

WASTE STREAM	7A40	Experimental Metallic Vessels
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SITE AWE Aldermaston

SITE OWNER Ministry of Defence (MOD)

WASTE CUSTODIAN AWE plc

WASTE TYPE ILW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025 = 9.0			
Future arisings:	1.4.2025 - 31.3.2080 = 0			
Total future arisings:	0.0			
Total waste volume:	9.0			

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

Comment on arising rates: Operational requirements at AWE are dependent on Strategic Defence Reviews and are subject to change over time. Future arisings are currently predicted to be zero, as the associated experimental vessel programme has ceased.
The stock volume is the nett volume of the vessels and does not include the final package proposal of the vessels being entombed into 3m3 boxes.

Additional information on quantities: The stock volumes are recorded in a maintained electronic database and are accurate. The total volume of arisings is now zero as experimental programme for trials on vessels has ceased.

Uncertainty factors on volumes: Stock (upper): x 1.00 Arisings (upper): x -
Stock (lower): x 1.00 Arisings (lower): x -

WASTE SOURCE Processes involved with the production, maintenance and decommissioning of the UK's nuclear deterrent.

PHYSICAL CHARACTERISTICS

General description: Metallic vessels.

Changes since waste generated: No changes have occurred to the stock volumes and no new waste have been generated.

Bulk density (t/m³): = 1.9

Comment on density: Bulk density not required to be reviewed for 2025 UK RWI. This was reviewed in 2022 and was the same as 2019 UK RWI.

CHEMICAL COMPOSITION

General description and components (%wt): Metal (77.0%), glass (2.86%), other materials (2.50%) and graphite (17.64%). Note that the precise breakdown by weight is not available for publication due to the classification of certain materials.

Chemical state: Neutral

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	= 0	-	
Other ferrous metals.....	= 76.9	Mild steel	
Iron.....	= 0	-	
Aluminium.....	= 0.05	-	
Beryllium.....	< 0.01	-	
Cobalt.....	= 0	-	
Copper.....	= 0.05	-	
Lead.....	= 0	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....	= 0	-	
Titanium.....	= 0	-	
Uranium.....	= 0	-	
Zinc.....	= 0	-	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	= 0	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	= 0.81	-	
Paper, cotton.....	= 0	-	
Wood.....	= 0.81	-	
Halogenated plastics.....	= 0	-	
Total non-halogenated plastics.....	= 0.01	-	
Condensation polymers.....	= 0.01	-	
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.....	= 0.31	-	
Cementitious material.....	= 1.4	-	
Sand.....	= 0	-	
Glass/Ceramics.....	= 2.9	-	
Graphite.....	= 17.6	-	
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.....	= 0	-	

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

Inorganic anions (%wt):

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

Materials of interest for waste acceptance criteria:

	(%wt)	Type(s) and comment
Combustible metals.....	NE	-
Low flash point liquids.....	NE	-
Explosive materials.....	NE	-
Phosphorus.....	NE	-
Hydrides.....	NE	-
Biological etc. materials.....	-	-
Biodegradable materials.....	NE	-
Putrescible wastes.....	NE	-
Non-putrescible wastes.....	NE	-
Corrosive materials.....	NE	-
Pyrophoric materials.....	NE	-
Generating toxic gases.....	NE	-
Reacting with water.....	NE	-
Higher activity particles.....	NE	-
Soluble solids as bulk chemical compounds.....	NE	-

Hazardous substances / non hazardous pollutants:

	(%wt)	Type(s) and comment
Acrylamide.....	= 0	-
Benzene.....	NE	-
Chlorinated solvents.....	= 0	-
Formaldehyde.....	= 0	-
Organometallics.....	= 0	-
Phenol.....	NE	-
Styrene.....	= 0	-
Tri-butyl phosphate.....	NE	-
Other organophosphates.....	= 0	-
Vinyl chloride.....	NE	-
Arsenic.....	NE	-
Barium.....	= 0	-
Boron.....	NE	-
Boron (in Boral).....	NE	-
Boron (non-Boral).....	NE	-
Cadmium.....	NE	-
Caesium.....	= 0	-
Selenium.....	NE	-
Chromium.....	NE	-
Molybdenum.....	NE	-
Thallium.....	= 0	-
Tin.....	NE	-
Vanadium.....	NE	-
Mercury compounds.....	= 0	-
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	-
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	On-site	= 100.0
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:

The vessels will be 'entombed' in 3m3 boxes this is consistent with AWE Conceptual Letter of Compliance.

