

<b>WASTE STREAM</b>	<b>9D17</b>	<b>PWTP Fine Filters (ILW)</b>
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**SITE** Hinkley Point A  
**SITE OWNER** Nuclear Decommissioning Authority  
**WASTE CUSTODIAN** Magnox Limited  
**WASTE TYPE** ILW

**WASTE VOLUMES**

		Reported
Stocks:	At 1.4.2019.....	25.4 m <sup>3</sup>
Future arisings -	1.4.2019 - 31.3.2022.....	7.9 m <sup>3</sup>
Total future arisings:		7.9 m <sup>3</sup>
Total waste volume:		33.3 m <sup>3</sup>
Comment on volumes:	-	
Uncertainty factors on volumes:	Stock (upper): x 1.2	Arisings (upper) x 1.2
	Stock (lower): x 0.8	Arisings (lower) x 0.8

**WASTE SOURCE** Cartridge filter elements from filtration of process liquors.

**PHYSICAL CHARACTERISTICS**

**General description:** Cartridge filter elements 840 mm long, 140 mm OD and 95 mm ID. Principal construction material is fibreglass. Filters are held in a steel frame in 240 litre mild steel drums (6 filters/drum). Dry filter weight is ~2 kg. Weight drained but retaining 30% of volume as water is ~4 kg.

**Physical components (%wt):** Fibreglass (~21% wt), plastic (<0.5% wt), stainless steel (<0.5% wt), rubber (~0.1% wt), steel frame (~52 wt), drum (~26% wt).

**Sealed sources:** -

**Bulk density (t/m<sup>3</sup>):** 0.3

**Comment on density:** The bulk density of a wet drained filter is about 0.32 t/m<sup>3</sup>.

**CHEMICAL COMPOSITION**

**General description and components (%wt):** Fibreglass (~21% wt), plastic (<0.5% wt), stainless steel (<0.5% wt), rubber (~0.1% wt), steel frame (~50 wt), drum (~26% wt), cotton (2%)

**Chemical state:** Neutral

**Chemical form of radionuclides:**  
H-3: Most tritium is expected to be present as water.  
C-14: The chemical form of carbon 14 may be graphite.  
Cl-36: The chemical form of chlorine 36 may be chloride.  
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: Chemical form of uranium isotopes may be uranium oxides.  
Np: The chemical form of neptunium has not been determined.  
Pu: Chemical form of plutonium isotopes may be plutonium oxides.

**Metals and alloys (%wt):** 26% of the waste is 200 litre mild steel drums with a typical wall thickness of 1-2 mm.

Stainless steel.....	~0.50	Nickel and chromium present in stainless steel.
Other ferrous metals.....	~76.0	
Iron.....		
Aluminium.....	0	
Beryllium.....	0	
Cobalt.....		
Copper.....	0	
Lead.....	0	
Magnox/Magnesium.....	0	

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	Nickel.....		
	Titanium.....		
	Uranium.....		
	Zinc.....	0	
	Zircaloy/Zirconium.....	0	
	Other metals.....	0	
Organics (%wt):	Traces of resin fines may be present on the filters. Rubbers are expected in small quantities but it has not been determined if these are halogenated.		
	Total cellulosics.....	2.0	
	Paper, cotton.....	2.0	
	Wood.....	0	
	Halogenated plastics .....	0	
	Total non-halogenated plastics.....	<0.50	
	Condensation polymers.....	<0.50	
	Others.....	0	
	Organic ion exchange materials....	TR	
	Total rubber.....	~0.10	
	Halogenated rubber .....	~0.10	
	Non-halogenated rubber.....	NE	
	Hydrocarbons.....		
	Oil or grease .....		
	Fuel.....		
	Asphalt/Tarmac (cont.coal tar)...		
	Asphalt/Tarmac (no coal tar)....		
	Bitumen.....		
	Others.....		
	Other organics.....	0	
Other materials (%wt):	Other materials may include Fibreglass (~21% wt).		
	Inorganic ion exchange materials.	TR	
	Inorganic sludges and flocs.....	0	
	Soil.....	0	
	Brick/Stone/Rubble.....	0	
	Cementitious material.....	0	
	Sand.....		
	Glass/Ceramics.....	~21.0	Fibre glass
	Graphite.....	0	
	Desiccants/Catalysts.....		
	Asbestos.....	0	
	Non/low friable.....		
	Moderately friable.....		
	Highly friable.....		
	Free aqueous liquids.....	0	
	Free non-aqueous liquids.....	0	

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	Powder/Ash.....	0
Inorganic anions (%wt):	Traces of salts from drying out of the held moisture will be present. Silicate will be present in the filter medium.	
	Fluoride.....	TR
	Chloride.....	NE
	Iodide.....	TR
	Cyanide.....	0
	Carbonate.....	TR
	Nitrate.....	TR
	Nitrite.....	TR
	Phosphate.....	TR
	Sulphate.....	NE
	Sulphide.....	TR
Materials of interest for waste acceptance criteria:	No materials likely to pose a fire or other non-radiological hazard have been identified.	
	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.....	

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Barium.....  
 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): Yes  
 EDTA.....  
 DPTA.....  
 NTA.....  
 Polycarboxylic acids.....  
 Other organic complexants.....  
 Total complexing agents..... TR

**PACKAGING AND CONDITIONING**

Conditioning method: Direct grout encapsulation of solids into 196 litre drums, grout 16 drums into RCB.  
 Plant Name: -  
 Location: Hinkley Point A Site  
 Plant startup date: -  
 Total capacity (m<sup>3</sup>/y incoming waste): -  
 Target start date for packaging this stream: -  
 Throughput for this stream (m<sup>3</sup>/y incoming waste): -  
 Other information: -

Likely container type:	Container	Waste packaged (%vol)	Waste loading (m <sup>3</sup> )	Payload (m <sup>3</sup> )	Number of packages
	6m <sup>3</sup> concrete box (SD)	100.0	4.538	5.8	8

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Likely container type comment: -

Range in container waste volume: -

Other information on containers: -

Likely conditioning matrix: Other information: -

Conditioned density (t/m<sup>3</sup>): -

Conditioned density comment: -

Other information on conditioning: -

Opportunities for alternative disposal routing:

Treatment	Stream volume (%)	Comment
-	-	-

**RADIOACTIVITY**

Source: Activity source is fission products, activation products and actinides.

