

WASTE STREAM	9H29	Dry Store Cell 4 Residue
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SITE Wyifa

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE LLW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025	= 1.8		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		1.8		

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

Comment on arising rates: -

Additional information on quantities: -

Uncertainty factors on volumes:

Stock (upper):	x 1.10	Arisings (upper):	x -
Stock (lower):	x 0.90	Arisings (lower):	x -

WASTE SOURCE Mainly from maintenance & decontamination processes.

PHYSICAL CHARACTERISTICS

General description: The waste will consist of metal, including skip tubes, drums, rods and sheets, biodegradable - non putrescibles, plastics (halogenated and non-halogenated), rubber, wood, powders/ash and other material i.e. HEPA filters and asbestos contaminated waste. The metal waste will consist of redundant plant removed as part of characterisation/project work and other tooling equipment such as tooling, ladders or paints tins. The remaining waste will be produced supporting project work and will consist of PPE, wipes, plastic sheeting, packaging and some cabling and WEEE. A small volume of Decon 90 may be used during cleaning and decontamination work and will be wiped off with wipalls.

There is the potential for some asbestos contaminated materials. No large items are currently planned to be deplanted.

The facility is redundant and all waste will arise from the IDW project work.

Changes since waste generated: None.

Bulk density (t/m³): = 0.41

Comment on density: -

CHEMICAL COMPOSITION

General description and components (%wt): Metal (66%), biodegradable - non putrescibles (9%), plastics - halogenated (1%), plastics non - halogenated (16%), rubber (4%), wood (2%), powder/ash (1%), and miscellaneous items (~1%)

Chemical state: Neutral

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	= 0	-	
Other ferrous metals.....	= 58.6	Tubes, sheets, rods, drums	
Iron.....	-	-	
Aluminium.....	= 3.2	tooling, ladders	
Beryllium.....	-	-	
Cobalt.....	-	-	
Copper.....	= 0.80	cables/WEEE	
Lead.....	-	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....	-	-	
Titanium.....	-	-	
Uranium.....	-	-	
Zinc.....	= 0.80	galvanised tooling, scaffolding, buckets	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	-	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulotics.....	= 2.0	-	
Paper, cotton.....	= 0	-	
Wood.....	= 2.0	-	
Halogenated plastics.....	= 1.0	liners, packaging	
Total non-halogenated plastics.....	= 16.0	-	
Condensation polymers.....	~ 8.0	tyvek overalls, sheeting, PPE	
Others.....	~ 8.0	tyvek overalls, sheeting, PPE	
Organic ion exchange materials.....	= 0	-	
Total rubber.....	= 4.0	-	
Halogenated rubber.....	= 4.0	-	
Non-halogenated rubber.....	= 0	-	
Hydrocarbons.....	-	-	
Oil or grease.....	-	-	
Fuel.....	-	-	
Asphalt/Tarmac (cont.coal tar).....	-	-	
Asphalt/Tarmac (no coal tar).....	-	-	
Bitumen.....	-	-	
Others.....	-	-	
Other organics.....	-	-	

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.....	NE	-	
Cementitious material.....	NE	-	
Sand.....	-	-	
Glass/Ceramics.....	= 0	-	
Graphite.....	= 0	-	
Desiccants/Catalysts.....	-	-	
Asbestos.....	= 1.8	-	
Non/low friable.....	= 1.8	contaminated plant items. Asbestos is a 50:50 mixture of amosite and chrysotile	
Moderately friable.....	= 0	-	
Highly friable.....	= 0	-	
Free aqueous liquids.....	= 0	-	
Free non-aqueous liquids.....	= 0	-	
Powder/Ash.....	= 1.0	-	

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.....	NE	-
Low flash point liquids.....	NE	-
Explosive materials.....	NE	-
Phosphorus.....	NE	-
Hydrides.....	NE	-
Biological etc. materials.....	= 0	-
Biodegradable materials.....	= 9.0	-
Putrescible wastes.....	= 0	-
Non-putrescible wastes.....	= 9.0	-
Corrosive materials.....	NE	-
Pyrophoric materials.....	NE	-
Generating toxic gases.....	NE	-
Reacting with water.....	P	20m2
Higher activity particles.....		-
Soluble solids as bulk chemical compounds.....		-

Hazardous substances / non hazardous pollutants:

	(%wt)	Type(s) and comment
Acrylamide.....		-
Benzene.....		-
Chlorinated solvents.....		-
Formaldehyde.....		-
Organometallics.....		-
Phenol.....		-
Styrene.....		-
Tri-butyl phosphate.....		-
Other organophosphates.....		-
Vinyl chloride.....		-
Arsenic.....		-
Barium.....	TR	Light bulbs (ca. 0.2 m3)
Boron.....	0	-
Boron (in Boral).....		-
Boron (non-Boral).....		-
Cadmium.....		-
Caesium.....		-
Selenium.....		-
Chromium.....		-
Molybdenum.....		-
Thallium.....		-
Tin.....	= 1.6	paint tins
Vanadium.....		-
Mercury compounds.....	TR	light bulbs (ca.0.2m3)
Others.....		-

Complexing agents (%wt):

Yes		
	(%wt)	Type(s) and comment
EDTA.....		-
DPTA.....		-
NTA.....		-
Polycarboxylic acids.....		-
Other organic complexants.....	TR	citrates (decon-90) are expected in trace quantities
Total complexing agents.....	TR	-

