

WASTE STREAM	4C26	AGR Fuel Transport Skips
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SITE Torness

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	= 4.1		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		4.1		

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

Comment on arising rates: Wastestream covers the trial treatment of 3 AGR fuel transport skips. No future arisings currently forecast, however a change in management strategy may result in a larger quantity of AGR fuel transport skips requiring management at Torness.

Additional information on quantities: This wastestream comprises 3 AGR fuel transport skips expected to be managed from Torness as part of a trial. Each skip is assumed to have an envelope volume of 1.36m³, based on manufacturing drawings.

Uncertainty factors on volumes: Stock (upper): x 1.10 Arisings (upper): x -
Stock (lower): x 0.90 Arisings (lower): x -

WASTE SOURCE

AGR fuel transport skips are used as required to transport fuel from AGR sites to Sellafield. The skips are an integral part of Wet Fuel Route operations at AGR sites, and as such have become contaminated through Wet Fuel Route activities. It is expected that there is no measureable activation of the skips, and that radiological properties are borne solely from contamination.

This wastestream covers only 3 of the '14/15-compartment' element skips to facilitate their transport to Cyclife Metals Recycling Facility (MRF) for characterisation, treatment, and size reduction trial activities which will inform the characterisation and forward management of the remaining population.

PHYSICAL CHARACTERISTICS

General description: Weights and volumes per skip are:
- '14/15-compartment' element skip: 900 kg, 1.36 m³
- Total weight: 2,700 kg, 4.08 m³ ('as is')

The main body of the skips are fabricated from 304 stainless steel, and the internal fins are composed of 0.6% boronated stainless steel, with potential of small amount of lead paint flakes (0.01 kg). Expected weight of the boronated steel is ~288.70kg per '14/15-compartment' skip.

Changes since waste generated: -

Bulk density (t/m³): ~ 0.66

Comment on density: Density based on weight of 900kg and envelope volume of 1.36m³ per skip.

CHEMICAL COMPOSITION

General description and components (%wt): 304 stainless steel (67%), boronated stainless steel (32%), carbonaceous / other debris (<1%)

Chemical state: Neutral

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	~ 67.0	-	
Other ferrous metals.....	~ 32.0	-	
Iron.....	= 0	-	
Aluminium.....	= 0	-	
Beryllium.....	= 0	-	
Cobalt.....	= 0	-	
Copper.....	= 0	-	
Lead.....	TR	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....	= 0	-	
Titanium.....	= 0	-	
Uranium.....	= 0	-	
Zinc.....	= 0	-	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	NE	-	

Organics (%wt):

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

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.....	= 0	-	
Glass/Ceramics.....	= 0	-	
Graphite.....	NE	-	
Desiccants/Catalysts.....	= 0	-	
Asbestos.....	= 0	-	
Non/low friable.....	= 0	-	
Moderately friable.....	= 0	-	
Highly friable.....	= 0	-	
Free aqueous liquids.....	= 0	-	
Free non-aqueous liquids.....	= 0	-	
Powder/Ash.....	TR	-	

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

Inorganic anions (%wt):

	(%wt)	Type(s) and comment
Fluoride.....	NE	-
Chloride.....	NE	-
Iodide.....	NE	-
Cyanide.....	NE	-
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.....	= 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.....	NE	-
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.....	~ 0.02	Alloyed in boronated stainless steel
Boron (in Boral).....	NE	-
Boron (non-Boral).....	NE	-
Cadmium.....	NE	-
Caesium.....	NE	-
Selenium.....	NE	-
Chromium.....	~ 18.0	Alloyed in 304 and boronated stainless steel
Molybdenum.....	NE	-
Thallium.....	NE	-
Tin.....	NE	-
Vanadium.....	NE	-
Mercury compounds.....	NE	-
Others.....	NE	-

Complexing agents (%wt):

Not yet determined		
	(%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.....	NE	-

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	Off-site	~ 3.3
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	Off-site	~ 96.7
Treatment not yet determined		
None		

Comments on planned treatments:

A trial is due to commence soon to determine the preferred method for treating AGR fuel transport skips. The waste hierarchy and WAC will be followed to determine the BAT to recycling / disposal.