Uncertainty: Specific activity is a function of operating history. The values quoted are indicative of the activities that may 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: -

Other information: -

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Nuclide	Mean radioactivity, TBq/m <sup>3</sup>				Nuclide	Mean radioactivity, TBq/m <sup>3</sup>			
	Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code
H 3	2.11E-03	CC 2	3.38E-03	CC 2	Gd 153		8		8
Be 10		8		8	Ho 163		8		8
C 14	6E-04	CC 2	6E-04	CC 2	Ho 166m		8		8
Na 22		8		8	Tm 170		8		8
Al 26		8		8	Tm 171		8		8
Cl 36	9E-05	CC 2	9E-05	CC 2	Lu 174		8		8
Ar 39		8		8	Lu 176		8		8
Ar 42		8		8	Hf 178n		8		8
K 40		8		8	Hf 182		8		8
Ca 41		8		8	Pt 193		8		8
Mn 53		8		8	Tl 204		8		8
Mn 54	1.27E-06	CC 2	8.79E-06	CC 2	Pb 205		8		8
Fe 55	4.96E-03	CC 2	1.87E-02	CC 2	Pb 210		8		8
Co 60	1.71E-03	CC 2	4.72E-03	CC 2	Bi 208		8		8
Ni 59		8		8	Bi 210m		8		8
Ni 63	7.87E-04	CC 2	8.81E-04	CC 2	Po 210		8		8
Zn 65	5.35E-07	CC 2	4.46E-06	CC 2	Ra 223		8		8
Se 79		8		8	Ra 225		8		8
Kr 81		8		8	Ra 226		8		8
Kr 85		8		8	Ra 228		8		8
Rb 87		8		8	Ac 227		8		8
Sr 90	1.95E-03	CC 2	2.79E-03	CC 2	Th 227		8		8
Zr 93		8		8	Th 228		8		8
Nb 91		8		8	Th 229		8		8
Nb 92		8		8	Th 230		8		8
Nb 93m		8		8	Th 232		8		8
Nb 94		8		8	Th 234	<5E-06	C 3	<5E-06	C 3
Mo 93		8		8	Pa 231		8		8
Tc 97		8		8	Pa 233	<1.02E-08	C 3	<1.95E-09	C 3
Tc 99		8		8	U 232		8		8
Ru 106	8.16E-06	CC 2	5.09E-05	CC 2	U 233		8		8
Pd 107		8		8	U 234	5.02E-06	CC 2	5.01E-06	CC 2
Ag 108m		8		8	U 235	1E-07	CC 2	1E-07	CC 2
Ag 110m	1.17E-07	CC 2	9.56E-07	CC 2	U 236	6E-07	CC 2	6E-07	CC 2
Cd 109		8		8	U 238	5E-06	CC 2	5E-06	CC 2
Cd 113m		8		8	Np 237	1.03E-08	CC 2	2.03E-09	CC 2
Sn 119m		8		8	Pu 236		8		8
Sn 121m		8		8	Pu 238	7.8E-04	CC 2	8.79E-04	CC 2
Sn 123		8		8	Pu 239	6E-04	CC 2	6E-04	CC 2
Sn 126		8		8	Pu 240	8E-04	CC 2	8E-04	CC 2
Sb 125	3.74E-06	CC 2	1.41E-05	CC 2	Pu 241	2.26E-02	CC 2	3.46E-02	CC 2
Sb 126		8		8	Pu 242		8		8
Te 125m	9.37E-07	CC 2	<3.54E-06	C 3	Am 241	2.34E-03	CC 2	2.17E-03	CC 2
Te 127m		8		8	Am 242m		8		8
I 129		8		8	Am 243		8		8
Cs 134	5.15E-06	CC 2	2.19E-05	CC 2	Cm 242	8.14E-08	CC 2	9.46E-07	CC 2
Cs 135		8		8	Cm 243	4.4E-06	CC 2	5.6E-06	CC 2
Cs 137	7.17E-04	CC 2	9.33E-04	CC 2	Cm 244	5.92E-05	CC 2	8.91E-05	CC 2
Ba 133	2.53E-06	CC 2	4.93E-06	CC 2	Cm 245		8		8
La 137		8		8	Cm 246		8		8
La 138		8		8	Cm 248		8		8
Ce 144	1.88E-06	CC 2	1.39E-05	CC 2	Cf 249		8		8
Pm 145		8		8	Cf 250		8		8
Pm 147	3.53E-04	CC 2	1.36E-03	CC 2	Cf 251		8		8
Sm 147		8		8	Cf 252		8		8
Sm 151		8		8	Other a				
Eu 152		8		8	Other b/g	2.11E-08	CC 2	4.08E-07	CC 2
Eu 154	6.41E-05	CC 2	1.57E-04	CC 2	<b>Total a</b>	<b>4.59E-03</b>	<b>CC 2</b>	<b>4.56E-03</b>	<b>CC 2</b>
Eu 155	1.81E-05	CC 2	5.21E-05	CC 2	<b>Total b/g</b>	<b>3.60E-02</b>	<b>CC 2</b>	<b>6.84E-02</b>	<b>CC 2</b>

**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