

WASTE STREAM	9E55	Ion Siv Filters
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SITE Oldbury

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE LLW

WASTE VOLUMES

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

0.0

2.1

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

Comment on arising rates: -

Additional information on quantities: Each filter has a volume of 0.053m³. There are 39 filters remaining in this waste stream. All filters are currently stored in 85 litre drums.

Uncertainty factors on volumes: Stock (upper): x 1.20 Arisings (upper): x -
Stock (lower): x 0.80 Arisings (lower): x -

WASTE SOURCE Filtration of pond water.

PHYSICAL CHARACTERISTICS

General description: Spent pre filters that form part of the submersible caesium removal unit.

Changes since waste generated: The total waste stream consisted of 79 Submersible Caesium Removal Unit (SCRU) pre (45), post (11) and unknown (23) filters. 40 have now been disposed bringing total down to 39. The filters are stainless steel with pleated stainless steel filter medium inside the housings. The filters are currently contained within vented 85ltr drums on the R1 Pilecap. Each individual filter is approximately 326mm by 643mm and weighs approximately 30kg. This weight includes plastic wrapping. Each filter has a volume of 0.053m³. Underwater and in air surveys have been completed which confirm the IonSiv filter population as suitable for disposal at LLWR.

Bulk density (t/m³): ~ 0.56

Comment on density: -

CHEMICAL COMPOSITION

General description and components (%wt): The waste is spent filters, which are composed principally of stainless steel (~99%). There is approximately 1% of plastic liners present.

Chemical state: Neutral

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	~ 99.0	The stainless steel is SS316L; nickel and chromium will be major constituents of the stainless steel filter construction material.	100.0
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 cellulotics.....	= 0	-	
Paper, cotton.....	= 0	-	
Wood.....	= 0	-	
Halogenated plastics.....	= 0	-	
Total non-halogenated plastics.....	= 1.0	-	
Condensation polymers.....	= 0	-	
Others.....	= 1.0	plastic liners	
Organic ion exchange materials.....	= 0	-	
Total rubber.....	< 0	-	
Halogenated rubber.....	= 0	-	
Non-halogenated rubber.....		-	
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.....	= 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.....	= 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:

	(%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):

No		
	(%wt)	Type(s) and comment
EDTA.....	= 0	-
DPTA.....		-
NTA.....		-
Polycarboxylic acids.....		-
Other organic complexants.....		-
Total complexing agents.....	= 0	-

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		
		= 100.0

Comments on planned treatments:

-

Conditioning method:

-

Conditioning plants:

Plant Name	Location

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
1/2 Height IP-2 Disposal/Re-usable ISO (TC01/TC02)	100.0	10.0	18.3	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)			
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			
	= 100.0	0.56	

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: 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: -

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: The selenium content is insignificant.
Tc-99: The technetium content is insignificant.
I-129: -
Ra: The radium isotope content is insignificant.
Th: The thorium isotope content is insignificant.
U: The chemical form of uranium isotopes may be uranium oxides.
Np: The neptunium content is insignificant.
Pu: The chemical form of plutonium isotopes may be plutonium oxides.

WASTE STREAM		9E55		Ion Siv Filters					
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	1.21E-04	C C 2			Gd 153		8		
Be 10					Ho 163		8		
C 14	7.24E-05	C C 2			Ho 166m		8		
Na 22					Tm 170		8		
Al 26					Tm 171		8		
Cl 36	6.44E-08	C C 2			Lu 174		8		
Ar 39					Lu 176		8		
Ar 42					Hf 178n		8		
K 40					Hf 182		8		
Ca 41					Pt 193		8		
Mn 53					Tl 204		8		
Mn 54					Pb 205		8		
Fe 55	5.12E-07	C C 2			Pb 210		8		
Co 60	3.12E-06	C C 2			Bi 208		8		
Ni 59					Bi 210m		8		
Ni 63	2.66E-05	C C 2			Po 210		8		
Zn 65					Ra 223		8		
Se 79	4.77E-09	C C 2			Ra 225		8		
Kr 81					Ra 226		8		
Kr 85	4.39E-06	C C 2			Ra 228		8		
Rb 87					Ac 227		8		
Sr 90	1.73E-04	C C 2			Th 227		8		
Zr 93	2.15E-08	C C 2			Th 228		8		
Nb 91					Th 229		8		
Nb 92					Th 230		8		
Nb 93m	1.54E-08	C C 2			Th 232		8		
Nb 94					Th 234	2.15E-08	C C 2		
Mo 93					Pa 231		8		
Tc 97					Pa 233	2.45E-09	C C 2		
Tc 99	1.67E-07	C C 2			U 232		8		
Ru 106					U 233		8		
Pd 107					U 234	2.40E-08	C C 2		
Ag 108m	9.03E-07	C C 2			U 235		8		
Ag 110m					U 236	2.39E-09	C C 2		
Cd 109					U 238	2.15E-08	C C 2		
Cd 113m	2.15E-08	C C 2			Np 237	2.45E-09	C C 2		
Sn 119m					Pu 236		8		
Sn 121m	1.61E-07	C C 2			Pu 238	6.10E-06	C C 2		
Sn 123					Pu 239	9.75E-06	C C 2		
Sn 126	9.55E-09	C C 2			Pu 240	1.44E-05	C C 2		
Sb 125					Pu 241	1.31E-04	C C 2		
Sb 126	1.34E-09	C C 2			Pu 242	7.16E-09	C C 2		
Te 125m					Am 241	4.63E-05	C C 2		
Te 127m					Am 242m	4.44E-08	C C 2		
I 129					Am 243	1.91E-08	C C 2		
Cs 134	7.00E-07	C C 2			Cm 242	3.66E-08	C C 2		
Cs 135	7.16E-09	C C 2			Cm 243	1.52E-08	C C 2		
Cs 137	4.64E-03	C C 2			Cm 244	1.89E-07	C C 2		
Ba 133					Cm 245		8		
La 137					Cm 246		8		
La 138					Cm 248		8		
Ce 144					Cf 249		8		
Pm 145					Cf 250		8		
Pm 147	2.40E-08	C C 2			Cf 251		8		
Sm 147					Cf 252		8		
Sm 151	2.75E-06	C C 2			Unsp a				
Eu 152	9.70E-09	C C 2			Unsp b/g				
Eu 154	5.71E-07	C C 2			Total a	7.69E-05	*	0	*
Eu 155	1.89E-08	C C 2			Total b/g	5.18E-03	*	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