WASTE STREAM	3S12	CVCS Resins and Spent Resins (ILW)

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)
Stocks:	At 1.4.2025	= 19.6
Future arisings:	1.4.2025 - 31.3.2026	~ -10.3
	1.4.2026 - 31.3.2027	~ 1.7
	1.4.2027 - 31.3.2028	~ 1.7
	1.4.2028 - 31.3.2035	~ 11.7
	1.4.2035 - 31.3.2041	~ 30.0
	1.4.2041 - 31.3.2042	-54.2
Total future arisings:		**-19.6**
Total waste volume:		**0.0**

OR

Conditioned (m^3)	Packaged (m^3)

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

Comment on arising rates: Annual arisings are estimated at 1.66m³ during generation. Decomissioning arisings increase due to primary circuit decontamination(additional 30m³). Negative arisings relate to conditioning campaigns and the waste volume then recorded under 3S12/C. Conditioning campaigns planned for ~2025 for 24 drums (12m³) and the remainder processed at end of station life ~2041.
Note that 2025-2026 arising of -10.34m³ is based on 1.66m³ annual arisng and a conditioning campaign of 12m³.

Additional information on quantities: -

Uncertainty factors on volumes:

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

WASTE SOURCE The spent resins arise from operational de-mineralisers, whose primary function is reactor coolant purification and chemistry control.

PHYSICAL CHARACTERISTICS

General description: Spent resin waste is an aqueous slurry of spent organic ion exchange resin comprising mixed anion and cation bead resin based on a styrene divinylbenzene co-polymer (DVB-styrene), in approximately a 50:50 (anion:cation) mix.

Changes since waste generated: -

Bulk density (t/m³): ~ 1.1

Comment on density: Density is representative of the stored condition of the waste which is flooded. 70% resin 30% interstitial water.

CHEMICAL COMPOSITION

General description and components (%wt): Proprietary ion exchange resins (70%wt), water (30%wt). Some fine particulate corrosion products (activated) and insoluble particulate fission products. No other constituent is anticipated. Mixture of resins (including polystyrene bead resin) with both acidic functional groups in the lithium form and basic functional groups in the borate form. Exhausted sites rendered neutral.

Chemical state: Neutral

Sheet metal proportion / thickness: -

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		-	
Beryllium	= 0	-	
Cobalt	TR	-	
Copper		-	
Lead	= 0	-	
Magnox/Magnesium	= 0	-	
Nickel		-	
Titanium	NE	-	
Uranium	= 0	-	
Zinc	= 0	-	
Zircaloy/Zirconium	= 0	-	
Other metals	TR	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulosics	= 0	-	
Paper, cotton	= 0	-	
Wood	= 0	-	
Halogenated plastics	= 0	-	
Total non-halogenated plastics	= 0	-	
Condensation polymers	= 0	-	
Others	= 0	-	
Organic ion exchange materials	~ 70.0	-	100.0
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	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	= 0	-	
Glass/Ceramics		-	
Graphite	= 0	-	
Desiccants/Catalysts	= 0	-	
Asbestos	= 0	-	
Non/low friable		-	
Moderately friable		-	
Highly friable		-	
Free aqueous liquids	~ 30.0	-	
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	~ 0.02	-
Chloride	~ 0.10	-
Iodide	NE	-
Cyanide	NE	-
Carbonate	NE	-
Nitrate	NE	-
Nitrite	NE	-
Phosphate	NE	-
Sulphate	~ 0.70	-
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): Yes

	(%wt)	Type(s) and comment
EDTA	NE	-
DPTA	NE	-
NTA	NE	-
Polycarboxylic acids	NE	-
Other organic complexants	NE	Complexing agents may be present in trace quantities.
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		

Comments on planned treatments: Refer to waste stream 3S12/C for information. A percentage of this waste is currently dry drained and stored in MOSAIK casks (3S12/C).

Conditioning method: Refer to 3S12/C for conditioning and container information.

