

WASTE STREAM	9D47	Contaminated Sand and Pond Sludge
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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.....	8.5 m ³
Total future arisings:		0 m ³
Total waste volume:		8.5 m ³

Comment on volumes: There will be no further arisings of this waste stream.

Uncertainty factors on volumes:	Stock (upper):	x 1.1	Arisings (upper)	x
	Stock (lower):	x 0.9	Arisings (lower)	x

WASTE SOURCE

The waste results from scrapping of sand pressure filters from the sludge canning building. Vessels appear not to have been backwashed and contain high levels of activity on the filter bed.

PHYSICAL CHARACTERISTICS

General description: The waste is the sand content of scrapped sand pressure filters. There are no large items.
 Physical components (%vol): Sand 80%, Sludge 20%.
 Sealed sources: The waste does not contain sealed sources.
 Bulk density (t/m³): ~2.6
 Comment on density: The density varies between 2.5 - 2.7 t/m³.

CHEMICAL COMPOSITION

General description and components (%wt): The filter may contain up to the full volume of sand. Fission products, actinides and other activation products will be present as contaminants.

Chemical state: Neutral

Chemical form of radionuclides:
 H-3: The chemical form of tritium has not been assessed.
 C-14: The chemical form of carbon 14 has not been assessed.
 Cl-36: The chemical form of chlorine 36 has not been assessed.
 Se-79: The chemical form of selenium has not been determined.
 Tc-99: The chemical form of technetium has not been determined.
 Ra: Radium isotopes content is insignificant.
 Th: The thorium isotope content is insignificant.
 U: The chemical form of uranium isotopes has not been determined but may be uranium oxides.
 Np: The chemical form of neptunium has not been determined.
 Pu: The chemical form of plutonium isotopes has not been determined but may be plutonium oxides.

Metals and alloys (%wt): Only traces of metals will be present if at all.

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	TR		
Other ferrous metals.....	TR		
Iron.....			
Aluminium.....	TR		
Beryllium.....	NE		
Cobalt.....			
Copper.....	TR		

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Lead.....	TR	
Magnox/Magnesium.....	TR	
Nickel.....		
Titanium.....		
Uranium.....		
Zinc.....	TR	
Zircaloy/Zirconium.....	TR	
Other metals.....	TR	Not fully assessed.

Organics (%wt): There may be traces of oils, grease and cellulosics. There may be traces of halogenated plastics and rubbers.

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

Other materials (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..	TR		
Inorganic sludges and flocs.....	~20.0		
Soil.....	TR		
Brick/Stone/Rubble.....	0		
Cementitious material.....	0		
Sand.....	~80.0		
Glass/Ceramics.....	0		
Graphite.....	TR		
Desiccants/Catalysts.....			
Asbestos.....	0		

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Non/low friable.....

Moderately friable.....

Highly friable.....

Free aqueous liquids..... TR

Free non-aqueous liquids..... 0

Powder/Ash..... P

Inorganic anions (%wt): Not fully assessed.

(%wt) Type(s) and comment

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: No materials likely to pose a fire or other non-radiological hazard have been identified.

(%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.....

Hazardous substances / non hazardous pollutants: Not fully assessed.

(%wt) Type(s) and comment

Acrylamide.....

Benzene.....

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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

Potential for the waste to contain discrete items: No. In & of itself not a DI; assumed not likely to contain any "rogue" items that could be.

PACKAGING AND CONDITIONING

Conditioning method: Cement encapsulation into 3m3 box using PCF external mixer

Plant Name: -

Location: Hinkley Point A Site

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Plant startup date: 2023
 Total capacity (m³/y incoming waste): -
 Target start date for packaging this stream: 2023
 Throughput for this stream (m³/y incoming waste): -
 Other information: -

Likely container type:	Container	Waste packaged (%vol)	Waste loading (m ³)	Payload (m ³)	Number of packages
	3m ³ box (round corners)	100.0	1.42	2.9	6

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: -

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Estimated Date that Opportunity will be realised	Opportunity Confidence	Comment
-	-	-	-	-	-

RADIOACTIVITY

Source: Contamination from the filtration of fuel pond water.
 Uncertainty: 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 from available data.
 Other information: Specific activity is a function of Station operating history.

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9D47

Contaminated Sand and Pond Sludge

Nuclide	Mean radioactivity, TBq/m ³				Nuclide	Mean radioactivity, TBq/m ³			
	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3	<4.80E-04	C 3			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	3.06E-04	CC 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	2.61E-05	CC 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		8			Pb 210		8		
Co 60	<1.27E-04	C 3			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	1.13E-03	CC 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	2.65E+00	CC 2			Th 227		8		
Zr 93		8			Th 228		8		
Nb 91		8			Th 229		8		
Nb 92		8			Th 230	3.94E-08	CC 2		
Nb 93m		8			Th 232		8		
Nb 94		8			Th 234	1.77E-04	CC 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233	1.57E-06	CC 2		
Tc 99	1.37E-04	CC 2			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234	4.17E-04	CC 2		
Ag 108m		8			U 235	1.17E-05	CC 2		
Ag 110m		8			U 236	6.14E-05	CC 2		
Cd 109		8			U 238	1.77E-04	CC 2		
Cd 113m		8			Np 237	1.58E-06	CC 2		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	5.62E-02	CC 2		
Sn 123		8			Pu 239	9.62E-02	CC 2		
Sn 126		8			Pu 240	1.28E-01	CC 2		
Sb 125		8			Pu 241	2.17E-01	CC 2		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241	4.73E-01	CC 2		
Te 127m		8			Am 242m		8		
I 129	7.51E-06	CC 2			Am 243	4.41E-03	CC 2		
Cs 134	9.32E-05	CC 2			Cm 242		8		
Cs 135		8			Cm 243	1.85E-04	CC 2		
Cs 137	2.59E+00	CC 2			Cm 244	3.77E-03	CC 2		
Ba 133		8			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		8			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151		8			Other a				
Eu 152		8			Other b/g				
Eu 154	6.41E-03	CC 2			Total a	7.62E-01	CC 2	0	
Eu 155	5.85E-03	CC 2			Total b/g	5.47E+00	CC 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