

WASTE STREAM	9C61	Contaminated Sand and Gravel from AETP and PWTP Sand Filters
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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.....	7.8 m ³
Total future arisings:		0 m ³
Total waste volume:		7.8 m ³

Comment on volumes: The waste will arise when sand pressure filters (SPF) 1 (2m3), 2 (2.05m3) & 3 (3.2m3) are decommissioned. Also includes gravel from Cation tank 2 (0.52m3)

Uncertainty factors on volumes: Stock (upper): x 1.2 Arisings (upper) x
 Stock (lower): x 0.8 Arisings (lower) x

WASTE SOURCE Sand and gravel from the sand pressure filters in the Active Effluent Water (AEWTP) and Pond Water Treatment Plants (PWTP). Sludge and solids are removed by filtration through a mixed bed of sand and gravel which is then backwashed into sludge tanks. Additionally gravel from Cation Tank 2.

PHYSICAL CHARACTERISTICS

General description: Sand & Gravel

Physical components (%wt): Sand (52%) & Gravel (48%)

Sealed sources: -

Bulk density (t/m³): ~1.56

Comment on density: Measured density average of ref EX09246_06_10_29, EX09246_06_10_31, EX09246/06/10/19 and EX09246/06/10/21

CHEMICAL COMPOSITION

General description and components (%wt): Sand (52%) & Gravel (48%)

Chemical state: Neutral

Chemical form of radionuclides: H-3: The chemical form of tritium has not been determined
 C-14: The chemical for of carbon has not been determined
 Tc-99: The chemical for of technetium has not been determined
 U: The chemical for of uranium has not been determined
 Np: The chemical for of neptunium has not been determined
 Pu: The chemical for of plutonium has not been determined

Metals and alloys (%wt): -

Stainless steel.....	NE
Other ferrous metals.....	NE
Iron.....	
Aluminium.....	NE
Beryllium.....	
Cobalt.....	
Copper.....	NE
Lead.....	NE
Magnox/Magnesium.....	NE
Nickel.....	
Titanium.....	
Uranium.....	

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	Zinc.....	NE	
	Zircaloy/Zirconium.....	NE	
	Other metals.....	0	
Organics (%wt):	-		
	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		
	Fuel.....		
	Asphalt/Tarmac (cont.coal tar)...		
	Asphalt/Tarmac (no coal tar)....		
	Bitumen.....		
	Others.....		
	Other organics.....	NE	
Other materials (%wt):	-		
	Inorganic ion exchange materials.	0	
	Inorganic sludges and flocs.....	TR	
	Soil.....	0	
	Brick/Stone/Rubble.....	48.0	Gravel
	Cementitious material.....	0	
	Sand.....	52.0	
	Glass/Ceramics.....	0	
	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):	-		

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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:

-	
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):

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

TREATMENT, PACKAGING AND DISPOSAL

Planned on-site / off-site treatment(s):

Treatment	On-site / Off site	Stream volume %
Low force compaction		100.0
Supercompaction (HFC)		
Incineration		
Solidification		
Decontamination		
Metal treatment		
Size reduction		
Decay storage		
Recycling / reuse		
Other / various		
None		

Comment on planned treatments:

Waste will be encapsulated to meet LLWR WAC, likely to be in HHISO's

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Disposal Route	Stream volume %
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	100.0

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 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	100.0	7.77	1

Other information: -

Waste Planned for Disposal at the LLW Repository:

Container voidage: -

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: -

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: -

RADIOACTIVITY

WASTE STREAM**9C61****Contaminated Sand and Gravel from AETP and PWTP
Sand Filters**

Source:	Activity retained within the filter media after back flushing. Activity from filtering the effluents of the pond water and active effluent treatment plants. Contamination by fission products, actinides and activation products.
Uncertainty:	The activity retained on the filter media cannot be known with accuracy until the filters are decommissioned and emptied.
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:	samples taken and reported in EX09246_06_10_29, EX09246_06_10_31, EX09246/06/10/19 and EX09246/06/10/21 decayed by three years for RWI 2019
Other information:	-

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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	6.30E-06	BB 2		Gd 153		8	
Be 10		8		Ho 163		8	
C 14	1.53E-05	BB 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	9.91E-06	BB 2		Pb 210		8	
Co 60	5.61E-06	BB 2		Bi 208		8	
Ni 59		8		Bi 210m		8	
Ni 63	3.71E-05	BB 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	3.21E-03	BB 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	3.98E-07	BB 2		U 232		8	
Ru 106		8		U 233		8	
Pd 107		8		U 234		8	
Ag 108m	6.04E-07	BB 2		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	7.77E-05	BB 2	
Sn 123		8		Pu 239	2.28E-04	BB 2	
Sn 126		8		Pu 240	2.28E-04	BB 2	
Sb 125		8		Pu 241	3.13E-03	BB 2	
Sb 126		8		Pu 242		8	
Te 125m		8		Am 241	3.73E-04	BB 2	
Te 127m		8		Am 242m		8	
I 129		8		Am 243		8	
Cs 134	6.58E-06	BB 2		Cm 242	8.42E-09	BB 2	
Cs 135		8		Cm 243	8.44E-06	BB 2	
Cs 137	2.79E-02	BB 2		Cm 244	8.07E-06	BB 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	2.64E-05	BB 2		Total a	9.24E-04	BB 2	0
Eu 155	1.86E-05	BB 2		Total b/g	3.44E-02	BB 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