

<b>WASTE STREAM</b>	<b>5G04</b>	<b>Winfrith ILW Sources</b>
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**SITE** Winfrith  
**SITE OWNER** Nuclear Decommissioning Authority  
**WASTE CUSTODIAN** Magnox Limited  
**WASTE TYPE** ILW  
 Is the waste subject to Scottish Policy: No

**WASTE VOLUMES**

		Reported
Stocks:	At 1.4.2022.....	0 m <sup>3</sup>
Future arisings -	1.4.2034 - 31.3.2035.....	<< 0.1 m <sup>3</sup>
Total future arisings:		<< 0.1 m <sup>3</sup>
Total waste volume:		<< 0.1 m <sup>3</sup>

Comment on volumes: The stream comprises of only one remaining ILW source, which has been identified and listed in the source register. The stream has been updated to reflect this using the common volume assumption per source of 0.0002m<sup>3</sup> per source (10cm x 10cm x 2cm).

Uncertainty factors on volumes:

Stock (upper):	x	Arisings (upper)	x 1.1
Stock (lower):	x	Arisings (lower)	x 0.9

**WASTE SOURCE** Redundant source.

**PHYSICAL CHARACTERISTICS**

General description: Total volume of sources is very small. Individual sources to be packed with other RHILW within activity limits.

Physical components (%vol): Sources (100%)

Sealed sources: The waste contains sealed sources. One remaining Sr90 source

Bulk density (t/m<sup>3</sup>): ~8

Comment on density: Miscellaneous sources.

**CHEMICAL COMPOSITION**

General description and components (%wt): One remaining Sr90 source.

Chemical state: -

Chemical form of radionuclides: Cl-36: Not known, possibly chloride.  
Ra: Not known, possibly chloride.

Metals and alloys (%wt): None.

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	~100.0	Source can- grades not known. Source housing are expected to be mostly stainless steel.	
Other ferrous metals.....	0		
Iron.....			
Aluminium.....	TR		
Beryllium.....	0		
Cobalt.....			
Copper.....	TR		
Lead.....	TR		
Magnox/Magnesium.....	0		
Nickel.....			
Titanium.....			

<b>WASTE STREAM</b>	<b>5G04</b>	<b>Winfrith ILW Sources</b>
---------------------	-------------	-----------------------------

Uranium.....	TR	
Zinc.....	TR	
Zircaloy/Zirconium.....	0	
Other metals.....	TR	Source may contain very small quantities of other metals.

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.....	0		

<b>WASTE STREAM</b>	<b>5G04</b>	<b>Winfrith ILW Sources</b>
---------------------	-------------	-----------------------------

Free non-aqueous liquids..... 0

Powder/Ash..... NE

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..... 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..... 0

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.....

Benzene.....

Chlorinated solvents.....

Formaldehyde.....

Organometallics.....

Phenol.....

<b>WASTE STREAM</b>	<b>5G04</b>	<b>Winfrith ILW Sources</b>
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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.....  
 Electronic Electrical Equipment (EEE)  
     EEE Type 1.....  
     EEE Type 2.....  
     EEE Type 3.....  
     EEE Type 4.....  
     EEE Type 5.....

Complexing agents (%wt): No

(%wt) Type(s) and comment

EDTA.....  
 DPTA.....  
 NTA.....  
 Polycarboxylic acids.....  
 Other organic complexants.....  
 Total complexing agents..... 0

Potential for the waste to contain discrete items: Not yet determined. Subject to DI type assessment (specific clauses within WAC)

**PACKAGING AND CONDITIONING**

Conditioning method: Waste will be transferred to Harwell for onward processing via the Solid Waste Complex cells with other ILW streams (likely to be co-packaged with 6C32).  
 Plant Name: Harwell Head End Cells  
 Location: Harwell  
 Plant startup date: -  
 Total capacity (m³/y incoming waste): -

<b>WASTE STREAM</b>	<b>5G04</b>	<b>Winfrith ILW Sources</b>
---------------------	-------------	-----------------------------

Target start date for packaging this stream: -

Throughput for this stream (m<sup>3</sup>/y incoming waste): -

Other information: Total volume of source is very small. Individual source to be packed with other ILW at Harwell (likely 6C32) within activity limits.

