

WASTE STREAM	3M20	Miscellaneous Sludges LLW
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SITE Heysham 2

SITE OWNER EDFE NGL

WASTE CUSTODIAN EDFE NGL

WASTE TYPE LLW

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	2.3 m ³

Total future arisings:		0 m ³
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Total waste volume:		2.3 m ³
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Comment on volumes: Future arisings possible but unpredictable. The volume of waste is approximate, based on numbers of drums currently in storage.

Uncertainty factors on volumes:	Stock (upper):	x 1.5	Arisings (upper)	x
	Stock (lower):	x 0.5	Arisings (lower)	x

WASTE SOURCE Waste arises from the treatment of active effluent. Occasionally sludge cannot be transferred to purpose built storage vessels and is removed from process/treatment vessels into drums, IBCs or similar containers for storage prior to characterisation and disposal.

PHYSICAL CHARACTERISTICS

General description: Sludge recovered from active effluent treatment plant vessels.

Physical components (%vol): Sludge (100% vol), no other items have been identified.

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): ~2

Comment on density: Waste density is an estimate based on average of current arisings.

CHEMICAL COMPOSITION

General description and components (%wt): A variety of materials.

Chemical state: Neutral

Chemical form of radionuclides:

- H-3: Tritiated water
- C-14: Contamination by activated graphite and metallic particulate
- Cl-36: To be determined
- Se-79: Not expected to be significant
- Tc-99: Not expected to be significant
- I-129: To be determined
- Ra: Not expected to be significant
- Th: Not expected to be significant
- U: To be determined
- Np: Not expected to be significant
- Pu: To be determined

Metals and alloys (%wt):

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

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	Titanium.....	NE
	Uranium.....	NE
	Zinc.....	NE
	Zircaloy/Zirconium.....	NE
	Other metals.....	NE
Organics (%wt):	-	
	Total cellulose.....	NE
	Paper, cotton.....	
	Wood.....	
	Halogenated plastics	NE
	Total non-halogenated plastics.....	NE
	Condensation polymers.....	
	Others.....	
	Organic ion exchange materials....	NE
	Total rubber.....	NE
	Halogenated rubber	
	Non-halogenated rubber.....	
	Hydrocarbons.....	NE
	Oil or grease	NE
	Fuel.....	
	Asphalt/Tarmac (cont.coal tar)...	
	Asphalt/Tarmac (no coal tar)....	
	Bitumen.....	
	Others.....	
	Other organics.....	NE
Other materials (%wt):	-	
	Inorganic ion exchange materials.	NE
	Inorganic sludges and flocs.....	100.0
	Soil.....	NE
	Brick/Stone/Rubble.....	NE
	Cementitious material.....	NE
	Sand.....	NE
	Glass/Ceramics.....	NE
	Graphite.....	NE
	Desiccants/Catalysts.....	NE
	Asbestos.....	0
	Non/low friable.....	
	Moderately friable.....	
	Highly friable.....	
	Free aqueous liquids.....	P
	Free non-aqueous liquids.....	NE
	Powder/Ash.....	0
Inorganic anions (%wt):	Inorganic anions may be present	

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Fluoride.....	NE
Chloride.....	NE
Iodide.....	NE
Cyanide.....	0
Carbonate.....	NE
Nitrate.....	NE
Nitrite.....	NE
Phosphate.....	NE
Sulphate.....	NE
Sulphide.....	NE

Materials of interest for waste acceptance criteria:

Expect only trace quantities if any. Oil and grease may be present.

Combustible metals.....	0
Low flash point liquids.....	0
Explosive materials.....	0
Phosphorus.....	0
Hydrides.....	0
Biological etc. materials.....	NE
Biodegradable materials.....	NE
Putrescible wastes.....	
Non-putrescible wastes.....	0
Corrosive materials.....	0
Pyrophoric materials.....	0
Generating toxic gases.....	NE
Reacting with water.....	0
Active particles.....	0
Soluble solids as bulk chemical compounds.....	0

Not expected

Hazardous substances / non hazardous pollutants:

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

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Cadmium.....	NE
Caesium.....	NE
Selenium.....	NE
Chromium.....	NE
Molybdenum.....	NE
Thallium.....	NE
Tin.....	NE
Vanadium.....	NE
Mercury compounds.....	NE
Others.....	NE
Electronic Electrical Equipment (EEE)	
EEE Type 1.....	NE
EEE Type 2.....	NE
EEE Type 3.....	NE
EEE Type 4.....	NE
EEE Type 5.....	NE
Complexing agents (%wt):	Not yet determined
EDTA.....	NE
DPTA.....	NE
NTA.....	NE
Polycarboxylic acids.....	NE
Other organic complexants.....	NE
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		
Recycling / reuse		
Other / various		
None		

Comment on planned treatments:

Preferred strategy not yet identified. In line with the waste hierarchy, waste will be preferentially treated by incineration, drying & supercompaction or cementation prior to disposal.

WASTE STREAM**3M20****Miscellaneous Sludges 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: (Not applicable to this waste stream)

Container	Stream volume %	Waste loading m ³	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			

Other information: -

Waste Planned for Disposal at the LLW Repository: (Not applicable to this waste stream)

Container voidage: -

Waste Characterisation Form (WCH): -

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: -

Other information: -

RADIOACTIVITY

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Source:	Contaminated sludge. Contamination by activation products will be the main source of activity.
Uncertainty:	Characterisation not yet complete.
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:	Nuclides likely to be present in significant quantities estimated from sludge waste stream 3M09.
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		Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code
H 3		6		Gd 153				
Be 10				Ho 163				
C 14				Ho 166m				
Na 22		4		Tm 170				
Al 26		4		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		6		Pb 205				
Fe 55		7		Pb 210				
Co 60		7		Bi 208				
Ni 59		6		Bi 210m				
Ni 63		7		Po 210				
Zn 65		6		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		6		U 233				
Pd 107				U 234				
Ag 108m				U 235				
Ag 110m		6		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		6		Cm 245				
La 137				Cm 246				
La 138				Cm 248				
Ce 144		6		Cf 249				
Pm 145				Cf 250				
Pm 147				Cf 251				
Sm 147				Cf 252				
Sm 151				Other a		8		
Eu 152				Other b/g		7		
Eu 154		6		Total a	NE	6	0	
Eu 155		6		Total b/g	NE	7	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