

<b>WASTE STREAM</b>	<b>3S08</b>	<b>Secondary Cartridge Filters (LLW)</b>
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**SITE** Sizewell B

**SITE OWNER** EDFE NGL

**WASTE CUSTODIAN** EDFE NGL

**WASTE TYPE** LLW

Is the waste subject to Scottish Policy: No

**WASTE VOLUMES**

	Reported
Stocks: At 1.4.2022.....	2.8 m <sup>3</sup>
Future arisings - 1.4.2022 - 31.3.2035.....	9.8 m <sup>3</sup>
1.4.2035 - 31.3.2043.....	12.0 m <sup>3</sup>
Total future arisings:	21.8 m <sup>3</sup>
Total waste volume:	24.6 m <sup>3</sup>

Comment on volumes: Waste volumes will be variable depending on station operating conditions. Following planned shutdown in 2035 and defuelling operations, the fuel storage ponds and associated plant will continue in operation for a number of years before removal of the last secondary cartridge filters. The current plan shows this in 2040/1.

Uncertainty factors on volumes: Stock (upper): x 1.25 Arisings (upper) x 1.5  
 Stock (lower): x 0.75 Arisings (lower) x 0.5

**WASTE SOURCE** Secondary filter cartridges from various systems.

**PHYSICAL CHARACTERISTICS**

General description: The wastes are spent filter cartridges that are composed principally of a stainless steel support with a glass fibre filter element and organic materials for binding. Some ion exchange resin may be present.

Physical components (%vol): Stainless steel ~99%, other ~1%.

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m<sup>3</sup>): 1.8

Comment on density: Based on conditioned weight and volume in waste characterisation form.

**CHEMICAL COMPOSITION**

General description and components (%wt): Stainless steel (99%wt), glass fibre, binding materials (~1%).

Chemical state: Neutral

Chemical form of radionuclides: H-3: Will be present in any retained water. Activity expected to be very low.  
 C-14: Not expected to be present in any measurable quantity.  
 Ra: Not expected to be present in any measurable quantity.  
 U: Trace (value unknown but not thought to be significant), probably as salts.  
 Pu: Trace (value unknown but not thought to be significant), probably as salts.

Metals and alloys (%wt): Overall dimensions for the filter are 200mm diameter by 500mm length. The filter has top and bottom discs that are connected by three rods and a metal gauze containing the filter matrix.

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	~99.0	304	
Other ferrous metals.....	0		
Iron.....	0		
Aluminium.....	TR		
Beryllium.....	0		
Cobalt.....	0		
Copper.....	TR		

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Lead.....	0
Magnox/Magnesium.....	0
Nickel.....	
Titanium.....	0
Uranium.....	0
Zinc.....	TR
Zircaloy/Zirconium.....	0
Other metals.....	TR

Organics (%wt):                      A small amount of organic material may be present. Breakdown is not assessed. None present.

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	0		
Paper, cotton.....	0		
Wood.....	0		
Halogenated plastics .....	0		
Total non-halogenated plastics.....	P		
Condensation polymers.....	0		
Others.....	0		
Organic ion exchange materials....	NE		
Total rubber.....	0		
Halogenated rubber .....	0		
Non-halogenated rubber.....	0		
Hydrocarbons.....	0		
Oil or grease .....	0		
Fuel.....			
Asphalt/Tarmac (cont.coal tar)...			
Asphalt/Tarmac (no coal tar).....			
Bitumen.....			
Others.....			
Other organics.....	NE		

Other materials (%wt):                      Glass fibre will be present

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..	NE		
Inorganic sludges and flocs.....	0		
Soil.....	0		
Brick/Stone/Rubble.....	0		
Cementitious material.....	0		
Sand.....	NE		
Glass/Ceramics.....	~1.0		
Graphite.....	0		
Desiccants/Catalysts.....	0		
Asbestos.....	0		

**WASTE STREAM****3S08****Secondary Cartridge Filters (LLW)**

Non/low friable.....

Moderately friable.....

Highly friable.....

Free aqueous liquids..... 0

Free non-aqueous liquids..... 0

Powder/Ash..... 0

Inorganic anions (%wt):      None of the listed inorganic anions are expected to be present at greater than the significant level (0.01% for halides, 0.1% for others).

