WASTE STREAM 9D49 Ion Siv Unit Pre Filters

SITE	Hinkley Point A
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.....	2.2 m^3
Total future arisings:		0 m^3
Total waste volume:		2.2 m^3

Comment on volumes: A total of 42 pre filters have been used. Each pre filter has a volume of 0.053 m3.

Uncertainty factors on volumes:

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

WASTE SOURCE Filtration of pond water.

PHYSICAL CHARACTERISTICS

General description: Spent pre filters that form part of the submersible caesium removal unit. The size of the pre filters will not influence the choice of treatment process or disposal container.

Physical components (%wt): Pre filters (100%). Stainless steel (~90%), sludge (~10%) and EPDM seal material (<1%). (EPDM is ethylene diene terpolymer).

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m^3): 0.57

Comment on density: The density of 0.57 t/m3 assumes that each pre filter will contain 2 kg of sludge, giving a total mass of 30 kg for each pre filter.

CHEMICAL COMPOSITION

General description and components (%wt): The waste is spent pre filters, which are composed principally of stainless steel supports with glass fibre/polyester filter elements and some organic materials. Pre filters will typically hold a maximum of 2 kg of sludge. Stainless steel (~90%), sludge (~10%) and EPDM seal material (<1%). (EPDM is ethylene diene terpolymer).

Chemical state: Neutral

Chemical form of radionuclides:
H-3: Most tritium is expected to be present as 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 isotope content is insignificant.
U: The chemical form of uranium isotopes may be uranium oxides.
Np: The neptunium content is insignificant.
Pu: The chemical form of plutonium isotopes may be plutonium oxides.

Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	~90.0	The stainless steel is SS316L; nickel and chromium will be major constituents of the stainless steel pre filter construction material.	
Other ferrous metals.....	NE		
Iron.....			
Aluminium.....	NE		
Beryllium.....	TR		

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Cobalt		
Copper	NE	
Lead	NE	
Magnox/Magnesium	NE	
Nickel		
Titanium		
Uranium		
Zinc	NE	
Zircaloy/Zirconium	NE	
Other metals	NE	Only the stainless steel content of the waste has been assessed. The sludge may contain aluminium and some unreacted Magnox.

Organics (%wt): EPDM seal material (<1%wt) is present. Halogenated plastics and rubbers are not expected in the waste.

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulosics	0		
Paper, cotton	0		
Wood	0		
Halogenated plastics	0		
Total non-halogenated plastics	0		
Condensation polymers	0		
Others	0		
Organic ion exchange materials	0		
Total rubber	<1.0		
Halogenated rubber	0		
Non-halogenated rubber	<1.0	EPDM (ethylene diene terpolymer) seal material	
Hydrocarbons			
Oil or grease			
Fuel			
Asphalt/Tarmac (cont.coal tar)			
Asphalt/Tarmac (no coal tar)			
Bitumen			
Others			
Other organics	NE		

Other materials (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials	0		
Inorganic sludges and flocs	~10.0		
Soil	0		
Brick/Stone/Rubble	0		
Cementitious material	0		
Sand			

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Glass/Ceramics	NE	glass fibre filter elements
Graphite	0	
Desiccants/Catalysts		
Asbestos	0	
Non/low friable		
Moderately friable		
Highly friable		
Free aqueous liquids	NE	
Free non-aqueous liquids	0	
Powder/Ash	0	

Inorganic anions (%wt): The inorganic anion content of the waste has not been assessed.

	(%wt)	Type(s) and comment
Fluoride	NE	
Chloride	NE	
Iodide	NE	
Cyanide	NE	
Carbonate	NE	
Nitrate	NE	
Nitrite	NE	
Phosphate	NE	
Sulphate	NE	
Sulphide	NE	

Materials of interest for waste acceptance criteria: There are no hazardous materials present in the waste. Free water may be associated with the retained sludge.

