

WASTE STREAM	5B306	Site Drains and Ducts ILW
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SITE Dounreay
SITE OWNER Nuclear Decommissioning Authority
WASTE CUSTODIAN Dounreay Site Restoration Limited
WASTE TYPE ILW

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	0 m ³
Future arisings -	1.4.2019 - 31.3.2028.....	8.0 m ³
Total future arisings:		8.0 m ³
Total waste volume:		8.0 m ³

Comment on volumes: It should be noted that the DSRL Site Programme is under revision and arisings dates are subject to change. Arisings are in line with PWI update. Initial indications show 2m³ CHILW from Zone H2 which contains declarable Pu. Also 6m³ RHILW from a high active drain.

Uncertainty factors on volumes:	Stock (upper):	x	Arisings (upper)	x 1.02
	Stock (lower):	x	Arisings (lower)	x 0.98

WASTE SOURCE -

PHYSICAL CHARACTERISTICS

General description: Pipework, drip tray
 Physical components (%vol): Iron (4.49%), Mild Steel (74.73%), Plastic (6.98%), Stainless steel (13.80%),
 Sealed sources: The waste does not contain sealed sources.
 Bulk density (t/m³): 0.41
 Comment on density: No consignor's records for ILW. Therefore, use LLW (5B305).

CHEMICAL COMPOSITION

General description and components (%wt): Iron (4.79%), Mild Steel (79.63%), Plastic (0.87%), Stainless steel (14.71%),
 Chemical state: Neutral
 Chemical form of radionuclides: -
 Metals and alloys (%wt):
 Pipework is typically 3mm
 Stainless steel..... 14.7
 Other ferrous metals..... 79.6
 Iron..... 4.8
 Aluminium.....
 Beryllium.....
 Cobalt.....
 Copper.....
 Lead.....
 Magnox/Magnesium.....
 Nickel.....
 Titanium.....
 Uranium.....
 Zinc.....
 Zircaloy/Zirconium.....
 Other metals.....

Organics (%wt):

-
- Total cellulose.....
- Paper, cotton.....
- Wood.....
- Halogenated plastics
- Total non-halogenated plastics..... 0.87
- Condensation polymers.....
- Others.....
- Organic ion exchange materials....
- Total rubber.....
- 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.....
- Soil.....
- Brick/Stone/Rubble.....
- Cementitious material.....
- Sand.....
- Glass/Ceramics.....
- Graphite.....
- Desiccants/Catalysts.....
- Asbestos.....
- Non/low friable.....
- Moderately friable.....
- Highly friable.....
- Free aqueous liquids.....
- Free non-aqueous liquids.....
- Powder/Ash.....

Inorganic anions (%wt):

-

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):

EDTA.....
 DPTA.....
 NTA.....
 Polycarboxylic acids.....
 Other organic complexants.....
 Total complexing agents.....

PACKAGING AND CONDITIONING

Conditioning method: Remote Handled ILW will be packaged into 500 litre drums for long term storage. Contact Handled ILW will be supercompacted with the pucks being encapsulated in 500 litre drums for long term storage.

Plant Name: -

Location: -

Plant startup date: TBC

Total capacity (m³/y incoming waste): -

Target start date for packaging this stream: -

Throughput for this stream (m³/y incoming waste): -

Other information: -

Likely container type:

Container	Waste packaged (%vol)	Waste loading (m ³)	Payload (m ³)	Number of packages
500 l drum	100.0	0.53	0.5	16

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Likely container type comment:

The conditioning factor for RHILW is about 1.7, while that for CHILW is about 0.5.

Range in container waste volume:

It is estimated that between 2 and 8 CHILW pucks will be placed into each 500 ltr drum with the average being 5 drums per 500l drum. A small percentage of drums may not be suitable for supercompaction and will be directly immobilised into the 500 ltr drum.

Other information on containers:

-

Likely conditioning matrix:

Cement

Other information:

-

Conditioned density (t/m³):

-

Conditioned density comment:

The density is likely to be around 2 - 3 t/m³.

Other information on conditioning:

-

Opportunities for alternative disposal routing:

Treatment	Stream volume (%)	Comment
-	-	-

RADIOACTIVITY

Source:

From reactors and reprocessing facilities

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:

Based on ILW particles found in land remediation

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					Gd 153				
Be 10					Ho 163				
C 14					Ho 166m				
Na 22					Tm 170				
Al 26					Tm 171				
Cl 36					Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41					Pt 193				
Mn 53					Tl 204				
Mn 54					Pb 205				
Fe 55					Pb 210				
Co 60			3.94E-04	CC 2	Bi 208				
Ni 59					Bi 210m				
Ni 63					Po 210				
Zn 65					Ra 223				
Se 79					Ra 225				
Kr 81					Ra 226				
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90			8.12E-02	CC 2	Th 227				
Zr 93					Th 228				
Nb 91					Th 229				
Nb 92					Th 230				
Nb 93m					Th 232				
Nb 94					Th 234				
Mo 93					Pa 231				
Tc 97					Pa 233				
Tc 99					U 232				
Ru 106					U 233				
Pd 107					U 234		9.85E-06	CC 2	
Ag 108m					U 235		1.79E-07	CC 2	
Ag 110m					U 236		7.16E-07	CC 2	
Cd 109					U 238				
Cd 113m					Np 237				
Sn 119m					Pu 236				
Sn 121m					Pu 238		3.63E-04	CC 2	
Sn 123					Pu 239		6.83E-04	CC 2	
Sn 126					Pu 240				
Sb 125					Pu 241		1.79E-04	CC 2	
Sb 126					Pu 242				
Te 125m					Am 241		4.06E-04	CC 2	
Te 127m					Am 242m				
I 129					Am 243				
Cs 134					Cm 242				
Cs 135					Cm 243				
Cs 137			9.74E-02	CC 2	Cm 244		3.29E-04	CC 2	
Ba 133					Cm 245				
La 137					Cm 246				
La 138					Cm 248				
Ce 144					Cf 249				
Pm 145					Cf 250				
Pm 147					Cf 251				
Sm 147					Cf 252				
Sm 151					Other a				
Eu 152					Other b/g				
Eu 154					Total a	0	1.79E-03	CC 2	
Eu 155					Total b/g	0	1.79E-01	CC 2	

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