

WASTE STREAM**3J04****Desiccants ILW****SITE** Dungeness B**SITE OWNER** EDFE NGL**WASTE CUSTODIAN** EDFE NGL**WASTE TYPE** ILW**WASTE VOLUMES**

		Reported
Stocks:	At 1.4.2019.....	120.0 m ³
Future arisings -	1.4.2019 - 31.3.2023.....	0 m ³
	1.4.2023 - 31.3.2025.....	40.0 m ³
	1.4.2025 - 31.3.2028.....	0 m ³
	1.4.2028 - 31.3.2029.....	40.0 m ³
Total future arisings:		80.0 m ³
Total waste volume:		200.0 m ³

Comment on volumes: Waste volumes will be variable depending on station operating conditions.

Uncertainty factors on volumes: Stock (upper): x 1.25 Arisings (upper) x 1.25
 Stock (lower): x 0.75 Arisings (lower) x 0.75

WASTE SOURCE Exhausted desiccants that have been used for the drying of carbon dioxide reactor coolant.**PHYSICAL CHARACTERISTICS**

General description: Desiccant materials. Some residual moisture may be associated with the desiccant. There are no large items in the waste which may require special handling.

Physical components (%wt): Desiccant (>90% wt), and paper and cloth vacuum cleaner bags (<10% wt).

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): ~0.8

Comment on density: -

CHEMICAL COMPOSITION

General description and components (%wt): Silica gel desiccant (>90% wt), Paper and cloth cleaner bags (<10% wt). Some residual moisture may be associated with the desiccant.

Chemical state: Neutral

Chemical form of radionuclides: H-3: Tritiated water absorbed onto desiccant.
 C-14: May be present as Graphite contamination
 Cl-36: Not yet determined
 Se-79: Not expected to be significant
 Tc-99: Not expected to be significant
 I-129: Not expected to be significant
 Ra: Not expected to be significant
 Th: Not expected to be significant
 U: Not expected to be significant
 Np: Not expected to be significant
 Pu: Not expected to be significant

Metals and alloys (%wt): -

Stainless steel.....	0
Other ferrous metals.....	0
Iron.....	0
Aluminium.....	0
Beryllium.....	0
Cobalt.....	0
Copper.....	0
Lead.....	0
Magnox/Magnesium.....	0

WASTE STREAM**3J04 Desiccants ILW**

	Nickel.....	0
	Titanium.....	0
	Uranium.....	0
	Zinc.....	0
	Zircaloy/Zirconium.....	0
	Other metals.....	0
Organics (%wt):	Paper/cloth vacuum cleaner bags are present.	
	Total cellulose.....	<10.0
	Paper, cotton.....	<10.0
	Wood.....	0
	Halogenated plastics	0
	Total non-halogenated plastics.....	0
	Condensation polymers.....	0
	Others.....	0
	Organic ion exchange materials....	0
	Total rubber.....	0
	Halogenated rubber	0
	Non-halogenated rubber.....	0
	Hydrocarbons.....	0
	Oil or grease	
	Fuel.....	
	Asphalt/Tarmac (cont.coal tar)...	
	Asphalt/Tarmac (no coal tar)....	
	Bitumen.....	
	Others.....	
	Other organics.....	NE
Other materials (%wt):	Silica desiccant (90%)	
	Inorganic ion exchange materials.	0
	Inorganic sludges and flocs.....	0
	Soil.....	0
	Brick/Stone/Rubble.....	0
	Cementitious material.....	0
	Sand.....	0
	Glass/Ceramics.....	
	Graphite.....	0
	Desiccants/Catalysts.....	90.0
	Asbestos.....	0
	Non/low friable.....	
	Moderately friable.....	
	Highly friable.....	
	Free aqueous liquids.....	0
	Free non-aqueous liquids.....	0
	Powder/Ash.....	0

WASTE STREAM**3J04 Desiccants ILW**

Inorganic anions (%wt): None of the listed inorganic anions are expected to be present at greater than 10%.

Fluoride.....	<10.0
Chloride.....	<10.0
Iodide.....	<10.0
Cyanide.....	NE
Carbonate.....	<10.0
Nitrate.....	<10.0
Nitrite.....	NE
Phosphate.....	<10.0
Sulphate.....	<10.0
Sulphide.....	<10.0

Materials of interest for waste acceptance criteria: There are no materials identified in the waste likely to present a fire or other non-radiological hazard.

