

WASTE STREAM	6C32	NDS Remote Handled 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	= 0.3		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		0.3		

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

Comment on arising rates: -

Additional information on quantities: Any receipt of waste from off-site sources is expected to be minimal

Uncertainty factors on volumes: Stock (upper): x 1.05 Arisings (upper): x -
Stock (lower): x 0.95 Arisings (lower): x -

WASTE SOURCE The waste arises from industry, research laboratories, educational establishments, institutes and hospitals - originally via the National Disposal Service. Newer arisings were consigned via Safeguard International.

PHYSICAL CHARACTERISTICS

General description: Laboratory waste, sealed sources, electrical equipment, compasses. The waste is packaged in cans with a maximum volume of 100 litres.

Changes since waste generated: Some sources have been segregated from the corresponding CHILW stream.

Bulk density (t/m³): ~ 1.2

Comment on density: Recorded mass divided by volume of outer containers. Not all consignments declare a mass.

CHEMICAL COMPOSITION

General description and components (%wt): Sources (79%), unspecified and ferrous metals (12%), plastics (7%), others (2%). Sources will comprise metal/plastic/ mica holders and source material.

Chemical state: -

Sheet metal proportion / thickness: Metal is expected to be present mostly as small items. It has been assumed that source housings will be mostly stainless steel.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	~ 10.0	The identity of steels/other alloys is not known.	
Other ferrous metals.....	~ 67.0	The identity of steels/other alloys is not known.	
Iron.....	-	-	
Aluminium.....	~ 0.10	-	
Beryllium.....	-	-	
Cobalt.....	-	-	
Copper.....	TR	-	
Lead.....	~ 10.0	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....	-	-	
Titanium.....	-	-	
Uranium.....	-	-	
Zinc.....	= 0	-	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	= 1.0	Tungsten and depleted uranium.	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	~ 0.90	-	
Paper, cotton.....	~ 0.90	Only paper is declared	
Wood.....	= 0	-	
Halogenated plastics.....	~ 1.0	PVC is expected to be present together with small amounts of PTFE	
Total non-halogenated plastics.....	~ 10.0	-	
Condensation polymers.....	NE	-	
Others.....	~ 10.0	-	
Organic ion exchange materials.....	= 0	-	
Total rubber.....	TR	-	
Halogenated rubber.....	TR	neoprene and hypalon	
Non-halogenated rubber.....	TR	-	
Hydrocarbons.....	-	-	
Oil or grease.....	-	-	
Fuel.....	-	-	
Asphalt/Tarmac (cont.coal tar).....	-	-	
Asphalt/Tarmac (no coal tar).....	-	-	
Bitumen.....	-	-	
Others.....	-	-	
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.....	= 0	-	
Brick/Stone/Rubble.....	= 0	-	
Cementitious material.....	= 0	-	
Sand.....	-	-	
Glass/Ceramics.....	~ 0.80	-	
Graphite.....	= 0	-	
Desiccants/Catalysts.....	-	-	
Asbestos.....	P	-	
Non/low friable.....	-	-	
Moderately friable.....	-	-	
Highly friable.....	-	-	
Free aqueous liquids.....	P	-	
Free non-aqueous liquids.....	-	-	
Powder/Ash.....	NE	-	

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

Inorganic anions (%wt):

	(%wt)	Type(s) and comment
Fluoride.....	< 0.01	-
Chloride.....	< 0.01	-
Iodide.....	< 0.01	-
Cyanide.....	= 0	-
Carbonate.....	< 0.10	-
Nitrate.....	< 0.10	-
Nitrite.....	< 0.10	-
Phosphate.....	< 0.10	-
Sulphate.....	< 0.10	-
Sulphide.....	< 0.10	-

Materials of interest for waste acceptance criteria:

	(%wt)	Type(s) and comment
Combustible metals.....	= 2.2	-
Low flash point liquids.....	~ 0.30	-
Explosive materials.....	< 0.01	-
Phosphorus.....	< 0.01	-
Hydrides.....	< 0.01	-
Biological etc. materials.....	= 0.10	-
Biodegradable materials.....	0.01	-
Putrescible wastes.....	< 0.01	-
Non-putrescible wastes.....	-	-
Corrosive materials.....	< 0.01	-
Pyrophoric materials.....	< 0.01	-
Generating toxic gases.....	< 0.01	-
Reacting with water.....	< 0.01	-
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):

No		
	(%wt)	Type(s) and comment
EDTA.....	= 0	-
DPTA.....		-
NTA.....		-
Polycarboxylic acids.....		-
Other organic complexants.....		-
Total complexing agents.....		-

Physical components:

	Number	Type(s) and comment
Sources.....		information not available
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		
None		

Comments on planned treatments:

Conditioning method: Plant only packages waste. NDS RHILW will be co-packaged with Harwell RHILW as stream 5C52- see for details of conditioning The waste will be co-packaged into 500-litre drums with 5C52.

