

WASTE STREAM	9G118	Active Drains
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SITE Trawsfynydd
SITE OWNER Nuclear Decommissioning Authority
WASTE CUSTODIAN Magnox Limited
WASTE TYPE LLW

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	~9.9 m ³
Future arisings -	1.4.2019 - 31.3.2020.....	~2.1 m ³
Total future arisings:		2.1 m ³
Total waste volume:		12.0 m ³
Comment on volumes:	-	
Uncertainty factors on volumes:	Stock (upper): x 1.2	Arisings (upper) x 1.2
	Stock (lower): x 0.8	Arisings (lower) x 0.8

WASTE SOURCE The waste arises from the manholes and connections associated with the Active Drains Tank (ADT) know as the 'Black Hole'

PHYSICAL CHARACTERISTICS

General description: The waste comprises of plastic pipework (estimated 823m of 100mm and 150mm), metal bracketry and metal valve assemblies (100kg) from the Active drainage system.
 Physical components (%wt): Metal (15%), Plastic (43%), Other (oily sludge and asbestos) (42%)
 Sealed sources: -
 Bulk density (t/m³): 1.71
 Comment on density: WCH mass divided by volume

CHEMICAL COMPOSITION

General description and components (%wt): Metal (15%), Plastic (43%), Other (42%). Other includes oily sludge and asbestos.

Chemical state: Neutral

Chemical form of radionuclides: -

Metals and alloys (%wt): -

Stainless steel.....	15.0	Stainless Steel flanges and pipe joints including 3.0% nickel, 3.9% chromium and 0.6% molybdenum
Other ferrous metals.....		
Iron.....		
Aluminium.....		
Beryllium.....		
Cobalt.....		
Copper.....		
Lead.....		
Magnox/Magnesium.....		
Nickel.....		
Titanium.....		
Uranium.....		
Zinc.....		
Zircaloy/Zirconium.....		

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	Other metals.....		
Organics (%wt):	-		
	Total cellulose.....	0	
	Paper, cotton.....		
	Wood.....		
	Halogenated plastics	43.0	Plastic piping
	Total non-halogenated plastics.....	0	
	Condensation polymers.....		
	Others.....		
	Organic ion exchange materials....		
	Total rubber.....	0	
	Halogenated rubber		
	Non-halogenated rubber.....		
	Hydrocarbons.....		
	Oil or grease		
	Fuel.....		
	Asphalt/Tarmac (cont.coal tar)...		
	Asphalt/Tarmac (no coal tar)....		
	Bitumen.....		
	Others.....		
	Other organics.....		
Other materials (%wt):	-		
	Inorganic ion exchange materials.		
	Inorganic sludges and flocs.....	42.0	sludge contaminated with lubricating oil
	Soil.....		
	Brick/Stone/Rubble.....		
	Cementitious material.....		
	Sand.....		
	Glass/Ceramics.....		
	Graphite.....		
	Desiccants/Catalysts.....		
	Asbestos.....	<<0.10	
	Non/low friable.....	<<0.10	Asbestos Contamination Blue, brown and white Asbestos mixture from Gaskets, lagging and textured coatings.
	Moderately friable.....	~0	
	Highly friable.....	~0	
	Free aqueous liquids.....		
	Free non-aqueous liquids.....		
	Powder/Ash.....		
Inorganic anions (%wt):	-		

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

Materials of interest for
 waste acceptance criteria:

-
 Combustible metals.....
 Low flash point liquids.....
 Explosive materials.....
 Phosphorus.....
 Hydrides.....
 Biological etc. materials.....
 Biodegradable materials.....
 Putrescible wastes.....
 Non-putrescible wastes.....
 Corrosive materials.....
 Pyrophoric materials.....
 Generating toxic gases.....
 Reacting with water.....
 Active particles.....
 Soluble solids as bulk chemical
 compounds.....

Hazardous substances /
 non hazardous pollutants:

-
 Acrylamide.....
 Benzene.....
 Chlorinated solvents.....
 Formaldehyde.....
 Organometallics.....
 Phenol.....
 Styrene.....
 Tri-butyl phosphate.....
 Other organophosphates.....
 Vinyl chloride.....
 Arsenic.....
 Barium.....
 Boron.....

