

WASTE STREAM	9D66	Contaminated Gravel and Sand
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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.....	3.0 m ³
Total future arisings:		0 m ³
Total waste volume:		3.0 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 a failed in service sand pressure filter from the sludge canning building.

PHYSICAL CHARACTERISTICS

General description: The waste is the sand and gravel contents of a scrapped sand pressure filter held in a concrete cell. There are no large items. A camera inspection found the sand layer gone but sand is expected in the gravel layer.

Physical components (%vol): Gravel 67%, Sand 32%.

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. This value needs to be reassessed.

CHEMICAL COMPOSITION

General description and components (%wt): Gravel (67%) and Sand (32%). Fission 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.....			

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Copper.....	TR	
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 oil and grease. The presence of halogenated plastics and rubbers has not been fully assessed.

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	NE		
Paper, cotton.....	NE		
Wood.....	NE		
Halogenated plastics	NE		
Total non-halogenated plastics.....	NE		
Condensation polymers.....	NE		
Others.....	NE		
Organic ion exchange materials....	NE		
Total rubber.....	NE		
Halogenated rubber	NE		
Non-halogenated rubber.....	NE		
Hydrocarbons.....			
Oil or grease	NE		
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..	TR		
Inorganic sludges and flocs.....	0		
Soil.....	0		
Brick/Stone/Rubble.....	67.0	gravel	
Cementitious material.....	0		
Sand.....	32.0	sand	
Glass/Ceramics.....	0		
Graphite.....	TR		
Desiccants/Catalysts.....			

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Asbestos.....	0
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: None expected

	(%wt)	Type(s) and comment
Acrylamide.....		

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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

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: -

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Location: -
 Plant startup date: 2028
 Total capacity (m³/y incoming waste): -
 Target start date for packaging this stream: 2029
 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	1.5	2.9	2

Likely container type comment: -
 Range in container waste volume: -
 Other information on containers: -
 Likely conditioning matrix: Not specified
 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. This is an initial assessment of activities and is only approximate.

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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	4.90E-06	DD 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	1.71E-06	DD 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	6.52E-07	DD 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	1.32E-06	DD 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	4.14E-06	DD 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	4.36E-02	DD 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	6.6E-07	DD 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233	2.17E-09	DD 8		
Tc 99	9.65E-07	DD 2			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234	9.12E-07	DD 2		
Ag 108m		8			U 235	2.64E-09	DD 2		
Ag 110m		8			U 236	1.40E-08	DD 2		
Cd 109		8			U 238	6.6E-07	DD 2		
Cd 113m		8			Np 237	2.21E-09	8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	1.45E-04	DD 2		
Sn 123		8			Pu 239	2.4E-04	DD 2		
Sn 126		8			Pu 240	3.18E-04	DD 2		
Sb 125		8			Pu 241	5.41E-04	DD 2		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241	1.14E-03	DD 2		
Te 127m		8			Am 242m		8		
I 129	9.07E-08	DD 2			Am 243	1.2E-05	DD 2		
Cs 134	1.83E-06	DD 2			Cm 242		8		
Cs 135		8			Cm 243	3.9E-07	DD 2		
Cs 137	1.96E-02	DD 2			Cm 244	7.95E-06	DD 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	8.20E-05	DD 2			Total a	1.86E-03	DD 2	0	
Eu 155	7.46E-05	DD 2			Total b/g	6.40E-02	DD 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