

WASTE STREAM	9G104	Resin Vaults LLW
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SITE Trawsfynydd

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	= 0		
Future arisings:	1.4.2025 - 31.3.2027	115.1		
Total future arisings:		115.1		
Total waste volume:		115.1		

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 -	Arisings (upper):	x 1.20
Stock (lower):	x -	Arisings (lower):	x 0.80

WASTE SOURCE Plant from operation of RVs (Resin Vaults) 1, 2 and 3, their transfer pipe lines from RV 1,2 and 3 to the Resin Solidification Plant.

PHYSICAL CHARACTERISTICS

General description: Waste consists of predominantly metal - pipes, shielding, pumps, floor plates and de-planted equipment. Plastics including tanks, valves and pipework, wood, rubber and soft waste. Ion exchange resin (no more than 100kg), lubricating oil, vacuum bags (close weave glass fibre bags weighing 0.115g when empty and averaging 8kg of dust) from operational cleaning including concrete, paint, plaster and trace amounts of magnesium oxide.

Changes since waste generated: -

Bulk density (t/m³): = 0.46

Comment on density: -

CHEMICAL COMPOSITION

General description and components (%wt): Metal (58%), concrete/rubble (5%), biodegradable - non-putrescibles (1%), plastics (20%), rubber (2%), wood (5%), other organic (6%) and other materials (3%).

Chemical state: Neutral

Sheet metal proportion / thickness: Not assessed.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	= 11.4	Pumps, pipework, shielding blocks de-plant items	
Other ferrous metals.....	= 46.6	Pump sections of contaminated steel from shield blocks and floor plates, pipes and flanges de-plant equipment.	
Iron.....	-		
Aluminium.....	-		
Beryllium.....	-		
Cobalt.....	-		
Copper.....	-		
Lead.....	~ 0.01	Lead contained with the paint dust (approximately 1% of the paint dust is lead)	
Magnox/Magnesium.....	-		
Nickel.....	-		
Titanium.....	-		
Uranium.....	-		
Zinc.....	-		
Zircaloy/Zirconium.....	-		
Other metals.....	-		

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulotics.....	= 6.0	-	
Paper, cotton.....	= 1.0	-	
Wood.....	= 5.0	-	
Halogenated plastics.....	= 10.0	Soft waste, gland seal water tank, pipework, valves, liners & packaging	
Total non-halogenated plastics.....	= 9.6	-	
Condensation polymers.....	-	-	
Others.....	= 9.6	Soft waste, gland seal water tank, pipework, Tyvek coverall, sheeting, sample pots, packaging & PPE	
Organic ion exchange materials.....	-	-	
Total rubber.....	= 2.0	-	
Halogenated rubber.....	= 1.0	neoprene	
Non-halogenated rubber.....	= 1.0	silicone	
Hydrocarbons.....	= 3.6	-	
Oil or grease.....	= 3.6	Waste lubricating oils & Coating on takki rags (white mineral oil)	
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.....	= 0.16	AW500 (0.07%), Lewatit (0.06%) trace amounts of IRN78, Zeocarb 225, A51, IE95 and CS100	
Inorganic sludges and flocs.....	-	-	
Soil.....	-	-	
Brick/Stone/Rubble.....	= 5.0	Concrete/rubble	
Cementitious material.....	-	-	
Sand.....	-	-	
Glass/Ceramics.....	-	-	
Graphite.....	-	-	
Desiccants/Catalysts.....	-	-	
Asbestos.....	0	-	
Non/low friable.....	-	-	
Moderately friable.....	-	-	
Highly friable.....	-	-	
Free aqueous liquids.....	-	-	
Free non-aqueous liquids.....	-	-	
Powder/Ash.....	= 4.3	concrete dust (1.88%), Paint dust (0.78%), plaster dust (1.57%), magnesium oxide dust (0.08%) in vacuum bags	

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

Inorganic anions (%wt):

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

Materials of interest for waste acceptance criteria:

