WASTE STREAM 2D56 Effluent Plants Maintenance Waste

SITE Sellafield

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Sellafield Limited

WASTE TYPE ILW

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	0.4 m³
Future arisings -	1.4.2019 - 31.3.2020.....	0.4 m³
	1.4.2020 - 31.3.2021.....	0 m³
	1.4.2021 - 31.3.2022.....	0.2 m³
	1.4.2022 - 31.3.2024.....	0 m³
	1.4.2024 - 31.3.2025.....	0.2 m³
	1.4.2025 - 31.3.2027.....	0 m³
	1.4.2027 - 31.3.2028.....	0.2 m³
	1.4.2028 - 31.3.2029.....	0 m³
	1.4.2029 - 31.3.2030.....	0.4 m³
	1.4.2030 - 31.3.2031.....	0.2 m³
	1.4.2031 - 31.3.2033.....	0 m³
	1.4.2033 - 31.3.2034.....	0.2 m³
	1.4.2034 - 31.3.2036.....	0 m³
	1.4.2036 - 31.3.2037.....	0.2 m³
	1.4.2037 - 31.3.2039.....	0 m³
	1.4.2039 - 31.3.2040.....	0.6 m³
Total future arisings:		2.6 m³
Total waste volume:		3.0 m³

Comment on volumes: Current waste arisings are generally decontaminated as acceptable for LLW disposal. Ultrafilters which may exceed LLW threshold in the future can be packaged as ILW and sent to MBGWS, hence the future arisings. No EPMF maintenance ILW has been encapsulated in WPEP to date. The estimated volumes are based on waste arisings from graphite ultrafilters, which are no longer used in the process. The filters are now stainless steel, with a ceramic filter also to be disposed of.

Uncertainty factors on volumes:

Stock (upper):	x 1.1	Arisings (upper)	x 2.0
Stock (lower):	x 0.9	Arisings (lower)	x 0.5

WASTE SOURCE EPMF Maintenance waste arisings that cannot be decontaminated and sentenced as LLW.

PHYSICAL CHARACTERISTICS

General description: Solid items mainly pump and valve components, sample tubes, etc. There are no large items.

Physical components (%vol): The waste stream comprises of a number of small miscellaneous items. Typical items may be pumps and valve components, pH probes, miscellaneous tools, fittings and cave equipment.

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): 3

Comment on density: Maximum density of scrap as stored.

CHEMICAL COMPOSITION

General description and components (%wt): Any future scrap would be mainly stainless steel with items containing aluminium, copper and other non-ferrous metals. Small amount of organic material arising from pump seals, residual electrical leads, etc.

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Chemical state:	Neutral
Chemical form of radionuclides:	-
Metals and alloys (%wt):	Mostly small bulk metal items.
	Stainless steel..... P
	Other ferrous metals..... NE
	Iron..... P
	Aluminium..... P
	Beryllium.....
	Cobalt..... 0
	Copper..... P
	Lead..... 0
	Magnox/Magnesium..... NE
	Nickel.....
	Titanium.....
	Uranium.....
	Zinc..... NE
	Zircaloy/Zirconium..... NE
	Other metals..... NE
Organics (%wt):	Small amounts of various organic materials may be present. Materials not specified.
	Total cellulosics..... P
	Paper, cotton..... P
	Wood..... P
	Halogenated plastics ..... P
	Total non-halogenated plastics..... P
	Condensation polymers..... P
	Others..... P
	Organic ion exchange materials.... 0
	Total rubber..... P
	Halogenated rubber ..... P
	Non-halogenated rubber..... P
	Hydrocarbons..... NE
	Oil or grease ..... NE
	Fuel..... NE
	Asphalt/Tarmac (cont.coal tar)... NE
	Asphalt/Tarmac (no coal tar)..... NE
	Bitumen..... NE
	Others..... NE
	Other organics..... 0
Other materials (%wt):	-

