

| WASTE STREAM | 4C06 | Active Effluent Filtration Resin |
|--------------|------|----------------------------------|
|--------------|------|----------------------------------|

**SITE** Torness

**SITE OWNER** EDF Energy Nuclear Generation Ltd (EDFE NGL)

**WASTE CUSTODIAN** EDF Energy Nuclear Generation Ltd (EDFE NGL)

**WASTE TYPE** ILW

#### WASTE VOLUMES

|                        | Reported (m <sup>3</sup> ) | OR | Conditioned (m <sup>3</sup> ) | Packaged (m <sup>3</sup> ) |
|------------------------|----------------------------|----|-------------------------------|----------------------------|
| Stocks:                | At 1.4.2025 = 2.6          |    |                               |                            |
| Future arisings:       | 1.4.2025 - 31.3.2028 = 0.3 |    |                               |                            |
|                        | 1.4.2028 - 31.3.2030 = 0.2 |    |                               |                            |
|                        | 1.4.2030 - 31.3.2031 = 0.7 |    |                               |                            |
| Total future arisings: | 1.2                        |    |                               |                            |
| Total waste volume:    | 3.8                        |    |                               |                            |

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

Comment on arising rates: Waste volumes will be variable depending on station operating conditions.

Additional information on quantities: -

Uncertainty factors on volumes:

|                |        |                   |        |
|----------------|--------|-------------------|--------|
| Stock (upper): | x 1.25 | Arisings (upper): | x 1.50 |
| Stock (lower): | x 0.75 | Arisings (lower): | x 0.50 |

**WASTE SOURCE** Waste arises from spent (chemically exhausted) ion exchange resins.

#### PHYSICAL CHARACTERISTICS

General description: Spent (chemically exhausted) IRN-150 ion exchange resins. Mixed bed resin. The waste will not contain any large items that require special handling.

Changes since waste generated: -

Bulk density (t/m<sup>3</sup>): ~ 1.0

Comment on density: Waste density is estimated.

#### CHEMICAL COMPOSITION

General description and components (%wt): Predominantly organic ion exchange resins with a small quantity of sand.

Chemical state: Neutral

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

|                           | (%wt) | Type(s) / Grades(s) with proportions | % of total C14 activity |
|---------------------------|-------|--------------------------------------|-------------------------|
| Stainless steel.....      | = 0   | -                                    |                         |
| Other ferrous metals..... | = 0   | -                                    |                         |
| Iron.....                 | = 0   | -                                    |                         |
| Aluminium.....            | = 0   | -                                    |                         |
| Beryllium.....            | = 0   | -                                    |                         |
| Cobalt.....               | = 0   | -                                    |                         |
| Copper.....               | = 0   | -                                    |                         |
| Lead.....                 | = 0   | -                                    |                         |
| Magnox/Magnesium.....     | = 0   | -                                    |                         |
| Nickel.....               | = 0   | -                                    |                         |
| Titanium.....             | = 0   | -                                    |                         |
| Uranium.....              | = 0   | -                                    |                         |
| Zinc.....                 | = 0   | -                                    |                         |
| Zircaloy/Zirconium.....   | = 0   | -                                    |                         |
| Other metals.....         | = 0   | -                                    |                         |

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... | ~ 99.0 | -                   |                         |
| Total rubber...                   | = 0    | -                   |                         |
| Halogenated rubber...             | = 0    | -                   |                         |
| Non-halogenated rubber...         | = 0    | -                   |                         |
| Hydrocarbons...                   | = 0    | -                   |                         |
| 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...      | NE    | -                   |                         |
| Soil...                             | = 0   | -                   |                         |
| Brick/Stone/Rubble...               | = 0   | -                   |                         |
| Cementitious material...            | = 0   | -                   |                         |
| Sand...                             | < 1.0 | -                   |                         |
| Glass/Ceramics...                   | = 0   | -                   |                         |
| Graphite...                         | = 0   | -                   |                         |
| Desiccants/Catalysts...             | = 0   | -                   |                         |
| Asbestos...                         | = 0   | -                   |                         |
| Non/low friable...                  | -     | -                   |                         |
| Moderately friable...               | -     | -                   |                         |
| Highly friable...                   | -     | -                   |                         |
| Free aqueous liquids...             | NE    | -                   |                         |
| 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...  | 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...                        | = 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...                 | P     | May be present      |
| Soluble solids as bulk chemical compounds... | = 0   | -                   |

