

WASTE STREAM**3T09****LLW Air and Water Filters****SITE**

Hinkley Point C

SITE OWNER

NNB GenCo (HPC) Ltd

WASTE CUSTODIAN

NNB GenCo (HPC) Ltd

WASTE TYPE

LLW

Is the waste subject to
Scottish Policy:

No

WASTE VOLUMES

Reported

Stocks:

At 1.4.2022.....

0 m³

Future arisings -

1.4.2027 - 31.3.2028.....

8.0 m³

1.4.2028 - 31.3.2029.....

8.0 m³

1.4.2029 - 31.3.2030.....

8.0 m³

1.4.2030 - 31.3.2031.....

8.0 m³

1.4.2031 - 31.3.2032.....

8.0 m³

1.4.2032 - 31.3.2033.....

8.0 m³

1.4.2033 - 31.3.2034.....

8.0 m³

1.4.2034 - 31.3.2035.....

8.0 m³

1.4.2035 - 31.3.2036.....

8.0 m³

1.4.2036 - 31.3.2037.....

8.0 m³

1.4.2037 - 31.3.2038.....

8.0 m³

1.4.2038 - 31.3.2039.....

8.0 m³

1.4.2039 - 31.3.2040.....

8.0 m³

1.4.2040 - 31.3.2041.....

8.0 m³

1.4.2041 - 31.3.2042.....

8.0 m³

1.4.2042 - 31.3.2043.....

8.0 m³

1.4.2043 - 31.3.2044.....

8.0 m³

1.4.2044 - 31.3.2045.....

8.0 m³

1.4.2045 - 31.3.2046.....

8.0 m³

1.4.2046 - 31.3.2047.....

8.0 m³

1.4.2047 - 31.3.2048.....

8.0 m³

1.4.2048 - 31.3.2049.....

8.0 m³

1.4.2049 - 31.3.2050.....

8.0 m³

1.4.2050 - 31.3.2051.....

8.0 m³

1.4.2051 - 31.3.2052.....

8.0 m³

1.4.2052 - 31.3.2053.....

8.0 m³

1.4.2053 - 31.3.2054.....

8.0 m³

1.4.2054 - 31.3.2055.....

8.0 m³

1.4.2055 - 31.3.2056.....

8.0 m³

1.4.2056 - 31.3.2057.....

8.0 m³

1.4.2057 - 31.3.2058.....

8.0 m³

1.4.2058 - 31.3.2059.....

8.0 m³

1.4.2059 - 31.3.2060.....

8.0 m³

1.4.2060 - 31.3.2061.....

8.0 m³

1.4.2061 - 31.3.2062.....

8.0 m³

1.4.2062 - 31.3.2063.....

8.0 m³

1.4.2063 - 31.3.2064.....

8.0 m³

1.4.2064 - 31.3.2065.....

8.0 m³

1.4.2065 - 31.3.2066.....

8.0 m³

1.4.2066 - 31.3.2067.....

8.0 m³

1.4.2067 - 31.3.2068.....

8.0 m³

1.4.2068 - 31.3.2069.....

8.0 m³

1.4.2069 - 31.3.2070.....

8.0 m³

1.4.2070 - 31.3.2071.....

8.0 m³

1.4.2071 - 31.3.2072.....

8.0 m³

1.4.2072 - 31.3.2073.....

8.0 m³

1.4.2073 - 31.3.2074.....

8.0 m³

1.4.2074 - 31.3.2075.....

8.0 m³

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1.4.2075 - 31.3.2076.....	8.0 m ³
1.4.2076 - 31.3.2077.....	8.0 m ³
1.4.2077 - 31.3.2078.....	8.0 m ³
1.4.2078 - 31.3.2079.....	8.0 m ³
1.4.2079 - 31.3.2080.....	8.0 m ³
1.4.2080 - 31.3.2081.....	8.0 m ³
1.4.2081 - 31.3.2082.....	8.0 m ³
1.4.2082 - 31.3.2083.....	8.0 m ³
1.4.2083 - 31.3.2084.....	8.0 m ³
1.4.2084 - 31.3.2085.....	8.0 m ³
1.4.2085 - 31.3.2086.....	8.0 m ³
1.4.2086 - 31.3.2087.....	8.0 m ³

Total future arisings: 480.0 m³

Total waste volume: 480.0 m³

Comment on volumes: No uncertainty data currently available.