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	Inorganic ion exchange materials. 0
	Inorganic sludges and flocs..... 0
	Soil..... 0
	Brick/Stone/Rubble..... 0
	Cementitious material..... 0
	Sand.....
	Glass/Ceramics.....
	Graphite..... 0
	Desiccants/Catalysts.....
	Asbestos..... 0
	Non/low friable..... 0
	Moderately friable..... 0
	Highly friable..... 0
	Free aqueous liquids..... 0
	Free non-aqueous liquids..... 0
	Powder/Ash..... 0
Inorganic anions (%wt):	No inorganic anions are present.
	Fluoride..... 0
	Chloride..... 0
	Iodide..... 0
	Cyanide..... 0
	Carbonate..... 0
	Nitrate..... 0
	Nitrite..... 0
	Phosphate..... 0
	Sulphate..... 0
	Sulphide..... 0
Materials of interest for waste acceptance criteria:	No hazardous materials are present.
	Combustible metals..... 0
	Low flash point liquids..... 0
	Explosive materials..... 0
	Phosphorus..... 0
	Hydrides..... 0
	Biological etc. materials..... 0
	Biodegradable materials..... 0
	Putrescible wastes..... 0
	Non-putrescible wastes.....
	Corrosive materials..... 0
	Pyrophoric materials..... 0
	Generating toxic gases..... 0
	Reacting with water..... 0
	Active particles.....

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Soluble solids as bulk chemical compounds.....

Hazardous substances / non hazardous pollutants: No toxic metals are present.

Acrylamide.....

Benzene.....

Chlorinated solvents.....

Formaldehyde.....

Organometallics.....

Phenol.....

Styrene.....

Tri-butyl phosphate.....

Other organophosphates.....

Vinyl chloride.....

Arsenic.....

Barium.....

Boron.....

Cadmium.....

Caesium.....

Selenium.....

Chromium.....

Molybdenum.....

Thallium.....

Tin.....

Vanadium.....

Mercury compounds.....

Others.....

Electronic Electrical Equipment (EEE)

EEE Type 1.....

EEE Type 2..... P

EEE Type 3.....

EEE Type 4.....

EEE Type 5.....

Complexing agents (%wt): No

EDTA..... 0

DPTA..... 0

NTA..... 0

Polycarboxylic acids……

Other organic complexants.....

Total complexing agents..... 0

PACKAGING AND CONDITIONING

Conditioning method: -

Plant Name: -

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Location: -

Plant startup date: -

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: Wastes are currently sent to MBGWS for interim storage pending the development of a final treatment route.

Likely container type:

Container	Waste packaged (%vol)	Waste loading (m^3)	Payload (m^3)	Number of packages
MBGWS box	100.0	2	3.5	2

Likely container type comment: -

Range in container waste volume: -

Other information on containers: Stainless Steel.

Likely conditioning matrix:

Other information: Ultrafilters would be sent to MBGWS in a 416 liner.

Conditioned density (t/m^3): 2.9

Conditioned density comment: -

Other information on conditioning: -

Opportunities for alternative disposal routing:

Treatment	Stream volume (%)	Comment
-	-	-

RADIOACTIVITY

Source: Main sources of activity will be actinide radionuclides with some mixed fission products. Activity will arise from operations within EARP, WPEP and SETP.

Uncertainty: -

Definition of total alpha and total beta/gamma: Activities are given nominal zero values.

Measurement of radioactivities: -

Other information: Activity already included in activity declared for EARP, WPEP and SETP feeds. Hence set to zero to avoid double counting.

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Nuclide	Mean radioactivity, TBq/m³				Nuclide	Mean radioactivity, TBq/m³			
	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					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					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				
Ag 108m					U 235				
Ag 110m					U 236				
Cd 109					U 238				
Cd 113m					Np 237				
Sn 119m					Pu 236				
Sn 121m					Pu 238				
Sn 123					Pu 239				
Sn 126					Pu 240				
Sb 125					Pu 241				
Sb 126					Pu 242				
Te 125m					Am 241				
Te 127m					Am 242m				
I 129					Am 243				
Cs 134					Cm 242				
Cs 135					Cm 243				
Cs 137					Cm 244				
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**		**0**	
Eu 155					**Total b/g**	**0**		**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