

WASTE STREAM	9G121	Active Drains (Final Delay Tank)
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SITE Trawsfynydd
SITE OWNER Nuclear Decommissioning Authority
WASTE CUSTODIAN Magnox Limited
WASTE TYPE LLW
 Is the waste subject to Scottish Policy: No

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2022.....	~0 m ³
Future arisings -	1.4.2022 - 31.3.2027.....	28.0 m ³
Total future arisings:		28.0 m ³
Total waste volume:		28.0 m ³
Comment on volumes:	-	
Uncertainty factors on volumes:	Stock (upper): x	Arisings (upper) x 1.2
	Stock (lower): x	Arisings (lower) x 0.8

WASTE SOURCE The Active Drains are a system across the active site areas (i.e. reactor buildings and Ponds complex), designed to collect spillages, surface waters and other contaminated effluent and route it, via the Active Drains Tank (ADT), to the Active Effluent Treatment Plant (AETP) for treatment prior to discharge to Llyn Trawsfynydd. The Active Drains have collected effluents over the generating, defueling and decommissioning phases and thus have a spectrum of contamination including activation and fission products. This waste stream was created to capture waste associated with "System 3" consisting of the manholes and connections associated with the pipework between the Final Delay Tank (FDT) and discharge point at manhole MH430.

PHYSICAL CHARACTERISTICS

General description: The waste consists of silt and sludge, oil (diesel and lubricate), contaminated plastic and steel pipework, tooling, tanks(tanks will be size reduced and nominally weighing less than 25 kg), agitators, bitumen tank top, approximately 1,400kg concrete/ rubble and associated soft waste, 8 x vacuum bags (close weave glass fibre bags) containing approximately 8kg each of concrete, plaster and paint dust. Vacuum bags weight 115g when empty.

Physical components (%wt): Metal (82%), Concrete / rubble (4%), Plastic pipework from active drains system (2%), Rubber (1%) other organic (10%), others (1%)

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): 1.12

Comment on density: WCH mass divided by volume

CHEMICAL COMPOSITION

General description and components (%wt): Metal (82%), Concrete / rubble (4%), Plastic pipework from active drains system (2%), Rubber (1%) other organic including sludge and silt (10%), others (1%)

Chemical state: -

Chemical form of radionuclides: -

Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	~11.4	Tanks, pipework and agitators	
Other ferrous metals.....	~71.2	Tanks, pipework and agitators	
Iron.....			
Aluminium.....			
Beryllium.....			
Cobalt.....			

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Copper.....
 Lead..... TR 10kg of paint dust containing 1%
 (0.1kg of lead) .
 Magnox/Magnesium.....
 Nickel.....
 Titanium.....
 Uranium.....
 Zinc.....
 Zircaloy/Zirconium.....
 Other metals.....

Organics (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	0		
Paper, cotton.....			
Wood.....			
Halogenated plastics	0.32	Plastic pipework, agitator, sheeting	
Total non-halogenated plastics.....	0.32		
Condensation polymers.....			
Others.....	~0.32	Soft waste, PPE, visqueen	
Organic ion exchange materials....			
Total rubber.....	0		
Halogenated rubber			
Non-halogenated rubber.....			
Hydrocarbons.....	~1.8		
Oil or grease	0.44	lubricating oil (0.41%), Mineral oil (0.03%)	
Fuel.....			
Asphalt/Tarmac (cont.coal tar)...			
Asphalt/Tarmac (no coal tar)....			
Bitumen.....	~1.4	Tank top cover	
Others.....			
Other organics.....			

Other materials (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..			
Inorganic sludges and flocs.....	~9.7	Sludge/silt from de-planting operations	
Soil.....			
Brick/Stone/Rubble.....	4.0		
Cementitious material.....			
Sand.....			
Glass/Ceramics.....	0.43	MMMF - Contaminated material, gratings, cements, insulation covers.	

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Graphite.....		
Desiccants/Catalysts.....		
Asbestos.....	0.43	
Non/low friable.....	0.43	Asbestos contaminated material, gratings, cements, insulation covers. Equal portions of white, brown and blue asbestos assumed.
Moderately friable.....	0	
Highly friable.....	0	
Free aqueous liquids.....		
Free non-aqueous liquids.....		
Powder/Ash.....	~0.15	Concrete dust (0.08%), plaster dust (0.04%), paint dust (0.03%)

Inorganic anions (%wt): -

(%wt) Type(s) and comment

- Fluoride.....
- Chloride.....
- Iodide.....
- Cyanide.....
- Carbonate.....
- Nitrate.....
- Nitrite.....
- Phosphate.....
- Sulphate.....
- Sulphide.....

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.....
- Higher activity particles.....

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Soluble solids as bulk chemical compounds.....

Hazardous substances /
non hazardous pollutants: -

	(%wt)	
Acrylamide.....		Type(s) and comment
Benzene.....		
Chlorinated solvents.....		
Formaldehyde.....		
Organometallics.....		
Phenol.....		
Styrene.....		
Tri-butyl phosphate.....		
Other organophosphates.....		
Vinyl chloride.....		
Arsenic.....		
Barium.....		
Boron.....	0	
Boron (in Boral).....		
Boron (non-Boral).....		
Cadmium.....		
Caesium.....		
Selenium.....		
Chromium.....		
Molybdenum.....		
Thallium.....		
Tin.....		
Vanadium.....		
Mercury compounds.....		
Others.....		
Electronic Electrical Equipment (EEE)		
EEE Type 1.....		
EEE Type 2.....		
EEE Type 3.....		
EEE Type 4.....		
EEE Type 5.....		

