WASTE STREAM 2X40 PCM Drums Reclassified To LLW

SITE Sellafield

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Sellafield Limited

WASTE TYPE LLW

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	0 m³
Future arisings -	1.4.2019 - 31.3.2020.....	164.0 m³
	1.4.2020 - 31.3.2021.....	164.0 m³
	1.4.2021 - 31.3.2022.....	164.0 m³
	1.4.2022 - 31.3.2023.....	164.0 m³
	1.4.2023 - 31.3.2024.....	164.0 m³
	1.4.2024 - 31.3.2025.....	164.0 m³
Total future arisings:		984.0 m³
Total waste volume:		984.0 m³

Comment on volumes: It is assumed that 800 PCM drums per year are consigned to LLWR for the next 6 years after being assayed through the PCM assay suite. This waste was previously accounted for in the following streams: 2D03, 2D90, 2F02 & 2F34. Uncertainty information is notional.

Uncertainty factors on volumes:

Stock (upper):	x	Arisings (upper)	x 1.5
Stock (lower):	x	Arisings (lower)	x 0.5

WASTE SOURCE Secondary waste from PCM operations which has been recategorised as LLW.

PHYSICAL CHARACTERISTICS

General description: The waste is contained in 205 litre drums which have an average weight of 50kg each. The waste has not undergone any changes since it was generated.

Physical components (%wt): Metals (44%), Rubber (1%), Halogenated Plastics (36%), Non-Halogenated Plastics (1%) and Other Organics (18%).

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): 0.244

Comment on density: Mean bulk density based on total weight and total volume.

CHEMICAL COMPOSITION

General description and components (%wt): Metals (44%), Rubber (1%), Halogenated Plastics (36%), Non-Halogenated Plastics (1%) and Other Organics (18%).

Chemical state: Neutral

Chemical form of radionuclides: -

Metals and alloys (%wt): -

Stainless steel.....	
Other ferrous metals.....	44.0
Iron.....	
Aluminium.....	
Beryllium.....	
Cobalt.....	
Copper.....	
Lead.....	
Magnox/Magnesium.....	
Nickel.....	
Titanium.....	

WASTE STREAM	2X40	PCM Drums Reclassified To LLW

	Uranium.....	
	Zinc.....	
	Zircaloy/Zirconium.....	
	Other metals.....	
Organics (%wt):	-	
	Total cellulosics.....	
	Paper, cotton.....	
	Wood.....	
	Halogenated plastics	36.0
	Total non-halogenated plastics.....	1.0
	Condensation polymers.....	
	Others.....	
	Organic ion exchange materials....	
	Total rubber.....	1.0
	Halogenated rubber	
	Non-halogenated rubber.....	
	Hydrocarbons.....	
	Oil or grease	
	Fuel.....	
	Asphalt/Tarmac (cont.coal tar)...	
	Asphalt/Tarmac (no coal tar).....	
	Bitumen.....	
	Others.....	
	Other organics.....	18.0
Other materials (%wt):	1% of 'other' waste not accounted for.	
	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	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: Restricted materials are prevented from being drummed PCM by Engineered Drum Stores CFA

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	0
Corrosive materials	0
Pyrophoric materials	0
Generating toxic gases	0
Reacting with water	0
Active particles	0
Soluble solids as bulk chemical compounds	0

Hazardous substances / non hazardous pollutants: -

Acrylamide	0
Benzene	0
Chlorinated solvents	0
Formaldehyde	0
Organometallics	0
Phenol	0
Styrene	0
Tri-butyl phosphate	0
Other organophosphates	0
Vinyl chloride	0
Arsenic	0
Barium	0
Boron	0

WASTE STREAM 2X40 PCM Drums Reclassified To LLW

Cadmium..... 0

Caesium..... 0

Selenium..... 0

Chromium..... 0

Molybdenum..... 0

Thallium..... 0

Tin..... 0

Vanadium..... 0

Mercury compounds..... 0

Others..... 0

Electronic Electrical Equipment (EEE)

EEE Type 1.....

EEE Type 2.....

EEE Type 3.....

EEE Type 4.....

EEE Type 5.....

Complexing agents (%wt): No

EDTA..... 0

DPTA..... 0

NTA..... 0

Polycarboxylic acids…… 0

Other organic complexants..... 0

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 Supercompaction (HFC) Incineration Solidification Decontamination Metal treatment Size reduction Decay storage Recyling / reuse Other / various None	On-Site	100.0

Comment on planned treatments: Waste will be supercompacted in WAMAC before being disposed to LLWR.

WASTE STREAM 2X40 PCM Drums Reclassified To LLW

Disposal Routes:

Disposal Route	Stream volume %
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	100.0

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:

Container	Stream volume %	Waste loading m³	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	100.0	59.28	17

Other information: -

Waste Planned for Disposal at the LLW Repository:

Container voidage: -

Waste Characterisation Form (WCH): The waste meets the LLWR's Waste Acceptance Criteria (WAC).
The waste has a current WCH.
Differences exist between Inventory information and current WCH.
Materials and radioactivity data has been taken from the current WCH, but data on waste volumes and waste routes is based on the Waste Forecasting database as this information is more recent.

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: -

WASTE STREAM 2X40 PCM Drums Reclassified To LLW

Other information:	-

RADIOACTIVITY

Source:	-
Uncertainty:	The uncertainty associated with the derived fingerprint is likely to be relatively low, however the volumes and total activity information (and possibly some other assumptions) are likely to be more notional and thus more uncertain.
Definition of total alpha and total beta/gamma:	Based on total activity and total volume quoted in WCH form.
Measurement of radioactivities:	-
Other information:	Radionuclide information is sourced from the latest WCH (Ref: 1S-1S-0-WCH-0-3893).

WASTE STREAM 2X40 PCM Drums Reclassified To LLW

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			1.30E-07	2
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90					Th 227				
Zr 93					Th 228			1.56E-07	2
Nb 91					Th 229				
Nb 92					Th 230			1.56E-07	2
Nb 93m					Th 232			1.56E-07	2
Nb 94					Th 234				
Mo 93					Pa 231				
Tc 97					Pa 233				
Tc 99					U 232				
Ru 106					U 233				
Pd 107					U 234			3.45E-06	2
Ag 108m					U 235			1.56E-07	2
Ag 110m					U 236			2.60E-08	2
Cd 109					U 238			4.67E-07	2
Cd 113m					Np 237				
Sn 119m					Pu 236				
Sn 121m					Pu 238			2.41E-06	2
Sn 123					Pu 239			1.20E-04	2
Sn 126					Pu 240			9.21E-06	2
Sb 125					Pu 241			8.40E-05	2
Sb 126					Pu 242				
Te 125m					Am 241			3.90E-05	2
Te 127m					Am 242m				
I 129					Am 243				
Cs 134					Cm 242			1.04E-07	2
Cs 135					Cm 243				
Cs 137			1.04E-07	2	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**		**1.75E-04**	**2**
Eu 155					**Total b/g**	**0**		**8.41E-05**	**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