Hazardous substances / non hazardous pollutants:

|                             | (%wt) | Type(s) and comment |
|-----------------------------|-------|---------------------|
| 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    | -                   |
| Boron.....                  | NE    | -                   |
| Boron (in Boral).....       |       | -                   |
| Boron (non-Boral).....      |       | -                   |
| Cadmium.....                | NE    | -                   |
| Caesium.....                | NE    | -                   |
| Selenium.....               | NE    | -                   |
| Chromium.....               | NE    | -                   |
| Molybdenum.....             | NE    | -                   |
| Thallium.....               | NE    | -                   |
| Tin.....                    | NE    | -                   |
| Vanadium.....               | NE    | -                   |
| Mercury compounds.....      | NE    | -                   |
| Others.....                 | NE    | -                   |

Complexing agents (%wt):

| Not yet determined             |       |                                                      |
|--------------------------------|-------|------------------------------------------------------|
|                                | (%wt) | Type(s) and comment                                  |
| EDTA.....                      | NE    | -                                                    |
| DPTA.....                      | NE    | -                                                    |
| NTA.....                       | NE    | -                                                    |
| Polycarboxylic acids.....      | NE    | -                                                    |
| Other organic complexants..... | NE    | No known complexing agents are present in the waste. |
| Total complexing agents.....   | NE    | -                                                    |

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                                             | On-site            | ~ 100.0         |
| 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:

-

Conditioning plants:

| Plant Name                                           | Location |
|------------------------------------------------------|----------|
| Torness Operational Waste Processing Facility (OWPF) | Torness  |

Likely conditioning matrix:

-

Further information on the conditioning matrix:

A 9:1 BFS/OPC matrix is expected to be used.

**Waste Packaging:**

|                        |            |                       |                    |              |                    |                                    |
|------------------------|------------|-----------------------|--------------------|--------------|--------------------|------------------------------------|
| Likely container type: | Container  | Waste packaged (vol%) | Waste loading (m³) | Payload (m³) | Number of packages | Estimated start date for packaging |
|                        | 500 l drum | 100.0                 | 0.20               | 0.47         | 19                 | -                                  |

Range in container waste loading:

Other information on packaging and conditioning: Appropriate plant to be provided at the station in accordance with EDF Energy strategy.

Conditioned density (t/m³): ~ 1.7  
 Conditioned density comment: Density may vary from 1.62 to 1.72 t/m³.

**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) | = 100.0         |                  |            |
| 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: Spent Ion Exchange resins. Contamination by activation products will be a main source of activity.

Uncertainty: The estimates are based on theoretical assessments. The values quoted are indicative of those expected after several years of operation and include an allowance for the additional activity that would arise if spilled activity is present.

Measurement of radioactivities: Theoretical assessment and limited tank sampling.

Chemical form of radionuclides: H-3: The waste is expected to contain some tritiated liquor.  
 C-14: Not determined  
 Cl-36: Not determined  
 Se-79: Not expected to be significant  
 Tc-99: Not expected to be significant  
 I-129: Not expected to be significant  
 Ra: Not determined  
 Th: Not determined  
 U: Not determined  
 Np: Not determined  
 Pu: Not determined