	(%wt)	Type(s) and comment
Combustible metals.....	-	-
Low flash point liquids.....	-	-
Explosive materials.....	-	-
Phosphorus.....	-	-
Hydrides.....	-	-
Biological etc. materials.....	-	-
Biodegradable materials.....	1.0	-
Putrescible wastes.....	-	-
Non-putrescible wastes.....	= 1.0	paper and cardboard
Corrosive materials.....	-	-
Pyrophoric materials.....	-	-
Generating toxic gases.....	-	-
Reacting with water.....	-	-
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.....	= 0.08	-
DPTA.....		-
NTA.....		-
Polycarboxylic acids.....		-
Other organic complexants.....		Decon-90
Total complexing agents.....		= 0.08

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	= 7.2
Decay storage		
Low force compaction		
Supercompaction (HFC)	Off-site	= 7.2
Incineration	Off-site	= 48.0
Drying/dewatering/liquid separation	Off-site	= 7.3
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		= 37.5

Comments on planned treatments:

22.2% of the stream is planned for disposal as VLLW to landfill.

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)	7.2	43.2	18.8	1	-
	1/2 Height IP-2 Disposal/Re-usable ISO (TC01/TC02)	15.3	10.0	18.3	2	-

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	= 22.5	0.46	
Expected to be consigned to a Landfill Facility	= 22.2	0.46	
Expected to be disposed On-Site			
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility	= 48.0	0.40	
Expected to be consigned to a Metal Treatment Facility	= 7.3	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 02 03

Opportunities for alternative disposal routing: No

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

RADIOACTIVITY

Source: Activity is from a mixture of fission and activation products and actinides. Tritium is also present.

Uncertainty: The values quoted are derived from available measurements and are indicative of the activities to be expected.

Measurement of radioactivities: -

Chemical form of radionuclides:

H-3: Most tritium is expected to be present as water but some may be in the form of other inorganic compounds or as organic compounds.

C-14: Carbon 14 will probably be present as graphite.

Cl-36: -

Se-79: The selenium content is insignificant.

Tc-99: The technetium content is insignificant.

I-129: -

Ra: Radium isotope content is insignificant.

Th: The thorium content is insignificant.

U: Uranium isotope content is insignificant.

Np: The neptunium content is insignificant.

Pu: Chemical form of plutonium isotope has not been determined but may be plutonium oxides.

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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			2.81E-07	C C 1	Gd 153				8
Be 10				8	Ho 163				8
C 14			8.00E-09	C C 1	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	Ti 204				8
Mn 54				8	Pb 205				8
Fe 55				8	Pb 210				8
Co 60			2.37E-09	C C 2	Bi 208				8
Ni 59				8	Bi 210m				8
Ni 63			3.27E-08	C C 1	Po 210				8
Zn 65				8	Ra 223				8
Se 79				8	Ra 225				8
Kr 81				8	Ra 226				8
Kr 85				8	Ra 228				8
Rb 87				8	Ac 227				8
Sr 90			4.69E-05	C C 1	Th 227				8
Zr 93				8	Th 228				8
Nb 91				8	Th 229				8
Nb 92				8	Th 230				8
Nb 93m				8	Th 232				8
Nb 94				8	Th 234			1.14E-09	C C 2
Mo 93				8	Pa 231				8
Tc 97				8	Pa 233				8
Tc 99			1.79E-07	C C 2	U 232				8
Ru 106				8	U 233				8
Pd 107				8	U 234				8
Ag 108m				8	U 235				8
Ag 110m				8	U 236				8
Cd 109				8	U 238			1.14E-09	C C 1
Cd 113m				8	Np 237				8
Sn 119m				8	Pu 236				8
Sn 121m				8	Pu 238			1.89E-07	C C 1
Sn 123				8	Pu 239			1.95E-07	C C 1
Sn 126				8	Pu 240			2.52E-07	C C 1
Sb 125				8	Pu 241			3.84E-06	C C 1
Sb 126				8	Pu 242				8
Te 125m				8	Am 241			5.35E-07	C C 1
Te 127m				8	Am 242m				8
I 129				8	Am 243				8
Cs 134			3.28E-09	C C 2	Cm 242				8
Cs 135				8	Cm 243				8
Cs 137			4.62E-04	C C 2	Cm 244			3.89E-09	C C 1
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			1.54E-08	C C 1	Unsp a				
Eu 152				8	Unsp b/g				
Eu 154			9.11E-09	C C 2	Total a	0	*	1.18E-06	*
Eu 155				8	Total b/g	0	*	5.13E-04	*

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