WASTE STREAM 3S302 Decommissioning: Mild Steel ILW

SITE Sizewell B

SITE OWNER EDFE NGL

WASTE CUSTODIAN EDFE NGL

WASTE TYPE ILW

Is the waste subject to Scottish Policy: No

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2022.....	0 m³
Future arisings -	1.4.2022 - 31.3.2040.....	0 m³
	1.4.2040 - 31.3.2052.....	214.5 m³
Total future arisings:		214.5 m³
Total waste volume:		214.5 m³

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

Uncertainty factors on volumes: Stock (upper): x Arisings (upper) x 1.5
Stock (lower): x Arisings (lower) x 0.5

WASTE SOURCE Mild steel items from the reactor pressure vessel.

PHYSICAL CHARACTERISTICS

General description: A variety of mild steel items. Waste can be packaged in standard RWM packages.

Physical components (%vol): Mild steel items (100%).

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): ~1.4

Comment on density: The density is of the waste as cut for packaging.

CHEMICAL COMPOSITION

General description and components (%wt): A variety of mild steels (100%) with possible traces of other metals.

Chemical state: -

Chemical form of radionuclides: -

Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	0		
Other ferrous metals.....	100.0		
Iron.....	0		
Aluminium.....			
Beryllium.....	0		
Cobalt.....	0		
Copper.....			
Lead.....	0		
Magnox/Magnesium.....	0		
Nickel.....			
Titanium.....	0		
Uranium.....	0		
Zinc.....	0		

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Zircaloy/Zirconium	0
Other metals	0

Organics (%wt): None expected.

	(%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	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			
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		

Inorganic anions (%wt): None likely to be present.

	(%wt)	Type(s) and comment
Fluoride	0	
Chloride	0	
Iodide	0	
Cyanide	0	
Carbonate	0	
Nitrate	0	
Nitrite	0	
Phosphate	0	
Sulphate	0	
Sulphide	0	

Materials of interest for waste acceptance criteria: No materials likely to pose a fire or other non-radiological hazard have been identified.

	(%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	
Electronic Electrical Equipment (EEE)		
EEE Type 1.....	0	
EEE Type 2.....	0	
EEE Type 3.....	0	
EEE Type 4.....	0	
EEE Type 5.....	0	

Complexing agents (%wt): Not yet determined

	(%wt)	Type(s) and comment
EDTA.....	NE	
DPTA.....	NE	
NTA.....	NE	
Polycarboxylic acids…….	NE	
Other organic complexants.....	NE	Only trace quantities, if any.
Total complexing agents.....	NE	

Potential for the waste to contain discrete items: No.

PACKAGING AND CONDITIONING

Conditioning method: The waste will be loaded into shielded (100mm) RWM 4m boxes and grouted.

Plant Name: -

Location: -

Plant startup date: About 8 years after reactor shutdown.

Total capacity (m^3/y incoming waste): ~500.0

Target start date for packaging this stream: -

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Throughput for this stream (m³/y incoming waste): -

Other information: Waste will be conditioned when removed from the reactor. Waste loading is limited by the maximum weight limit for transport of 65Te.

Likely container type:

Container	Waste packaged (%vol)	Waste loading (m³)	Payload (m³)	Number of packages
4m box (100mm concrete shielding)	100.0	~8.6	~14.3	25

Likely container type comment: -

Range in container waste volume: -

Other information on containers: Stainless Steel.

Likely conditioning matrix: BFS/OPC

Other information: -

Conditioned density (t/m³): ~3.15

Conditioned density comment: Assumes waste will be encapsulated, matrix would be likely to be BFS/OPC.

Other information on conditioning: Different decommissioning ILW wastes may be in the same waste package.

Opportunities for alternative disposal routing: No

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Estimated Date that Opportunity will be realised	Opportunity Confidence	Comment
-	-	-	-	-	-

RADIOACTIVITY

Source: Activation of the mild steel and its impurities.

Uncertainty: The values quoted were derived by calculation from available material specifications and are indicative of the activities that are to be expected. These figures require review as there is significant uncertainty in the values quoted.

Definition of total alpha and total beta/gamma: Where totals are shown on the table of radionuclide activities they are the sums of the listed alpha or beta/gamma emitting radionuclides plus 'other alpha' or 'other beta/gamma'.

Measurement of radioactivities: Activation/decay calculations based on neutron flux and operating history.

Other information: There may be some contamination by Cs137. The activities quoted are those at the time of decommissioning.

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Nuclide	Mean radioactivity, TBq/m³				Nuclide	Mean radioactivity, TBq/m³			
	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3			1E-02	C C 2	Gd 153				
Be 10				8	Ho 163				
C 14			1E-04	C C 2	Ho 166m				
Na 22				4	Tm 170				
Al 26				4	Tm 171				
Cl 36			6E-07	C C 2	Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41				8	Pt 193				
Mn 53					Tl 204				
Mn 54				8	Pb 205				
Fe 55			7E-01	C C 2	Pb 210				8
Co 60			7E-02	C C 2	Bi 208				
Ni 59			1E-04	C C 2	Bi 210m				
Ni 63			1E-02	C C 2	Po 210				8
Zn 65				8	Ra 223				
Se 79				8	Ra 225				
Kr 81					Ra 226				8
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90				8	Th 227				
Zr 93				8	Th 228				
Nb 91					Th 229				8
Nb 92					Th 230				8
Nb 93m			5E-05	C C 2	Th 232				8
Nb 94			2E-07	C C 2	Th 234				
Mo 93			5E-05	C C 2	Pa 231				8
Tc 97					Pa 233				
Tc 99			1E-05	C C 2	U 232				
Ru 106				8	U 233				8
Pd 107				8	U 234				8
Ag 108m			3E-07	C C 2	U 235				8
Ag 110m					U 236				8
Cd 109					U 238				8
Cd 113m					Np 237				8
Sn 119m					Pu 236				
Sn 121m			6E-05	C C 2	Pu 238				8
Sn 123					Pu 239				8
Sn 126				8	Pu 240				8
Sb 125					Pu 241				8
Sb 126					Pu 242				8
Te 125m					Am 241				8
Te 127m					Am 242m				8
I 129				8	Am 243				8
Cs 134				8	Cm 242				8
Cs 135				8	Cm 243				8
Cs 137				8	Cm 244				8
Ba 133					Cm 245				8
La 137					Cm 246				8
La 138					Cm 248				
Ce 144				8	Cf 249				
Pm 145					Cf 250				
Pm 147				8	Cf 251				
Sm 147					Cf 252				
Sm 151				8	Other a				8
Eu 152			3E-07	C C 2	Other b/g				8
Eu 154			7E-07	C C 2	**Total a**	**0**		**<1E-09**	**8**
Eu 155				8	**Total b/g**	**0**		**7.90E-01**	**C C 2**

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 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