

WASTE STREAM	9C38	Ion Siv Unit Pre Filters
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SITE Dungeness A

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE ILW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025	= 1.4		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		1.4		

Number of waste packages in stock: At 1.4.2025..... - packages

Comment on arising rates: -

Additional information on quantities: Each pre filter has a volume of 0.053 m3 and the volume is based on 27 pre filters in stock.

Uncertainty factors on volumes:

Stock (upper):	x 1.20	Arisings (upper):	x -
Stock (lower):	x 0.80	Arisings (lower):	x -

WASTE SOURCE Ion Siv pre-filter for the removal of particulate from pond water prior to the removal of caesium.

PHYSICAL CHARACTERISTICS

General description: Spent pre filters that form part of the submersible caesium removal unit. There are no bulk items present in the waste.

Changes since waste generated: -

Bulk density (t/m³): ~ 0.57

Comment on density: The density of 0.57 t/m3 assumes that each pre filter will contain 2 kg of sludge, giving a total mass of 30 kg for each pre filter.

CHEMICAL COMPOSITION

General description and components (%wt): Some early filters (about 5) will contain sludge (~7%) and EPDM seal material (<1%). The remainder will contain sludge (~10%) and EPDM seal material (<1%) (EPDM is ethylene diene terpolymer).

Chemical state: Neutral

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	~ 90.0	The stainless steel is SS316L; nickel and chromium will be major constituents of the stainless steel pre filter construction material. Only the stainless steel content of the waste has been assessed.	
Other ferrous metals.....	NE	-	
Iron.....	-	-	
Aluminium.....	NE	-	
Beryllium.....	TR	-	
Cobalt.....	-	-	
Copper.....	NE	-	
Lead.....	NE	-	
Magnox/Magnesium.....	NE	-	
Nickel.....	-	-	
Titanium.....	-	-	
Uranium.....	-	-	
Zinc.....	NE	-	
Zircaloy/Zirconium.....	NE	-	
Other metals.....	NE	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	= 0	-	
Paper, cotton.....	= 0	-	
Wood.....	= 0	-	
Halogenated plastics.....	= 0	-	
Total non-halogenated plastics.....	NE	polyester	
Condensation polymers.....	= 0	-	
Others.....	NE	polyester	
Organic ion exchange materials.....	= 0	-	
Total rubber.....	< 0.10	EPDM seal material	
Halogenated rubber.....	= 0	-	
Non-halogenated rubber.....	< 0.10	EPDM seal material	
Hydrocarbons.....		-	
Oil or grease.....		-	
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.....	= 0	-	
Inorganic sludges and flocs.....	= 10.0	-	
Soil.....	= 0	-	
Brick/Stone/Rubble.....	= 0	-	
Cementitious material.....	= 0	-	
Sand.....		-	
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	-	

COMPONENTS OF MATERIALS, WASTE PROPERTIES, MATERIALS NOT CONTRIBUTING TO MASS

Inorganic anions (%wt):

	(%wt)	Type(s) and comment
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:

	(%wt)	Type(s) and comment
Combustible metals.....	TR	-
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.....	TR	-
Higher activity particles.....		-
Soluble solids as bulk chemical compounds.....		-

Hazardous substances / non hazardous pollutants:

	(%wt)	Type(s) and comment
Acrylamide.....	0	-
Benzene.....		-
Chlorinated solvents.....		-
Formaldehyde.....		-
Organometallics.....		-
Phenol.....		-
Styrene.....		-
Tri-butyl phosphate.....		-
Other organophosphates.....		-
Vinyl chloride.....		-
Arsenic.....		-
Barium.....		-
Boron.....		-
Boron (in Boral).....		-
Boron (non-Boral).....		-
Cadmium.....		-
Caesium.....		-
Selenium.....		-
Chromium.....		-
Molybdenum.....		-
Thallium.....		-
Tin.....		-
Vanadium.....		-
Mercury compounds.....		-
Others.....		-

Complexing agents (%wt):

Yes		
	(%wt)	Type(s) and comment
EDTA.....	TR	-
DPTA.....		-
NTA.....		-
Polycarboxylic acids.....		-
Other organic complexants.....		-
Total complexing agents.....		-

Physical components:

	Number	Type(s) and comment
Sources.....		-
Electronic & Electrical Equipment (EEE)		-
EEE Type 1.....		-
EEE Type 2.....		-
EEE Type 3.....		-
EEE Type 4.....		-
EEE Type 5.....		-

TREATMENT, PACKAGING AND DISPOSAL

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

Treatment	On-site / Off-site	Stream volume %
Size reduction Decay storage Low force compaction Supercompaction (HFC) Incineration Drying/dewatering/liquid separation Tie down/fixatives/strippable coating/painting application Decontamination Metal treatment Recycling / reuse Thermal treatment, including vitrification Encapsulation Polymer encapsulation Other physical treatment Other chemical treatment Containerisation Treatment not yet determined None	On-site	100.0

Comments on planned treatments:

-

Conditioning method:

Initially the filters will be held in shielded drums in a buffer store, then transferred into a drum, crushed and the pucks placed into a DCIC. Filters will be co-packaged with 9C24 and 9C53.

