WASTE STREAM 3S08 Secondary Cartridge Filters (LLW)

SITE Sizewell B

SITE OWNER EDFE NGL

WASTE CUSTODIAN EDFE NGL

WASTE TYPE LLW

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	2.2 m³
Future arisings -	1.4.2019 - 31.3.2035.....	36.3 m³
	1.4.2035 - 31.3.2040.....	0 m³
	1.4.2040 - 31.3.2041.....	10.5 m³
Total future arisings:		46.8 m³
Total waste volume:		49.0 m³

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/m³): 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.

Stainless steel.....	~99.0	304
Other ferrous metals.....	0	
Iron.....	0	
Aluminium.....	TR	
Beryllium.....	0	
Cobalt.....	0	
Copper.....	TR	
Lead.....	0	
Magnox/Magnesium.....	0	
Nickel.....		

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

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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).

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.

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
Active particles	0
Soluble solids as bulk chemical compounds	0

Hazardous substances / non hazardous pollutants: -

Acrylamide	NE
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

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Barium..... NE

Boron..... 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

EDTA..... NE

DPTA..... NE

NTA..... NE

Polycarboxylic acids…… NE

Other organic complexants..... NE Not expected to be present.

Total complexing agents..... 0

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 Recyling / 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.

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Disposal Routes:

Disposal Route	Stream volume %
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

Upcoming (2019/20-2021/22) Waste Routing (if expected to change from above):

Disposal Route	Stream volume %		
	2019/20	2020/21	2021/22
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			

Waste Packaging for Disposal:

Container	Stream volume %	Waste loading m³	Number of packages
1/3 Height IP-1 ISO 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	100.0	~9.46	6

Other information: Waste loading is estimated. Canisters may be placed into interstitial spaces with other waste streams.

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.

Potential for the waste to contain discrete items: No

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: -

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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:	-

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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	4.29E-03	C C 2	4.29E-03	C C 2	Gd 153				
Be 10		8		8	Ho 163				
C 14	4.95E-05	C C 2	4.95E-05	C C 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	6.26E-04	C C 2	6.26E-04	C C 2	Pb 205				
Fe 55	8.66E-03	C C 2	8.66E-03	C C 2	Pb 210		8		8
Co 60	5.51E-03	C C 2	5.51E-03	C C 2	Bi 208				
Ni 59		8		8	Bi 210m				
Ni 63	1.39E-03	C C 2	1.39E-03	C C 2	Po 210		8		8
Zn 65	<3.38E-05	C C 3	<3.38E-05	C C 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	1.91E-06	C C 2	1.91E-06	C C 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	C C 2	<3.62E-06	C C 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	C C 8	<2.38E-07	C C 8
Sn 123					Pu 239	<5.04E-07	C C 8	<5.04E-07	C C 8
Sn 126		8		8	Pu 240	<6.23E-07	C C 8	<6.23E-07	C C 8
Sb 125	4.76E-04	C C 2	4.76E-04	C C 2	Pu 241	1.98E-04	C C 8	1.98E-04	C C 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	C C 1	9.24E-04	C C 1	Cm 242		8		8
Cs 135		8		8	Cm 243		8		8
Cs 137	4.37E-03	C C 1	4.37E-03	C C 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	C C 1	4.29E-06	C C 1	Cf 249				
Pm 145					Cf 250				
Pm 147	2.54E-06	C C 1	2.54E-06	C C 1	Cf 251				
Sm 147					Cf 252				
Sm 151					Other a		8		8
Eu 152		8		8	Other b/g	4.08E-04	C C 2	4.08E-04	C C 2
Eu 154		8		8	**Total a**	**<4.98E-06**	**C 3**	**<4.98E-06**	**C 3**
Eu 155	1.29E-06	C C 8	1.29E-06	C C 8	**Total b/g**	**2.69E-02**	**C C 2**	**2.69E-02**	**C C 2**

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