| WASTE STREAM 4C06 Active Effluent Filtration Resin |                            |                |                 |                |                  |                            |                |                 |                |
|----------------------------------------------------|----------------------------|----------------|-----------------|----------------|------------------|----------------------------|----------------|-----------------|----------------|
| 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                                                | 1.32E-06                   | C C 2          | 2.67E-06        | C C 2          | Gd 153           |                            |                |                 |                |
| Be 10                                              |                            |                |                 |                | Ho 163           |                            |                |                 |                |
| C 14                                               | 4.25E-07                   | C C 2          | 4.25E-07        | C C 2          | Ho 166m          |                            |                |                 |                |
| Na 22                                              |                            | 4              |                 | 4              | Tm 170           |                            |                |                 |                |
| Al 26                                              |                            | 4              |                 | 4              | Tm 171           |                            |                |                 |                |
| Cl 36                                              | 6.10E-07                   | C C 2          | 6.10E-07        | C C 2          | Lu 174           |                            |                |                 |                |
| Ar 39                                              |                            |                |                 |                | Lu 176           |                            |                |                 |                |
| Ar 42                                              |                            |                |                 |                | Hf 178n          |                            |                |                 |                |
| K 40                                               | < 4.10E-06                 | C 3            | < 4.10E-06      | C 3            | Hf 182           |                            |                |                 |                |
| Ca 41                                              |                            |                |                 |                | Pt 193           |                            |                |                 |                |
| Mn 53                                              |                            |                |                 |                | Ti 204           |                            |                |                 |                |
| Mn 54                                              | 6.94E-04                   | C C 2          | 1.16E-02        | C C 2          | Pb 205           |                            |                |                 |                |
| Fe 55                                              | 1.49E-02                   | C C 2          | 1.22E-01        | C C 2          | Pb 210           | 3.80E-05                   | C C 2          | 5.78E-05        | C C 2          |
| Co 60                                              | 1.31E-03                   | C C 2          | 4.94E-03        | C C 2          | Bi 208           |                            |                |                 |                |
| Ni 59                                              |                            |                |                 |                | Bi 210m          |                            |                |                 |                |
| Ni 63                                              | 2.03E-03                   | C C 2          | 2.03E-03        | C C 2          | Po 210           |                            |                |                 |                |
| Zn 65                                              | < 4.30E-06                 | C 3            | < 8.39E-05      | C 3            | Ra 223           |                            |                |                 |                |
| Se 79                                              |                            |                |                 |                | Ra 225           |                            |                |                 |                |
| Kr 81                                              |                            |                |                 |                | Ra 226           | 9.70E-05                   | C C 2          | 9.70E-05        | C C 2          |
| Kr 85                                              |                            |                |                 |                | Ra 228           |                            |                |                 |                |
| Rb 87                                              |                            |                |                 |                | Ac 227           |                            |                |                 |                |
| Sr 90                                              | 2.33E-04                   | C C 2          | 3.24E-04        | C C 2          | Th 227           |                            |                |                 |                |
| Zr 93                                              |                            |                |                 |                | Th 228           |                            |                |                 |                |
| Nb 91                                              |                            |                |                 |                | Th 229           |                            |                |                 |                |
| Nb 92                                              |                            |                |                 |                | Th 230           |                            |                |                 |                |
| Nb 93m                                             |                            |                |                 |                | Th 232           |                            |                |                 |                |
| Nb 94                                              | < 4.40E-06                 | C 3            | 4.40E-06        | C 3            | Th 234           | 6.70E-05                   | C C 2          | 2.01E-03        | C C 2          |
| Mo 93                                              |                            |                |                 |                | Pa 231           |                            |                |                 |                |
| Tc 97                                              |                            |                |                 |                | Pa 233           | 6.50E-06                   | C C 2          | 1.95E-04        | C C 2          |
