WASTE STREAM 9D15 PWTP Fine Filters

SITE Hinkley Point A

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Magnox Limited

WASTE TYPE ILW

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	5.8 m³
Total future arisings:		0 m³
Total waste volume:		5.8 m³

Comment on volumes: The site is now being decommissioned so there will be no further arisings in this operational stream. This waste has been reclassified to ILW from LLW as does not meet LLWR WAC

Uncertainty factors on volumes:

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

WASTE SOURCE Cartridge filter elements from filtration of process liquors.

PHYSICAL CHARACTERISTICS

General description: Cartridge filter elements in 240 litre drums; 3 to 6 filters per drum. The filters were grouted for disposal as LLW but subsequently found to not meet LLWR WAC. There are no large items to influence the choice of treatment process or disposal container.

Physical components (%wt): Fibreglass (~1% wt), plastic (~0.02% wt), stainless steel (~0.02% wt), rubber (<0.01% wt), 3:1 PFA/OPC grout (~81% wt), 240 litre drums (~5% wt), steel in-drum frame (~10% wt).

Sealed sources: -

Bulk density (t/m³): 2

Comment on density: Density of conditioned filters as contained in 240 litre drums. 3 to 6 filters per drum.

CHEMICAL COMPOSITION

General description and components (%wt): Fibreglass (~1% wt), plastic (~0.02% wt), stainless steel (~0.02% wt), rubber (<0.01% wt), 3:1 PFA/OPC grout (~81% wt), steel frame (~10% wt) and drums (~5% wt).

Chemical state: Neutral

Chemical form of radionuclides:
H-3: The chemical form of tritium is probably water.
C-14: The chemical form of carbon 14 may be graphite.
Cl-36: The chemical form of chlorine 36 may be chloride.
Se-79: The selenium content is insignificant.
Tc-99: The technetium content is insignificant.
Ra: The radium isotope content is insignificant.
Th: The thorium content is insignificant.
U: The uranium content is insignificant.
Np: The neptunium content is insignificant.
Pu: The chemical form of plutonium isotopes may be oxides.

Metals and alloys (%wt): There are no bulk metal items present. There is the sheet metal of the drums containing the waste which have walls about 1 mm thick. There is also a steel in-drum frame.

Stainless steel.....	~0.02
Other ferrous metals.....	~15.0
Iron.....	
Aluminium.....	0
Beryllium.....	0
Cobalt.....	
Copper.....	0
Lead.....	0
Magnox/Magnesium.....	0

WASTE STREAM 9D15 PWTP Fine Filters

	Nickel		
	Titanium		
	Uranium		
	Zinc	0	
	Zircaloy/Zirconium	0	
	Other metals	0	
Organics (%wt):	Traces of resin fines may be present on the filters.		
	Total cellulosics	0	
	Paper, cotton	0	
	Wood	0	
	Halogenated plastics	0	
	Total non-halogenated plastics	~0.02	
	Condensation polymers	~0.02	
	Others	0	
	Organic ion exchange materials	TR	
	Total rubber	<0.01	
	Halogenated rubber	<0.01	Rubbers will be present in small quantities. It is not determined whether they are halogenated.
	Non-halogenated rubber	NE	
	Hydrocarbons		
	Oil or grease		
	Fuel		
	Asphalt/Tarmac (cont.coal tar)		
	Asphalt/Tarmac (no coal tar)		
	Bitumen		
	Others		
	Other organics	0	
Other materials (%wt):	Other materials may include Fibreglass (~1% wt).		
	Inorganic ion exchange materials.	TR	
	Inorganic sludges and flocs	0	
	Soil	0	
	Brick/Stone/Rubble	0	
	Cementitious material	81.0	
	Sand		
	Glass/Ceramics	~1.0	
	Graphite	0	
	Desiccants/Catalysts		
	Asbestos	0	
	Non/low friable		
	Moderately friable		
	Highly friable		
	Free aqueous liquids	0	

WASTE STREAM 9D15 PWTP Fine Filters

Free non-aqueous liquids	0
Powder/Ash	0

Inorganic anions (%wt): Traces of salts from drying out of the held moisture will be present. Silicate will be present in the filter medium.

Fluoride	TR
Chloride	TR
Iodide	TR
Cyanide	0
Carbonate	TR
Nitrate	TR
Nitrite	TR
Phosphate	TR
Sulphate	TR
Sulphide	TR

Materials of interest for waste acceptance criteria: No materials likely to pose a fire or other non-radiological hazard have been identified.

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

Hazardous substances / non hazardous pollutants: None expected

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

WASTE STREAM 9D15 PWTP Fine Filters

Arsenic.....

Barium.....

Boron.....

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):

EDTA.....

DPTA.....

NTA.....

Polycarboxylic acids……

Other organic complexants.....

Total complexing agents..... NE

PACKAGING AND CONDITIONING

Conditioning method: Assumption is that up to 8 drums will be encapsulated per 6m3 Concrete box as per other MCI streams.

Plant Name: -

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: -

Likely container type:

Container	Waste packaged (%vol)	Waste loading (m^3)	Payload (m^3)	Number of packages
6m^3 concrete box (SD)	100.0	1.92	5.8	3

WASTE STREAM 9D15 PWTP Fine Filters

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:	

Treatment	Stream volume (%)	Comment
-	-	-

RADIOACTIVITY

Source:	Activity source is fission products, activation products and actinides.
Uncertainty:	The values quoted are indicative of the activities that are expected.
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:	The specific activities have been estimated from measurement of the drum activity corrected to 2019.
Other information:	The activities refer to conditioned waste assuming 6 filters per drum. Other similar wastes (not encapsulated) too active to be LLW are described in waste stream 9D17.

WASTE STREAM 9D15 PWTP Fine Filters

Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code	Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code
H 3	1.02E-04	C C 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	5.00E-05	C C 2			Ho 166m		8		
Na 22					Tm 170		8		
Al 26					Tm 171		8		
Cl 36	7E-06	C C 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	1.87E-06	C C 2			Pb 210		8		
Co 60	1.03E-05	C C 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	5.52E-05	C C 2			Po 210		8		
Zn 65		8			Ra 223		8		
Se 79		8			Ra 225		8		
Kr 81		8			Ra 226		8		
Kr 85		8			Ra 228		8		
Rb 87		8			Ac 227		8		
Sr 90	1.50E-04	C C 2			Th 227		8		
Zr 93		8			Th 228		8		
Nb 91		8			Th 229		8		
Nb 92		8			Th 230		8		
Nb 93m		8			Th 232		8		
Nb 94		8			Th 234		8		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233		8		
Tc 99		8			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234		8		
Ag 108m		8			U 235		8		
Ag 110m		8			U 236		8		
Cd 109		8			U 238		8		
Cd 113m		8			Np 237		8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	5.46E-05	C C 2		
Sn 123		8			Pu 239	4E-05	C C 2		
Sn 126		8			Pu 240	5.00E-05	C C 2		
Sb 125	1.93E-09	C C 2			Pu 241	1.13E-03	C C 2		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241	2.26E-04	C C 2		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134		8			Cm 242		8		
Cs 135		8			Cm 243	2.27E-07	C C 2		
Cs 137	5.31E-05	C C 2			Cm 244	3.79E-06	C C 2		
Ba 133	9.12E-08	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	1.68E-07	C C 2			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151		8			Other a				
Eu 152		8			Other b/g				
Eu 154	1.52E-06	C C 2			**Total a**	**3.74E-04**	**C C 2**	**0**	
Eu 155	1.28E-07	C C 2			**Total b/g**	**1.56E-03**	**C C 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