

WASTE STREAM	9G109	Pond Scabbling Wastes
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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	= 30.2		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		30.2		

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

Comment on arising rates: -

Additional information on quantities: There is no further forecasted project work; all scabbling waste operations have been completed.

Uncertainty factors on volumes:

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

WASTE SOURCE This waste stream captures plant, equipment and structural materials and secondary wastes generated from pond scabbling operations.

PHYSICAL CHARACTERISTICS

General description: Most of the waste is concrete blocks, cores and dust arising from the removal of pond surfaces, which contain most of the contamination, packaged in steel Scabbled Waste Containers (SWCs), Lidded Containers (LCs) or 210 litre IP2 rated drums. The Ponds were used to cool fuel following its removal from the reactors before being removed for offsite reprocessing and hence contamination is mainly in the form of fission products.

Changes since waste generated: -

Bulk density (t/m³): ~ 1.1

Comment on density: -

CHEMICAL COMPOSITION

General description and components (%wt): Concrete (~62%wt), metal (~32%), plastic/rubber (~3%wt), wood (~1%) and others (including asbestos) (2%).

Chemical state: Alkali

Sheet metal proportion / thickness: The scabbled concrete is loaded into mild steel boxes.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	= 29.0	Waste containers	
Other ferrous metals.....	= 3.5	Deplant equipment and mechanical components	
Iron.....	-	-	
Aluminium.....	= 0.18	Scaffolding	
Beryllium.....	-	-	
Cobalt.....	-	-	
Copper.....	-	-	
Lead.....	TR	Lead contained with paint dust (1% of paint dust)	
Magnox/Magnesium.....	-	-	
Nickel.....	-	-	
Titanium.....	-	-	
Uranium.....	-	-	
Zinc.....	-	-	
Zircaloy/Zirconium.....	-	-	
Other metals.....	-	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulotics.....	= 1.0	-	
Paper, cotton.....	-	-	
Wood.....	= 1.0	-	
Halogenated plastics.....	= 0.70	Soft waste, drum liners, plastic wrap, pipework	
Total non-halogenated plastics.....	= 0.70	-	
Condensation polymers.....	-	-	
Others.....	= 0.70	Soft waste, plastic wrap, PPE sample pots, and taki rags	
Organic ion exchange materials.....	-	-	
Total rubber.....	= 1.0	-	
Halogenated rubber.....	~ 0	-	
Non-halogenated rubber.....	= 1.0	-	
Hydrocarbons.....	0.02	-	
Oil or grease.....	= 0.02	white mineral oil on taki rags	
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.....	-	-	
Inorganic sludges and flocs.....	-	-	
Soil.....	-	-	
Brick/Stone/Rubble.....	= 62.0	concrete/rubble	
Cementitious material.....	-	-	
Sand.....	-	-	
Glass/Ceramics.....	-	-	
Graphite.....	-	-	
Desiccants/Catalysts.....	-	-	
Asbestos.....	= 0.82	-	
Non/low friable.....	= 0.82	Asbestos contaminated material, insulation. Equal portions of white, brown and blue asbestos assumed.	
Moderately friable.....	= 0	-	
Highly friable.....	= 0	-	
Free aqueous liquids.....	-	-	
Free non-aqueous liquids.....	-	-	
Powder/Ash.....	= 0.71	Concrete dust (0.53%), plaster dust (0.13%), dust paint (0.04%) within vac bags from operational cleaning	

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.....	= 0	-
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.....	-	-
Low flash point liquids.....	-	-
Explosive materials.....	-	-
Phosphorus.....	-	-
Hydrides.....	-	-
Biological etc. materials.....	-	-
Biodegradable materials.....	0	-
Putrescible wastes.....	-	-
Non-putrescible wastes.....	-	-
Corrosive materials.....	-	-
Pyrophoric materials.....	-	-
Generating toxic gases.....	-	-
Reacting with water.....	P	33.25m2
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.....	= 0.01	-
DPTA.....		-
NTA.....		-
Polycarboxylic acids.....		-
Other organic complexants.....		Decon-90
Total complexing agents.....		= 0.01

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	= 0.1
Decay storage		
Low force compaction		
Supercompaction (HFC)	Off-site	= 0.1
Incineration	Off-site	= 12.8
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		= 87.1

Comments on planned treatments:

6.04% of this waste stream is expected to be sent 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)	0.1	43.2	18.8	0	-
	1/2 Height IP-2 Disposal/Re-usable ISO (TC01/TC02)	81.1	10.0	18.3	3	-

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	= 81.2	1.1	
Expected to be consigned to a Landfill Facility	= 6.0	1.1	
Expected to be disposed On-Site			
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility	= 12.8	0.40	
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: 17 04 07, 17 01 01, 17 06 01*

Opportunities for alternative disposal routing: No

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

RADIOACTIVITY

Source: Contamination of paint and concrete from walls and floors in the fuel ponds.

Uncertainty: The values quoted were derived by calculation and are indicative of the activities that are expected.

Measurement of radioactivities: -

Chemical form of radionuclides: H-3: Any 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: Chemical form of carbon 14 has not been determined but may be graphite.

Cl-36: The chemical form of chlorine 36 has not been determined.

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: Chemical form of uranium has not been determined but may be uranium oxides.

Np: The neptunium content is insignificant.

Pu: Chemical form of plutonium 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		8			Gd 153		8		
Be 10		8			Ho 163		8		
C 14		8			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	1.91E-05	C C 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63		8			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	1.03E-03	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	7.32E-07	C C 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233		8		
Tc 99		8			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234	6.27E-07	C C 1		
Ag 108m		8			U 235	1.60E-08	C C 1		
Ag 110m		8			U 236	1.60E-08	C C 1		
Cd 109		8			U 238	7.32E-07	C C 1		
Cd 113m		8			Np 237		8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	4.70E-05	C C 1		
Sn 123		8			Pu 239	6.52E-05	C C 1		
Sn 126		8			Pu 240	8.40E-05	C C 1		
Sb 125		8			Pu 241	1.22E-03	C C 1		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241	5.25E-04	C C 1		
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	1.26E-03	C C 2			Cm 244		8		
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	8.40E-06	C C 2			Total a	7.22E-04	*	0	*
Eu 155	1.35E-06	C C 2			Total b/g	3.54E-03	*	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