(%wt)      Type(s) and comment

Fluoride..... TR

Chloride..... TR

Iodide..... TR

Cyanide..... NE

Carbonate..... TR

Nitrate..... TR

Nitrite..... NE

Phosphate..... TR

Sulphate..... TR

Sulphide..... 0

Materials of interest for waste acceptance criteria:      None expected.

(%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..... 0

Corrosive materials..... 0

Pyrophoric materials..... 0

Generating toxic gases..... 0

Reacting with water..... 0

Higher activity particles..... 0

Soluble solids as bulk chemical compounds..... 0

Hazardous substances / non hazardous pollutants:      -

(%wt)      Type(s) and comment

Acrylamide..... NE

**WASTE STREAM****3S08****Secondary Cartridge Filters (LLW)**

Benzene.....	NE
Chlorinated solvents.....	NE
Formaldehyde.....	NE
Organometallics.....	NE
Phenol.....	NE
Styrene.....	NE
Tri-butyl phosphate.....	NE
Other organophosphates.....	NE
Vinyl chloride.....	NE
Arsenic.....	NE
Barium.....	NE
Boron.....	NE
Boron (in Boral).....	NE
Boron (non-Boral).....	NE
Cadmium.....	NE
Caesium.....	NE
Selenium.....	NE
Chromium.....	NE
Molybdenum.....	NE
Thallium.....	NE
Tin.....	NE
Vanadium.....	NE
Mercury compounds.....	NE
Others.....	NE

## Electronic Electrical Equipment (EEE)

EEE Type 1.....	0
EEE Type 2.....	0
EEE Type 3.....	0
EEE Type 4.....	0
EEE Type 5.....	0

Complexing agents (%wt): No

	(%wt)	Type(s) and comment
EDTA.....	NE	
DPTA.....	NE	
NTA.....	NE	
Polycarboxylic acids.....	NE	
Other organic complexants.....	NE	Not expected to be present.
Total complexing agents.....	0	

Potential for the waste to contain discrete items: No.

**TREATMENT, PACKAGING AND DISPOSAL**

Planned on-site / off-site treatment(s):

Treatment	On-site / Off site	Stream volume %
Low force compaction Supercompaction (HFC) Incineration Solidification Decontamination Metal treatment Size reduction Decay storage Recycling / reuse Other / various None	On-site	100.0

Comment on planned treatments:

Canisters are expected to be loaded into half-height ISO containers with other LLW and encapsulated.

**Disposal Routes:**

Disposal Route	Stream volume %	Disposal density t/m3
Expected to be consigned to the LLW Repository Expected to be consigned to a Landfill Facility Expected to be consigned to an On-Site Disposal Facility Expected to be consigned to an Incineration Facility Expected to be consigned to a Metal Treatment Facility Expected to be consigned as Out of Scope Expected to be recycled / reused Disposal route not known	100.0	

Classification codes for waste expected to be consigned to a landfill facility: -

**Upcoming (2022/23-2024/25) Waste Routing (if expected to change from above):**

Disposal Route	Stream volume %		
	2022/23	2023/24	2024/25
Expected to be consigned to the LLW Repository Expected to be consigned to a Landfill Facility Expected to be consigned to an On-Site Disposal Facility Expected to be consigned to an Incineration Facility Expected to be consigned to a Metal Treatment Facility Expected to be consigned as Out of Scope Expected to be recycled / reused Disposal route not known			

**Opportunities for alternative disposal routing:** -

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Estimated Date that Opportunity will be realised	Opportunity Confidence	Comment
-	-	-	-	-	-

**Waste Packaging for Disposal:**

**WASTE STREAM****3S08****Secondary Cartridge Filters (LLW)**

Container	Stream volume %	Waste loading m <sup>3</sup>	Number of packages
1/3 Height IP-1 ISO	100.0	~20	2
2/3 Height IP-2 ISO			
1/2 Height WAMAC IP-2 ISO			
1/2 Height IP-2 Disposal/Re-usable ISO			
2m box (no shielding)			
4m box (no shielding)			
Other			

Other information: Nominal value entered for waste loading. Filters are loaded into cansisters and placed into interstitial spaces in HHISO of other waste streams (mainly 3S06 LLW resin that is encapsulated in drums).

**Waste Planned for Disposal at the LLW Repository:**

Container voidage: -

Waste Characterisation Form (WCH): The waste meets the LLWR's Waste Acceptance Criteria (WAC). The waste has a current WCH. Inventory information is consistent with the current WCH.