Conditioning plants:

Plant Name	Location

Likely conditioning matrix:

Further information on the conditioning matrix: 3:1 PFA:OPC w/s 0.42.

Waste Packaging:

Likely container type:	Container	Waste packaged (vol%)	Waste loading (m³)	Payload (m³)	Number of packages	Estimated start date for packaging
	-	-	-	-	-	-

Range in container waste loading: Loading will vary depending on drum contents and specific limits.

Other information on packaging and conditioning: -

Conditioned density (t/m³): ~ 2.0

Conditioned density comment: Will vary according to nature of wastes.

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			

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: Most activity from sealed sources. Remainder from contamination.

Uncertainty: Activities are currently only as accurate as the original declarations. This information will be verified as far as possible on packing the waste.

Measurement of radioactivities: Declarations from waste consignors. Some fingerprints have been applied to generic terms.

Chemical form of radionuclides: H-3: H3 may be present as gaseous sources, but is expected to be absorbed in metal targets.
C-14: Present as labelled organic compounds
Cl-36: -
Se-79: -
Tc-99: -
I-129: -
Ra: Radium will be present in Ra and Ra/Be sources
Th: -
U: Metal or oxide.
Np: -
Pu: -

WASTE STREAM 6C32 NDS Remote Handled ILW									
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	3.12E-01	B B 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	1.52E-03	B B 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	5.81E-08	B B 2			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	1.48E-05	B B 2		
Mn 54		8			Pb 205		8		
Fe 55	1.92E-03	B B 2			Pb 210	7.55E-02	B B 2		
Co 60	9.73E-02	B B 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	1.01E-02	B B 2			Po 210	7.30E-02	B B 2		
Zn 65	1.53E-07	B B 2			Ra 223	1.68E-04	B B 2		
Se 79		8			Ra 225		8		
Kr 81		8			Ra 226	2.23E-01	B B 2		
Kr 85	2.94E-01	B B 2			Ra 228	1.45E-06	B B 2		
Rb 87		8			Ac 227	1.67E-04	B B 2		
Sr 90	9.44E-01	B B 2			Th 227	1.65E-04	B B 2		
Zr 93		8			Th 228	1.24E-06	B B 2		
Nb 91		8			Th 229		8		
Nb 92		8			Th 230		8		
Nb 93m		8			Th 232	1.90E-06	B B 2		
Nb 94		8			Th 234	6.12E-03	B B 2		
Mo 93		8			Pa 231	7.63E-09	B B 2		
Tc 97		8			Pa 233	2.07E-06	B B 2		
Tc 99		8			U 232		8		
Ru 106	1.03E-08	B B 2			U 233	4.95E-07	B B 2		
Pd 107		8			U 234	2.16E-05	B B 2		
Ag 108m		8			U 235	2.99E-05	B B 2		
Ag 110m		8			U 236		8		
Cd 109	3.13E-06	B B 2			U 238	6.12E-03	B B 2		
Cd 113m		8			Np 237	2.09E-06	B B 2		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	7.98E-02	B B 2		
Sn 123		8			Pu 239	3.44E-06	B B 2		
Sn 126		8			Pu 240	2.71E-07	B B 2		
Sb 125		8			Pu 241		8		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241	3.92E-01	B B 2		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134		8			Cm 242		8		
Cs 135		8			Cm 243		8		
Cs 137	1.16E+01	B B 2			Cm 244		8		
Ba 133	6.75E-07	B B 2			Cm 245		8		
La 137		8			Cm 246		8		
La 138		8			Cm 248	3.32E-08	B B 2		
Ce 144		8			Cf 249		8		
Pm 145		8			Cf 250		8		
Pm 147	5.11E-02	B B 2			Cf 251		8		
Sm 147		8			Cf 252	1.80E-04	B B 2		
Sm 151		8			Unsp a				
Eu 152	6.87E-04	B B 2			Unsp b/g				
Eu 154		8			Total a	7.75E-01	*	0	*
Eu 155		8			Total b/g	1.34E+01	*	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