Complexing agents (%wt): Yes

	(%wt)	
EDTA.....		Type(s) and comment
DPTA.....		
NTA.....		
Polycarboxylic acids.....		
Other organic complexants.....	0.08	Decon-90

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Total complexing agents..... 0.08

Potential for the waste to contain discrete items: Yes. Large Metal Items (LMIs)/"substantial" thickness items considered "durable" assumed DIs; Stainless items assumed DIsSludge - In & of itself not a DI; assumed not likely to contain any "rogue" items that could be.

TREATMENT, PACKAGING AND DISPOSAL

Planned on-site / off-site treatment(s):

Treatment	On-site / Off site	Stream volume %
Low force compaction	Off-site	12.8
Supercompaction (HFC)		
Incineration		
Solidification	Off-site	30.3
Decontamination		
Metal treatment		
Size reduction		
Decay storage		
Recycling / reuse	56.9	
Other / various		
None		

Comment on planned treatments: 54.48% VLLW landfill disposal

Disposal Routes:

Disposal Route	Stream volume %	Disposal density t/m3
Expected to be consigned to the LLW Repository	2.4	1.1
Expected to be consigned to a Landfill Facility	54.5	1.1
Expected to be consigned to an On-Site Disposal Facility		
Expected to be consigned to an Incineration Facility	12.8	0.40
Expected to be consigned to a Metal Treatment Facility	30.3	1.4
Expected to be consigned as Out of Scope		
Expected to be recycled / reused		
Disposal route not known		

Classification codes for waste expected to be consigned to a landfill facility: 13 02 08*, 17 02 03, 17 04 05

Upcoming (2022/23-2024/25) Waste Routing (if expected to change from above):

Disposal Route	Stream volume %		
	2022/23	2023/24	2024/25
Expected to be consigned to the LLW Repository			
Expected to be consigned to a Landfill Facility			
Expected to be consigned to an On-Site Disposal Facility			
Expected to be consigned to an Incineration Facility			
Expected to be consigned to a Metal Treatment Facility			
Expected to be consigned as Out of Scope			
Expected to be recycled / reused			
Disposal route not known			

Opportunities for alternative disposal routing: -

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Estimated Date that Opportunity will be realised	Opportunity Confidence	Comment
-	-	-	-	-	-

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Waste Packaging for Disposal:

Container	Stream volume %	Waste loading m ³	Number of packages
1/3 Height IP-1 ISO 2/3 Height IP-2 ISO 1/2 Height WAMAC IP-2 ISO 1/2 Height IP-2 Disposal/Re-usable ISO 2m box (no shielding) 4m box (no shielding) Other	2.4	10	< 1

Other information: -

Waste Planned for Disposal at the LLW Repository:

Container voidage: -

Waste Characterisation Form (WCH): The waste meets the LLWR's Waste Acceptance Criteria (WAC).
The waste has a current WCH.
Inventory information is consistent with the current WCH.

Waste consigned for disposal to LLWR in year of generation: -

Non-Containerised Waste for In-Vault Grouting: (Not applicable to this waste stream)

Stream volume (%): -

Waste stream variation: -

Bounding cuboidal volume:

Inaccessible voidage: -

Other information: -

RADIOACTIVITY

Source: -

Uncertainty: -

Definition of total alpha and total beta/gamma: Where totals are shown on the table of radionuclide activities they are the sums of the listed alpha or beta/gamma emitting radionuclides plus 'other alpha' or 'other beta/gamma'.

Measurement of radioactivities: Data taken from WCH - 1MXN-3TRA-0-WCH-0-4742 V4 and decayed by 1 year for RWI 2022

Other information: -

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Nuclide	Mean radioactivity, TBq/m ³				Nuclide	Mean radioactivity, TBq/m ³			
	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3			2.92E-04	CC 2	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			1.1E-05	CC 2	Hf 182				8
Ca 41				8	Pt 193				8
Mn 53				8	Tl 204				8
Mn 54				8	Pb 205				8
Fe 55			2.46E-07	CC 2	Pb 210				8
Co 60			3.34E-07	CC 2	Bi 208				8
Ni 59				8	Bi 210m				8
Ni 63			5.96E-07	CC 2	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			3.7E-06	CC 2	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		3.03E-09	CC 2	8
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		1.53E-09	CC 2	8
Ag 108m				8	U 235				8
Ag 110m				8	U 236				8
Cd 109				8	U 238		3.03E-09	CC 2	8
Cd 113m				8	Np 237				8
Sn 119m				8	Pu 236				8
Sn 121m				8	Pu 238		2.26E-06	CC 2	8
Sn 123				8	Pu 239		2.92E-06	CC 2	8
Sn 126				8	Pu 240		3.76E-06	CC 2	8
Sb 125				8	Pu 241		6.21E-05	CC 2	8
Sb 126				8	Pu 242				8
Te 125m				8	Am 241		9.72E-06	CC 2	8
Te 127m				8	Am 242m				8
I 129				8	Am 243				8
Cs 134				8	Cm 242				8
Cs 135				8	Cm 243		1.49E-07	CC 2	8
Cs 137			3.21E-05	CC 2	Cm 244		2.3E-06	CC 2	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			6.94E-07	CC 2	Cf 251				8
Sm 147				8	Cf 252				8
Sm 151				8	Other a				8
Eu 152			1.1E-06	CC 2	Other b/g				8
Eu 154				8	Total a	0	2.11E-05	CC 2	8
Eu 155				8	Total b/g	0	4.04E-04	CC 2	8

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 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