

WASTE STREAM**3N02****Sludge**

	Nickel.....	NE
	Titanium.....	NE
	Uranium.....	NE
	Zinc.....	TR
	Zircaloy/Zirconium.....	TR
	Other metals.....	TR
Organics (%wt):	Oil and grease may be present.	
	Total cellulose.....	TR
	Paper, cotton.....	NE
	Wood.....	NE
	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.....	NE
	Oil or grease	NE
	Fuel.....	
	Asphalt/Tarmac (cont.coal tar)...	
	Asphalt/Tarmac (no coal tar)....	
	Bitumen.....	
	Others.....	
	Other organics.....	NE
Other materials (%wt):	-	
	Inorganic ion exchange materials.	0
	Inorganic sludges and flocs.....	~100.0
	Soil.....	0
	Brick/Stone/Rubble.....	0
	Cementitious material.....	0
	Sand.....	NE
	Glass/Ceramics.....	
	Graphite.....	0
	Desiccants/Catalysts.....	0
	Asbestos.....	0
	Non/low friable.....	
	Moderately friable.....	
	Highly friable.....	
	Free aqueous liquids.....	P
	Free non-aqueous liquids.....	P
	Powder/Ash.....	0

WASTE STREAM**3N02****Sludge**

Inorganic anions (%wt):

Only expected in trace quantities if any.

Fluoride.....	TR
Chloride.....	TR
Iodide.....	TR
Cyanide.....	NE
Carbonate.....	TR
Nitrate.....	TR
Nitrite.....	NE
Phosphate.....	TR
Sulphate.....	TR
Sulphide.....	TR

Materials of interest for waste acceptance criteria:

None expected, but there could be traces of non-pathogenic biological material.

Combustible metals.....	0
Low flash point liquids.....	0
Explosive materials.....	0
Phosphorus.....	0
Hydrides.....	0
Biological etc. materials.....	
Biodegradable materials.....	0
Putrescible wastes.....	0
Non-putrescible wastes.....	0
Corrosive materials.....	0
Pyrophoric materials.....	0
Generating toxic gases.....	0
Reacting with water.....	0
Active particles.....	P
Soluble solids as bulk chemical compounds.....	0

May be present

Hazardous substances / non hazardous pollutants:

-	
Acrylamide.....	NE
Benzene.....	NE
Chlorinated solvents.....	NE
Formaldehyde.....	NE
Organometallics.....	NE
Phenol.....	NE
Styrene.....	NE
Tri-butyl phosphate.....	NE
Other organophosphates.....	NE
Vinyl chloride.....	NE
Arsenic.....	NE
Barium.....	NE

WASTE STREAM	3N02	Sludge
---------------------	-------------	---------------

Boron..... NE
 Cadmium..... NE
 Caesium..... NE
 Selenium..... NE
 Chromium..... NE
 Molybdenum..... NE
 Thallium..... NE
 Tin..... NE
 Vanadium..... NE
 Mercury compounds..... NE
 Others..... NE
 Electronic Electrical Equipment (EEE)
 EEE Type 1..... 0
 EEE Type 2..... 0
 EEE Type 3..... 0
 EEE Type 4..... 0
 EEE Type 5..... 0

Complexing agents (%wt): Not yet determined
 EDTA..... NE
 DPTA..... NE
 NTA..... NE
 Polycarboxylic acids..... NE
 Other organic complexants..... NE
 Total complexing agents..... TR

Expect only trace quantities, if any.

PACKAGING AND CONDITIONING

Conditioning method: The waste is expected to be encapsulated probably in a BFS/OPC matrix. Another approach being kept under review is (i) to dry the sludge (ii) to supercompact drums of dry sludge (iii) to grout the supercompacted drums in an "enhanced" drum.
 Plant Name: None.
 Location: Hinkley Point B Power Station.
 Plant startup date: Probably between 2023 and 2028.
 Total capacity (m³/y incoming waste): ~175.0
 Target start date for packaging this stream: -
 Throughput for this stream (m³/y incoming waste): -
 Other information: All the waste in a tank will be retrieved when a conditioning campaign is undertaken. There may be more than one campaign.

Likely container type:	Container	Waste packaged (%vol)	Waste loading (m ³)	Payload (m ³)	Number of packages
	500 l drum	100.0	~0.33	0.47	44

WASTE STREAM	3N02	Sludge
---------------------	-------------	---------------

Likely container type comment: -

Range in container waste volume: -

Other information on containers: Stainless Steel

Likely conditioning matrix: BFS/OPC
 Other information: The matrix is expected to be 9:1 BFS/OPC to formula FS044A.

Conditioned density (t/m³): ~1.7
 Conditioned density comment: Density range of 1.68 - 1.84 t/m³ is expected.

Other information on conditioning: Appropriate plant to be provided at the Station in accordance with strategy.

Opportunities for alternative disposal routing: No

Treatment	Stream volume (%)	Comment
-	-	-

RADIOACTIVITY

Source: Contaminated sludge. Contamination by activation products will be the main source of activity.

Uncertainty: The values quoted are indicative of the activities that may be expected. The values quoted were based on theoretical assessments. The activities indicate a maximum total specific activity based upon operating experience and assume significant oxide spalling.

