

WASTE STREAM	3K02	Active Effluent Filtration Sludges
--------------	------	------------------------------------

SITE Hartlepool

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	= 43.8		
Future arisings:	1.4.2025 - 31.3.2026	= 3.0		
	1.4.2026 - 31.3.2027	= 3.0		
	1.4.2027 - 31.3.2028	= 3.0		
Total future arisings:		9.0		
Total waste volume:		52.8		

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

Comment on arising rates: Arisings depend on station operation and are expected to increase during defuelling.

Additional information on quantities: Station operation is assumed to end in 2024 and defuelling to last 3 years.

Uncertainty factors on volumes:

Stock (upper):	x 1.25	Arisings (upper):	x 1.50
Stock (lower):	x 0.75	Arisings (lower):	x 0.50

WASTE SOURCE Filtration of radioactive effluent.

PHYSICAL CHARACTERISTICS

General description: Sludge, sand and any filter precoat material that may be used. There are no large items that may require special handling.

Changes since waste generated: -

Bulk density (t/m³): ~ 1.6

Comment on density: -

CHEMICAL COMPOSITION

General description and components (%wt): A wide variety of materials including dust, grit, sand, oil, paint, clay and water. Water is expected to be about 65% wt. Wt% of other constituents has not been assessed.

Chemical state: Alkali

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	NE	-	
Other ferrous metals.....	NE	-	
Iron.....	NE	-	
Aluminium.....	NE	-	
Beryllium.....	NE	-	
Cobalt.....	NE	-	
Copper.....	NE	-	
Lead.....	NE	-	
Magnox/Magnesium.....	NE	-	
Nickel.....	NE	-	
Titanium.....	NE	-	
Uranium.....	NE	-	
Zinc.....	NE	-	
Zircaloy/Zirconium.....	NE	-	
Other metals.....	NE	Traces of lithium cations may be present from lithium hydroxide.	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	TR	-	
Paper, cotton.....		-	
Wood.....		-	
Halogenated plastics.....	TR	-	
Total non-halogenated plastics.....	TR	-	
Condensation polymers.....		-	
Others.....		-	
Organic ion exchange materials.....	NE	-	
Total rubber.....	NE	-	
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.....	~ 2.0	-	

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials.....	NE	-	
Inorganic sludges and flocs.....	~ 98.0	-	
Soil.....	NE	-	
Brick/Stone/Rubble.....	NE	-	
Cementitious material.....	NE	-	
Sand.....	P	-	
Glass/Ceramics.....	NE	-	
Graphite.....	NE	-	
Desiccants/Catalysts.....	NE	-	
Asbestos.....	= 0	-	
Non/low friable.....		-	
Moderately friable.....		-	
Highly friable.....		-	
Free aqueous liquids.....	P	-	
Free non-aqueous liquids.....	P	-	
Powder/Ash.....	= 0	-	

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

Inorganic anions (%wt):

	(%wt)	Type(s) and comment
Fluoride.....	= 0	-
Chloride.....	< 0.10	-
Iodide.....	= 0	-
Cyanide.....	= 0	-
Carbonate.....	< 0.10	-
Nitrate.....	= 0	-
Nitrite.....	= 0	-
Phosphate.....	= 0	-
Sulphate.....	< 0.10	-
Sulphide.....	= 0	-

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.....	= 0	-
Putrescible wastes.....	= 0	-
Non-putrescible wastes.....	NE	-
Corrosive materials.....	= 0	-
Pyrophoric materials.....	= 0	-
Generating toxic gases.....	= 0	-
Reacting with water.....	= 0	-
Higher activity particles.....	= 0	Not expected
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:

Waste is stored pending decommissioning stage 1. However, campaigns to retrieve the waste have occurred in the past with latest treatment by incineration.

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: Specific activity is a function of station operating history. The values quoted are based upon activity measurements made on previously conditioned wastes.

Measurement of radioactivities: Activity estimates are based on fingerprint of wastestream and on limited dose rate measurements and spectroscopic analysis.

