

WASTE STREAM	9J61	Pond Skip Decontamination Liquor
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SITE Hunterston 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	= 140.0		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		140.0		

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

Comment on arising rates: There are no more arisings expected for this waste stream.

Additional information on quantities: The predicted volume for this stream does not account for any volume reduction measures that may be used.

Uncertainty factors on volumes:

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

WASTE SOURCE Acid liquor from the decontamination of aluminium pond skips.

PHYSICAL CHARACTERISTICS

General description: Acid liquor from the decontamination of aluminium pond skips.

Changes since waste generated: -

Bulk density (t/m³): ~ 1.2

Comment on density: Based on 150 g/l of metals and silicon salts in the decontamination liquor.

CHEMICAL COMPOSITION

General description and components (%wt): Nitric acid (1M) containing aluminium nitrate, magnesium nitrate, iron (III) nitrate as dissolved salts and insoluble sodium silicate.

Chemical state: Acid

Sheet metal proportion / thickness: Present as nitrates and insoluble silicates.

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.....	= 0	-	
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.....	= 0	-	

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.....	= 100.0	-	
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.....	= 16.0	-
Nitrite.....	= 0	-
Phosphate.....	= 0	-
Sulphate.....	= 0	-
Sulphide.....	= 0	-

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.....	= 100.0	-
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):

Not yet determined		
	(%wt)	Type(s) and comment
EDTA.....	NE	-
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:

The wet waste will be retrieved and transferred to tanks. There are no plans to neutralise the acid prior to encapsulation. However, it is possible that lime or calcium hydroxide or sodium hydroxide can be added to BFS/OPC mixture when the waste is encapsulated in a 3m³ drum. The waste is expected to be encapsulated in a 3m³ drum.

Conditioning plants:

Plant Name	Location
HNA CILWPP WILWREP	Hunterston A

Likely conditioning matrix:

Unknown

Further information on the conditioning matrix:

The most likely conditioning matrix is a BFS/OPC mixture, but this will be finalised nearer the time of waste encapsulation.

Waste Packaging:

Likely container type:	Container	Waste packaged (vol%)	Waste loading (m³)	Payload (m³)	Number of packages	Estimated start date for packaging
	3 m³ drum	100.0	1.6	2.2	86	-

Range in container waste loading: No significant variability is expected.

Other information on packaging and conditioning:

The container material is expected to be stainless steel. Transportable ILW Solidification Plant to be used for the conditioning of the waste.

Conditioned density (t/m³):
Conditioned density comment:

NE
The conditioned density has not been estimated.

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)	NE		
Expected to be Non-NSD HAW managed under Scottish Government's policy	NE		
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:

Contamination from pond operations and plant operation.

Uncertainty:

-

Measurement of radioactivities:

Activities are based upon measurement of several representative skips. These activities have previously been accounted for in waste stream 9J50. As all of the pond skips have now been decontaminated, it has been estimated that about 80% of the skip contamination would appear in the acid liquor stream.

Chemical form of radionuclides:

H-3: The chemical form of tritium has not been determined.
C-14: The carbon-14 content is insignificant.
Cl-36: -
Se-79: The selenium content is insignificant.
Tc-99: The chemical form of technetium has not been determined.
I-129: -
Ra: The radium content is insignificant.
Th: The thorium content is insignificant.
U: The chemical form of uranium isotopes may be uranium oxides.
Np: The chemical form of neptunium has not been determined.
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		8			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	4.00E-05	C C 2			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	4.42E-05	C C 2			Pb 210		8		
Co 60	2.79E-06	C C 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	1.80E-03	C C 2			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	2.79E-02	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		8			Th 234	2.00E-06	C C 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233	2.05E-08	C C 2		
Tc 99	2.00E-07	C C 2			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234	8.33E-07	C C 2		
Ag 108m		8			U 235	3.00E-08	C C 2		
Ag 110m		8			U 236		8		
Cd 109		8			U 238	2.00E-06	C C 2		
Cd 113m		8			Np 237	2.06E-08	C C 2		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	7.11E-04	C C 2		
Sn 123		8			Pu 239	7.00E-04	C C 2		
Sn 126		8			Pu 240	7.99E-04	C C 2		
Sb 125	1.84E-09	C C 2			Pu 241	9.72E-03	C C 2		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241	2.29E-03	C C 2		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134	1.94E-09	C C 2			Cm 242		8		
Cs 135		8			Cm 243	3.54E-06	C C 2		
Cs 137	1.42E-03	C C 2			Cm 244	3.38E-05	C C 2		
Ba 133	1.12E-06	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		8			Unsp a				
Eu 152		8			Unsp b/g				
Eu 154	8.95E-06	C C 2			Total a	4.54E-03	*	0	*
Eu 155	4.72E-07	C C 2			Total b/g	4.09E-02	*	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