

WASTE STREAM	1A01	LLW Compactable Drummable
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SITE Amersham

SITE OWNER GE Healthcare

WASTE CUSTODIAN GE Healthcare Limited

WASTE TYPE LLW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025	= 3.0		
Future arisings:	1.4.2025 - 31.3.2030	= 37.5		
Total future arisings:		37.5		
Total waste volume:		40.5		

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

Comment on arising rates: Stock and future waste arisings now only from decommissioning.

Additional information on quantities: Waste treatment: in-drum low force compaction only. Waste uncertainty factor is low due to understanding of operational waste volumes and predictions for decommissioning operations based on previous work.

Uncertainty factors on volumes:

Stock (upper):	x 1.50	Arisings (upper):	x 1.50
Stock (lower):	x 0.50	Arisings (lower):	x 0.50

WASTE SOURCE This waste was generated as a result of manufacturing and developing radio-pharmaceuticals and bio-science products. Waste will arise in the future from decommissioning of these redundant facilities.

PHYSICAL CHARACTERISTICS

General description: General laboratory refuse and decayed manufacturing solid waste. The waste is subject to inspection, shredding and low force compaction within 200l drums. No items require special handling.

Changes since waste generated: The waste has undergone in-drum low force compaction.

Bulk density (t/m³): ~ 0.50

Comment on density: The waste density is 0.5 t/m³ after compaction.

CHEMICAL COMPOSITION

General description and components (%wt): The waste comprising mainly cellulose, plastics and rubber. Metal (27%), soft organics -paper / cotton wool / wood / cardboard (40%), PVC (14%), polyethylene (4%), polystyrene (5%), latex (5%), neoprene/hypalon (<1%), glass (5%).

Chemical state: Neutral

Sheet metal proportion / thickness: ~100% of metal present is as sheet in form of mild steel drum. Typical thickness 1mm. Metal component of waste excluding drum <0.1%.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	< 0.10	-	
Other ferrous metals.....	~ 26.1	Mild steel drum to BS1449 Part 1	
Iron.....	-	-	
Aluminium.....	< 0.10	-	
Beryllium.....	= 0	-	
Cobalt.....	= 0	-	
Copper.....	< 0.20	-	
Lead.....	= 0	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....	= 0	-	
Titanium.....	= 0	-	
Uranium.....	= 0	-	
Zinc.....	< 0.10	Trace, component of galvanised steel	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	< 0.10	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	~ 40.0	-	
Paper, cotton.....	~ 39.0	-	
Wood.....	< 1.0	-	
Halogenated plastics.....	~ 14.0	PVC sheeting / gaitors	
Total non-halogenated plastics.....	~ 9.0	Polyethylene / Polystyrene	
Condensation polymers.....	< 0.10	-	
Others.....	~ 9.0	-	
Organic ion exchange materials.....	= 0	-	
Total rubber.....	~ 5.0	-	
Halogenated rubber.....	< 1.0	Hypalon/neoprene gloves/gaitors	
Non-halogenated rubber.....	= 5.0	Latex gloves	
Hydrocarbons.....	-	-	
Oil or grease.....	-	-	
Fuel.....	-	-	
Asphalt/Tarmac (cont.coal tar).....	-	-	
Asphalt/Tarmac (no coal tar).....	-	-	
Bitumen.....	-	-	
Others.....	-	-	
Other organics.....	< 0.20	-	

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.....	= 0	-	
Glass/Ceramics.....	= 5.0	-	
Graphite.....	= 0	-	
Desiccants/Catalysts.....	= 0	-	
Asbestos.....	< 0.10	Trace levels in floor and ceiling tiles	
Non/low friable.....	0.05	-	
Moderately friable.....	0.05	-	
Highly friable.....	< 0.01	-	
Free aqueous liquids.....	= 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.....	< 0.10	-
Chloride.....	< 0.10	-
Iodide.....	< 0.10	-
Cyanide.....	= 0	-
Carbonate.....	< 0.10	-
Nitrate.....	< 0.10	-
Nitrite.....	= 0	-
Phosphate.....	< 0.10	-
Sulphate.....	< 0.10	-
Sulphide.....	< 0.10	-

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.....	< 0.01	-
Biodegradable materials.....	~ 39.0	-
Putrescible wastes.....	< 0.01	-
Non-putrescible wastes.....	= 39.0	39% Paper and cotton.
Corrosive materials.....	= 0	-
Pyrophoric materials.....	= 0	-
Generating toxic gases.....	= 0	-
Reacting with water.....	= 0	-
Higher activity particles.....	= 0	-
Soluble solids as bulk chemical compounds.....	= 0	-

Hazardous substances / non hazardous pollutants:

	(%wt)	Type(s) and comment
Acrylamide.....	= 0	-
Benzene.....	= 0	-
Chlorinated solvents.....	= 0	-
Formaldehyde.....	= 0	-
Organometallics.....	= 0	-
Phenol.....	= 0	-
Styrene.....	= 0	-
Tri-butyl phosphate.....	= 0	-
Other organophosphates.....	= 0	-
Vinyl chloride.....	= 14.0	PVC plastic sheeting / bags / overshoes
Arsenic.....	= 0	-
Barium.....	= 0	-
Boron.....	= 0.04	Present in Borosilicate glass
Boron (in Boral).....	-	-
Boron (non-Boral).....	0.04	-
Cadmium.....	= 0	-
Caesium.....	= 0	-
Selenium.....	= 0	-
Chromium.....	= 0	-
Molybdenum.....	= 0	-
Thallium.....	= 0	-
Tin.....	= 0	-
Vanadium.....	= 0	-
Mercury compounds.....	= 0	-
Others.....	= 0	-

Complexing agents (%wt):

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

Physical components:

	Number	Type(s) and comment
Sources.....	-	-
Electronic & Electrical Equipment (EEE)	-	-
EEE Type 1.....	< 25	<25 stripped down circuit boards
EEE Type 2.....	-	-
EEE Type 3.....	< 50	<50 Various tooling from inside enclosures or used in decommissioning, any power tools (such as electric screwdrivers, drills, jigsaws) have batteries removed prior to use in the plant - they are adapted to use external power supply.
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:

None

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
	-	-	-	-	-	-

Range in container waste loading:

Other information on packaging and conditioning: Majority is being consigned as LALLW in 200l TC14 drums or 1m3 FIBC.

