

WASTE STREAM	7A36	Pyrochemical Wastes
--------------	------	---------------------

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	= 2.5		
Future arisings:	1.4.2025 - 31.3.2030	= 1.0		
	1.4.2031 - 31.3.2040	= 0.4		
	1.4.2041 - 31.3.2050	= 0.4		
	1.4.2051 - 31.3.2062	= 0.5		
	1.4.2063 - 31.3.2080	= 0		
Total future arisings:		2.3		
Total waste volume:		4.8		

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

Comment on arising rates: Waste contained within a 205 litre drums, but constitutes to 20 x 1 litre packages per drum.

Additional information on quantities: Data reviewed in previous UK RWI; 2022 highlighted a reduction in future arisings from the 2019 UKRWI. It is important to understand that the outer drums, which contain the waste packages, are just handling aids. It is the inner smaller packages that will be processed.

Uncertainty factors on volumes: Stock (upper): x 2.00 Arisings (upper): x 5.00
Stock (lower): x 0.50 Arisings (lower): x 0.50

WASTE SOURCE Wastes were generated from processes used to refine metals.

PHYSICAL CHARACTERISTICS

General description: Mixed pyrochemical salts and crucible wastes.

Changes since waste generated: -

Bulk density (t/m³): = 3.2

Comment on density: Reviewed in 2025, slight increase due to other containers being identified on the company electronic waste management system.

CHEMICAL COMPOSITION

General description and components (%wt): -

Chemical state: -

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

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

Organics (%wt):

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

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials.....	NE	-	
Inorganic sludges and flocs.....	NE	-	
Soil.....	NE	-	
Brick/Stone/Rubble.....	NE	-	
Cementitious material.....	NE	-	
Sand.....	NE	-	
Glass/Ceramics.....	NE	-	
Graphite.....	NE	-	
Desiccants/Catalysts.....	NE	-	
Asbestos.....	NE	-	
Non/low friable.....	NE	-	
Moderately friable.....	NE	-	
Highly friable.....	NE	-	
Free aqueous liquids.....	NE	-	
Free non-aqueous liquids.....	NE	-	
Powder/Ash.....	NE	-	

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.....	NE	-
Low flash point liquids.....	NE	-
Explosive materials.....	NE	-
Phosphorus.....	NE	-
Hydrides.....	NE	-
Biological etc. materials.....	NE	-
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.....	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	Unlikely that complexing agents present but needs to be determined through sampling when waste is processed.
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		
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	Off-site	= 100.0
None		

Comments on planned treatments:

These wastes may potentially be treated, segregated, encapsulated and sentenced to the GDF This is dependant on future characterisation analysis.

Conditioning method:

-

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
	Not yet determined	100.0	-	-	-	-

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/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	= 3.2	

Classification codes for waste expected to be consigned to a landfill facility:

Opportunities for alternative disposal routing: Not yet determined

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Opportunity Confidence	Comment
-	-	-	-	-

RADIOACTIVITY

Source: Plutonium contamination

Uncertainty: The total stock activity has been reviewed and the activities have been recalculated for the 2025 UK RWI.

Measurement of radioactivities: A programme is ongoing to re-assay these wastes using PNCC and high resolution gamma spectrometry.

Chemical form of radionuclides:

- H-3: Not present in waste stream
- C-14: Not present in waste stream
- Cl-36: Not present in waste stream
- Se-79: Not present in waste stream
- Tc-99: Not present in waste stream
- I-129: Not present in 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 as metal or metal oxide
- Np: Np-237 present in waste stream as oxide form from daughter product of Am-241 alpha decay.
- Pu: Present as metal or metal oxide

WASTE STREAM 7A36 Pyrochemical Wastes									
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					Ti 204				
Mn 54					Pb 205				
Fe 55					Pb 210	= 4.62E-12	C C 2	= 7.73E-12	C C 2
Co 60					Bi 208				
Ni 59					Bi 210m				
Ni 63					Po 210	= 4.34E-12	C C 2	= 7.31E-12	C C 2
Zn 65					Ra 223	= 3.32E-11	C C 2	= 4.41E-11	C C 2
Se 79					Ra 225	= 2.22E-12	C C 2	= 1.53E-12	C C 2
Kr 81					Ra 226	= 2.20E-11	C C 2	= 3.39E-11	C C 2
Kr 85					Ra 228	= 1.24E-15	C C 2	= 1.57E-15	C C 2
Rb 87					Ac 227	= 3.36E-11	C C 2	= 4.45E-11	C C 2
Sr 90					Th 227	= 3.29E-11	C C 2	= 4.36E-11	C C 2
Zr 93					Th 228	= 9.98E-16	C C 2	= 1.30E-15	C C 2
Nb 91					Th 229	= 2.23E-12	C C 2	= 1.54E-12	C C 2
Nb 92					Th 230	= 4.60E-09	C C 2	= 6.40E-09	C C 2
Nb 93m					Th 232	= 2.01E-15	C C 2	= 2.43E-15	C C 2
Nb 94					Th 234	= 1.52E-12	C C 2	= 1.69E-12	C C 2
Mo 93					Pa 231	= 1.24E-10	C C 2	= 1.52E-10	C C 2
Tc 97					Pa 233	= 3.10E-05	C C 2	= 2.82E-05	C C 2
Tc 99					U 232				
Ru 106					U 233	= 2.19E-09	C C 2	= 1.65E-09	C C 2
Pd 107					U 234	= 2.96E-05	C C 2	= 3.69E-05	C C 2
Ag 108m					U 235	= 3.60E-07	C C 2	= 3.97E-07	C C 2
Ag 110m					U 236	= 2.51E-06	C C 2	= 2.74E-06	C C 2
Cd 109					U 238	= 1.53E-12	C C 2	= 1.69E-12	C C 2
Cd 113m					Np 237	= 3.11E-05	C C 2	= 2.83E-05	C C 2
Sn 119m					Pu 236				
Sn 121m					Pu 238	= 2.84E-01	C C 2	= 3.14E-01	C C 2
Sn 123					Pu 239	= 1.13E+01	C C 2	= 1.12E+01	C C 2
Sn 126					Pu 240	= 2.61E+00	C C 2	= 2.57E+00	C C 2
Sb 125					Pu 241	= 1.33E+01	C C 2	= 1.62E+01	C C 2
Sb 126					Pu 242	= 3.04E-04	C C 2	= 3.03E-04	C C 2
Te 125m					Am 241	= 2.64E+00	C C 2	= 3.73E+00	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	1.68E+01	*	1.78E+01	*
Eu 155					Total b/g	1.33E+01	*	1.62E+01	*

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