

WASTE STREAM	9A38	Miscellaneous Contaminated Items
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SITE Berkeley

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	= 10.9		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		10.9		

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

Comment on arising rates: -

Additional information on quantities: Station operation ceased in March 1989. The last accumulation of waste in this stream was in 1992. There will be no further arisings of this waste stream.

Uncertainty factors on volumes: Stock (upper): x 1.10 Arisings (upper): x -
Stock (lower): x 0.90 Arisings (lower): x -

WASTE SOURCE Redundant contaminated and activated materials and equipment from reactor and pond areas.

PHYSICAL CHARACTERISTICS

General description: The waste consists of miscellaneous contaminated items from the operation of the Berkeley Power Station. The waste is predominantly items of redundant or scrap equipment made of mild steel, including trailing lead thermocouples, actuator wires, defective gags and Syntox blocks. There are also 13 steel baskets from Bradwell Power Station which, although they are classed as Berkeley Technology Centre MCI, will be processed as Berkeley Power Station MCI. The smaller items of waste are in a variety of steel drum and cans, whilst the larger items are loose in the vault and may have been wrapped in polythene or coated with 'Detex' to contain contamination. The waste containers are included in this waste stream. Some of the loose items will be large and may need to be size reduced.

Changes since waste generated: -

Bulk density (t/m³): ~ 0.34

Comment on density: Calculated from total mass and volume of this waste.

CHEMICAL COMPOSITION

General description and components (%wt): The waste is expected to be principally mild steel (~95% wt). There will be polythene (<1% wt) and miscellaneous materials (~4% wt).

Chemical state: Neutral

Sheet metal proportion / thickness: The metal will be of varying thickness (~1mm to 50mm thick). There is no further information on the metals in the waste.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	NE	-	
Other ferrous metals.....	~ 95.0	-	
Iron.....		-	
Aluminium.....	= 0	-	
Beryllium.....	0	-	
Cobalt.....		-	
Copper.....	= 0	-	
Lead.....	= 0	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....		-	
Titanium.....		-	
Uranium.....		-	
Zinc.....	= 0	-	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	NE	"Other" metals will include unidentified thermocouple materials.	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	TR	-	
Paper, cotton.....	TR	-	
Wood.....	= 0	-	
Halogenated plastics.....	= 0	-	
Total non-halogenated plastics.....	< 1.0	-	
Condensation polymers.....	= 0	-	
Others.....	< 1.0	-	
Organic ion exchange materials.....	= 0	-	
Total rubber.....	TR	-	
Halogenated rubber.....	TR	-	
Non-halogenated rubber.....	NE	-	
Hydrocarbons.....		-	
Oil or grease.....		-	
Fuel.....		-	
Asphalt/Tarmac (cont.coal tar).....		-	
Asphalt/Tarmac (no coal tar).....		-	
Bitumen.....		-	
Others.....		-	
Other organics.....	TR	-	

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.....	TR	-	
Desiccants/Catalysts.....		-	
Asbestos.....	= 0	-	
Non/low friable.....		-	
Moderately friable.....		-	
Highly friable.....		-	
Free aqueous liquids.....	= 0	-	
Free non-aqueous liquids.....	TR	-	
Powder/Ash.....	= 0	-	

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

Inorganic anions (%wt):

	(%wt)	Type(s) and comment
Fluoride.....	= 0	-
Chloride.....	TR	-
Iodide.....	= 0	-
Cyanide.....	= 0	-
Carbonate.....	TR	-
Nitrate.....	TR	-
Nitrite.....	TR	-
Phosphate.....	TR	-
Sulphate.....	TR	-
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.....	= 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):

Yes		
	(%wt)	Type(s) and comment
EDTA.....	TR	-
DPTA.....		-
NTA.....		-
Polycarboxylic acids.....		-
Other organic complexants.....		Organic complexing agents may be present in trace quantities.
Total complexing agents.....	TR	-

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		

Comments on planned treatments:

-

Conditioning method:

This stream is to be co-packaged with 9A36, 9A37, 9A57, 9A58, 9A59, 9A65, 9A68, 9A69, 9A70, 9A71, 9A72, 9A75, 9A77, 9A78, 9A82. Packages are assigned to 9A68, 9A71 & 9A75.