Chemical form of radionuclides:

- H-3: As tritiated water
- C-14: As graphite particulate or in activated metals
- Cl-36: Not determined
- Se-79: Not expected
- Tc-99: Not expected
- I-129: Not expected
- Ra: Not determined
- Th: Not determined
- U: Not determined
- Np: Not determined
- Pu: Not determined

WASTE STREAM		3K02		Active Effluent Filtration Sludges					
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	4.01E-04	C C 1	4.01E-04	C C 2	Gd 153				
Be 10					Ho 163				
C 14	2.24E-05	C C 1	2.24E-05	C C 2	Ho 166m				
Na 22		4		4	Tm 170				
Al 26		4		4	Tm 171				
Cl 36	< 2.40E-08	C 1	< 2.40E-08	C 2	Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40	< 7.80E-07	C 1	< 7.80E-07	C 2	Hf 182				
Ca 41					Pt 193				
Mn 53					Tl 204				
Mn 54	3.10E-07	C C 1	3.10E-07	C C 2	Pb 205				
Fe 55	2.40E-06	C C 1	2.40E-06	C C 2	Pb 210	< 3.80E-06	C 1	< 3.80E-06	C 2
Co 60	2.31E-06	C C 1	2.31E-06	C C 2	Bi 208				
Ni 59					Bi 210m				
Ni 63	5.40E-06	C C 1	5.40E-06	C C 2	Po 210				
Zn 65	< 1.07E-07	C 1	< 1.07E-07	C 2	Ra 223				
Se 79					Ra 225				
Kr 81					Ra 226	< 1.12E-06	C 1	< 1.12E-06	C 2
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90	1.48E-06	C C 1	1.48E-06	C C 2	Th 227				
Zr 93					Th 228				
Nb 91					Th 229				
Nb 92					Th 230				
Nb 93m					Th 232				
Nb 94	< 2.50E-08	C 1	< 2.50E-08	C 2	Th 234	< 3.50E-07	C 1	< 3.50E-07	C 2
Mo 93					Pa 231				
Tc 97					Pa 233	< 6.40E-08	C 1	< 6.40E-08	C 2
Tc 99					U 232				
Ru 106	< 4.80E-07	C 1	< 4.80E-07	C 2	U 233				
Pd 107					U 234	1.60E-08	C C 1	1.60E-08	C C 2
Ag 108m					U 235	< 6.40E-08	C 1	< 6.40E-08	C 2
Ag 110m	< 3.50E-08	C 1	< 3.50E-08	C 2	U 236	< 2.10E-11	C 1	< 2.10E-11	C 2
Cd 109					U 238	1.10E-08	C C 1	1.10E-08	C C 2
Cd 113m					Np 237	< 2.70E-07	C 1	< 2.70E-07	C 2
Sn 119m					Pu 236				
Sn 121m					Pu 238	3.10E-07	C C 1	3.10E-07	C C 2
Sn 123					Pu 239	5.80E-07	C C 1	5.80E-07	C C 2
Sn 126					Pu 240				
Sb 125	< 1.76E-07	C 1	< 1.76E-07	C 2	Pu 241				
Sb 126					Pu 242	< 4.00E-09	C 3	< 4.00E-09	C 3
Te 125m					Am 241	1.38E-06	C C 1	1.38E-06	C C 2
Te 127m					Am 242m				
I 129					Am 243				
Cs 134	7.40E-08	C C 1	7.40E-08	C C 2	Cm 242	6.56E-09	C C 1	6.56E-09	C C 2
Cs 135					Cm 243	5.40E-08	C C 1	5.40E-08	C C 3
Cs 137	1.73E-05	C C 1	1.73E-05	C C 2	Cm 244				
Ba 133					Cm 245				
La 137					Cm 246				
La 138					Cm 248				
Ce 144	< 1.49E-06	C 3	< 1.49E-06	C 2	Cf 249				
Pm 145					Cf 250				
Pm 147	3.80E-06	C C 1	3.80E-06	C C 2	Cf 251				
Sm 147					Cf 252				
Sm 151	2.60E-07	C C 1	2.60E-07	C C 2	Unsp a	< 1.00E-09	8	< 1.00E-09	8
Eu 152	< 5.80E-08	C C 1	< 5.80E-08	C C 2	Unsp b/g	1.92E-07	C C 2	1.92E-07	C C 2
Eu 154	2.70E-07	C C 1	2.70E-07	C C 2	Total a	3.82E-06	*	3.82E-06	*
Eu 155	1.30E-07	C C 1	1.30E-07	C C 2	Total b/g	4.65E-04	*	4.65E-04	*

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