Conditioning method:

-

Conditioning plants:

Plant Name	Location

Likely conditioning matrix:

-

Further information on the conditioning matrix:

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Waste Packaging:

Likely container type:	Container	Waste packaged (vol%)	Waste loading (m³)	Payload (m³)	Number of packages	Estimated start date for packaging
	Sellafield 3 m³ box	100.0	0.45	2.8	20	-

Range in container waste loading:

Other information on packaging and conditioning: -

Conditioned density (t/m³): NE
Conditioned density comment: -

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)	= 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: Uranium, Plutonium and Americium.

Uncertainty: The stocks have been decay corrected utilising the data and information from historical waste record cards and company waste management database.

Measurement of radioactivities: Mass balance was used.

Chemical form of radionuclides:

- H-3: Not present in this waste stream
- C-14: Not present in this waste stream
- Cl-36: Not present in this waste stream
- Se-79: Not present in this waste stream
- Tc-99: Not present in this waste stream
- I-129: Not present in this waste stream
- Ra: Only daughter products present from uranium in this waste stream. Oxide form
- Th: Only daughter products present from uranium in this waste stream. Oxide form
- U: Present in waste stream in compound form (oxide, fluoride and hydride)
- Np: Np-237 present in waste stream as oxide form from daughter product of Am-241 alpha decay.
- Pu: Present in waste stream in plutonium hydride / oxide form

WASTE STREAM		7A40		Experimental Metallic Vessels					
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					Gd 153				
Be 10					Ho 163				
C 14					Ho 166m				
Na 22					Tm 170				
Al 26					Tm 171				
Cl 36					Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41					Pt 193				
Mn 53					Tl 204				
Mn 54					Pb 205				
Fe 55					Pb 210	= 1.08E-08	C C 2		
Co 60					Bi 208				
Ni 59					Bi 210m	= 1.08E-08	C C 2		
Ni 63					Po 210	= 9.82E-09	C C 2		
Zn 65					Ra 223	= 4.25E-07	C C 2		
Se 79					Ra 225	= 1.26E-12	C C 2		
Kr 81					Ra 226	= 7.57E-08	C C 2		
Kr 85					Ra 228	= 2.29E-13	C C 2		
Rb 87					Ac 227	= 4.32E-07	C C 2		
Sr 90					Th 227	= 4.22E-07	C C 2		
Zr 93					Th 228	= 1.72E-13	C C 2		
Nb 91					Th 229	= 1.27E-12	C C 2		
Nb 92					Th 230	= 2.27E-05	C C 2		
Nb 93m					Th 232	= 4.22E-13	C C 2		
Nb 94					Th 234	= 2.91E-01	C C 2		
Mo 93					Pa 231	= 2.06E-06	C C 2		
Tc 97					Pa 233	= 1.24E-05	C C 2		
Tc 99					U 232				
Ru 106					U 233	= 1.04E-09	C C 2		
Pd 107					U 234	= 1.62E-01	C C 2		
Ag 108m					U 235	= 6.39E-03	C C 2		
Ag 110m					U 236	= 5.63E-04	C C 2		
Cd 109					U 238	= 2.91E-01	C C 2		
Cd 113m					Np 237	= 1.24E-05	C C 2		
Sn 119m					Pu 236				
Sn 121m					Pu 238	= 6.78E-02	C C 2		
Sn 123					Pu 239	= 1.01E+00	C C 2		
Sn 126					Pu 240	= 4.98E-01	C C 2		
Sb 125					Pu 241	= 1.94E-01	C C 2		
Sb 126					Pu 242	= 1.65E-04	C C 2		
Te 125m					Am 241	= 9.86E-01	C C 2		
Te 127m					Am 242m				
I 129					Am 243				
Cs 134					Cm 242				
Cs 135					Cm 243				
Cs 137					Cm 244				
Ba 133					Cm 245				
La 137					Cm 246				
La 138					Cm 248				
Ce 144					Cf 249				
Pm 145					Cf 250				
Pm 147					Cf 251				
Sm 147					Cf 252				
Sm 151					Unsp a				
Eu 152					Unsp b/g				
Eu 154					Total a	3.02E+00	*	0	*
Eu 155					Total b/g	4.85E-01	*	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