

<b>WASTE STREAM</b>	<b>9F28</b>	<b>Shield Cooling Air Filters - R1</b>
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**SITE** Sizewell A  
**SITE OWNER** Nuclear Decommissioning Authority

**WASTE CUSTODIAN** Magnox Limited

**WASTE TYPE** LLW; SPD3

Is the waste subject to Scottish Policy: No

**WASTE VOLUMES**

		Reported
Stocks:	At 1.4.2022.....	12.7 m <sup>3</sup>
Total future arisings:		0 m <sup>3</sup>
Total waste volume:		12.7 m <sup>3</sup>
Comment on volumes:	Wastes are expected to be retained until Final Site Clearance.	
Uncertainty factors on volumes:	Stock (upper): x 1.1	Arisings (upper) x
	Stock (lower): x 0.9	Arisings (lower) x

**WASTE SOURCE** The waste consists of used shield cooling air filter elements.

**PHYSICAL CHARACTERISTICS**

General description: Shield cooling filter elements about 0.5 m diameter x 2 m long and weighing ~0.2 t. The filter elements are double wrapped in polythene. Special handling requirements have not been assessed. Items are about 0.5 m diameter x 2 m long and weigh ~0.2 t.

Physical components (%vol): 100% shield cooling air filter elements.

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m<sup>3</sup>): ~0.5

Comment on density: The bulk density of the waste is about 0.5 t/m<sup>3</sup>.

**CHEMICAL COMPOSITION**

General description and components (%wt): Air filters consisting of rolls of glass fibre (9%) on metal spindles (90%). Chemical compositions not fully assessed. Polythene wrapping material (~1%).

Chemical state: Neutral

Chemical form of radionuclides:  
 H-3: The chemical form of tritium has not been determined.  
 C-14: The chemical form of carbon 14 has not been determined.  
 Cl-36: The chemical form of chlorine 36 has not been determined.  
 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: The uranium isotope content is insignificant.  
 Np: The neptunium content is insignificant.  
 Pu: The plutonium isotope content is insignificant.

Metals and alloys (%wt): The waste includes metal spindles which are about 2 m long. These spindles are expected to be disposed of as non-active waste.

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	0		
Other ferrous metals.....	~90.0		
Iron.....			
Aluminium.....	0		
Beryllium.....	0		
Cobalt.....			
Copper.....	0		
Lead.....	0		

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Magnox/Magnesium.....	0	
Nickel.....		
Titanium.....		
Uranium.....		
Zinc.....	0	
Zircaloy/Zirconium.....	0	
Other metals.....	0	No "other" metals present.

Organics (%wt):                      Organics are only expected in trace quantities. Halogenated plastics and rubbers are not present.

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulosics.....	0		
Paper, cotton.....	0		
Wood.....	0		
Halogenated plastics .....	0		
Total non-halogenated plastics.....	~1.0		
Condensation polymers.....	0		
Others.....	~1.0	Polythene wrapping material (~1%).	
Organic ion exchange materials....	0		
Total rubber.....	0		
Halogenated rubber .....	0		
Non-halogenated rubber.....	0		
Hydrocarbons.....			
Oil or grease .....			
Fuel.....			
Asphalt/Tarmac (cont.coal tar)...			
Asphalt/Tarmac (no coal tar)....			
Bitumen.....			
Others.....			
Other organics.....	TR		

Other materials (%wt):                      -

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..	0		
Inorganic sludges and flocs.....	0		
Soil.....	0		
Brick/Stone/Rubble.....	0		
Cementitious material.....	0		
Sand.....			
Glass/Ceramics.....	9.0	glass fibre	
Graphite.....	0		
Desiccants/Catalysts.....			
Asbestos.....	0		

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Non/low friable.....

Moderately friable.....

Highly friable.....

Free aqueous liquids..... 0

Free non-aqueous liquids..... 0

Powder/Ash..... TR

Inorganic anions (%wt): Not fully assessed.

(%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: -

(%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.....

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.....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.....  
     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):      No

(%wt)      Type(s) and comment

EDTA.....  
 DPTA.....  
 NTA.....  
 Polycarboxylic acids.....  
 Other organic complexants.....  
 Total complexing agents.....      0

Potential for the waste to contain discrete items:      Yes. Large Metal Items (LMIs)/"substantial" thickness items considered "durable" assumed DIs; Stainless items assumed DIs.

**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		100.0

Comment on planned treatments:

It is expected that the metal spindles will be removed and disposed as non-active waste.

**Disposal Routes:**

Disposal Route	Stream volume %	Disposal density t/m3
Expected to be consigned to the LLW Repository	10.0	
Expected to be consigned to a Landfill Facility		
Expected to be consigned to an On-Site Disposal Facility	90.0	
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		

Classification codes for waste expected to be consigned to a landfill facility: 17 04 05, 17 06 03\*

**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:** (Not applicable to this waste stream)

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Container	Stream volume %	Waste loading m <sup>3</sup>	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			

Other information: -

**Waste Planned for Disposal at the LLW Repository:** (Not applicable to this waste stream)

Container voidage: -

Waste Characterisation Form (WCH): -

Waste consigned for disposal to LLWR in year of generation: -

**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: Particulates collected by the filters.

Uncertainty: Activities are expected to be very low. There is a strong possibility that this waste will be VLLW, but this cannot be confirmed until retrieval.

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: Activities have been calculated from available information.

Other information: Specific activity is a function of Station operating history.

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**9F28**

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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	1.85E-07	CC 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	4.99E-08	CC 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	9E-08	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		8			Pb 205		8		
Fe 55		8			Pb 210		8		
Co 60	3.16E-09	CC 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	1.73E-07	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		8			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		8		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233		8		
Tc 99		8			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234		8		
Ag 108m		8			U 235		8		
Ag 110m		8			U 236		8		
Cd 109		8			U 238		8		
Cd 113m		8			Np 237		8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238		8		
Sn 123		8			Pu 239		8		
Sn 126		8			Pu 240		8		
Sb 125		8			Pu 241		8		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241		8		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134		8			Cm 242		8		
Cs 135		8			Cm 243		8		
Cs 137		8			Cm 244		8		
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		8			<b>Total a</b>	<b>0</b>			<b>0</b>
Eu 155		8			<b>Total b/g</b>	<b>5.00E-07</b>	<b>CC 2</b>		<b>0</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