

WASTE STREAM	5C310	Solid Waste Complex Decommissioning ILW
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SITE Harwell

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE ILW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025	= 0		
Future arisings:	1.4.2027 - 31.3.2035	25.0		
Total future arisings:		25.0		
Total waste volume:		25.0		

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

Comment on arising rates: Arisings as a result of decommissioning.

Additional information on quantities: Contact-handled ILW from decommissioning of the Solid Waste Complex. Volumes estimated based on historic information and project review.

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

WASTE SOURCE Contact-handled ILW from decommissioning of the Solid Waste Complex.

PHYSICAL CHARACTERISTICS

General description: Waste from the PoCo/decommissioning of facilities, cells, ventilation systems and pipework.

Changes since waste generated: -

Bulk density (t/m³): ~ 2.9

Comment on density: Based on densities of streams 5C30 and 5C304 (similar waste types).

CHEMICAL COMPOSITION

General description and components (%wt): Metal, concrete , cellulose , plastic, rubber etc.

Chemical state: Neutral

Sheet metal proportion / thickness: Metal is present in a large range of thicknesses

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	~ 20.0	-	
Other ferrous metals.....	~ 60.0	-	
Iron.....	-	-	
Aluminium.....	~ 0.50	-	
Beryllium.....	P	-	
Cobalt.....	-	-	
Copper.....	P	-	
Lead.....	P	-	
Magnox/Magnesium.....	TR	-	
Nickel.....	-	-	
Titanium.....	-	-	
Uranium.....	-	-	
Zinc.....	-	-	
Zircaloy/Zirconium.....	P	-	
Other metals.....	TR	Uranium, europium, cobalt, magnesium, tin, and nickel.	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	~ 6.0	-	
Paper, cotton.....	~ 3.0	-	
Wood.....	~ 3.0	-	
Halogenated plastics.....	~ 2.0	PVC and PTFE	
Total non-halogenated plastics.....	P 1.0	-	
Condensation polymers.....	~ 1.0	-	
Others.....	NE	-	
Organic ion exchange materials.....	P	-	
Total rubber.....	P 1.0	-	
Halogenated rubber.....	~ 0.50	neoprene and hypalon.	
Non-halogenated rubber.....	~ 0.50	-	
Hydrocarbons.....		-	
Oil or grease.....		-	
Fuel.....		-	
Asphalt/Tarmac (cont.coal tar).....		-	
Asphalt/Tarmac (no coal tar).....		-	
Bitumen.....		-	
Others.....		-	
Other organics.....	P	-	

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials.....	P	-	
Inorganic sludges and flocs.....	= 0	-	
Soil.....	= 0	-	
Brick/Stone/Rubble.....	= 0	-	
Cementitious material.....	~ 5.0	-	
Sand.....		-	
Glass/Ceramics.....	P	-	
Graphite.....	P	-	
Desiccants/Catalysts.....		-	
Asbestos.....	TR	-	
Non/low friable.....		-	
Moderately friable.....		-	
Highly friable.....		-	
Free aqueous liquids.....	TR	-	
Free non-aqueous liquids.....	TR	-	
Powder/Ash.....	P	-	

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

Inorganic anions (%wt):

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

Materials of interest for waste acceptance criteria:

	(%wt)	Type(s) and comment
Combustible metals.....	TR	-
Low flash point liquids.....	TR	-
Explosive materials.....	TR	-
Phosphorus.....	TR	-
Hydrides.....	TR	-
Biological etc. materials.....	TR	-
Biodegradable materials.....	0	-
Putrescible wastes.....	TR	-
Non-putrescible wastes.....		-
Corrosive materials.....	TR	-
Pyrophoric materials.....	TR	-
Generating toxic gases.....	TR	-
Reacting with water.....	TR	-
Higher activity particles.....		-
Soluble solids as bulk chemical compounds.....		-

Hazardous substances / non hazardous pollutants:

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

Complexing agents (%wt):

Yes		
	(%wt)	Type(s) and comment
EDTA.....	TR	Present at trace levels (includes EDTA, Citrate, TBP, etc).
DPTA.....		-
NTA.....		-
Polycarboxylic acids.....		-
Other organic complexants.....		-
Total complexing agents.....	TR	-

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:

-

Conditioning method:

The waste will be packaged into 6m3 boxes and placed in long-term storage.

Conditioning plants:

Plant Name	Location
HAR SWC	Harwell

Likely conditioning matrix:

Unknown

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
	6 m³ concrete box (SD)	100.0	1.8	5.8	15	-

Range in container waste loading: -

Other information on packaging and conditioning: -

Conditioned density (t/m³): ~ 2.6

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: Activity is principally contamination associated with historic operations.

Uncertainty: The above radionuclides are expected to be present but predominantly dominated by Co60 and Cs137. Full characterisation will be undertaken near to the start of decommissioning.

Measurement of radioactivities: -

Chemical form of radionuclides:

- H-3: Metal activation product.
- C-14: In labelled organic compounds and activation of metals.
- Cl-36: -
- Se-79: -
- Tc-99: -
- I-129: -
- Ra: Found as an oxide, a nitrate, and as a sulphate.
- Th: Found as an oxide, a metal, and in irradiated fuel.
- U: Found as an oxide, a metal, and as a fuel.
- Np: -
- Pu: Found as an oxide, a metal, and as a fuel.

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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				6	Gd 153				8
Be 10				8	Ho 163				8
C 14				6	Ho 166m				8
Na 22				8	Tm 170				8
Al 26				8	Tm 171				8
Cl 36				8	Lu 174				8
Ar 39				8	Lu 176				8
Ar 42				8	Hf 178n				8
K 40				8	Hf 182				8
Ca 41				8	Pt 193				8
Mn 53				8	Tl 204				8
Mn 54				8	Pb 205				8
Fe 55				6	Pb 210				8
Co 60				6	Bi 208				8
Ni 59				6	Bi 210m				8
Ni 63				6	Po 210				8
Zn 65				8	Ra 223				8
Se 79				8	Ra 225				8
Kr 81				8	Ra 226				6
Kr 85				8	Ra 228				8
Rb 87				8	Ac 227				8
Sr 90				6	Th 227				8
Zr 93				8	Th 228				6
Nb 91				8	Th 229				8
Nb 92				8	Th 230				8
Nb 93m				8	Th 232				8
Nb 94				8	Th 234				8
Mo 93				8	Pa 231				8
Tc 97				8	Pa 233				8
Tc 99				8	U 232				6
Ru 106				8	U 233				8
Pd 107				8	U 234				6
Ag 108m				8	U 235				6
Ag 110m				8	U 236				6
Cd 109				8	U 238				6
Cd 113m				6	Np 237				8
Sn 119m				8	Pu 236				8
Sn 121m				8	Pu 238				6
Sn 123				8	Pu 239				6
Sn 126				8	Pu 240				6
Sb 125				8	Pu 241				6
Sb 126				8	Pu 242				8
Te 125m				8	Am 241				6
Te 127m				8	Am 242m				8
I 129				8	Am 243				8
Cs 134				6	Cm 242				8
Cs 135				8	Cm 243				8
Cs 137				6	Cm 244				6
Ba 133				8	Cm 245				8
La 137				8	Cm 246				8
La 138				8	Cm 248				8
Ce 144				8	Cf 249				8
Pm 145				8	Cf 250				8
Pm 147				8	Cf 251				8
Sm 147				8	Cf 252				8
Sm 151				8	Unsp a				
Eu 152				8	Unsp b/g				
Eu 154				6	Total a	0	*	0	*
Eu 155				6	Total b/g	0	*	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