WASTE STREAM	7V26	Area K Operational Supercompactable Drummed LLW

SITE NRTE Vulcan

SITE OWNER Ministry of Defence (MOD)

WASTE CUSTODIAN Ministry of Defence (MOD)

WASTE TYPE LLW

WASTE VOLUMES

		Reported (m^3)
Stocks:	At 1.4.2025	12.2
Future arisings:	1.4.2025 - 31.3.2028	72.0
Total future arisings:		**72.0**
Total waste volume:		**84.2**

OR

Conditioned (m^3)	Packaged (m^3)

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

Comment on arising rates: Rates of arising will depend on operations carried out. Operational wastes will arise until the site closure date of 2028.

Additional information on quantities: Estimates are based on historical information and waste arising to date.

Uncertainty factors on volumes:

Stock (upper):	x 1.10	Arisings (upper):	x 1.40
Stock (lower):	x 0.90	Arisings (lower):	x 0.60

WASTE SOURCE Waste predominantly arising from decontamination operations and maintenance work.

PHYSICAL CHARACTERISTICS

General description: The waste comprises general and soft trash including paper swabs, redundant PPE, sheet polythene etc. and metallic items such as filter housings, small tools & pipework. Estimated material content by % volume: Polythene (43.17%), paper (24.06%), stainless steel (18.19%), other plastics (5.85%), rubber (4.02%), mild steel (3.0%), cotton (1.55%), cardboard (0.17%).

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

Bulk density (t/m³): ~ 0.60

Comment on density: Waste densities are estimated from the percentage of materials present in historical waste consignments.

CHEMICAL COMPOSITION

General description and components (%wt): The waste comprises general and soft trash including paper swabs, redundant PPE, sheet polythene etc. and metallic items such as filter housings, small tools & pipework. Percentage weight not determined

Chemical state: Neutral

Sheet metal proportion / thickness: The metals are supercompacted and include the 200 litre mild steel drum.

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 cellulosics	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	TR	-	
Oil or grease	TR	-	
Fuel	= 0	-	
Asphalt/Tarmac (cont.coal tar)	= 0	-	
Asphalt/Tarmac (no coal tar)	= 0	-	
Bitumen	= 0	-	
Others	= 0	-	
Other organics	NE	-	

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	NE	-	
Graphite	= 0	-	
Desiccants/Catalysts	= 0	-	
Asbestos	NE	-	
Non/low friable		-	
Moderately friable		-	
Highly friable		-	
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	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	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	0	-
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	TR	-
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	= 0	-
DPTA	= 0	-
NTA	= 0	-
Polycarboxylic acids	= 0	-
Other organic complexants	TR	Trace amounts of decontamination agents may be present.
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)	Off-site	= 100.0
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: Uncompacted drums will be supercompacted before being placed in HHISOs. The waste will be encapsulated before final disposal.

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 (m^3)	Payload (m^3)	Number of packages	Estimated start date for packaging
1/2 Height IP-2 Disposal/Re-usable ISO (TC01/TC02)	100.0	15.6	18.3	6	-

Range in container waste loading:

Other information on packaging and conditioning: Waste in 200 litre drums will be supercompacted on the Dounreay site before loading in a HHISO container for grouting & disposal to the Dounreay LLW Facility.

Conditioned density (t/m^3): -
Conditioned density comment: -

Management Routes:

Disposal Route	Stream volume %	Raw density t/m^3	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	= 100.0	NE	
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: The activity has arisen from activation and contamination of reactor components.

Uncertainty: This is based on the best current available information.

Measurement of radioactivities: Activities for future arising are based on the average activities calculated from historical waste consignments.

Chemical form of radionuclides:

H-3: Present in the form of radiologically contaminated materials.
C-14: Present in the form of radiologically contaminated materials.
Cl-36: Not known to be present.
Se-79: Not known to be present.
Tc-99: Not known to be present.
I-129: Not known to be present.
Ra: Not known to be present.
Th: Not known to be present.
U: Not known to be present.
Np: Not known to be present.
Pu: Not known to be present.

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Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code	Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code
H 3	6.63E-07	D 3	< 7.20E-07	D 3	Gd 153				
Be 10					Ho 163				
C 14	3.96E-05	D 3	< 3.96E-05	D 3	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	1.37E-03	D 3	< 1.96E-03	D 3	Pb 210				
Co 60	3.98E-03	D 3	< 4.82E-03	D 3	Bi 208				
Ni 59					Bi 210m				
Ni 63	3.74E-04	D 3	< 3.78E-04	D 3	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					Unsp a				
Eu 152					Unsp b/g				
Eu 154					**Total a**	**0**	*	**0**	*
Eu 155					**Total b/g**	**5.77E-03**	*	**7.20E-03**	*

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