Conditioned density (t/m³): -

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	= 5.0	~ 0.50	
Expected to be consigned to a Landfill Facility	= 90.0	~ 0.50	
Expected to be disposed On-Site			
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility	= 5.0	~ 0.50	
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: This waste was generated as a result of manufacturing radio-pharmaceuticals and bio-science products. The waste consists of general laboratory refuse collected in paper sacks, including clothing, plastics, light metal items and paper, and decayed waste from manufacturing enclosures including glassware, gloves and soft wastes. Similar waste will be generated from decommissioning of pharmaceutical manufacturing areas and redundant manufacturing areas for the production of radioactive sources and bio-science products. The waste is subject to on-site low force compaction within 200l drums. No items require special handling.

Uncertainty: All waste is measured individually by gamma spectroscopy using hyperpure germanium detectors, giving high confidence in declared activity.

Measurement of radioactivities: All waste is measured individually by gamma spectroscopy using hyperpure germanium detectors, which are calibrated using traceable radioactive standards in reference drums. The process follows that in the NPL good practice guide number 34 "Radiometric non-destructive assay".

Chemical form of radionuclides: H-3: Organic - trace only
C-14: Organic - trace only
Cl-36: Trace quantity only
Se-79: -
Tc-99: Trace quantity only - sodium pertechnetate
I-129: -
Ra: Radium sulphate - Trace only
Th: -
U: -
Np: -
Pu: -

WASTE STREAM		1A01		LLW Compactable Drummable					
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	=	2.81E-07	A A 2	~	2.13E-07	A A 2	Gd 153		
Be 10							Ho 163		
C 14	=	3.33E-09	A A 2	~	2.00E-07	A A 2	Ho 166m		
Na 22	=	2.60E-08	A A 1	~	6.67E-08	A A 2	Tm 170		
Al 26							Tm 171		
Cl 36	=	1.00E-08	A A 2	~	6.67E-08	A A 2	Lu 174		
Ar 39							Lu 176		
Ar 42							Hf 178n		
K 40							Hf 182		
Ca 41							Pt 193		
Mn 53							Tl 204	=	8.07E-08 A A 1
Mn 54				~	8.00E-08	A A 2	Pb 205		
Fe 55				~	6.67E-08	A A 2	Pb 210		~ 6.67E-08 A A 2
Co 60	=	9.60E-07	A A 1	~	4.00E-07	A A 2	Bi 208		
Ni 59							Bi 210m		
Ni 63				~	6.67E-08	A A 2	Po 210		~ 6.67E-08 A A 2
Zn 65				~	6.67E-08	A A 2	Ra 223		
Se 79							Ra 225		
Kr 81							Ra 226	=	4.33E-09 A A 1
Kr 85							Ra 228		~ 6.67E-08 A A 2
Rb 87							Ac 227		
Sr 90	=	1.10E-05	A A 1	~	6.67E-05	A A 2	Th 227		
Zr 93							Th 228		
Nb 91							Th 229		
Nb 92							Th 230		
Nb 93m							Th 232		
Nb 94							Th 234		
Mo 93							Pa 231		
Tc 97							Pa 233		
Tc 99	=	6.00E-07	A A 2	~	6.67E-08	A A 2	U 232		
Ru 106							U 233		
Pd 107							U 234		
Ag 108m	=	2.07E-08	A A 1	~	6.67E-08	A A 2	U 235		
Ag 110m				~	6.67E-08	A A 2	U 236		
Cd 109				~	3.73E-07	A A 2	U 238		
Cd 113m							Np 237	=	3.33E-10 A A 1
Sn 119m							Pu 236		
Sn 121m							Pu 238		
Sn 123							Pu 239		
Sn 126							Pu 240		
Sb 125				~	6.67E-08	A A 2	Pu 241		
Sb 126							Pu 242		
Te 125m							Am 241	=	2.00E-08 A A 1
Te 127m							Am 242m		~ 8.00E-07 A A 2
I 129							Am 243		
Cs 134	=	6.67E-10	A A 1	~	6.67E-08	A A 2	Cm 242		
Cs 135							Cm 243		
Cs 137	=	3.03E-05	A A 1	~	2.00E-06	A A 2	Cm 244		~ 6.67E-08 A A 2
Ba 133	=	3.50E-08	A A 1	~	6.67E-08	A A 2	Cm 245		
La 137							Cm 246		
La 138							Cm 248		
Ce 144							Cf 249		
Pm 145							Cf 250		
Pm 147							Cf 251		
Sm 147							Cf 252		
Sm 151							Unsp a		
Eu 152	=	3.33E-09	A A 1	~	6.67E-08	A A 2	Unsp b/g	=	2.80E-08 A A 2
Eu 154				~	6.67E-08	A A 2	Total a		1.00E-06 *
Eu 155							Total b/g		7.14E-05 *

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