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
	-	-	-	-	-	-

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			

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: The radioactivity may have arisen both from activation and contamination while the material was used in the reactor area or pond area.

Uncertainty: The values quoted are indicative of the activities that may be expected. Specific activity is a function of Station operating history. Specific activities were derived by estimation based upon available information. The caesium 137 activity will probably determine when this waste becomes LLW.

Measurement of radioactivities: The specific activities were derived by estimation based upon available information.

Chemical form of radionuclides:

H-3: Tritium may be present as water, in the form of other inorganic compounds or organic compounds, or as tritium gas incorporated in metal.

C-14: Chemical form of carbon 14 has not been determined but may be graphite.

Cl-36: The chemical form of chlorine 36 in these wastes is not known.

Se-79: The chemical form of selenium-79 has not been determined.

Tc-99: The chemical form of technetium-99 has not been determined.

I-129: -

Ra: .The chemical form of radium isotopes have not been determined.

Th: The chemical form of thorium isotopes have not been determined.

U: Chemical form of uranium isotopes has not been determined but may be uranium oxides.

Np: The chemical form of neptunium isotopes have not been determined.

Pu: Chemical form of plutonium isotopes has not been determined but may be plutonium oxides.

WASTE STREAM		9A38		Miscellaneous Contaminated Items					
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	1.09E-03	C C 2			Gd 153		8		
Be 10					Ho 163		8		
C 14	9.99E-06	C C 2			Ho 166m		8		
Na 22					Tm 170		8		
Al 26					Tm 171		8		
Cl 36	7.00E-07	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	9.22E-06	C C 2			Pb 210		8		
Co 60	4.69E-05	C C 2			Bi 208		8		
Ni 59	1.00E-06	C C 2			Bi 210m		8		
Ni 63	7.93E-05	C C 2			Po 210		8		
Zn 65					Ra 223		8		
Se 79	1.21E-08	C C 2			Ra 225		8		
Kr 81					Ra 226		8		
Kr 85					Ra 228		8		
Rb 87					Ac 227		8		
Sr 90	4.55E-03	C C 2			Th 227		8		
Zr 93	6.00E-07	C C 2			Th 228		8		
Nb 91					Th 229		8		
Nb 92					Th 230		8		
Nb 93m	4.09E-07	C C 2			Th 232		8		
Nb 94					Th 234	3.00E-07	C C 2		
Mo 93					Pa 231		8		
Tc 97					Pa 233	4.19E-08	C C 2		
Tc 99	3.00E-06	C C 2			U 232		8		
Ru 106					U 233		8		
Pd 107					U 234	3.11E-07	C C 2		
Ag 108m	< 2.93E-06	C 3			U 235	7.00E-09	C C 2		
Ag 110m					U 236	4.01E-08	C C 2		
Cd 109					U 238	3.00E-07	C C 2		
Cd 113m					Np 237	4.19E-08	C C 2		
Sn 119m					Pu 236		8		
Sn 121m					Pu 238	1.73E-04	C C 2		
Sn 123					Pu 239	1.00E-04	C C 2		
Sn 126	4.35E-08	C C 2			Pu 240	2.00E-04	C C 2		
Sb 125					Pu 241	1.27E-03	C C 2		
Sb 126	6.09E-09	C C 2			Pu 242	1.00E-07	C C 2		
Te 125m					Am 241	3.49E-04	C C 2		
Te 127m					Am 242m	8.24E-07	C C 2		
I 129	6.00E-09	C C 2			Am 243	3.00E-07	C C 2		
Cs 134	9.51E-09	C C 2			Cm 242	6.80E-07	C C 2		
Cs 135	1.00E-07	C C 2			Cm 243	1.98E-07	C C 2		
Cs 137	4.62E-03	C C 2			Cm 244	1.50E-06	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	4.28E-07	C C 2			Cf 251		8		
Sm 147					Cf 252		8		
Sm 151	2.60E-05	C C 2			Unsp a				
Eu 152	1.19E-07	C C 2			Unsp b/g				
Eu 154	1.18E-05	C C 2			Total a	8.25E-04	*	0	*
Eu 155	5.44E-07	C C 2			Total b/g	1.17E-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