

<b>WASTE STREAM</b>	<b>9D60</b>	<b>Sand in Sand Pressure Filters - PWTP</b>
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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.....	19.2 m <sup>3</sup>
Total future arisings:		0 m <sup>3</sup>
Total waste volume:		19.2 m <sup>3</sup>

Comment on volumes: All Pond Water Treatment Plant Sand Pressure Filters are planned to be emptied of filter media in a single campaign.

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

**WASTE SOURCE** Sand from sand pressure filters in the Pond Water Treatment Plant. Sludge and solids are removed by mechanical filtration through a bed of sand which is then backwashed into sludge tanks. The filters will be emptied of sand when the ponds are decommissioned.

**PHYSICAL CHARACTERISTICS**

General description: Mineral sand, containing high levels of activity due to the significant quantities of entrained sludge within the sand filter bed. Expected to be emptied using a vacuum retrieval method.

Physical components (%vol): Sand (90%), Sludge (10%).

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m<sup>3</sup>): 2.6

Comment on density: The density varies between 2.5 - 2.7 t/m<sup>3</sup>.

**CHEMICAL COMPOSITION**

General description and components (%wt): Sand (90%), Sludge (10%).

Chemical state: Neutral

Chemical form of radionuclides: H-3: Most tritium is expected to be present as water but some may be present in the form of other inorganic compounds or as organic compounds.  
 C-14: Carbon-14 may be present as graphite.  
 Se-79: The selenium content is insignificant.  
 Tc-99: The technetium content is insignificant.  
 Ra: The radium content is insignificant.  
 Th: The thorium content is insignificant.  
 U: The chemical form of uranium isotopes has not been determined but will probably be uranium oxides.  
 Np: The chemical form of neptunium has not been determined.  
 Pu: The chemical form of plutonium isotopes has not been determined but will probably be plutonium oxides.

Metals and alloys (%wt): Any metals will be present as small particles in trace quantities. There are likely to be traces of metals and metallic corrosion products, including magnesium and ferrous metals.

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

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

Organics (%wt): Not expected in greater than trace quantities.

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	TR		
Paper, cotton.....	TR		
Wood.....	TR		
Halogenated plastics .....	TR		
Total non-halogenated plastics.....	TR		
Condensation polymers.....	TR		
Others.....	TR		
Organic ion exchange materials....	TR		
Total rubber.....	TR		
Halogenated rubber .....	TR		
Non-halogenated rubber.....	TR		
Hydrocarbons.....			
Oil or grease .....			
Fuel.....			
Asphalt/Tarmac (cont.coal tar)...			
Asphalt/Tarmac (no coal tar)....			
Bitumen.....			
Others.....			
Other organics.....	TR		

Other materials (%wt): Traces of graphite may also be present.

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..	0		
Inorganic sludges and flocs.....	10.0		
Soil.....	0		
Brick/Stone/Rubble.....	0		
Cementitious material.....	0		
Sand.....	90.0		
Glass/Ceramics.....	0		
Graphite.....	TR		

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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):           Not yet determined. May be present in trace quantities.

	(%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:           No materials likely to pose a fire or other non-radiological hazard have been identified.

	(%wt)	Type(s) and comment
Combustible metals.....	0	
Low flash point liquids.....	0	
Explosive materials.....	0	
Phosphorus.....	0	
Hydrides.....	TR	
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):      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:

No. In &amp; of itself not a DI; context will define if likely to contain any "rogue" items that could be (unlikely as sand from SPFs)

**PACKAGING AND CONDITIONING**

Conditioning method: Encapsulation into 3m3 boxes

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: 2023

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
3m <sup>3</sup> box (round corners)	100.0	1.5	2.9	13

Likely container type comment: -

Range in container waste volume: -

Other information on containers: -

Likely conditioning matrix: Not specified

Other information: -

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

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: Activity from the cleanup of Fuel Storage Pond Water.

Uncertainty: Activity retained on the filter media cannot be known with accuracy until the filters are decommissioned and emptied.

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: Based on activities found on sludge.

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Other information:

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Nuclide	Mean radioactivity, TBq/m <sup>3</sup>				Nuclide	Mean radioactivity, TBq/m <sup>3</sup>			
	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3	1.38E-05	CC 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	8.15E-06	CC 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	<6.97E-07	C 3			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	2.33E-05	CC 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	3.05E-05	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	7.73E-02	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	5.74E-06	CC 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233	4.54E-08	CC 2		
Tc 99	3.64E-06	CC 2			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234	1.20E-05	CC 2		
Ag 108m		8			U 235	3.94E-07	CC 2		
Ag 110m		8			U 236	2.07E-06	CC 2		
Cd 109		8			U 238	5.74E-06	CC 2		
Cd 113m		8			Np 237	4.59E-08	CC 2		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	2.5E-03	CC 2		
Sn 123		8			Pu 239	3.82E-03	CC 2		
Sn 126		8			Pu 240	5.06E-03	CC 2		
Sb 125		8			Pu 241	3.16E-02	CC 2		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241	1.59E-02	CC 2		
Te 127m		8			Am 242m		8		
I 129	2E-07	CC 2			Am 243	1.18E-04	CC 2		
Cs 134	3.84E-06	CC 2			Cm 242		8		
Cs 135		8			Cm 243	1.59E-05	CC 2		
Cs 137	7.44E-02	CC 2			Cm 244	3.21E-04	CC 2		
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	3.31E-04	CC 2			<b>Total a</b>	<b>2.77E-02</b>	<b>CC 2</b>	<b>0</b>	<b>CC 2</b>
Eu 155	1.97E-04	CC 2			<b>Total b/g</b>	<b>1.84E-01</b>	<b>CC 2</b>	<b>0</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