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 (m^3)	Payload (m^3)	Number of packages	Estimated start date for packaging
-	-	-	-	-	-

Range in container waste loading:

Other information on packaging and conditioning: -

Conditioned density (t/m^3): -
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)			
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: Spent ion exchange resin arising from the treatment of liquids. Contamination will be by fission and activation products, and trace quantities of actinides.

Uncertainty: The activity values quoted for existing waste is based on characterisation results. Activity of future arisings based on possible future contamination of resins with fission products. The activity estimates are thought to be accurate to within a factor of 10.

Measurement of radioactivities: Theoretical assessment. Some activity data comes from limited tank sampling activities.

Chemical form of radionuclides:

H-3: In interstitial water between the resin beads.
C-14: Not determined.
Cl-36: Not expected to be present in any measurable quantity.
Se-79: Not expected to be present in any measurable quantity.
Tc-99: Not expected to be present in any measurable quantity.
I-129: Not determined.
Ra: Not expected to be present in any measurable quantity.
Th: Not determined.
U: Trace quantities may exist adsorbed on the resin beads - detailed analysis still awaited.
Np: Not expected to be present in any measurable quantity.
Pu: Trace quantities may exist adsorbed on the resin beads - detailed analysis still awaited.

WASTE STREAM **3S12** **CVCS Resins and Spent Resins (ILW)**

Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code	Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code
H 3	2.41E-03	C C 2	1.64E-02	C C 2	Gd 153			2.29E-06	C C 2
Be 10			3.13E-09	C C 2	Ho 163			1.11E-07	C C 2
C 14	4.41E-02	C C 2	3.84E-02	C C 2	Ho 166m			1.63E-05	C C 2
Na 22		4		4	Tm 170			6.01E-06	C C 2
Al 26		4		4	Tm 171			5.26E-04	C C 2
Cl 36			8.24E-08	C C 2	Lu 174			8.51E-07	C C 2
Ar 39			3.41E-05	C C 2	Lu 176			1.06E-13	C C 2
Ar 42			1.96E-10	C C 2	Hf 178n			1.89E-05	C C 2
K 40			5.00E-11	C C 2	Hf 182			2.07E-10	C C 2
Ca 41			9.40E-08	C C 2	Pt 193			3.71E-07	C C 2
Mn 53			1.05E-12	C C 2	Tl 204			1.20E-04	C C 2
Mn 54	8.83E-04	C C 2	3.63E-02	C C 2	Pb 205			2.49E-12	C C 2
Fe 55	5.21E-02	C C 2	2.41E-01	C C 2	Pb 210			5.51E-10	C C 2
Co 60	6.58E-02	C C 2	4.46E-01	C C 2	Bi 208			1.26E-11	C C 2
Ni 59			6.41E-07	C C 2	Bi 210m			1.73E-12	C C 2
Ni 63	3.29E-01	C C 2	2.63E-01	C C 2	Po 210			1.60E-09	C C 2