Waste consigned for disposal to LLWR in year of generation: No. Waste is accumulated on site until authority to dispose to the LLWR is obtained.

**Non-Containerised Waste for In-Vault Grouting:** (Not applicable to this waste stream)

Stream volume (%): -

Waste stream variation: -

Bounding cuboidal volume:

Inaccessible voidage: -

Other information: -

**RADIOACTIVITY**

Source: Secondary filter cartridges from various systems. There will be contamination by fission products and activation products.

Uncertainty: The activity values quoted are indicative of the activities expected. Indicative data. Uncertainty is large. Activity levels are expected to be low.

Definition of total alpha and total beta/gamma: The listed alpha specific activities are all upper limits, therefore the total alpha activity will be less than the sum of the listed activities.

Measurement of radioactivities: Activity based on fingerprint of waste stream.

Other information: -

**WASTE STREAM**

**3S08**

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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	4.29E-03	CC 2	4.29E-03	CC 2	Gd 153				
Be 10		8		8	Ho 163				
C 14	4.95E-05	CC 2	4.95E-05	CC 2	Ho 166m				
Na 22		4		4	Tm 170				
Al 26		4		4	Tm 171				
Cl 36		8		8	Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41		8		8	Pt 193				
Mn 53					Tl 204				
Mn 54	6.25E-04	CC 2	6.25E-04	CC 2	Pb 205				
Fe 55	8.66E-03	CC 2	8.66E-03	CC 2	Pb 210		8		8
Co 60	5.51E-03	CC 2	5.51E-03	CC 2	Bi 208				
Ni 59		8		8	Bi 210m				
Ni 63	1.39E-03	CC 2	1.39E-03	CC 2	Po 210		8		8
Zn 65	<3.38E-05	CC 3	<3.38E-05	CC 2	Ra 223				
Se 79		8		8	Ra 225				
Kr 81					Ra 226		8		8
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90		8		8	Th 227				
Zr 93		8		8	Th 228				
Nb 91					Th 229		8		8
Nb 92					Th 230		8		8
Nb 93m		8		8	Th 232		8		8
Nb 94	1.90E-06	CC 2	1.90E-06	CC 2	Th 234				
Mo 93		8		8	Pa 231		8		8
Tc 97					Pa 233				
Tc 99		8		8	U 232				
Ru 106		8		8	U 233		8		8
Pd 107		8		8	U 234	<3.62E-06	CC 2	<3.62E-06	CC 2
Ag 108m		8		8	U 235		8	<	8
Ag 110m		8		8	U 236		8	<	8
Cd 109					U 238		8	<	8
Cd 113m					Np 237		8		8
Sn 119m					Pu 236				
Sn 121m		8		8	Pu 238	<2.38E-07	CC 8	<2.38E-07	CC 8
Sn 123					Pu 239	<5.04E-07	CC 8	<5.04E-07	CC 8
Sn 126		8		8	Pu 240	<6.23E-07	CC 8	<6.23E-07	CC 8
Sb 125	4.76E-04	CC 2	4.76E-04	CC 2	Pu 241	1.98E-04	CC 8	1.98E-04	CC 8
Sb 126		8		8	Pu 242		8		8
Te 125m					Am 241		8		8
Te 127m					Am 242m		8		8
I 129		8		8	Am 243		8		8
Cs 134	9.24E-04	CC 1	9.24E-04	CC 1	Cm 242		8		8
Cs 135		8		8	Cm 243		8		8
Cs 137	4.37E-03	CC 1	4.37E-03	CC 1	Cm 244		8		8
Ba 133					Cm 245		8		8
La 137					Cm 246		8		8
La 138					Cm 248				
Ce 144	4.29E-06	CC 1	4.29E-06	CC 1	Cf 249				
Pm 145					Cf 250				
Pm 147	2.54E-06	CC 1	2.54E-06	CC 1	Cf 251				
Sm 147					Cf 252				
Sm 151					Other a		8		8
Eu 152		8		8	Other b/g	4.08E-04	CC 2	4.08E-04	CC 2
Eu 154		8		8	<b>Total a</b>	<b>&lt;4.98E-06</b>	<b>C 3</b>	<b>&lt;4.98E-06</b>	<b>C 3</b>
Eu 155	1.29E-06	CC 8	1.29E-06	CC 8	<b>Total b/g</b>	<b>2.69E-02</b>	<b>CC 2</b>	<b>2.69E-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