Uncertainty factors on volumes: Stock (upper): x Arisings (upper) x 1.0
 Stock (lower): x Arisings (lower) x 1.0

WASTE SOURCE

All radiation controlled areas of the nuclear auxiliary building, fuel building, safeguards buildings, reactor building, operational production centre, access building and effluent treatment building are served by dedicated ventilation systems. The extract from these systems is subject to a number of airborne activity abatement techniques, including the use of High Efficiency Particulate Air (HEPA) filtration, before discharge to the environment. The HEPA filters remove particulate material to ensure doses to workers are ALARP and discharges to the environment are minimised. This also ensures that the doses to members of the public from airborne discharges are minimised. The abatement systems will produce a number of spent LLW pre and HEPA filters over the course of reactor operations. In addition to the filters serving the primary systems, LLW water filters will be generated from the filtration of low activity effluent (TEU, APG). The physical form of this waste stream consists of filter cartridges that are composed principally of stainless steel supports with glass fibre filter media and some organic materials.

PHYSICAL CHARACTERISTICS

General description: Cartridge filters composed principally of stainless steel supports with a filter medium and some organic materials. HEPA filters with glass fibre filter media.

Physical components (%wt): % percentage breakdown not yet known.

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): NE

Comment on density: Not assessed

CHEMICAL COMPOSITION

General description and components (%wt): -

Chemical state: -

Chemical form of radionuclides: -

Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	NE		
Other ferrous metals.....			
Iron.....			
Aluminium.....			
Beryllium.....	<0.01		
Cobalt.....			
Copper.....			

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Lead.....	~0.09	
Magnox/Magnesium.....		
Nickel.....	~0.03	
Titanium.....		
Uranium.....		
Zinc.....		
Zircaloy/Zirconium.....		
Other metals.....	<0.01	antimony

Organics (%wt): -

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

Other materials (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..	NE		
Inorganic sludges and flocs.....	NE		
Soil.....	NE		
Brick/Stone/Rubble.....	NE		
Cementitious material.....	NE		
Sand.....	NE		
Glass/Ceramics.....	NE		
Graphite.....	NE		
Desiccants/Catalysts.....	NE		
Asbestos.....	NE		

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Non/low friable.....	NE
Moderately friable.....	NE
Highly friable.....	NE
Free aqueous liquids.....	NE
Free non-aqueous liquids.....	NE
Powder/Ash.....	NE

Inorganic anions (%wt): -

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

Materials of interest for waste acceptance criteria: -

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

Hazardous substances / non hazardous pollutants: -

	(%wt)	Type(s) and comment
Acrylamide.....		
Benzene.....	<0.01	

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Chlorinated solvents.....
 Formaldehyde.....
 Organometallics.....
 Phenol.....
 Styrene.....
 Tri-butyl phosphate.....
 Other organophosphates.....
 Vinyl chloride.....
 Arsenic..... <0.01
 Barium.....
 Boron..... ~-0.82
 Boron (in Boral).....
 Boron (non-Boral).....
 Cadmium..... <0.01
 Caesium.....
 Selenium..... <0.01
 Chromium..... ~-0.03
 Molybdenum.....
 Thallium.....
 Tin.....
 Vanadium.....
 Mercury compounds..... <0.01
 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.....

Potential for the waste to contain discrete items: Yes.

TREATMENT, PACKAGING AND DISPOSAL

Planned on-site / off-site treatment(s):

Treatment	On-site / Off site	Stream volume %
Low force compaction		
Supercompaction (HFC)	Off-site	NE
Incineration	Off-site	NE
Solidification		
Decontamination		
Metal treatment		
Size reduction		
Decay storage		
Recycling / reuse		
Other / various		
None		

Comment on planned treatments:

Both air and water filters will primarily be sent for incineration following onsite- size reduction. Filters that cannot be incinerated will be sent for supercompaction and if that isn't possible they will be managed, conditioned and sent for direct LLWR disposal.

