

WASTE STREAM	9C52	Contaminated Sand
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SITE Dungeness A
SITE OWNER Nuclear Decommissioning Authority
WASTE CUSTODIAN Magnox Limited
WASTE TYPE LLW

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	1.9 m ³
Total future arisings:		0 m ³
Total waste volume:		1.9 m ³
Comment on volumes:	-	
Uncertainty factors on volumes:	Stock (upper): x 1.2	Arisings (upper) x
	Stock (lower): x 0.8	Arisings (lower) x

WASTE SOURCE Sand from the sandfilter in the Magnox Dissolution plant.

PHYSICAL CHARACTERISTICS

General description: Sand from the sandfilter in the Magnox Dissolution plant stored in 200l drums. The drums are only half filled with the sand.

Physical components (%wt): Sand (100%wt).

Sealed sources: -

Bulk density (t/m³): 2.5

Comment on density: The density varies between 2.3 and 2.7 t/m³.

CHEMICAL COMPOSITION

General description and components (%wt): Sand (100%wt).

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.
 U: The chemical form of uranium isotopes may be uranium oxides.
 Pu: The chemical form of plutonium isotopes may be plutonium oxides.

Metals and alloys (%wt): -

Stainless steel.....	TR	
Other ferrous metals.....	TR	
Iron.....		
Aluminium.....	TR	
Beryllium.....		
Cobalt.....		
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

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has not been fully assessed.

Total cellulose..... NE

Paper, cotton..... NE

Wood..... NE

Halogenated plastics NE

Total non-halogenated plastics..... 0

Condensation polymers..... 0

Others..... 0

Organic ion exchange materials.... 0

Total rubber..... NE

Halogenated rubber NE

Non-halogenated rubber..... NE

Hydrocarbons.....

Oil or grease

Fuel.....

Asphalt/Tarmac (cont.coal tar)...

Asphalt/Tarmac (no coal tar)....

Bitumen.....

Others.....

Other organics..... NE

Other materials (%wt):

There may be traces of graphite.

Inorganic ion exchange materials. TR

Inorganic sludges and flocs..... 0

Soil..... 0

Brick/Stone/Rubble..... 0

Cementitious material..... 0

Sand..... ~100.0

Glass/Ceramics..... 0

Graphite..... TR

Desiccants/Catalysts.....

Asbestos..... 0

Non/low friable.....

Moderately friable.....

Highly friable.....

Free aqueous liquids..... 0

Free non-aqueous liquids..... 0

Powder/Ash..... 0

Inorganic anions (%wt):

Not fully assessed.

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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:

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.....	
Arsenic.....	
Barium.....	
Boron.....	

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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
 EDTA.....
 DPTA.....
 NTA.....
 Polycarboxylic acids.....
 Other organic complexants.....
 Total complexing agents..... TR

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		13.0
None		87.0

Comment on planned treatments:

13% of this waste stream is expected to be sent to Landfill as VLLW.

WASTE STREAM**9C52****Contaminated Sand****Disposal Routes:**

Disposal Route	Stream volume %
Expected to be consigned to the LLW Repository	87.0
Expected to be consigned to a Landfill Facility	13.0
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	

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:

Container	Stream volume %	Waste loading m ³	Number of packages
1/3 Height IP-1 ISO	87.0	10	< 1
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:

Container voidage: Yet to be determined.

Waste Characterisation Form (WCH): The waste meets the LLWR's Waste Acceptance Criteria (WAC).
The waste does not have a current WCH.

Waste consigned for disposal to LLWR in year of generation: The timing of consignment of the waste for disposal cannot be determined at present.

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: -

WASTE STREAM**9C52****Contaminated Sand****RADIOACTIVITY**

Source:	Sand from the Magnox Dissolution Plant sandfilter, contaminated with activation and fission products.
Uncertainty:	-
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:	Activities have been estimated from measurements of the sand and application of the relevant waste stream fingerprint.
Other information:	-

WASTE STREAM

9C52

Contaminated Sand

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
H 3	1.02E-03	CC 2		Gd 153		8	
Be 10		8		Ho 163		8	
C 14	6E-05	CC 2		Ho 166m		8	
Na 22		8		Tm 170		8	
Al 26		8		Tm 171		8	
Cl 36	2E-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	4.68E-06	CC 2		Pb 210		8	
Co 60	2.06E-05	CC 2		Bi 208		8	
Ni 59		8		Bi 210m		8	
Ni 63	3.68E-04	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	6.76E-05	CC 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	4E-07	CC 2	
Mo 93		8		Pa 231		8	
Tc 97		8		Pa 233		8	
Tc 99		8		U 232		8	
Ru 106	1.31E-09	CC 2		U 233		8	
Pd 107		8		U 234	4E-07	CC 2	
Ag 108m	4.92E-06	CC 2		U 235	1E-08	CC 2	
Ag 110m		8		U 236		8	
Cd 109		8		U 238	4E-07	CC 2	
Cd 113m		8		Np 237		8	
Sn 119m		8		Pu 236		8	
Sn 121m		8		Pu 238	4.57E-06	CC 2	
Sn 123		8		Pu 239	8E-06	CC 2	
Sn 126		8		Pu 240	1E-05	CC 2	
Sb 125	9.65E-09	CC 2		Pu 241	2.24E-04	CC 2	
Sb 126		8		Pu 242		8	
Te 125m	<2.42E-09	C 3		Am 241	4.5E-05	CC 2	
Te 127m		8		Am 242m		8	
I 129		8		Am 243		8	
Cs 134	5.3E-08	CC 2		Cm 242		8	
Cs 135		8		Cm 243	2.28E-08	CC 2	
Cs 137	1.51E-04	CC 2		Cm 244	4.42E-07	CC 2	
Ba 133	2.73E-07	CC 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	4.2E-07	CC 2		Cf 251		8	
Sm 147		8		Cf 252		8	
Sm 151		8		Other a			
Eu 152	1.62E-07	CC 2		Other b/g			
Eu 154	7.58E-07	CC 2		Total a	6.88E-05	CC 2	0
Eu 155	7.36E-08	CC 2		Total b/g	1.95E-03	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