WASTE STREAM 9G124 Loose Particulate Waste North and South FED vaults

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.....	0 m³
Future arisings -	1.4.2022 - 31.3.2023.....	3.8 m³
Total future arisings:		3.8 m³
Total waste volume:		3.8 m³

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 This waste arises from the 32 FED vaults (16 North and 16 South) and is FED dust from the base of the vault.

PHYSICAL CHARACTERISTICS

General description: A major component of the LPW in the Trawsfynydd FED vaults is expected to be loose corrosion products from the FED stored in the vaults. Trawsfynydd FED is made up largely of splitters, braces and top end fittings removed from spent fuel elements.

Physical components (%vol): The LPW consists mostly of inert inorganic materials (metal corrosion products, concrete fragments etc.) Percentage composition not assessed.

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): 1.13

Comment on density: Bulk Density in the range of 0.96-1.31 t/m3 with a mean density of 1.13 t/m3

CHEMICAL COMPOSITION

General description and components (%wt): -

Chemical state: Neutral

Chemical form of radionuclides: -

Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	P		
Other ferrous metals.....	P	Present as bolts, wire, chain, rust, tools	
Iron.....			
Aluminium.....	P	Present as scaffolding poles	
Beryllium.....			
Cobalt.....			
Copper.....			
Lead.....			
Magnox/Magnesium.....	P	Present as FED, FED corrosion products and surface contamination	
Nickel.....			

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Titanium.....		
Uranium.....	P	Present as fuel fragments
Zinc.....		
Zircaloy/Zirconium.....		
Other metals.....	NE	

Organics (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulosics.....	0		
Paper, cotton.....	P	Cardboard	
Wood.....			
Halogenated plastics			
Total non-halogenated plastics.....	0		
Condensation polymers.....			
Others.....	P	Cable ties, tape	
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.....	P	Paint flakes	

Other materials (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..			
Inorganic sludges and flocs.....	P	Present as dried pond sludge	
Soil.....			
Brick/Stone/Rubble.....	P	Present as gravel	
Cementitious material.....	P	Present as concrete rebar, concrete dust, concrete fragments	
Sand.....			
Glass/Ceramics.....			
Graphite.....			
Desiccants/Catalysts.....			
Asbestos.....	0		
Non/low friable.....			
Moderately friable.....			
Highly friable.....			

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Free aqueous liquids.....

Free non-aqueous liquids.....

Powder/Ash.....

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.....		
Soluble solids as bulk chemical compounds.....		

Hazardous substances / non hazardous pollutants: -

	(%wt)	Type(s) and comment
Acrylamide.....		
Benzene.....		
Chlorinated solvents.....		
Formaldehyde.....		
Organometallics.....		

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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):

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

Potential for the waste to contain discrete items: Yes. Other HDRIs incl T/C pieces etc (typ. stainless) are DIs by definition

PACKAGING AND CONDITIONING

Conditioning method: Revised volume of ILW for encapsulation using the Drum Roller equipment. New scope utilising exiting technology/equipment within the AWV to encapsulate the ILW into 135 litre drums for loading into 3m3 boxes and entombment within the FEP facility within SS2 basement

Plant Name: -

Location: -

Plant startup date: -

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Total capacity (m^3/y incoming waste): -

Target start date for packaging this stream: -

Throughput for this stream (m^3/y incoming waste): -

Other information: -

Likely container type:

Container	Waste packaged (%vol)	Waste loading (m^3)	Payload (m^3)	Number of packages
3m^3 box (round corners)	100.0	0.65	2.9	6

Likely container type comment: -

Range in container waste volume: -

Other information on containers: -

Likely conditioning matrix:

Other information: -

Conditioned density (t/m^3): -

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: -

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: -

Other information: -

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Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code	Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3			9.38E-02	B B 2	Gd 153				8
Be 10				8	Ho 163				8
C 14			6.63E-03	B B 2	Ho 166m				8
Na 22				8	Tm 170				8
Al 26				8	Tm 171				8
Cl 36			8.52E-05	B B 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			2.24E-02	B B 2	Pb 210				8
Co 60			1.25E-02	C C 2	Bi 208				8
Ni 59				8	Bi 210m				8
Ni 63			2.09E-02	C C 2	Po 210				8
Zn 65				8	Ra 223				8
Se 79			7.13E-07	D D 2	Ra 225				8
Kr 81				8	Ra 226				8
Kr 85				8	Ra 228				8
Rb 87				8	Ac 227				8
Sr 90			2.69E-01	C C 2	Th 227				8
Zr 93				8	Th 228				8
Nb 91				8	Th 229				8
Nb 92				8	Th 230			2.24E-09	C C 2
Nb 93m				8	Th 232				8
Nb 94			2.78E-04	C C 2	Th 234			3.67E-05	C C 2
Mo 93				8	Pa 231				8
Tc 97				8	Pa 233			2.53E-07	B B 2
Tc 99			3.08E-05	D D 2	U 232				8
Ru 106			2.88E-09	B B 2	U 233				8
Pd 107				8	U 234			3.06E-05	C C 2
Ag 108m			2.92E-05	B B 2	U 235			8.33E-07	C C 2
Ag 110m				8	U 236			6.24E-09	B B 2
Cd 109				8	U 238			3.67E-05	C C 2
Cd 113m				8	Np 237			2.57E-07	B B 2
Sn 119m				8	Pu 236				8
Sn 121m				8	Pu 238			1.29E-02	B B 2
Sn 123				8	Pu 239			2.02E-02	B B 2
Sn 126				8	Pu 240			2.63E-02	B B 2
Sb 125			6.9E-06	C C 2	Pu 241			2.23E-01	C C 2
Sb 126				8	Pu 242				8
Te 125m			1.73E-06	C C 2	Am 241			1E-01	B B 2
Te 127m				8	Am 242m				8
I 129			1.02E-07	C C 2	Am 243			1.77E-09	B B 2
Cs 134			9.45E-07	B B 2	Cm 242			1.25E-09	B B 2
Cs 135				8	Cm 243			8.94E-04	B B 2
Cs 137			1.38E-01	C C 2	Cm 244			8.07E-04	B B 2
Ba 133			6.41E-05	C C 2	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			9.55E-05	B B 2	Cf 251				8
Sm 147				8	Cf 252				8
Sm 151				8	Other a				
Eu 152			1.99E-05	D D 2	Other b/g				
Eu 154			2.08E-03	B B 2	**Total a**	**0**		**1.61E-01**	**B B 2**
Eu 155			2.73E-04	B B 2	**Total b/g**	**0**		**7.89E-01**	**C C 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