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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):

No
 EDTA.....
 DPTA.....
 NTA.....
 Polycarboxylic acids.....
 Other organic complexants.....
 Total complexing agents..... 0

TREATMENT, PACKAGING AND DISPOSAL

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

Treatment	On-site / Off site	Stream volume %
Low force compaction	Off-site	88.0
Supercompaction (HFC)		
Incineration		
Solidification		
Decontamination		
Metal treatment		
Size reduction		
Decay storage		
Recycling / reuse		
Other / various		
None		12.0

Comment on planned treatments:

12% of the stream is expected to be disposed of to landfill as VLLW

WASTE STREAM**9G118 Active Drains****Disposal Routes:**

Disposal Route	Stream volume %
Expected to be consigned to the LLW Repository	12.0
Expected to be consigned to a Landfill Facility	
Expected to be consigned to an On-Site Disposal Facility	88.0
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	

Upcoming (2019/20-2021/22) Waste Routing (if expected to change from above):

Disposal Route	Stream volume %		
	2019/20	2020/21	2021/22
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			

Waste Packaging for Disposal: (Not applicable to this waste stream)

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			

Other information: -

Waste Planned for Disposal at the LLW Repository: (Not applicable to this waste stream)

Container voidage: -

Waste Characterisation Form (WCH): The waste has a current WCH.

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

Potential for the waste to contain discrete items: -

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

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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:

Activity data taken from WCH (1-MXN-TRA-0-WCH-0-3886) and decayed for 2 years for RWI 2019

Other information:

-

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Nuclide	Mean radioactivity, TBq/m ³				Nuclide	Mean radioactivity, TBq/m ³			
	Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code
H 3	1.98E-05	CC 1	1.98E-05	CC 1	Gd 153		8		8
Be 10		8		8	Ho 163		8		8
C 14	1.2E-06	CC 1	1.2E-06	CC 1	Ho 166m		8		8
Na 22		8		8	Tm 170		8		8
Al 26		8		8	Tm 171		8		8
Cl 36		8		8	Lu 174		8		8
Ar 39		8		8	Lu 176		8		8
Ar 42		8		8	Hf 178n		8		8
K 40	5.74E-07	CC 1	5.74E-07	CC 1	Hf 182		8		8
Ca 41		8		8	Pt 193		8		8
Mn 53		8		8	Tl 204		8		8
Mn 54		8		8	Pb 205		8		8
Fe 55	1.3E-06	CC 1	1.30E-06	CC 1	Pb 210		8		8
Co 60	5.3E-06	CC 1	5.30E-06	CC 1	Bi 208		8		8
Ni 59		8		8	Bi 210m		8		8
Ni 63	3.53E-06	CC 1	3.53E-06	CC 1	Po 210		8		8
Zn 65		8		8	Ra 223		8		8
Se 79		8		8	Ra 225		8		8
Kr 81		8		8	Ra 226		8		8
Kr 85		8		8	Ra 228		8		8
Rb 87		8		8	Ac 227		8		8
Sr 90	1.05E-04	CC 1	1.05E-04	CC 1	Th 227		8		8
Zr 93		8		8	Th 228		8		8
Nb 91		8		8	Th 229		8		8
Nb 92		8		8	Th 230		8		8
Nb 93m		8		8	Th 232		8		8
Nb 94		8		8	Th 234		8		8
Mo 93		8		8	Pa 231		8		8
Tc 97		8		8	Pa 233		8		8
Tc 99		8		8	U 232		8		8
Ru 106		8		8	U 233		8		8
Pd 107		8		8	U 234		8		8
Ag 108m		8		8	U 235		8		8
Ag 110m		8		8	U 236		8		8
Cd 109		8		8	U 238		8		8
Cd 113m		8		8	Np 237		8		8
Sn 119m		8		8	Pu 236		8		8
Sn 121m		8		8	Pu 238	6.83E-06	CC 1	6.83E-06	CC 1
Sn 123		8		8	Pu 239	3.49E-05	CC 1	3.49E-05	CC 1
Sn 126		8		8	Pu 240	3.49E-05	CC 1	3.49E-05	CC 1
Sb 125		8		8	Pu 241	2.36E-04	CC 1	2.36E-04	CC 1
Sb 126		8		8	Pu 242		8		8
Te 125m		8		8	Am 241	7.52E-05	CC 1	7.52E-05	CC 1
Te 127m		8		8	Am 242m		8		8
I 129		8		8	Am 243		8		8
Cs 134	4.51E-09	CC 1	4.51E-09	CC 1	Cm 242		8		8
Cs 135		8		8	Cm 243	4.47E-07	CC 1	4.47E-07	CC 1
Cs 137	2.91E-04	CC 1	2.91E-04	CC 1	Cm 244	4.17E-07	CC 1	4.17E-07	CC 1
Ba 133		8		8	Cm 245		8		8
La 137		8		8	Cm 246		8		8
La 138		8		8	Cm 248		8		8
Ce 144		8		8	Cf 249		8		8
Pm 145		8		8	Cf 250		8		8
Pm 147		8		8	Cf 251		8		8
Sm 147		8		8	Cf 252		8		8
Sm 151		8		8	Other a				
Eu 152	3.67E-07	CC 1	3.67E-07	CC 1	Other b/g				
Eu 154	6.76E-07	CC 1	6.76E-07	CC 1	Total a	1.53E-04	CC 1	1.53E-04	CC 1
Eu 155		8		8	Total b/g	6.65E-04	CC 1	6.65E-04	CC 1

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