

WASTE STREAM**9G64****Miscellaneous Contaminated Items**

SITE Trawsfynydd
SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Magnox Limited

WASTE TYPE ILW

Is the waste subject to Scottish Policy: No

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2022.....	2.0 m ³
Total future arisings:		0 m ³
Total waste volume:		2.0 m ³

Comment on volumes: The LLW component of this stream can be found in waste stream 9G66.

Uncertainty factors on volumes:	Stock (upper):	x 1.2	Arisings (upper)	x
	Stock (lower):	x 0.8	Arisings (lower)	x

WASTE SOURCE The wastes in this stream have not been identified or characterised but are known to have arisen during the reactor and cooling ponds operation and maintenance.

PHYSICAL CHARACTERISTICS

General description: The waste is predominantly stored in drums, packages and boxes : Steel RB's tank, concrete cores, Pantograph equip, PNV Solids, Ponds steel plates, FED Hoover bags, Wood, pump.

Physical components (%vol): The waste will consist of principally metal components.

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): ~1

Comment on density: The assumption of 1 t/m³ as the average bulk density may be subject to revision.

CHEMICAL COMPOSITION

General description and components (%wt): The waste may be principally carbon steel (>50%). Other components have not been assessed. Fission products, actinides and other activation products will be present as contaminants.

Chemical state: Neutral

Chemical form of radionuclides: H-3: Tritium may be present as water or in the form of other inorganic or organic compounds.
 C-14: Chemical form of carbon 14 has not been determined but may be graphite.
 Se-79: The chemical form of selenium has not been determined.
 Tc-99: The chemical form of technetium has not been determined.
 Ra: Radium isotope content is insignificant.
 Th: Thorium isotope content is insignificant.
 U: Chemical form of uranium isotopes has not been determined but may be uranium oxides.
 Np: The chemical form of neptunium has not been determined.
 Pu: Chemical form of plutonium isotopes has not been determined but may be plutonium oxides.

Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	NE		
Other ferrous metals.....	>50.0	Carbon steel	
Iron.....			
Aluminium.....	NE		
Beryllium.....			
Cobalt.....			

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Copper.....	NE	
Lead.....	NE	
Magnox/Magnesium.....	NE	
Nickel.....		
Titanium.....		
Uranium.....		
Zinc.....	NE	
Zircaloy/Zirconium.....	NE	
Other metals.....	NE	The presence of "other" metals has not been assessed.

Organics (%wt): Not assessed. Halogenated plastics and rubbers are not assessed but not expected to be in excess of trace quantities.

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	NE		
Paper, cotton.....	NE		
Wood.....	NE		
Halogenated plastics	NE		
Total non-halogenated plastics.....	NE		
Condensation polymers.....	NE		
Others.....	NE		
Organic ion exchange materials....			
Total rubber.....	NE		
Halogenated rubber	NE		
Non-halogenated rubber.....	NE		
Hydrocarbons.....			
Oil or grease			
Fuel.....			
Asphalt/Tarmac (cont.coal tar)...			
Asphalt/Tarmac (no coal tar)....			
Bitumen.....			
Others.....			
Other organics.....	NE		

Other materials (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..	0		
Inorganic sludges and flocs.....	0		
Soil.....	NE		
Brick/Stone/Rubble.....	NE		
Cementitious material.....	NE		
Sand.....			
Glass/Ceramics.....	NE		
Graphite.....	NE		

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Desiccants/Catalysts.....	
Asbestos.....	NE
Non/low friable.....	
Moderately friable.....	
Highly friable.....	
Free aqueous liquids.....	0
Free non-aqueous liquids.....	0
Powder/Ash.....	0

Inorganic anions (%wt): None greater than 5%.

	(%wt)	Type(s) and comment
Fluoride.....	<5.0	
Chloride.....	<5.0	
Iodide.....	<5.0	
Cyanide.....	0	
Carbonate.....	<5.0	
Nitrate.....	<5.0	
Nitrite.....	<5.0	
Phosphate.....	<5.0	
Sulphate.....	<5.0	
Sulphide.....	<5.0	

Materials of interest for waste acceptance criteria: The possible presence of materials likely to represent a fire or other non-radiological hazard has not been fully assessed.