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.....	0
Corrosive materials.....	0
Pyrophoric materials.....	0
Generating toxic gases.....	0
Reacting with water.....	0
Active particles.....	0
Soluble solids as bulk chemical compounds.....	0

Not expected

Hazardous substances / non hazardous pollutants:

-	
Acrylamide.....	NE
Benzene.....	NE
Chlorinated solvents.....	NE
Formaldehyde.....	NE
Organometallics.....	NE
Phenol.....	NE
Styrene.....	NE
Tri-butyl phosphate.....	NE
Other organophosphates.....	NE
Vinyl chloride.....	NE
Arsenic.....	NE
Barium.....	NE

WASTE STREAM**3J04 Desiccants ILW**

Boron.....	NE
Cadmium.....	NE
Caesium.....	NE
Selenium.....	NE
Chromium.....	NE
Molybdenum.....	NE
Thallium.....	NE
Tin.....	NE
Vanadium.....	NE
Mercury compounds.....	NE
Others.....	NE
Electronic Electrical Equipment (EEE)	
EEE Type 1.....	0
EEE Type 2.....	0
EEE Type 3.....	0
EEE Type 4.....	0
EEE Type 5.....	0
Complexing agents (%wt):	Not yet determined
EDTA.....	0
DPTA.....	0
NTA.....	0
Polycarboxylic acids.....	NE
Other organic complexants.....	NE
Total complexing agents.....	NE

Expect only trace quantities, if any.

LAW TREATMENT, PACKAGING AND DISPOSAL

Waste that is currently ILW: This waste is ILW at the time of arising. The waste is stored temporarily to allow decay of short lived radionuclides, following this, the desiccant is transferred off-site for incineration.

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

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

Comment on planned treatments:

The waste will be decontaminated prior to incineration or directly incinerated.

WASTE STREAM**3J04****Desiccants ILW****Disposal Routes:**

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: (Not applicable to this waste stream)

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			

Other information: -

Waste Consigned to the LLW Repository:

Container voidage: -

Waste Characterisation Form (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**3J04****Desiccants ILW**

Source:	Contamination by tritium and activation products will be the main sources of activity.
Uncertainty:	The values given are indicative of the activities that may 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:	-
Other information:	The degree of minor contamination of the materials needs further assessment. Other beta/gamma nuclides of arisings and stocks (in TBq/m ³) include S35 (1E-4, 3E-7), Cr51 (4E-9, 4E-13) and Co58 (4E-9, 7E-12).

WASTE STREAM

3J04

Desiccants ILW

Nuclide	Mean radioactivity, TBq/m ³				Nuclide	Mean radioactivity, TBq/m ³			
	Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code
H 3	8E-02	CC 2	1E-01	CC 2	Gd 153				
Be 10		8		8	Ho 163				
C 14	1E-06	CC 2	1E-06	CC 2	Ho 166m				
Na 22		4		4	Tm 170				
Al 26		4		4	Tm 171				
Cl 36	1E-04	CC 2	1E-04	CC 2	Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41		8		8	Pt 193				
Mn 53					Tl 204				
Mn 54	7E-09	CC 2	2E-07	CC 2	Pb 205				
Fe 55		8		8	Pb 210	8			8
Co 60	2E-07	CC 2	4E-07	CC 2	Bi 208				
Ni 59		8		6	Bi 210m				
Ni 63		8		8	Po 210	8			8
Zn 65	3E-10	CC 2	2E-08	CC 2	Ra 223				
Se 79		8		8	Ra 225				
Kr 81					Ra 226	8			8
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90		8		8	Th 227				
Zr 93		8		8	Th 228				
Nb 91					Th 229	8			8
Nb 92					Th 230	8			8
Nb 93m		8		8	Th 232	8			8
Nb 94		8		8	Th 234				
Mo 93		8		8	Pa 231	8			8
Tc 97					Pa 233				
Tc 99		8		8	U 232				
Ru 106		8		8	U 233	8			8
Pd 107		8		8	U 234	8			8
Ag 108m		8		8	U 235	8			8
Ag 110m					U 236	8			8
Cd 109					U 238	8			8
Cd 113m					Np 237	8			8
Sn 119m					Pu 236				
Sn 121m		8		8	Pu 238	8			8
Sn 123					Pu 239	8			8
Sn 126		8		8	Pu 240	8			8
Sb 125					Pu 241	8			8
Sb 126					Pu 242	8			8
Te 125m					Am 241	8			8
Te 127m					Am 242m	8			8
I 129		8		8	Am 243	8			8
Cs 134	4E-10	CC 2	3E-09	CC 2	Cm 242	8			8
Cs 135		8		8	Cm 243	8			8
Cs 137	8E-08	CC 2	1E-07	CC 2	Cm 244	8			8
Ba 133					Cm 245	8			8
La 137					Cm 246	8			8
La 138					Cm 248				
Ce 144		8		8	Cf 249				
Pm 145					Cf 250				
Pm 147		8		8	Cf 251				
Sm 147					Cf 252				
Sm 151		8		8	Other a	8			8
Eu 152		8		8	Other b/g	3E-07	CC 2	1E-04	CC 2
Eu 154		8		8	Total a	<1E-09	8	<1E-09	8
Eu 155		8		8	Total b/g	8.01E-02	CC 2	1.00E-01	CC 2

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