Likely container type:	Container	Waste packaged (%vol)	Waste loading (m <sup>3</sup> )	Payload (m <sup>3</sup> )	Number of packages

Likely container type comment: Individual source to be packed with other ILW at Harwell (likely to be 6C32) within activity limits, therefore maximising packaging efficiency.

Range in container waste volume: -

Other information on containers: -

Likely conditioning matrix:

Other information: -

Conditioned density (t/m<sup>3</sup>): -

Conditioned density comment: -

Other information on conditioning: -

Opportunities for alternative disposal routing: -

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Estimated Date that Opportunity will be realised	Opportunity Confidence	Comment
-	-	-	-	-	-

## RADIOACTIVITY

Source: Source.

Uncertainty: The waste is a single source, therefore the specific activity is dependent on the recorded volume of this small item. The volume has been estimated and therefore represents an area of some uncertainty on the specific activity, although the total activity is known.

Definition of total alpha and total beta/gamma: Where totals are shown on the table of radionuclide activities they are the sums of the listed alpha or beta/gamma emitting radionuclides plus 'other alpha' or 'other beta/gamma'.

Measurement of radioactivities: Recorded activities for specified source decayed to 01/04/2034

Other information: Only one remaining source in this stream is Sr90. The radionuclide activity content of the source is recorded in an inventory list.

**WASTE STREAM**

**5G04**

**Winfrith ILW Sources**

Nuclide	Mean radioactivity, TBq/m <sup>3</sup>				Nuclide	Mean radioactivity, TBq/m <sup>3</sup>			
	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3				4	Gd 153				4
Be 10				4	Ho 163				4
C 14				4	Ho 166m				4
Na 22				4	Tm 170				4
Al 26				4	Tm 171				4
Cl 36				4	Lu 174				4
Ar 39				4	Lu 176				4
Ar 42				4	Hf 178n				4
K 40				4	Hf 182				4
Ca 41				4	Pt 193				4
Mn 53				4	Tl 204				4
Mn 54				4	Pb 205				4
Fe 55				4	Pb 210				4
Co 60				4	Bi 208				4
Ni 59				4	Bi 210m				4
Ni 63				4	Po 210				4
Zn 65				4	Ra 223				4
Se 79				4	Ra 225				4
Kr 81				4	Ra 226				4
Kr 85				4	Ra 228				4
Rb 87				4	Ac 227				4
Sr 90			8.40E-02	BB 1	Th 227				4
Zr 93				4	Th 228				4
Nb 91				4	Th 229				4
Nb 92				4	Th 230				4
Nb 93m				4	Th 232				4
Nb 94				4	Th 234				4
Mo 93				4	Pa 231				4
Tc 97				4	Pa 233				4
Tc 99				4	U 232				4
Ru 106				4	U 233				4
Pd 107				4	U 234				4
Ag 108m				4	U 235				4
Ag 110m				4	U 236				4
Cd 109				4	U 238				4
Cd 113m				4	Np 237				4
Sn 119m				4	Pu 236				4
Sn 121m				4	Pu 238				4
Sn 123				4	Pu 239				4
Sn 126				4	Pu 240				4
Sb 125				4	Pu 241				4
Sb 126				4	Pu 242				4
Te 125m				4	Am 241				4
Te 127m				4	Am 242m				4
I 129				4	Am 243				4
Cs 134				4	Cm 242				4
Cs 135				4	Cm 243				4
Cs 137				4	Cm 244				4
Ba 133				4	Cm 245				4
La 137				4	Cm 246				4
La 138				4	Cm 248				4
Ce 144				4	Cf 249				4
Pm 145				4	Cf 250				4
Pm 147				4	Cf 251				4
Sm 147				4	Cf 252				4
Sm 151				4	Other a				
Eu 152				4	Other b/g				
Eu 154				4	<b>Total a</b>	<b>0</b>		<b>0</b>	
Eu 155				4	<b>Total b/g</b>	<b>0</b>		<b>8.40E-02</b>	<b>BB 1</b>

**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 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