

**WASTE STREAM****9F38****PWTP Filters - Sand and Gravel**

**SITE** Sizewell 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 m <sup>3</sup>
Future arisings -	1.4.2024 - 31.3.2030.....	9.4 m <sup>3</sup>
Total future arisings:		9.4 m <sup>3</sup>
Total waste volume:		9.4 m <sup>3</sup>

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

Uncertainty factors on volumes: Stock (upper): x Arisings (upper) x 1.2  
 Stock (lower): x Arisings (lower) x 0.8

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

**PHYSICAL CHARACTERISTICS**

General description: Mineral sand and gravel. Filters are expected to be emptied using a combination of pumping and manual removal.  
 Physical components (%vol): Sand (75%), gravel (25%).  
 Sealed sources: The waste does not contain sealed sources.  
 Bulk density (t/m<sup>3</sup>): ~2.6  
 Comment on density: -

**CHEMICAL COMPOSITION**

General description and components (%wt): Sand (75%), gravel (25%).

Chemical state: Neutral

Chemical form of radionuclides: H-3: Not determined.  
 C-14: Not determined.  
 Se-79: Not determined.  
 Tc-99: Not determined.  
 Ra: Not determined.  
 Th: Not determined.  
 U: Not determined.  
 Np: Not determined.  
 Pu: Not determined.

Metals and alloys (%wt): Any metals will be present as small particles in trace quantities.

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	NE		
Other ferrous metals.....	TR	There are likely be traces of metals and metallic corrosion products, including magnesium and ferrous metals.	
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

There are likely be traces of metals and metallic corrosion products, including magnesium and ferrous metals.

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

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

Other materials (%wt): Rubble is graded gravel.

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..	0		
Inorganic sludges and flocs.....	TR		
Soil.....	0		
Brick/Stone/Rubble.....	25.0	Graded gravel	
Cementitious material.....			
Sand.....	75.0		
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):           Not yet determined. May be present in trace quantities.

	(%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:           -

	(%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):

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

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Potential for the waste to contain discrete items:

No. In &amp; of itself not a DI; assumed not likely to contain any "rogue" items that could be.

**PACKAGING AND CONDITIONING**

Conditioning method: This waste stream will be containerised in Ductile Cast Iron Containers (DCICs) and dried.

Plant Name: AVDS

Location: Sizewell 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: Sludges and sands will be loaded into the DCICs on a fill/dry cycle to maximise waste volume per container

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> RS box	100.0	2.36	2.5	4

Likely container type comment: -

Range in container waste volume: -

Other information on containers: The container is expected to be made from Ductile Cast Iron (DCI).

Likely conditioning matrix:

Other information: -

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

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'.

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Measurement of  
radioactivities:

Based on activities found on ponds sludge as reported in TR/WT/621.

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			1.99E-03	CC 2	Gd 153				8
Be 10				8	Ho 163				8
C 14			1.61E-03	CC 2	Ho 166m				8
Na 22				8	Tm 170				8
Al 26				8	Tm 171				8
Cl 36			2.21E-06	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				2	Pb 205				8
Fe 55			1.79E-04	CC 2	Pb 210				8
Co 60			2.23E-04	CC 2	Bi 208				8
Ni 59				8	Bi 210m				8
Ni 63			9.4E-04	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			1.49E-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		3.31E-07	CC 2	
Mo 93				8	Pa 231				8
Tc 97				8	Pa 233		1.54E-09	CC 2	
Tc 99				8	U 232				8
Ru 106				8	U 233				8
Pd 107				8	U 234		3.7E-07	CC 2	
Ag 108m				8	U 235		7.8E-09	CC 2	
Ag 110m				8	U 236		3.78E-08	CC 2	
Cd 109				8	U 238		3.31E-07	CC 2	
Cd 113m				8	Np 237		1.6E-09	CC 2	
Sn 119m				8	Pu 236				8
Sn 121m				8	Pu 238		3.70E-04	CC 2	
Sn 123				8	Pu 239		5.08E-04	CC 2	
Sn 126				8	Pu 240		5.08E-04	CC 2	
Sb 125				8	Pu 241		8.30E-03	CC 2	
Sb 126				8	Pu 242				8
Te 125m				8	Am 241		1.67E-03	CC 2	
Te 127m				8	Am 242m				8
I 129				8	Am 243				8
Cs 134			5.48E-06	CC 2	Cm 242				8
Cs 135				8	Cm 243		1.31E-05	CC 2	
Cs 137			1.78E-02	CC 2	Cm 244		1.16E-05	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			2.7E-05	CC 2	Cf 251				8
Sm 147				8	Cf 252				8
Sm 151			1.18E-04	CC 2	Other a				
Eu 152				8	Other b/g				
Eu 154			5.21E-05	CC 2	<b>Total a</b>	<b>0</b>	<b>3.08E-03</b>	<b>CC 2</b>	
Eu 155			1.5E-05	CC 2	<b>Total b/g</b>	<b>0</b>	<b>4.62E-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