Conditioning method:

To be confirmed

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: Radioactivity in the form of contamination from radionuclides present in the AGR fuel storage ponds at AGR stations and Sellafield. Contamination will be both entrained in the metal body of the skip and present as surface contamination. No notable activation of the skip is anticipated.

Uncertainty: Specific activity data is based on analysis of coupons recovered from the top of a limited number of skips. This is not fully representative of the whole skip. It is assumed that all AGR fuel transport skips can be treated as a single population, subject to confirmation from further characterisation in the future.

Measurement of radioactivities: Activities derived from exiting AGR fingerprints supplemented with information from analysis of coupons from a number of skips. Full details within WCH 3BE-3TOR-0-WCH-0-5688.

Chemical form of radionuclides: H-3: To be determined
C-14: To be determined
Cl-36: To be determined
Se-79: To be determined
Tc-99: To be determined
I-129: To be determined
Ra: To be determined
Th: To be determined
U: To be determined
Np: To be determined
Pu: To be determined

WASTE STREAM 4C26 AGR Fuel Transport Skips									
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	7.58E-06	C C 2			Gd 153				
Be 10					Ho 163				
C 14	3.23E-07	C C 2			Ho 166m				
Na 22					Tm 170				
Al 26					Tm 171				
Cl 36	3.50E-07	C C 2			Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41					Pt 193				
Mn 53					Ti 204				
Mn 54	2.03E-06	C C 2			Pb 205				
Fe 55	1.16E-04	C C 2			Pb 210				
Co 60	8.78E-06	C C 2			Bi 208				
Ni 59					Bi 210m				
Ni 63	1.10E-05	C C 2			Po 210				
Zn 65	1.91E-07	C C 2			Ra 223				
Se 79					Ra 225				
Kr 81					Ra 226				
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90	1.29E-06	C C 2			Th 227				
Zr 93					Th 228				
Nb 91					Th 229				
Nb 92					Th 230				
Nb 93m					Th 232				
Nb 94	1.86E-07	C C 2			Th 234				
Mo 93					Pa 231				
Tc 97					Pa 233				
Tc 99					U 232				
Ru 106	2.18E-07	C C 2			U 233				
Pd 107					U 234	6.60E-08	C C 2		
Ag 108m	4.64E-08	C C 2			U 235	1.06E-09	C C 2		
Ag 110m	8.65E-07	C C 2			U 236	1.71E-08	C C 2		
Cd 109					U 238	1.96E-08	C C 2		
Cd 113m					Np 237				
Sn 119m					Pu 236				
Sn 121m					Pu 238	2.35E-05	C C 2		
Sn 123					Pu 239	1.19E-05	C C 2		
Sn 126					Pu 240	2.81E-05	C C 2		
Sb 125	2.15E-07	C C 2			Pu 241	3.23E-05	C C 2		
Sb 126					Pu 242				
Te 125m					Am 241	6.73E-05	C C 2		
Te 127m					Am 242m				
I 129	1.87E-11	C C 2			Am 243				
Cs 134	1.86E-07	C C 2			Cm 242	9.46E-07	C C 2		
Cs 135					Cm 243	7.09E-08	C C 2		
Cs 137	5.41E-05	C C 2			Cm 244	4.22E-06	C C 2		
Ba 133					Cm 245				
La 137					Cm 246				
La 138					Cm 248				
Ce 144	7.33E-08	C C 2			Cf 249				
Pm 145					Cf 250				
Pm 147	4.35E-07	C C 2			Cf 251				
Sm 147					Cf 252				
Sm 151					Unsp a				
Eu 152	1.39E-07	C C 2			Unsp b/g	1.06E-05	C C 2		
Eu 154	3.23E-06	C C 2			Total a	1.36E-04	*	0	*
Eu 155	1.89E-06	C C 2			Total b/g	2.52E-04	*	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