

WASTE STREAM	9C58	AEWTP Cationic, Anionic and CRU1 Resin
--------------	------	--

SITE Dungeness A

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	= 7.0		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		7.0		

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

Comment on arising rates: -

Additional information on quantities: -

Uncertainty factors on volumes:

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

WASTE SOURCE Ion exchange media from the active effluent water treatment plant in the following vessels: Anion Tank 2.07m3, Cation Tank 1.36m3, Cation Tank 2 1.43m3 and CRU 1 2.11m3.

PHYSICAL CHARACTERISTICS

General description: Amberlite 120 Acidic cation exchange resin with sulfonic acid functionality. Ion exchange media used in the treatment of active effluent. The material is stored under water in a vessel. The ion exchange media is flooded with water and would be expected to have a voidage of about 0.3. That is about 0.3 of the volume of a settled bed of flooded media would be interstitial water. There are no large items that may require special handling.

Changes since waste generated: -

Bulk density (t/m³): ~ 0.97

Comment on density: The bulk density of the waste was measured as ~0.969t/m³.

CHEMICAL COMPOSITION

General description and components (%wt): Proprietary ion exchange material(s) (~70%), interstitial water (~30%).

Chemical state: -

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	0	-	
Other ferrous metals.....	0	-	
Iron.....		-	
Aluminium.....	0	-	
Beryllium.....		-	
Cobalt.....		-	
Copper.....	0	-	
Lead.....	0	-	
Magnox/Magnesium.....	0	-	
Nickel.....		-	
Titanium.....		-	
Uranium.....		-	
Zinc.....	0	-	
Zircaloy/Zirconium.....	0	-	
Other metals.....	0	-	

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.....	= 0	-	
Condensation polymers.....	= 0	-	
Others.....	= 0	-	
Organic ion exchange materials.....	NE	-	
Total rubber.....	= 0	-	
Halogenated rubber.....	= 0	-	
Non-halogenated rubber.....	= 0	-	
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.....	~ 70.0	-	
Inorganic sludges and flocs.....	TR	-	
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.....	~ 30.0	-	
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.....	0	-
Chloride.....	0	-
Iodide.....	0	-
Cyanide.....	0	-
Carbonate.....	0	-
Nitrate.....	0	-
Nitrite.....	0	-
Phosphate.....	0	-
Sulphate.....	0	-
Sulphide.....	0	-

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.....	NE	-
Biodegradable materials.....	0	-
Putrescible wastes.....	= 0	-
Non-putrescible wastes.....		-
Corrosive materials.....	= 0	-
Pyrophoric materials.....	= 0	-
Generating toxic gases.....	NE	-
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.....		-
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		= 100.0

Comments on planned treatments:

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

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	7.2	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)	= 100.0	2.4	
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 resin. Contamination by fission products, actinides and activation products.

Uncertainty: -

Measurement of radioactivities: Data taken from sample results and decayed.

Chemical form of radionuclides:
H-3: -
C-14: -
Cl-36: -
Se-79: -
Tc-99: -
I-129: -
Ra: -
Th: -
U: -
Np: -
Pu: -

WASTE STREAM		9C58		AEWTP Cationic, Anionic and CRU1 Resin					
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	4.87E-05	B B 2			Gd 153		8		
Be 10					Ho 163		8		
C 14	3.48E-05	B B 2			Ho 166m		8		
Na 22					Tm 170		8		
Al 26					Tm 171		8		
Cl 36					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	2.25E-06	B B 2			Pb 210		8		
Co 60	1.27E-06	B B 2			Bi 208		8		
Ni 59					Bi 210m		8		
Ni 63	1.16E-05	B B 2			Po 210		8		
Zn 65					Ra 223		8		
Se 79					Ra 225		8		
Kr 81					Ra 226		8		
Kr 85					Ra 228		8		
Rb 87					Ac 227		8		
Sr 90	3.14E-04	B B 2			Th 227		8		
Zr 93					Th 228		8		
Nb 91					Th 229		8		
Nb 92					Th 230		8		
Nb 93m					Th 232		8		
Nb 94					Th 234		8		
Mo 93					Pa 231		8		
Tc 97					Pa 233		8		
Tc 99	9.51E-05	B B 2			U 232		8		
Ru 106	1.59E-09	B B 2			U 233		8		
Pd 107					U 234		8		
Ag 108m					U 235		8		
Ag 110m					U 236		8		
Cd 109					U 238		8		
Cd 113m					Np 237		8		
Sn 119m					Pu 236		8		
Sn 121m					Pu 238	5.23E-05	B B 2		
Sn 123					Pu 239	6.84E-05	B B 2		
Sn 126					Pu 240	6.83E-05	B B 2		
Sb 125	1.90E-07	B B 2			Pu 241	1.45E-03	B B 2		
Sb 126					Pu 242		8		
Te 125m	4.76E-08	B B 2			Am 241	1.86E-04	B B 2		
Te 127m					Am 242m		8		
I 129	1.66E-07	B B 2			Am 243		8		
Cs 134	1.95E-08	B B 2			Cm 242		8		
Cs 135					Cm 243	1.27E-05	B B 2		
Cs 137	2.20E-03	B B 2			Cm 244	1.11E-05	B B 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					Cf 251		8		
Sm 147					Cf 252		8		
Sm 151					Unsp a				
Eu 152	1.50E-07	B B 2			Unsp b/g				
Eu 154	3.37E-05	B B 2			Total a	3.98E-04	*	0	*
Eu 155	7.46E-06	B B 2			Total b/g	4.21E-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