

WASTE STREAM	7J25	Luminised Waste
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SITE HMNB Portsmouth

SITE OWNER Ministry of Defence (MOD)

WASTE CUSTODIAN Ministry of Defence (MOD)

WASTE TYPE ILW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025	= 2.4		
Future arisings:	1.4.2025 - 31.3.2026	= 1.0		
	1.4.2026 - 31.3.2027	= 1.0		
	1.4.2027 - 31.3.2028	= 1.0		
	1.4.2028 - 31.3.2029	= 1.0		
	1.4.2029 - 31.3.2030	= 1.0		
	1.4.2030 - 31.3.2031	= 1.0		
	1.4.2031 - 31.3.2032	= 1.0		
	1.4.2032 - 31.3.2033	= 1.0		
	1.4.2033 - 31.3.2043	= 10.0		
	1.4.2043 - 31.3.2053	= 10.0		
	1.4.2053 - 31.3.2063	= 10.0		
Total future arisings:		38.0		
Total waste volume:		40.4		

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

Comment on arising rates: MoD(N) luminised wastes are primarily derived from the decommissioning of naval vessels and the disposal of obsolete equipments at the end of their useful life. These are events wholly governed by factors beyond the control of the site from which they are finally accumulated for remediation processes and disposal.

Additional information on quantities: Luminised accumulations are not expected to exceed 1 m³ per year for the next 5 years (estimates given for 10 year periods 2033>2063)

Uncertainty factors on volumes: Stock (upper): x 1.20 Arisings (upper): x 2.00
Stock (lower): x 0.80 Arisings (lower): x 0.50

WASTE SOURCE Luminised scrap/unserviceable MOD stores items and other radioactive items from the de-equipping of ships, together with smaller quantities (annually <1m³) from the MOD Institute of Naval Medicine Alverstoke.

PHYSICAL CHARACTERISTICS

General description: Luminised aluminium boxes such as luminised sound powered telephones, telephone control boards. Dials, gauges, compasses, rudder indicators, signs. Small quantities of soil, spoil and rubble contaminated with, principally radium-226 luminising compounds. There are no large items.

Changes since waste generated: The waste has not undergone any physical/chemical processes or changes.

Bulk density (t/m³): = 0.80

Comment on density: The type of equipment and metal arising that predominates within this waste stream is well known and documented within the WSCD.

CHEMICAL COMPOSITION

General description and components (%wt): Metal (80%), Organics (8%) and Other materials (12%)

Chemical state: Neutral

Sheet metal proportion / thickness: No sheet metal present in this form of waste stream. Very little bulk metals present. High proportion of metals are in the form of boxes typically 20cm x 30cm x 15cm (average), typical thicknesses are about 3 mm with Metal (80%) and other materials (20%).

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	= 7.0	-	
Other ferrous metals.....	< 1.0	Mild steel (<1%)	
Iron.....	= 0	-	
Aluminium.....	= 70.0	Cast (50%), Dural (20%)	
Beryllium.....	= 0	-	
Cobalt.....	= 0	-	
Copper.....	< 1.0	Copper brass (each less than 1%)	
Lead.....	< 1.0	-	
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 cellulotics.....	~ 4.0	-	
Paper, cotton.....	< 3.0	Paper (2 %), cotton (1%)	
Wood.....	< 1.0	Soft woods boxes such as pine	
Halogenated plastics.....	= 2.0	PVC from electrical components	
Total non-halogenated plastics.....	= 0	-	
Condensation polymers.....	= 0	-	
Others.....	= 0	-	
Organic ion exchange materials.....	= 0	-	
Total rubber.....	= 2.0	-	
Halogenated rubber.....	= 0	-	
Non-halogenated rubber.....	= 2.0	Latex (2%)	
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.....	= 7.0	Samples	
Brick/Stone/Rubble.....	= 0	-	
Cementitious material.....	= 0	-	
Sand.....	< 2.0	Samples	
Glass/Ceramics.....	= 3.0	Glass (2%), ceramics (1%)	
Graphite.....	= 0	-	
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.....	= 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:

	(%wt)	Type(s) and comment
Combustible metals.....	= 40.0	Glass 37%, Paper 3% by weight
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.....	= 0	-
Soluble solids as bulk chemical compounds.....	= 0	-

Hazardous substances / non hazardous pollutants:

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

Complexing agents (%wt):

	(%wt)	Type(s) and comment
EDTA.....	= 0	-
DPTA.....	= 0	-
NTA.....	= 0	-
Polycarboxylic acids.....	= 0	-
Other organic complexants.....	= 0	-
Total complexing agents.....	= 0	-

Physical components:

	Number	Type(s) and comment
Sources.....	NE	-
Electronic & Electrical Equipment (EEE)		-
EEE Type 1.....	~ 60	Military Radios / Instrumentation / Switches etc.
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	< 40.0
Decay storage		
Low force compaction	Off-site	<< 60.0
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:

There are no plans or strategy, even tentative, for the use of any packaging or conditioning plant.

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:

100% of the waste is consigned to an authorised disposal contractor. The contractor will determine the quantity that requires routing as radioactive waste and consign it as appropriate to the LLWR, metal decontamination, incineration, recycling/ reuse, out of scope etc.

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)	NE	NE	
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: Luminised wastes that contain or have been contaminated with H-3, Pm-147 or Ra-226 luminising compounds. Principally processed metal shells, TCB, SPT shells / metal boxes in a raw state that may contain Ra-226 or Pm-147 painted indicators or dials.

Uncertainty: The accuracy of the specific activity data is within +/- 10%.

Measurement of radioactivities: Samples of all 7J25 'type' material is sent to DSTL (DRPS) NAMAS accredited lab for assay to ensure quantitative activities are representative with holdings as declared.

Chemical form of radionuclides: H-3: Present as internal contaminant after processing. 5% of wastes by volume are H-3.
C-14: Not present
Cl-36: Not present
Se-79: Not present
Tc-99: Not present
I-129: Not present
Ra: Luminised compounds within gauges, dials etc. and representing 95% by volume of all arisings.
Th: In equilibrium with Ra-226 luminised compounds within gauges, dials etc. and representing 95% by volume of all arisings.
U: Not present
Np: Not present
Pu: Not present

WASTE STREAM		7J25		Luminised Waste					
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	= 4.44E+01	A A 2	= 2.50E-03	A A 2	Gd 153	= 3.09E-04	B B 2	= 1.00E-05	B B 2
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				
Co 60					Bi 208				
Ni 59					Bi 210m				
Ni 63					Po 210				
Zn 65					Ra 223				
Se 79					Ra 225				
Kr 81					Ra 226				
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90					Th 227				
Zr 93					Th 228				
Nb 91					Th 229				
Nb 92					Th 230				
Nb 93m					Th 232				
Nb 94					Th 234				
Mo 93					Pa 231				
Tc 97					Pa 233				
Tc 99					U 232				
Ru 106					U 233				
Pd 107					U 234				
Ag 108m					U 235				
Ag 110m					U 236				
Cd 109					U 238				
Cd 113m					Np 237				
Sn 119m					Pu 236				
Sn 121m					Pu 238				
Sn 123					Pu 239				
Sn 126					Pu 240				
Sb 125					Pu 241				
Sb 126					Pu 242				
Te 125m					Am 241				
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	2.99E-04	A A 2			Cf 251				
Sm 147					Cf 252				
Sm 151					Unsp a				
Eu 152					Unsp b/g				
Eu 154					Total a				
Eu 155					Total b/g				

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