WASTE STREAM 7J27 Intermediate Level Tritium Waste

SITE HMNB Portsmouth

SITE OWNER Ministry of Defence

WASTE CUSTODIAN Ministry of Defence

WASTE TYPE ILW

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	<<0.1 m³
Future arisings -	1.4.2019 - 31.3.2020.....	~~0.1 m³
	1.4.2020 - 31.3.2021.....	~~0.1 m³
	1.4.2021 - 31.3.2024.....	~~0.1 m³
	1.4.2024 - 31.3.2034.....	~~0.1 m³
	1.4.2034 - 31.3.2044.....	NE m³
	1.4.2044 - 31.3.2054.....	NE m³
	1.4.2054 - 31.3.2064.....	NE m³
Total future arisings:		0.4 m³
Total waste volume:		0.5 m³

Comment on volumes: Accumulations are consistent with MoD policy in respect to decommissioning of fleet vessels and the avoidance in use of radionuclides where other (non-radioactive) options have been identified, available and fit for 'in-service' use. The use of tritium continues in signage, sights and valves the arising rates will be fairly consistant for the foreseeable future. H-3 luminised accumulations are not expected to exceed 0.1 m3 per year for the next five years.

Uncertainty factors on volumes:

Stock (upper):	x 1.5	Arisings (upper)	x 1.5
Stock (lower):	x 0.5	Arisings (lower)	x 0.5

WASTE SOURCE MOD Remediation processing of unserviceable tritium luminised equipment and items returned to the Logistics Radioactive Storehouse facility at HMNB Portsmouth produces comtaminated materials from the removal of the H3 luminising items such as 'flags and valves including GTLS for recyling and disposal. the leeching effects of tritium cause the majority of the housing materials to be contaminated. These items plus tissues, smears polythene sheeting are generated in the decontamination and clean up processes.

PHYSICAL CHARACTERISTICS

General description: Primarily tritium luminised paint compounds on small, typically 1 cm² 'flags', and other aluminium surfaces not involving any large items and not influenced by the choice of treatment process or disposal container. The majority of the arisings can be disposed packaged within a small (<litre) metal container. The waste has not been subjected to any physical / chemical processes or changes.

Physical components (%vol): Tritium flags, dials and other aluminium surfaces. 40 % by volume. glass from valves, and clean up/ sampling materials. 60% by volume

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): 2.5

Comment on density: Density refined from the last consignment made to AEA Winfrith.

CHEMICAL COMPOSITION

General description and components (%wt): Metal (40%), other materials (60%).

Chemical state: Neutral

Chemical form of radionuclides: H-3: 40% tritiated paint compounds on aluminium surfaces, 60% tritium gas in valves and GTLS in glass
C-14: Not present
Cl-36: Not present
Se-79: Not present
Tc-99: Not present
I-129: Not present
Ra: Not present
Th: Not present
U: Not present

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Np: Not present
Pu: Not present

Metals and alloys (%wt):	No sheet metal present in this waste stream, typical lthickenesses are approximately 5 mm with casings typically 200 x 200 x 100 mm.		
	Stainless steel	NE	
	Other ferrous metals	NE	
	Iron		
	Aluminium	~40.0	Aluminium (~24%), Dural (~16%)
	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):	-		
	Total cellulosics	~20.0	
	Paper, cotton	~20.0	Tissue 15% and smears papers 5%
	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		
	Oil or grease		
	Fuel		
	Asphalt/Tarmac (cont.coal tar)		
	Asphalt/Tarmac (no coal tar)		
	Bitumen		
	Others		
	Other organics	0	
Other materials (%wt):	Inorganic sludges and flocs are not associated with this waste stream.		

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Inorganic ion exchange materials.	0	
Inorganic sludges and flocs.....	0	
Soil.....	0	
Brick/Stone/Rubble.....	0	
Cementitious material.....	0	
Sand.....	0	
Glass/Ceramics.....	~40.0	Glass (40%)
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): There are no inorganic anions in the waste.

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: Combustible tissues and smear papers from sampling and clean up

Combustible metals.....	~60.0	Paper 20%, Glass 40% 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	
Active particles.....	0	

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Soluble solids as bulk chemical compounds.....	0
Hazardous substances / non hazardous pollutants:	-
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
Cadmium.....	0
Caesium.....	0
Selenium.....	0
Chromium.....	0
Molybdenum.....	0
Thallium.....	0
Tin.....	0
Vanadium.....	0
Mercury compounds.....	0
Others.....	0
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):	No
EDTA.....	0
DPTA.....	0
NTA.....	0
Polycarboxylic acids……	0
Other organic complexants.....	0
Total complexing agents.....	0

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PACKAGING AND CONDITIONING

Conditioning method: 100% of the waste is consigned to an authorised disposal contractor. The contractor will determine the appropriate conditioning method. Long term storage is not an option we wish to pursue. No supercompaction or pre-treatment is envisaged. There are no packaging or conditioning plants planned.

Plant Name: -

Location: -

Plant startup date: -

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

Target start date for packaging this stream: -

Throughput for this stream (m^3/y incoming waste): -

Other information: -

Likely container type:

Container	Waste packaged (%vol)	Waste loading (m^3)	Payload (m^3)	Number of packages
Not specified	100.0	NE	NE	NE

Likely container type comment: To be specified in the contract to dispose by the contractor

Range in container waste volume: -

Other information on containers: -

Likely conditioning matrix:

Other information: -

Conditioned density (t/m^3): -

Conditioned density comment: Cannot be accurately ascertained until the ILW has been finally declared to the Waste Contractor.

Other information on conditioning: There are no packaging or conditioning plants planned.

Opportunities for alternative disposal routing: Not yet determined

Treatment	Stream volume (%)	Comment
-	-	-

RADIOACTIVITY

Source: Tritium luminised paint compounds on small, typically on aluminium surfaces, glass valves containing gaseous tritium, paper tissues and smear papers used in the clean up post volume reduction.

Uncertainty: The accuracy is known to within a factor of ten.

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'.

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Measurement of radioactivities:	Measured by sampling assay undertaken at NAMAS Approved Laboratory.
Other information:	No other radionuclides are involved in 7J27 ILW.

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Nuclide	Mean radioactivity, TBq/m³				Nuclide	Mean radioactivity, TBq/m³			
	Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code
H 3	2.15E+01	B C 2	3E+01	B C 2	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				
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					Cf 251				
Sm 147					Cf 252				
Sm 151					Other a				
Eu 152					Other b/g				
Eu 154					**Total a**	**0**		**0**	
Eu 155					**Total b/g**	**2.15E+01**	**B C 2**	**3E+01**	**B 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