

WASTE STREAM	3S09	Miscellaneous Activated Components
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SITE Sizewell B

SITE OWNER EDF Energy Nuclear Generation Ltd (EDFE NGL)

WASTE CUSTODIAN EDF Energy Nuclear Generation Ltd (EDFE NGL)

WASTE TYPE ILW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025 = 11.8			
Future arisings:	1.4.2025 - 31.3.2026 = 0.5			
	1.4.2026 - 31.3.2027 = 0.5			
	1.4.2027 - 31.3.2028 = 0.5			
	1.4.2028 - 31.3.2035 = 3.5			
	1.4.2035 - 31.3.2042 = 23.1			
Total future arisings:	28.1			
Total waste volume:	39.9			

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 1.75
Stock (lower): x 0.50 Arisings (lower): x 0.25

WASTE SOURCE Metallic waste components removed from the reactor during refuelling.

PHYSICAL CHARACTERISTICS

General description: Redundant reactor components including; Rod cluster control assemblies; Burnable poison assemblies; Neutron source assemblies; Flux mapping detectors; Core thermocouples. The presence of large items which may require special handling is to be assessed. No other constituents have been identified.

Changes since waste generated: -

Bulk density (t/m³): ~ 1.0

Comment on density: Density expected to be fairly low.

CHEMICAL COMPOSITION

General description and components (%wt): Steel (>50wt%). A detailed assessment of percentage constituents has not been made. There will be high concentrations of activation products. Fission products and actinides may be present as contaminants. Rod cluster control assembly materials are Ag (80 wt%) - In (15 wt%) - Cd (5 wt%) absorber, stainless steel cladding, spider and spring retainer, Inconel spring. Burnable poison rod assembly materials are borosilicate glass absorber and Inconel spring, with stainless steel for all other components. Primary neutron source assembly materials include those of burnable poison rod assemblies and there is additionally Cf252 and aluminium oxide.

Chemical state: Neutral

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	> 50.0	-	
Other ferrous metals.....	NE	-	
Iron.....	NE	-	
Aluminium.....	NE	-	
Beryllium.....	NE	-	
Cobalt.....	NE	-	
Copper.....	NE	-	
Lead.....	NE	-	
Magnox/Magnesium.....	NE	-	
Nickel.....	NE	Present as constituent of stainless steel.	
Titanium.....	NE	-	
Uranium.....	NE	-	
Zinc.....	NE	-	
Zircaloy/Zirconium.....	NE	-	
Other metals.....	< 50.0	Cr present as constituent of stainless steel.	

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.....	-	-	
Fuel.....	-	-	
Asphalt/Tarmac (cont.coal tar).....	-	-	
Asphalt/Tarmac (no coal tar).....	-	-	
Bitumen.....	-	-	
Others.....	-	-	
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.....	= 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.....	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.....	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):

Not yet determined

	(%wt)	Type(s) and comment
EDTA.....	NE	-
DPTA.....	NE	-
NTA.....	NE	-
Polycarboxylic acids.....	NE	-
Other organic complexants.....	NE	None anticipated.
Total complexing agents.....	NE	-

Physical components:

	Number	Type(s) and comment
Sources.....		-
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	On-site	= 100.0

Comments on planned treatments:

-

Conditioning method:

-

Conditioning plants:

Plant Name	Location
Sizewell B Modified Radioactive Waste Building (MRWB)	Sizewell B

Likely conditioning matrix:

-

Further information on the conditioning matrix:

Matrix expected to be BFS/OPC, but could also be PFA/OPC based upon the assumption that items will require a free flowing grout.

Waste Packaging:

Likely container type:

Container	Waste packaged (vol%)	Waste loading (m³)	Payload (m³)	Number of packages	Estimated start date for packaging
4 m box (100 mm concrete shielding)	100.0	12.2	14.3	4	-

Range in container waste loading:

Other information on packaging and conditioning:

Waste may be retained at the Station pending Final Site Clearance.

Conditioned density (t/m³):

~ 3.0

Conditioned density comment:

The density of the encapsulated waste is expected to be approximately 3 t/m³.

Management Routes:

Disposal Route	Stream volume %	Raw density t/m³	Start date
Expected to be consigned to a Near Site, Near Surface Disposal Facility (Scotland) 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	= 100.0		

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: Metallic components removed from the reactor during refuelling. The components will generally have high concentrations of activation products of which Co-60 is likely to be the most dominant in the medium term.

Uncertainty: The activity values quoted are indicative of the activities expected. Indicative of the order of magnitude.

Measurement of radioactivities: Theoretical estimates.

Chemical form of radionuclides: H-3: Diffused into materials.
C-14: Incorporated into steel components.
Cl-36: Not assessed.
Se-79: Not assessed.
Tc-99: Not assessed.
I-129: Not assessed.
Ra: Not expected to be significant.
Th: Not expected to be significant.
U: Not assessed.
Np: Not assessed.
Pu: Not assessed.