	(%wt)	Type(s) and comment
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	
Higher activity particles		
Soluble solids as bulk chemical compounds		

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Hazardous substances / non hazardous pollutants: If any, present in trace quantities only.

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

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

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Potential for the waste to contain discrete items: Yes. Stainless Steel so DI by definition

PACKAGING AND CONDITIONING

Conditioning method: Direct grout encapsulation of solids into 196 litre drums, grout 16 drums into RCB.

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	2.2	5.8	1

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: Contaminated sludge. Contamination by fission products, actinides and activation products.

Uncertainty: Specific activity is a function of Station operating history. The values quoted are indicative of the activities that might be 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: Specific activities have been estimated using sludge and fuel fingerprints. Data taken from M/EF/HPA/REP/0011/19 - Issue 1

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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	3.08E-04	C C 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	2.97E-04	B B 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36		8			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	2.17E-05	C C 2			Pb 210		8		
Co 60	1.77E-04	C C 2			Bi 208		8		
Ni 59	6.2E-09	C C 2			Bi 210m		8		
Ni 63	7.79E-04	C C 2			Po 210		8		
Zn 65		8			Ra 223		8		
Se 79	2.36E-07	C C 2			Ra 225		8		
Kr 81		8			Ra 226		8		
Kr 85	2.19E-03	C C 2			Ra 228		8		
Rb 87		8			Ac 227		8		
Sr 90	6.83E-02	C C 2			Th 227		8		
Zr 93	1.3E-06	C C 2			Th 228	6.75E-07	B B 2		
Nb 91		8			Th 229		8		
Nb 92		8			Th 230		8		
Nb 93m	7.29E-07	C C 2			Th 232		8		
Nb 94		8			Th 234	1.2E-05	C C 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233	1.56E-07	B B 2		
Tc 99	1.04E-04	B B 2			U 232	7.17E-07	C C 2		
Ru 106	1.59E-06	C C 2			U 233		8		
Pd 107	6.09E-08	B B 2			U 234	9.95E-06	C C 2		
Ag 108m		8			U 235	3.21E-07	C C 2		
Ag 110m		8			U 236	1.15E-06	C C 2		
Cd 109		8			U 238	1.2E-05	C C 2		
Cd 113m	6.08E-06	B B 2			Np 237	1.58E-07	B B 2		
Sn 119m		8			Pu 236		8		
Sn 121m	1.42E-05	B B 2			Pu 238	5.64E-03	C C 2		
Sn 123		8			Pu 239	7.80E-03	C C 2		
Sn 126	4.74E-07	B B 2			Pu 240	7.99E-03	C C 2		
Sb 125	8.97E-05	C C 2			Pu 241	9.67E-02	C C 2		
Sb 126	6.64E-08	B B 2			Pu 242	3.11E-07	C C 2		
Te 125m	2.25E-05	C C 2			Am 241	4.07E-02	C C 2		
Te 127m		8			Am 242m	3.11E-06	B B 2		
I 129	2.13E-08	C C 2			Am 243	5.89E-07	B B 2		
Cs 134	6.06E-05	B B 2			Cm 242	2.56E-06	C C 2		
Cs 135	6.03E-07	C C 2			Cm 243	2.06E-05	C C 2		
Cs 137	6.73E-03	B B 2			Cm 244	3.11E-04	C C 2		
Ba 133		8			Cm 245		8		
La 137		8			Cm 246		8		
La 138		8			Cm 248		8		
Ce 144	1.2E-07	C C 2			Cf 249		8		
Pm 145		8			Cf 250		8		
Pm 147	3.05E-09	C C 2			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151	5.57E-04	B B 2			Other a				
Eu 152	5.01E-06	B B 2			Other b/g				
Eu 154	3.65E-04	C C 2			**Total a**	**6.25E-02**	**C C 2**	**0**	
Eu 155	4.62E-05	C C 2			**Total b/g**	**1.77E-01**	**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