Zn 65	< 2.19E-08	C 3	1.53E-03	C C 2	Ra 223			1.63E-10	C C 2
Se 79			3.40E-08	C C 2	Ra 225			2.50E-07	C C 2
Kr 81			1.06E-07	C C 2	Ra 226			1.90E-09	C C 2
Kr 85	< 1.90E-06	C 3	9.91E-03	C C 2	Ra 228			2.40E-07	C C 2
Rb 87			1.19E-10	C C 2	Ac 227			1.63E-10	C C 2
Sr 90	1.17E-03	C C 2	9.27E-03	C C 2	Th 227			1.60E-10	C C 2
Zr 93			9.46E-06	C C 2	Th 228	< 5.84E-07	C 3	4.56E-07	C C 2
Nb 91			6.16E-09	C C 2	Th 229	< 2.92E-07	C 3	2.50E-07	C C 2
Nb 92			6.50E-12	C C 2	Th 230	< 2.92E-07	C 3	2.50E-07	C C 2
Nb 93m			4.19E-04	C C 2	Th 232	< 3.65E-07	C 3	3.13E-07	C C 2
Nb 94			7.36E-06	C C 2	Th 234			7.19E-07	C C 2
Mo 93			1.63E-07	C C 2	Pa 231			4.03E-10	C C 2
Tc 97			6.11E-13	C C 2	Pa 233			1.79E-06	C C 2
Tc 99			6.96E-05	C C 2	U 232	< 2.92E-07	C 3	2.17E-07	C C 2
Ru 106	< 5.33E-05	C 3	7.64E-03	C C 2	U 233	9.49E-07	C C 2	5.97E-10	C C 2
Pd 107			7.43E-07	C C 2	U 234			1.18E-06	C C 2
Ag 108m			4.46E-07	C C 2	U 235			3.74E-08	C C 2
Ag 110m			7.36E-04	C C 2	U 236	< 5.84E-07	C 3	4.93E-07	C C 2
Cd 109	< 8.03E-08	C 3	1.36E-05	C C 2	U 238	< 8.03E-07	C 3	7.19E-07	C C 2
Cd 113m	< 3.65E-05	C 3	7.61E-05	C C 2	Np 237			1.79E-06	C C 2
Sn 119m			1.30E-06	C C 2	Pu 236			1.23E-08	C C 2
Sn 121m			1.25E-04	C C 2	Pu 238	9.56E-06	C C 2	9.66E-05	C C 2
Sn 123			3.63E-06	C C 2	Pu 239		6	3.79E-05	C C 2
Sn 126			1.10E-06	C C 2	Pu 240	< 6.57E-07	C 3	3.80E-05	C C 2
Sb 125	< 4.38E-08	C 3	3.26E-02	C C 2	Pu 241	< 5.47E-05	C 3	5.74E-03	C C 2
Sb 126			3.54E-07	C C 2	Pu 242	< 3.29E-07	C 3	3.99E-07	C C 2
Te 125m			8.16E-03	C C 2	Am 241	< 5.11E-07	C 3	1.83E-04	C C 2
Te 127m			2.14E-05	C C 2	Am 242m	< 6.57E-08	C 3	6.63E-07	C C 2
I 129	< 1.83E-07	C 3	2.41E-07	C C 2	Am 243	< 5.11E-08	C 3	2.37E-06	C C 2
Cs 134	4.20E-02	C C 2	3.07E-02	C C 2	Cm 242	< 5.11E-08	C 3	2.00E-06	C C 2
Cs 135			2.66E-06	C C 2	Cm 243			1.11E-07	C C 2
Cs 137	3.62E-01	C C 2	4.03E-01	C C 2	Cm 244	< 1.46E-08	C 3	1.46E-05	C C 2
Ba 133			1.41E-05	C C 2	Cm 245			3.77E-06	C C 2
La 137			1.60E-08	C C 2	Cm 246	< 7.30E-09	C 3	1.06E-06	C C 2
La 138			2.34E-14	C C 2	Cm 248			4.93E-11	C C 2
Ce 144	< 2.92E-08	C 3	3.76E-03	C C 2	Cf 249			5.17E-10	C C 2
Pm 145			5.36E-08	C C 2	Cf 250			3.17E-09	C C 2
Pm 147	< 1.10E-05	C 2	3.14E-02	C C 2	Cf 251			4.90E-11	C C 2
Sm 147			1.66E-11	C C 2	Cf 252			1.33E-09	C C 2
Sm 151			1.51E-03	C C 2	Unsp a		8		8
Eu 152			1.57E-06	C C 2	Unsp b/g	< 7.30E-04	C 3		6
Eu 154	< 3.65E-08	C 3	1.31E-02	C C 2	**Total a**	**1.53E-05**	*	**3.85E-04**	*
Eu 155	< 1.46E-08	C 3	3.23E-03	C C 2	**Total b/g**	**9.01E-01**	*	**1.60E+00**	*

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