Disposal Routes:

Disposal Route	Stream volume %	Disposal density t/m3
Expected to be consigned to the LLW Repository	NE	
Expected to be consigned to a Landfill Facility		
Expected to be consigned to an On-Site Disposal Facility		
Expected to be consigned to an Incineration Facility	NE	
Expected to be consigned to a Metal Treatment Facility		
Expected to be consigned as Out of Scope		
Expected to be recycled / reused		
Disposal route not known		

Classification codes for waste expected to be consigned to a landfill facility: -

Upcoming (2022/23-2024/25) Waste Routing (if expected to change from above):

Disposal Route	Stream volume %		
	2022/23	2023/24	2024/25
Expected to be consigned to the LLW Repository			
Expected to be consigned to a Landfill Facility			
Expected to be consigned to an On-Site Disposal Facility			
Expected to be consigned to an Incineration Facility			
Expected to be consigned to a Metal Treatment Facility			
Expected to be consigned as Out of Scope			
Expected to be recycled / reused			
Disposal route not known			

Opportunities for alternative disposal routing: -

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

Waste Packaging for Disposal: (Not applicable to this waste stream)

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Container	Stream volume %	Waste loading m ³	Number of packages
1/3 Height IP-1 ISO 2/3 Height IP-2 ISO 1/2 Height WAMAC IP-2 ISO 1/2 Height IP-2 Disposal/Re-usable ISO 2m box (no shielding) 4m box (no shielding) Other	NE	NE	

Other information: -

Waste Planned for Disposal at the LLW Repository: (Not applicable to this waste stream)

Container voidage: -

Waste Characterisation Form (WCH): The waste meets the LLWR's Waste Acceptance Criteria (WAC).
The waste does not have a current WCH.

Waste consigned for disposal to LLWR in year of generation: -

Non-Containerised Waste for In-Vault Grouting: (Not applicable to this waste stream)

Stream volume (%): -

Waste stream variation: -

Bounding cuboidal volume:

Inaccessible voidage: -

Other information: -

RADIOACTIVITY

Source: The abatement systems will produce a number of spent HEPA filters over the course of reactor operations. These HEPA filters have the potential to be classed as radioactive waste should they have arrested any radioactive particulate or aerosol. The low active effluent water filters are composed principally of stainless steel supports with a filter medium and some organic materials. The amount of particulate radioactive material (metallic oxides) trapped on each filter may be variable.

Uncertainty: -

Definition of total alpha and total beta/gamma: In addition to the individual radionuclides which have been quantified the total beta gamma value accounts for relevant radionuclides which have been identified but not quantified individually. Total alpha may include some relevant radionuclides however which ones and in what quantity is not known at this stage.

Measurement of radioactivities: -

Other information: -

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LLW Air and Water Filters

Nuclide	Mean radioactivity, TBq/m ³				Nuclide	Mean radioactivity, TBq/m ³			
	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					Gd 153				
Be 10					Ho 163				
C 14			-6.5E-07	BB 2	Ho 166m				
Na 22					Tm 170				
Al 26					Tm 171				
Cl 36					Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41					Pt 193				
Mn 53					Tl 204				
Mn 54				6	Pb 205				
Fe 55				6	Pb 210				
Co 60			-5.9E-05	BB 2	Bi 208				
Ni 59					Bi 210m				
Ni 63					Po 210				
Zn 65				6	Ra 223				
Se 79					Ra 225				
Kr 81					Ra 226				
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90					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					U 232				
Ru 106					U 233				
Pd 107					U 234				
Ag 108m					U 235				
Ag 110m				6	U 236				
Cd 109					U 238				
Cd 113m					Np 237				
Sn 119m					Pu 236				
Sn 121m					Pu 238				
Sn 123					Pu 239				
Sn 126					Pu 240				
Sb 125					Pu 241				
Sb 126					Pu 242				
Te 125m					Am 241				
Te 127m					Am 242m				
I 129			-2.58E-12	BB 2	Am 243				
Cs 134					Cm 242				
Cs 135					Cm 243				
Cs 137				6	Cm 244				
Ba 133					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					Other a				
Eu 152					Other b/g				
Eu 154					Total a	0		~8.85E-09	BB 2
Eu 155					Total b/g	0		~2.53E-04	BB 2

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