WASTE STREAM		3S09		Miscellaneous Activated Components					
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	2.00E-01	C C 2	2.00E-01	C C 2	Gd 153				
Be 10		8		8	Ho 163				
C 14	< 6.00E-05	C 3	< 6.00E-05	C 3	Ho 166m				
Na 22		4		4	Tm 170				
Al 26		4		4	Tm 171				
Cl 36		8		6	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	2.00E+01	C C 2	3.00E+02	C C 2	Pb 205				
Fe 55	2.00E+02	C C 2	5.00E+02	C C 2	Pb 210		8		8
Co 60	3.00E+02	C C 2	5.00E+02	C C 2	Bi 208				
Ni 59	4.00E-02	C C 2	4.00E-02	C C 2	Bi 210m				
Ni 63	5.00E+00	C C 2	5.00E+00	C C 2	Po 210		8		8
Zn 65	1.00E+00	C C 2	3.00E+01	C C 2	Ra 223				
Se 79	1.72E-05	C C 2	1.72E-05	C C 2	Ra 225				
Kr 81					Ra 226		8		8
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90	4.00E+00	C C 2	4.00E+00	C C 2	Th 227				
Zr 93	3.00E-04	C C 2	3.00E-04	C C 2	Th 228				
Nb 91					Th 229		8		8
Nb 92					Th 230		8		8
Nb 93m	6.00E-05	C C 2	5.00E-06	C C 2	Th 232		8		8
Nb 94	4.00E-03	C C 2	4.00E-03	C C 2	Th 234				
Mo 93	5.00E-03	C C 2	5.00E-03	C C 2	Pa 231		8		8
Tc 97					Pa 233				
Tc 99	5.00E-05	C C 2	5.00E-05	C C 2	U 232				
Ru 106	3.00E+00	C C 2	5.00E+01	C C 2	U 233		8		8
Pd 107	5.00E-05	C C 2	5.00E-05	C C 2	U 234	1.00E-05	C C 2	1.00E-05	C C 2
Ag 108m	1.00E-08	C C 2	1.00E-08	C C 2	U 235	2.00E-07	C C 2	2.00E-07	C C 2
Ag 110m	4.00E-01	C C 2	1.00E+01	C C 2	U 236	3.00E-06	C C 2	3.00E-06	C C 2
Cd 109					U 238	4.00E-06	C C 2	4.00E-06	C C 2
Cd 113m					Np 237	3.00E-06	C C 2	3.00E-06	C C 2
Sn 119m					Pu 236				
Sn 121m		8		8	Pu 238	2.00E-02	C C 2	2.00E-02	C C 2
Sn 123					Pu 239	9.00E-03	C C 2	9.00E-03	C C 2
Sn 126		8		8	Pu 240	9.00E-03	C C 2	9.00E-03	C C 2
Sb 125	2.00E+01	C C 2	6.00E+01	C C 2	Pu 241	3.00E+00	C C 2	3.00E+00	C C 2
Sb 126	3.00E-01	C C 2	2.00E+02	C C 2	Pu 242	3.00E-05	C C 2	3.00E-05	C C 2
Te 125m	2.00E+01	C C 2	6.00E+00	C C 2	Am 241	3.00E-02	C C 2	4.00E-03	C C 2
Te 127m					Am 242m	2.00E-04	C C 2	2.00E-04	C C 2
I 129	2.00E-06	C C 2	2.00E-06	C C 2	Am 243	6.00E-04	C C 2	6.00E-04	C C 2
Cs 134	9.00E+00	C C 2	4.00E+01	C C 2	Cm 242	1.00E-03	C C 2	6.00E-02	C C 2
Cs 135	2.00E-04	C C 2	2.00E-04	C C 2	Cm 243	4.00E-05	C C 2	4.00E-05	C C 2
Cs 137	6.00E+01	C C 2	6.00E+01	C C 2	Cm 244	5.00E-03	C C 2	6.00E-03	C C 2
Ba 133					Cm 245	3.00E-06	C C 2	3.00E-06	C C 2
La 137					Cm 246	6.00E-07	C C 2	6.00E-07	C C 2
La 138					Cm 248				
Ce 144	2.00E+00	C C 2	4.00E+01	C C 2	Cf 249				
Pm 145					Cf 250				
Pm 147	2.00E+00	C C 2	5.00E+00	C C 2	Cf 251				
Sm 147					Cf 252				
Sm 151	8.00E-03	C C 2	8.00E-03	C C 2	Unsp a		8		8
Eu 152	8.00E-05	C C 2	1.00E-04	C C 2	Unsp b/g	5.00E+01	C C 2	3.00E+03	C C 2
Eu 154	2.00E-01	C C 2	4.00E-01	C C 2	Total a	7.48E-02	*	1.09E-01	*
Eu 155	1.00E-01	C C 2	3.00E-01	C C 2	Total b/g	7.00E+02	*	4.81E+03	*

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