| Tc 99                                              |                            |                |                 |                | U 232            |                            |                |                 |                |
| Ru 106                                             | < 5.00E-05                 | C 3            | 7.40E-04        | C 3            | U 233            |                            |                |                 |                |
| Pd 107                                             |                            |                |                 |                | U 234            | 1.10E-07                   | C C 2          | 1.10E-07        | C C 2          |
| Ag 108m                                            | 2.00E-06                   | C C 2          | 2.00E-06        | C C 2          | U 235            | 5.80E-08                   | C C 2          | 5.80E-08        | C C 2          |
| Ag 110m                                            | 4.50E-06                   | C C 2          | 8.55E-05        | C C 2          | U 236            |                            |                |                 |                |
| Cd 109                                             |                            |                |                 |                | U 238            | 6.50E-08                   | C C 2          | 6.50E-08        | C C 2          |
| Cd 113m                                            |                            |                |                 |                | Np 237           | 1.90E-05                   | C C 2          | 1.90E-05        | C C 2          |
| Sn 119m                                            |                            |                |                 |                | Pu 236           |                            |                |                 |                |
| Sn 121m                                            |                            |                |                 |                | Pu 238           | 2.00E-05                   | C C 2          | 2.24E-05        | C C 2          |
| Sn 123                                             |                            |                |                 |                | Pu 239           |                            | 6              |                 | 6              |
| Sn 126                                             |                            |                |                 |                | Pu 240           | < 3.23E-05                 | C C 2          | < 3.23E-05      | C C 2          |
| Sb 125                                             | < 2.50E-05                 | C 3            | 1.65E-04        | C 3            | Pu 241           | 1.31E-03                   | C C 2          | 2.42E-03        | C C 2          |
| Sb 126                                             |                            |                |                 |                | Pu 242           | < 8.30E-07                 | C C 2          | < 8.30E-07      | C C 2          |
| Te 125m                                            |                            |                |                 |                | Am 241           | 9.04E-05                   | C C 2          | 9.04E-05        | C C 2          |
| Te 127m                                            |                            |                |                 |                | Am 242m          |                            |                |                 |                |
| I 129                                              |                            |                |                 |                | Am 243           |                            |                |                 |                |
| Cs 134                                             | 1.16E-03                   | C C 2          | 9.94E-03        | C C 2          | Cm 242           | 4.20E-07                   | C C 2          | 9.90E-06        | C C 2          |
| Cs 135                                             |                            |                |                 |                | Cm 243           | 5.85E-06                   | C C 2          | 8.07E-06        | C C 2          |
| Cs 137                                             | 3.39E-02                   | C C 2          | 4.64E-02        | C C 2          | Cm 244           | 5.85E-06                   | C C 2          | 9.65E-06        | C C 2          |
| Ba 133                                             |                            |                |                 |                | Cm 245           |                            |                |                 |                |
| La 137                                             |                            |                |                 |                | Cm 246           |                            |                |                 |                |
| La 138                                             |                            |                |                 |                | Cm 248           |                            |                |                 |                |
| Ce 144                                             | 1.40E-05                   | C C 2          | 2.47E-04        | C C 2          | Cf 249           |                            |                |                 |                |
| Pm 145                                             |                            |                |                 |                | Cf 250           |                            |                |                 |                |
| Pm 147                                             | 2.65E-04                   | C C 2          | 1.86E-03        | C C 2          | Cf 251           |                            |                |                 |                |
| Sm 147                                             |                            |                |                 |                | Cf 252           |                            |                |                 |                |
| Sm 151                                             | 1.60E-05                   | C C 2          | 1.78E-05        | C C 2          | Unsp a           | 1.42E-03                   | C C 2          | 1.42E-03        | C C 2          |
| Eu 152                                             | < 5.30E-06                 | C 3            | 1.01E-05        | C 3            | Unsp b/g         | 7.19E-05                   | C C 2          | 7.19E-05        | C C 2          |
| Eu 154                                             | 4.22E-05                   | C C 2          | 1.08E-04        | C C 2          | <b>Total a</b>   | <b>1.69E-03</b>            | *              | <b>1.71E-03</b> | *              |
| Eu 155                                             | 2.56E-05                   | C C 2          | 1.05E-04        | C C 2          | <b>Total b/g</b> | <b>5.62E-02</b>            | *              | <b>2.06E-01</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 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