Conditioning plants:

Plant Name	Location
DNA AVDS	Dungeness A

Likely conditioning matrix:

-

Further information on the conditioning matrix:

-

Waste Packaging:

Likely container type:	Container	Waste packaged (vol%)	Waste loading (m³)	Payload (m³)	Number of packages	Estimated start date for packaging
	3 m³ RS box	100.0	1.5	2.5	1	-

Range in container waste loading: -

Other information on packaging and conditioning: -

Conditioned density (t/m³): -

Conditioned density comment: -

Management Routes:

Disposal Route	Stream volume %	Raw density t/m³	Start date
Expected to be consigned to a Near Site, Near Surface Disposal Facility (Scotland)	100.0		
Expected to be Non-NSD HAW managed under Scottish Government's policy			
Expected to be disposed to LLW Vaults NRS Dounreay			
Expected to be consigned to the Geological Disposal Facility			
Expected to be consigned to a Near Surface Disposal Facility			
Expected to be consigned to the LLW Repository			
Expected to be consigned to a Landfill Facility			
Expected to be disposed On-Site			
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility			
Expected to be consigned to a Metal Treatment Facility			
Expected to be Out of Scope			
Expected to be recycled / reused			
Disposal route not known			

Classification codes for waste expected to be consigned to a landfill facility:

Opportunities for alternative disposal routing: No

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Opportunity Confidence	Comment
-	-	-	-	-

RADIOACTIVITY

Source: Contaminated sludge. Contamination by fission products, actinides and activation products.

Uncertainty: Specific activity is a function of Station operating history. The values quoted are indicative of the activities that might be expected.

Measurement of radioactivities: Specific activities have been estimated using a sample of Dungeness A pond water. It is assumed that the water throughput is 18m³ per hour and that the dwell time of the pre filter is 30 days.

Chemical form of radionuclides:

- H-3: Most tritium is expected to be present as water.
- C-14: The chemical form of carbon 14 may be graphite.
- Cl-36: The chemical form of chlorine 36 may be chloride.
- Se-79: -
- Tc-99: -
- I-129: -
- Ra: -
- Th: -
- U: The chemical form of uranium isotopes may be uranium oxides
- Np: -
- Pu: The chemical form of plutonium isotopes may be plutonium oxides.

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Nuclide	Mean radioactivity, TBq/m³				Nuclide	Mean radioactivity, TBq/m³			
	Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code		Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code
H 3			8		Gd 153			8	
Be 10			8		Ho 163			8	
C 14	4.99E-03	C C 2			Ho 166m			8	
Na 22			8		Tm 170			8	
Al 26			8		Tm 171			8	
Cl 36	< 2.00E-04	C 3			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	1.00E-04	C C 2			Pb 210			8	
Co 60	1.20E-04	C C 2			Bi 208			8	
Ni 59	< 8.00E-04	C 3			Bi 210m			8	
Ni 63	< 6.20E-04	C 3			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	4.59E-03	C C 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	< 2.00E-04	C 3			Th 234	2.00E-05	C C 2		
Mo 93			8		Pa 231	8.30E-09	C C 2		
Tc 97			8		Pa 233	1.03E-07	C C 2		
Tc 99			8		U 232			8	
Ru 106	1.56E-06	C C 2			U 233			8	
Pd 107			8		U 234	< 1.06E-05	C 3		
Ag 108m	< 2.93E-04	C 3			U 235	< 2.00E-05	C 3		
Ag 110m			8		U 236	2.45E-09		8	
Cd 109			8		U 238	< 2.00E-05	C 3		
Cd 113m			8		Np 237	< 1.04E-07	C 3		
Sn 119m			8		Pu 236			8	
Sn 121m			8		Pu 238	8.74E-03	C C 2		
Sn 123			8		Pu 239	7.00E-03	C C 2		
Sn 126			8		Pu 240	6.99E-03	C C 2		
Sb 125	5.37E-05	C C 2			Pu 241	3.16E-01	C C 2		
Sb 126			8		Pu 242			8	
Te 125m	1.35E-05	C C 2			Am 241	2.26E-02	C C 2		
Te 127m			8		Am 242m			8	
I 129	< 4.00E-06	C 3			Am 243	6.53E-09	C C 2		
Cs 134	3.77E-05	C C 2			Cm 242			8	
Cs 135			8		Cm 243	1.33E-03	C C 2		
Cs 137	5.46E-02	C C 2			Cm 244	1.02E-03	C C 2		
Ba 133	< 6.93E-05	C 3			Cm 245			8	
La 137			8		Cm 246			8	
La 138			8		Cm 248			8	
Ce 144	2.01E-07	C C 2			Cf 249			8	
Pm 145			8		Cf 250			8	
Pm 147	2.92E-03	C C 2			Cf 251			8	
Sm 147			8		Cf 252			8	
Sm 151	8.72E-02	C C 2			Unsp a				
Eu 152	< 2.10E-04	C 3			Unsp b/g				
Eu 154	4.89E-03	C C 2			Total a	4.77E-02	*	0	*
Eu 155	9.99E-04	C C 2			Total b/g	4.79E-01	*	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 the 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
* Total calculated from the 114 declared radionuclides