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: Theoretical estimates. Stock activities of Mn54, Co60, Cs134, Cs137, Eu154, Eu155, Am241 are derived from tank sampling.

Other information: Other beta/gamma nuclides of arisings and stocks (in TBq/m³) include; S35 (2E-4, 7E-10); Ca45 (6E-4, 2E-7); Cr51 (1E+1, 8E-14); Co58 (5E-1, 2E-7) Sr89 (1E-8, 0E+0); Y91 (1E-7, 2E-15); Zr95 (4E-5, 4E-12); Nb95 (1E-4, 4E-16); Ru103 (1E-7, 0E+0), Ta182 (2E-1, 8E-6); Fe59 (2E-2, 1E-11) and Sb124 (6E-3, 3E-10).

WASTE STREAM 3N02 Sludge

Nuclide	Mean radioactivity, TBq/m ³				Nuclide	Mean radioactivity, TBq/m ³			
	Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code
H 3	<1E-05	D 3	<2.02E-05	D 3	Gd 153				
Be 10		8		8	Ho 163				
C 14		8		8	Ho 166m				
Na 22		4		4	Tm 170				
Al 26		4		4	Tm 171				
Cl 36		6		6	Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41		8		8	Pt 193				
Mn 53					Tl 204				
Mn 54	7.15E-06	CC 2	1.20E-04	DD 2	Pb 205				
Fe 55	3E-01	CD 2	2.46E+00	CD 2	Pb 210		8		8
Co 60	4.78E-04	CC 2	1.80E-03	DD 2	Bi 208				
Ni 59	1E-03	CD 2	1E-03	CD 2	Bi 210m				
Ni 63	9E-02	CD 2	9E-02	CD 2	Po 210		8		8
Zn 65	1E-03	CD 2	1.95E-02	CD 2	Ra 223				
Se 79	1.21E-09	CD 2	7E-09	CD 2	Ra 225				
Kr 81					Ra 226		8		8
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90	2E-03	CD 2	2.78E-03	CD 2	Th 227				
Zr 93	6E-08	CD 2	6E-08	CD 2	Th 228				
Nb 91					Th 229		8		8
Nb 92					Th 230		8		8
Nb 93m		8		8	Th 232		8		8
Nb 94	1E-06	CD 2	1E-06	CD 2	Th 234				
Mo 93		8		8	Pa 231		8		8
Tc 97					Pa 233				
Tc 99	3E-07	CD 2	3E-07	CD 2	U 232				
Ru 106	1E-04	CD 2	1.48E-03	CD 2	U 233		8		8
Pd 107		8		8	U 234	2E-07	CD 2	2E-07	CD 2
Ag 108m		8		8	U 235	5E-09	CD 2	5E-09	CD 2
Ag 110m	3E-04	CD 2	5.70E-03	CD 2	U 236	4E-08	CD 2	4E-08	CD 2
Cd 109					U 238	7E-08	CD 2	7E-08	CD 2
Cd 113m					Np 237	3E-08	CD 2	3E-08	CD 2
Sn 119m					Pu 236				
Sn 121m		8		8	Pu 238	9E-05	CD 2	1.01E-04	CD 2
Sn 123					Pu 239	4E-05	CD 2	4E-05	CD 2
Sn 126	4.35E-09	CD 2	1E-08	CD 2	Pu 240	8E-05	CD 2	8E-05	CD 2
Sb 125	1E-04	CD 2	6.58E-04	CD 2	Pu 241	7E-03	CD 2	1.30E-02	CD 2
Sb 126					Pu 242	2E-07	CD 2	2E-07	CD 2
Te 125m					Am 241	7.83E-05	CC 2	7.83E-05	DD 2
Te 127m					Am 242m	1E-06	CD 2	1E-06	CD 2
I 129		8		8	Am 243	7E-07	CD 2	7E-07	CD 2
Cs 134	5.79E-06	CC 2	4.96E-05	CD 2	Cm 242	5E-06	CD 2	1.18E-04	CD 2
Cs 135	9E-09	CD 2	9E-09	CD 2	Cm 243	8E-07	CD 2	1.10E-06	CD 2
Cs 137	3.9E-04	CC 2	5.34E-04	DD 2	Cm 244	3E-05	CD 2	4.95E-05	CD 2
Ba 133					Cm 245		8		8
La 137					Cm 246		8		8
La 138					Cm 248				
Ce 144	1E-04	CD 2	1.77E-03	CD 2	Cf 249				
Pm 145					Cf 250				
Pm 147	5E-04	CD 2	3.51E-03	CD 2	Cf 251				
Sm 147					Cf 252				
Sm 151	3E-06	CD 2	3.33E-06	CD 2	Other a		8		8
Eu 152		8		8	Other b/g	9E-06	CD 2	1E+01	CD 2
Eu 154	2.31E-05	CC 2	5.89E-05	DD 2	Total a	3.25E-04	CD 2	4.69E-04	CD 2
Eu 155	9.44E-06	CC 2	3.86E-05	DD 2	Total b/g	4.03E-01	CD 2	1.26E+01	CD 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