Physical components:

	Number	Type(s) and comment
Sources.....		-
Electronic & Electrical Equipment (EEE)		-
EEE Type 1.....	P	-
EEE Type 2.....		-
EEE Type 3.....	P	-
EEE Type 4.....	P	-
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	On-site	= 7.5
Supercompaction (HFC)	Off-site	= 7.5
Incineration		
Drying/dewatering/liquid separation		
Tie down/fixatives/strippable coating/painting application		
Decontamination		
Metal treatment	Off-site	= 18.5
Recycling / reuse		
Thermal treatment, including vitrification		
Encapsulation		
Polymer encapsulation		
Other physical treatment		
Other chemical treatment		
Containerisation		
Treatment not yet determined		
None		= 74.0

Comments on planned treatments:

65% of this stream is expected to be disposed of to landfill as VLLW.

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
1/2 Height WAMAC IP-2 ISO (TC08)	7.5	43.2	18.8	1	-
1/2 Height IP-2 Disposal/Re-usable ISO (TC01/TC02)	9.0	10.0	18.3	1	-

Range in container waste loading: -

Other information on packaging and conditioning:

-

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)			
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	= 16.5	0.41	
Expected to be consigned to a Landfill Facility	= 65.0	0.41	
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	= 18.5	1.4	
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:

17 04 05, 17 04 07, 17 02 03, 17 06 01*

Opportunities for alternative disposal routing: No

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Opportunity Confidence	Comment
-	-	-	-	-

RADIOACTIVITY

Source: Contamination at activation and fission products.

Uncertainty: -

Measurement of radioactivities: -

Chemical form of radionuclides: H-3: H-3: The chemical form of tritium has not been determined.
C-14: C-14: The chemical form of carbon 14 has not been determined.
Cl-36: Chlorine 36 is expected to be insignificant.
Se-79: Se-79: The chemical form of selenium has not been determined.
Tc-99: Tc-99: The chemical form of technetium has not been determined.
I-129: -
Ra: Ra: Radium isotope content is expected to be insignificant.
Th: The Thorium content is insignificant
U: U: Uranium isotope content is expected to be insignificant.
Np: Np: Neptunium isotope content is expected to be insignificant.
Pu: Pu: Chemical form of plutonium isotopes has not been determined

WASTE STREAM 9H29 Dry Store Cell 4 Residue									
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	1.03E-06	C C 1			Gd 153		8		
Be 10					Ho 163		8		
C 14	3.02E-07	C C 1			Ho 166m		8		
Na 22					Tm 170		8		
Al 26					Tm 171		8		
Cl 36	1.10E-07	C C 1			Lu 174		8		
Ar 39					Lu 176		8		
Ar 42					Hf 178n		8		
K 40					Hf 182		8		
Ca 41					Pt 193		8		
Mn 53					Ti 204		8		
Mn 54					Pb 205		8		
Fe 55	9.68E-09	C C 1			Pb 210		8		
Co 60	4.59E-08	C C 2			Bi 208		8		
Ni 59					Bi 210m		8		
Ni 63	6.42E-07	C C 1			Po 210		8		
Zn 65					Ra 223		8		
Se 79					Ra 225		8		
Kr 81					Ra 226		8		
Kr 85					Ra 228		8		
Rb 87					Ac 227		8		
Sr 90	4.35E-05	C C 1			Th 227		8		
Zr 93					Th 228		8		
Nb 91					Th 229		8		
Nb 92					Th 230		8		
Nb 93m					Th 232		8		
Nb 94					Th 234	2.07E-08	8		
Mo 93					Pa 231		8		
Tc 97					Pa 233		8		
Tc 99	2.67E-08	C C 2			U 232		8		
Ru 106					U 233		8		
Pd 107					U 234	1.78E-08	C C 1		
Ag 108m					U 235	1.48E-08	C C 1		
Ag 110m					U 236	1.48E-09	C C 1		
Cd 109					U 238	2.07E-08	C C 1		
Cd 113m					Np 237		8		
Sn 119m					Pu 236		8		
Sn 121m					Pu 238	1.71E-06	C C 1		
Sn 123					Pu 239	2.14E-06	C C 1		
Sn 126					Pu 240	2.76E-06	C C 1		
Sb 125	2.79E-09	C C 2			Pu 241	3.94E-05	C C 1		
Sb 126					Pu 242		8		
Te 125m					Am 241	1.12E-05	C C 1		
Te 127m					Am 242m		8		
I 129					Am 243		8		
Cs 134	1.08E-09	C C 2			Cm 242		8		
Cs 135					Cm 243	6.91E-09	C C 1		
Cs 137	8.60E-05	C C 2			Cm 244	9.36E-08	C C 1		
Ba 133					Cm 245		8		
La 137					Cm 246		8		
La 138					Cm 248		8		
Ce 144					Cf 249		8		
Pm 145					Cf 250		8		
Pm 147	1.01E-08	C C 2			Cf 251		8		
Sm 147					Cf 252		8		
Sm 151	3.40E-07	C C 2			Unsp a				
Eu 152	1.78E-08	C C 2			Unsp b/g				
Eu 154	1.94E-07	C C 2			Total a	1.79E-05	*	0	*
Eu 155	1.74E-08	C C 2			Total b/g	1.72E-04	*	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