WASTE STREAM 9C43 Ion Siv Unit Post Filters

SITE Dungeness A

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Magnox Limited

WASTE TYPE ILW

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	0.8 m³
Total future arisings:		0 m³
Total waste volume:		0.8 m³

Comment on volumes: The volume of each post filter is 0.053 m3, 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: -

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): -

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	
Magnox/Magnesium.....	NE	
Nickel.....		
Titanium.....		

WASTE STREAM 9C43 Ion Siv Unit Post Filters

	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.		
	Total cellulosics.....	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):	-		
	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	
	Non/low friable.....		
	Moderately friable.....		
	Highly friable.....		
	Free aqueous liquids.....	TR	
	Free non-aqueous liquids.....	0	
	Powder/Ash.....	0	

WASTE STREAM 9C43 Ion Siv Unit Post Filters

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

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.

Combustible metals	0
Low flash point liquids	0
Explosive materials	0
Phosphorus	0
Hydrides	0
Biological etc. materials	0
Biodegradable materials	
Putrescible wastes	0
Non-putrescible wastes	
Corrosive materials	0
Pyrophoric materials	0
Generating toxic gases	0
Reacting with water	0
Active particles	
Soluble solids as bulk chemical compounds	

Hazardous substances / non hazardous pollutants: None expected.

Acrylamide	
Benzene	
Chlorinated solvents	
Formaldehyde	
Organometallics	
Phenol	
Styrene	
Tri-butyl phosphate	
Other organophosphates	
Vinyl chloride	
Arsenic	
Barium	

WASTE STREAM 9C43 Ion Siv Unit Post Filters

Boron.....

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):

EDTA.....

DPTA.....

NTA.....

Polycarboxylic acids……

Other organic complexants.....

Total complexing agents..... NE

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: -

Location: Dungeness A Site

Plant startup date: -

Total capacity (m^3/y incoming waste): -

Target start date for packaging this stream: -

Throughput for this stream (m^3/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

WASTE STREAM 9C43 Ion Siv Unit Post Filters

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:	

Treatment	Stream volume (%)	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:	-

WASTE STREAM 9C43 Ion Siv Unit Post Filters

Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code	Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2019	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	1.85E-09	C C 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	7.16E-01	C C 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	C C 2		
Sn 126		8			Pu 240	2E-09	C C 2		
Sb 125		8			Pu 241	3.77E-08	C C 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	1.74E-01	C C 2			Cm 242		8		
Cs 135		8			Cm 243		8		
Cs 137	7.22E+00	C C 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	4.49E-09	C C 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**	**4E-09**	**C C 2**	**0**	
Eu 155		8			**Total b/g**	**8.11E+00**	**C C 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