WASTE STREAM	9C37	DNA Resin Secondary Waste

SITE Dungeness A

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE LLW

WASTE VOLUMES

	Reported (m^3)
Stocks: At 1.4.2025	4.3
Future arisings:	
Total future arisings:	**0.0**
Total waste volume:	**4.3**

OR

Conditioned (m^3)	Packaged (m^3)

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 1.10	Arisings (upper):	x -
Stock (lower):	x 0.90	Arisings (lower):	x -

WASTE SOURCE A campaign of resin retrieval and conditioning of Dungeness A ion exchange resin is underway, from Settling Tanks 3 and 4 (ST3 and ST4). The resin itself is ILW. The process is creating a variety of secondary waste.

PHYSICAL CHARACTERISTICS

General description: This includes soft waste (gloves, swabs, Taki wipes/de-rad wipes, polythene, sizalcraft, Wypalls, etc) that will span the duration of the resin retrieval campaign; hoses, HEPA filters, and at the end of the project, the main transfer hoses and lances, and the tank arrangements (break tank, batch tank). Other contaminated items may be encountered such as tooling, or small pieces of equipment (torque wrenchs, spanners, thermocouples, blanking plugs, pumps, etc). Some of these items may have some oil or grease present.

Changes since waste generated: -

Bulk density (t/m^3): = 0.43

Comment on density: -

CHEMICAL COMPOSITION

General description and components (%wt): Metal (28%), Biodegradable- non putrescibles (7%), Plastics (non-halogenated) (57%), Rubber (7%) and other (1%)

Chemical state: Neutral

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel	= 7.0	Standard Grade: 316 (385 kg break tank, 331 kg hand tools e.g. torque wrenches, spanners, etc, pumps, hose connectors/fittings, HEPA filter cases, suction lances, thermocouples, blanking plugs, 592.1g TC14 (unshielded) drums used for disposal to incineration site)	
Other ferrous metals	= 21.4	Standard Grade: S275JR (3500 kg batch tank, 400 kg wheels from cross site transport, 100 kg miscellaneous hand tools e.g. torque wrenches, spanners, etc)	
Iron		-	
Aluminium		-	
Beryllium		-	
Cobalt		-	
Copper		-	
Lead		-	
Magnox/Magnesium		-	
Nickel		-	
Titanium		-	
Uranium		-	
Zinc		-	
Zircaloy/Zirconium		-	
Other metals		-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulosics	0	-	
Paper, cotton		-	
Wood		-	
Halogenated plastics		-	
Total non-halogenated plastics	= 57.3	0.32 tonnes of hoses, plus 80% of soft waste estimated to be plastic (10.42 tonnes of 13.02 tonnes soft waste)	
Condensation polymers	= 57.3	0.32 tonnes of hoses, plus 80% of soft waste estimated to be plastic (10.42 tonnes of 13.02 tonnes soft waste)	
Others	= 0	-	
Organic ion exchange materials	< 0.01	Lewatit and Duolite IX resins Solid resin beads or fines present as contamination on other material	
Total rubber	= 7.0	-	
Halogenated rubber	= 3.5	-	
Non-halogenated rubber	= 3.5	-	
Hydrocarbons		-	
Oil or grease	< 0.01	Present on tools/pumps	
Fuel		-	
Asphalt/Tarmac (cont.coal tar)		-	
Asphalt/Tarmac (no coal tar)		-	
Bitumen		-	
Others		-	
Other organics		-	

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials		-	
Inorganic sludges and flocs		-	
Soil		-	
Brick/Stone/Rubble		-	
Cementitious material		-	
Sand		-	
Glass/Ceramics		-	
Graphite		-	
Desiccants/Catalysts		-	
Asbestos	0	-	
Non/low friable		-	
Moderately friable		-	
Highly friable		-	
Free aqueous liquids		-	
Free non-aqueous liquids		-	
Powder/Ash		-	

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

Inorganic anions (%wt):

	(%wt)	Type(s) and comment
Fluoride		-
Chloride		-
Iodide		-
Cyanide		-
Carbonate		-
Nitrate		-
Nitrite		-
Phosphate		-
Sulphate		-
Sulphide		-

Materials of interest for waste acceptance criteria:

	(%wt)	Type(s) and comment
Combustible metals		-
Low flash point liquids		-
Explosive materials		-
Phosphorus		-
Hydrides		-
Biological etc. materials		-
Biodegradable materials	= 7.0	-
Putrescible wastes		-
Non-putrescible wastes	= 7.0	-
Corrosive materials		-
Pyrophoric materials		-
Generating toxic gases		-
Reacting with water		-
Higher activity particles		-
Soluble solids as bulk chemical compounds		-

Hazardous substances / non hazardous pollutants: -

	(%wt)	Type(s) and comment
Acrylamide		-
Benzene		-
Chlorinated solvents		-
Formaldehyde		-
Organometallics		-
Phenol		-
Styrene		-
Tri-butyl phosphate		-
Other organophosphates		-
Vinyl chloride		-
Arsenic		-
Barium		-
Boron	0	-
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	< 0.01	-
DPTA		-
NTA		-
Polycarboxylic acids		-
Other organic complexants		-
Total complexing agents	< 0.01	-

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	Off-site	= 81.7
Drying/dewatering/liquid separation		
Tie down/fixatives/strippable coating/painting application		
Decontamination		
Metal treatment	Off-site	= 7.5
Recycling / reuse		
Thermal treatment, including vitrification		
Encapsulation		
Polymer encapsulation		
Other physical treatment		
Other chemical treatment		
Containerisation		
Treatment not yet determined		
None		= 10.8

Comments on planned treatments: None = 10.8% expected to be consigned to LLWR.

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 (m^3)	Payload (m^3)	Number of packages	Estimated start date for packaging
1/2 Height IP-2 Disposal/Re-usable ISO (TC01/TC02)	10.8	10.0	18.3	1	-

Range in container waste loading: -

Other information on packaging and conditioning: -

Conditioned density (t/m^3): -
Conditioned density comment: -

Management Routes:

Disposal Route	Stream volume %	Raw density t/m^3	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	= 10.8	0.43	
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	= 81.7	0.40	
Expected to be consigned to a Metal Treatment Facility	= 7.5	1.4	
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: -

Uncertainty: -

Measurement of radioactivities: -

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

WASTE STREAM **9C37** **DNA Resin Secondary Waste**

Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code	Nuclide	Mean radioactivity, TBq/m³ 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		8			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	1.12E-09	C C 1			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		8			Pb 210		8		
Co 60		8			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	1.81E-08	C C 1			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	2.78E-06	C C 1			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		8			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234		8		
Ag 108m	3.70E-09	C C 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	4.79E-09	C C 1		
Sn 123		8			Pu 239	3.73E-09	C C 1		
Sn 126		8			Pu 240	3.73E-09	C C 1		
Sb 125		8			Pu 241	1.56E-07	C C 1		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241	1.37E-08	C C 1		
Te 127m		8			Am 242m		8		
I 129	2.49E-09	C C 1			Am 243		8		
Cs 134	1.44E-08	C C 2			Cm 242		8		
Cs 135		8			Cm 243		8		
Cs 137	6.34E-05	C C 2			Cm 244		8		
Ba 133	2.69E-09	C C 2			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	2.40E-09	C C 1			Unsp a				
Eu 152	7.70E-09	C C 2			Unsp b/g				
Eu 154	1.66E-09	C C 2			**Total a**	**2.59E-08**	*	**0**	*
Eu 155	9.15E-09	C C 2			**Total b/g**	**6.64E-05**	*	**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