

WASTE STREAM	3L17	Gas Circulator Maintenance Sludge
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SITE Heysham 1

SITE OWNER EDF Energy Nuclear Generation Ltd (EDFE NGL)

WASTE CUSTODIAN EDF Energy Nuclear Generation Ltd (EDFE NGL)

WASTE TYPE LLW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025	= 1.5		
Future arisings:	1.4.2025 - 31.3.2026	= 0.1		
	1.4.2026 - 31.3.2027	= 0.1		
Total future arisings:		0.2		
Total waste volume:		1.7		

Number of waste packages in stock: At 1.4.2025..... - packages

Comment on arising rates: Waste volumes will be variable depending on station operating conditions.

Additional information on quantities: -

Uncertainty factors on volumes: Stock (upper): x 1.50 Arisings (upper): x 1.50
Stock (lower): x 0.50 Arisings (lower): x 0.50

WASTE SOURCE Sludge arising from Gas Circulator Maintenance.

PHYSICAL CHARACTERISTICS

General description: Sludge, sand and pre-coat materials. There are no large items that may require special handling.

Changes since waste generated: -

Bulk density (t/m³): ~ 2.0

Comment on density: -

CHEMICAL COMPOSITION

General description and components (%wt): Sludge (100% vol). No other items identified. The breakdown of the components constituting the sludge has not been assessed.

Chemical state: -

Sheet metal proportion / thickness: Trace quantities expected as particulate.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	TR	-	
Other ferrous metals.....	TR	-	
Iron.....	TR	-	
Aluminium.....	TR	-	
Beryllium.....	NE	-	
Cobalt.....	NE	-	
Copper.....	TR	-	
Lead.....	TR	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....	NE	-	
Titanium.....	NE	-	
Uranium.....	NE	-	
Zinc.....	TR	-	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	NE	-	

Organics (%wt):

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

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials.....	= 0	-	
Inorganic sludges and flocs.....	~ 100.0	-	
Soil.....	= 0	-	
Brick/Stone/Rubble.....	= 0	-	
Cementitious material.....	= 0	-	
Sand.....	= 0	-	
Glass/Ceramics.....	= 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	-	

COMPONENTS OF MATERIALS, WASTE PROPERTIES, MATERIALS NOT CONTRIBUTING TO MASS

Inorganic anions (%wt):

	(%wt)	Type(s) and comment
Fluoride.....	TR	-
Chloride.....	TR	-
Iodide.....	TR	-
Cyanide.....	NE	-
Carbonate.....	TR	-
Nitrate.....	TR	-
Nitrite.....	NE	-
Phosphate.....	TR	-
Sulphate.....	TR	-
Sulphide.....	TR	-

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.....	NE	-
Biodegradable materials.....	NE	-
Putrescible wastes.....		-
Non-putrescible wastes.....	= 0	-
Corrosive materials.....	= 0	-
Pyrophoric materials.....	= 0	-
Generating toxic gases.....		-
Reacting with water.....	= 0	-
Higher activity particles.....	P	May be present
Soluble solids as bulk chemical compounds.....	= 0	-

Hazardous substances / non hazardous pollutants:

	(%wt)	Type(s) and comment
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	-
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	-

Complexing agents (%wt):

Yes		
	(%wt)	Type(s) and comment
EDTA.....	NE	-
DPTA.....	NE	-
NTA.....	NE	-
Polycarboxylic acids.....	NE	-
Other organic complexants.....	NE	Expect only trace quantities, if any.
Total complexing agents.....	TR	-

Physical components:

	Number	Type(s) and comment
Sources.....	= 0	-
Electronic & Electrical Equipment (EEE)		
EEE Type 1.....		-
EEE Type 2.....		-
EEE Type 3.....		-
EEE Type 4.....		-
EEE Type 5.....		-

TREATMENT, PACKAGING AND DISPOSAL

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

Treatment	On-site / Off-site	Stream volume %
Size reduction Decay storage Low force compaction Supercompaction (HFC) Incineration Drying/dewatering/liquid separation Tie down/fixatives/strippable coating/painting application Decontamination Metal treatment Recycling / reuse Thermal treatment, including vitrification Encapsulation Polymer encapsulation Other physical treatment Other chemical treatment Containerisation Treatment not yet determined None	Off-site	= 100.0

Comments on planned treatments:

Treatment is expected to be same as the equivalent waste stream at Hartlepool Power Station, where a preliminary characterisation campaign showed this as incinerable.