	(%wt)	Type(s) and comment
Combustible metals.....	NE	
Low flash point liquids.....	0	
Explosive materials.....	0	
Phosphorus.....	0	
Hydrides.....	0	
Biological etc. materials.....	NE	
Biodegradable materials.....	0	
Putrescible wastes.....	0	
Non-putrescible wastes.....		
Corrosive materials.....	NE	
Pyrophoric materials.....	0	
Generating toxic gases.....	NE	
Reacting with water.....	NE	
Higher activity particles.....		
Soluble solids as bulk chemical compounds.....		

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Hazardous substances /
non hazardous pollutants: -

	(%wt)	Type(s) and comment
Acrylamide.....		
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)	Type(s) and comment
EDTA.....		
DPTA.....		
NTA.....		
Polycarboxylic acids.....		
Other organic complexants.....		
Total complexing agents.....	TR	

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Potential for the waste to contain discrete items:

Not yet determined. In & of itself not a DI; waste stream may include DIs (notably any stainless steel components)

PACKAGING AND CONDITIONING

Conditioning method: Waste streams 9G64, 9G72, 9G73, 9G79, 9G125, 9G126, 9G129 and 9G131 will be co-packaged. Container numbers for all these streams are allocated to stream 9G129.

Plant Name: -

Location: -

Plant startup date: Not yet determined

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

Likely container type comment: -

Range in container waste volume: -

Other information on containers: -

Likely conditioning matrix: Other information: -

Conditioned density (t/m³): -

Conditioned density comment: -

Other information on conditioning: -

Opportunities for alternative disposal routing: -

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

RADIOACTIVITY

Source: The waste usually arises from the irradiated fuel handling and pond operations. Components that have been associated with fuel pond operations are likely to be of high activity. Fission products, actinides and other activation products will be present.

Uncertainty: Activity best estimate (taken from a waste stream of similar origin) thought to be accurate to within two orders of magnitude, but not fully assessed.

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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:

Figures were derived by estimation based upon available information.

Other information:

Specific activity is a function of Station operating history. The values quoted are indicative of the activities that might be expected.

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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	1.53E-03	DD 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	9.99E-06	DD 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	7E-07	DD 2			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			Tl 204		8		
Mn 54		8			Pb 205		8		
Fe 55	4.26E-05	DD 2			Pb 210		8		
Co 60	1.03E-04	DD 2			Bi 208		8		
Ni 59	1E-06	DD 2			Bi 210m		8		
Ni 63	8.28E-05	DD 2			Po 210		8		
Zn 65		8			Ra 223		8		
Se 79	1.21E-08	DD 2			Ra 225		8		
Kr 81		8			Ra 226		8		
Kr 85		8			Ra 228		8		
Rb 87		8			Ac 227		8		
Sr 90	5.26E-03	DD 2			Th 227		8		
Zr 93	6E-07	DD 2			Th 228		8		
Nb 91		8			Th 229		8		
Nb 92		8			Th 230		8		
Nb 93m	3.56E-07	DD 2			Th 232		8		
Nb 94		8			Th 234	3E-07	DD 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233	4.12E-08	DD 2		
Tc 99	3E-06	DD 2			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234	3.07E-07	DD 2		
Ag 108m	<2.95E-06	D 3			U 235	7E-09	DD 2		
Ag 110m		8			U 236	4.00E-08	DD 2		
Cd 109		8			U 238	3E-07	DD 2		
Cd 113m		8			Np 237	4.12E-08	DD 2		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	1.81E-04	DD 2		
Sn 123		8			Pu 239	1.00E-04	DD 2		
Sn 126	1E-07	DD 2			Pu 240	2.00E-04	DD 2		
Sb 125		8			Pu 241	1.69E-03	DD 2		
Sb 126	1.4E-08	DD 2			Pu 242	1E-07	DD 2		
Te 125m		8			Am 241	3.38E-04	DD 2		
Te 127m		8			Am 242m	8.49E-07	DD 2		
I 129	6E-09	DD 2			Am 243	3.00E-07	DD 2		
Cs 134	1.78E-08	DD 2			Cm 242	7.00E-07	DD 2		
Cs 135	1E-07	DD 2			Cm 243	2.27E-07	DD 2		
Cs 137	5.32E-03	DD 2			Cm 244	2.53E-06	DD 2		
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	1.68E-06	DD 2			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151	2.73E-05	DD 2			Other a				
Eu 152	1.62E-07	DD 2			Other b/g				
Eu 154	1.52E-05	DD 2			Total a	8.23E-04	DD 2	0	
Eu 155	1.27E-06	DD 2			Total b/g	1.41E-02	DD 2	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 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