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.....		

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):

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

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

PACKAGING AND CONDITIONING

Conditioning method: Initially the filters will be held in shielded drums in a buffer store, then transferred into a drum, crushed and the pucks placed into a DCIC

Plant Name: -

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Location: Dungeness A Site

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
	3m ³ RS box	100.0	0.795	2.5	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'.

Measurement of radioactivities: Assuming ~20g of IonSiv per filter.

Other information: -

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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		8			Gd 153		8		
Be 10		8			Ho 163		8		
C 14		8			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36		8			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		8			Pb 210		8		
Co 60		8			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	1.81E-09	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	6.66E-01	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		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		8		
Cd 113m		8			Np 237		8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238		8		
Sn 123		8			Pu 239	2E-09	CC 2		
Sn 126		8			Pu 240	2.00E-09	CC 2		
Sb 125		8			Pu 241	3.26E-08	CC 2		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241		8		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134	6.37E-02	CC 2			Cm 242		8		
Cs 135		8			Cm 243		8		
Cs 137	6.74E+00	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	2.03E-09	CC 2			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151		8			Other a				
Eu 152		8			Other b/g				
Eu 154		8			Total a	4.00E-09	CC 2	0	
Eu 155		8			Total b/g	7.47E+00	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