Conditioning method:

-

Conditioning plants:

Plant Name	Location

Likely conditioning matrix:

-

Further information on the conditioning matrix:

-

Waste Packaging:

Likely container type:	Container	Waste packaged (vol%)	Waste loading (m³)	Payload (m³)	Number of packages	Estimated start date for packaging
	-	-	-	-	-	-

Range in container waste loading:

Other information on packaging and conditioning: -

Conditioned density (t/m³): -

Conditioned density comment: -

Management Routes:

Disposal Route	Stream volume %	Raw density t/m ³	Start date
Expected to be consigned to a Near Site, Near Surface Disposal Facility (Scotland)	= 100.0		
Expected to be Non-NSD HAW managed under Scottish Government's policy			
Expected to be disposed to LLW Vaults NRS Dounreay			
Expected to be consigned to the Geological Disposal Facility			
Expected to be consigned to a Near Surface Disposal Facility			
Expected to be consigned to the LLW Repository			
Expected to be consigned to a Landfill Facility			
Expected to be disposed On-Site			
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility			
Expected to be consigned to a Metal Treatment Facility			
Expected to be Out of Scope			
Expected to be recycled / reused			
Disposal route not known			

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

Opportunities for alternative disposal routing: No

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Opportunity Confidence	Comment
-	-	-	-	-

RADIOACTIVITY

Source: Contaminated sludge. Contamination by activation products will be the main source of activity.

Uncertainty: As the activity data is not currently assessed, the waste is expected to be ILW but may fall into the LLW category. This will need further assessment in the future.

Measurement of radioactivities: Radionuclide Content based on AETP Sludge (3L16). Error bands reflect that Individual activity levels are indicative only. The same has been done for Hartlepool (3K20 radionuclide content based on AETP Sludge 3K02)

Chemical form of radionuclides:

- H-3: Not assessed
- C-14: Not assessed
- Cl-36: Not assessed
- Se-79: Not assessed
- Tc-99: Not assessed
- I-129: Not assessed
- Ra: Not assessed
- Th: Not assessed
- U: Not assessed
- Np: Not assessed
- Pu: Not assessed

WASTE STREAM 3L17 Gas Circulator Maintenance Sludge									
Nuclide	Mean radioactivity, TBq/m³				Nuclide	Mean radioactivity, TBq/m³			
	Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code		Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code
H 3	1.63E-03	C C 1		6	Gd 153				
Be 10				8	Ho 163				
C 14	3.95E-06	C C 1		8	Ho 166m				
Na 22				4	Tm 170				
Al 26				4	Tm 171				
Cl 36	< 4.48E-08	C 1		6	Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40	< 1.38E-06	C 1			Hf 182				
Ca 41				8	Pt 193				
Mn 53					Ti 204				
Mn 54	3.09E-06	C C 1		6	Pb 205				
Fe 55	2.56E-05	C C 1		6	Pb 210	< 1.15E-06	C 1		8
Co 60	4.42E-06	C C 1		6	Bi 208				
Ni 59				6	Bi 210m				
Ni 63	9.34E-06	C C 1		6	Po 210				8
Zn 65	< 1.92E-07	C 1		6	Ra 223				
Se 79				8	Ra 225				
Kr 81					Ra 226	< 5.28E-06	C 1		8
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90	4.35E-07	C C 1		8	Th 227				
Zr 93				8	Th 228				
Nb 91					Th 229				8
Nb 92					Th 230				8
Nb 93m				8	Th 232				8
Nb 94	< 1.14E-07	C 1		8	Th 234	< 1.39E-06	C 1		
Mo 93				8	Pa 231				8
Tc 97					Pa 233	< 9.44E-07	C 1		
Tc 99				8	U 232	< 3.52E-10	C 1		
Ru 106	< 7.04E-07	C 1		8	U 233	< 6.88E-10	C 1		8
Pd 107				8	U 234	2.98E-08	C C 1		8
Ag 108m				8	U 235	1.17E-09	C C 1		8
Ag 110m	< 1.92E-07	C 1			U 236	1.78E-10	C C 1		8
Cd 109					U 238	2.64E-08	C C 1		8
Cd 113m					Np 237	< 1.01E-06	C 1		8
Sn 119m					Pu 236				
Sn 121m				8	Pu 238	7.34E-07	C C 1		8
Sn 123					Pu 239	7.18E-07	C C 1		8
Sn 126				8	Pu 240	7.18E-07	C C 1		8
Sb 125	< 1.02E-06	C 1			Pu 241	4.29E-05	C C 1		8
Sb 126					Pu 242	< 3.68E-09	C 1		8
Te 125m					Am 241	2.51E-06	C C 1		8
Te 127m					Am 242m				8
I 129				8	Am 243				8
Cs 134	2.72E-06	C C 1		6	Cm 242	1.06E-07	C C 1		8
Cs 135				8	Cm 243	< 7.52E-09	C 1		8
Cs 137	3.13E-04	C C 1		6	Cm 244	< 7.52E-09	C 1		8
Ba 133					Cm 245				8
La 137					Cm 246				8
La 138					Cm 248				
Ce 144	< 8.00E-07	C 1		8	Cf 249				
Pm 145					Cf 250				
Pm 147	7.20E-07	C C 1		8	Cf 251				
Sm 147					Cf 252				
Sm 151	3.89E-07	C C 1		8	Unsp a				
Eu 152	< 7.36E-07	C 1		8	Unsp b/g	2.36E-05	C C 1		
Eu 154	4.16E-07	C C 1		8	Total a	1.12E-05	*	0	*
Eu 155	< 5.12E-07	C 1		8	Total b/g	2.07E-03	*	0	*

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 the 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
* Total calculated from the 114 declared radionuclides