

| WASTE STREAM | 3L115 | Care and Maintenance Preparations: Wet Fuel Route LLW |
|--------------|-------|-------------------------------------------------------|
|--------------|-------|-------------------------------------------------------|

**SITE** Heysham 1

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

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

**WASTE TYPE** LLW

#### WASTE VOLUMES

|                        | Reported (m <sup>3</sup> ) | OR            | Conditioned (m <sup>3</sup> ) | Packaged (m <sup>3</sup> ) |
|------------------------|----------------------------|---------------|-------------------------------|----------------------------|
| Stocks:                | At 1.4.2025                | = 0           |                               |                            |
| Future arisings:       | 1.4.2025 - 31.3.2030       | = 0           |                               |                            |
|                        | 1.4.2030 - 31.3.2031       | = 20.0        |                               |                            |
|                        | 1.4.2031 - 31.3.2032       | = 20.0        |                               |                            |
|                        | 1.4.2032 - 31.3.2033       | = 50.0        |                               |                            |
|                        | 1.4.2033 - 31.3.2034       | = 80.0        |                               |                            |
|                        | 1.4.2034 - 31.3.2035       | = 100.0       |                               |                            |
|                        | 1.4.2035 - 31.3.2036       | = 150.0       |                               |                            |
|                        | 1.4.2036 - 31.3.2037       | = 120.0       |                               |                            |
|                        | 1.4.2037 - 31.3.2038       | = 120.0       |                               |                            |
|                        | 1.4.2038 - 31.3.2039       | = 120.0       |                               |                            |
|                        | 1.4.2039 - 31.3.2040       | = 100.0       |                               |                            |
|                        | 1.4.2040 - 31.3.2041       | = 80.0        |                               |                            |
|                        | 1.4.2041 - 31.3.2042       | = 20.0        |                               |                            |
|                        | 1.4.2042 - 31.3.2043       | = 60.0        |                               |                            |
| Total future arisings: |                            | <b>1040.0</b> |                               |                            |
| Total waste volume:    |                            | <b>1040.0</b> |                               |                            |

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: Volumes based on Back to Bio Shield strategy. Work is ongoing looking at optimising the strategy which could lead to a change in volume and timings of arisings across Pre C&M wastes (100s) and Final Site Clearance wastes (300s), in future submissions.

Uncertainty factors on volumes: Stock (upper): x - Arisings (upper): x 1.50  
Stock (lower): x - Arisings (lower): x 0.50

**WASTE SOURCE** General solid decommissioning LLW arisings from the wet Fuel Route. Waste arising from plant dismantling and associated contamination control procedures.

#### PHYSICAL CHARACTERISTICS

General description: A variety of mixed decommissioning materials, including metals, organics and other mixed materials

Changes since waste generated: -

Bulk density (t/m<sup>3</sup>): ~ 1.3

Comment on density: Density based on raw volume and weight

#### CHEMICAL COMPOSITION

General description and components (%wt): Stainless Steel (0.02%), Mild steel (92.8%), Organics (5.88%), Sludge (0.3%), Rubble (~1%)

Chemical state: Neutral

Sheet metal proportion / thickness: Not estimated

Metals and alloys (%wt):

|                           | (%wt)  | Type(s) / Grades(s) with proportions | % of total C14 activity |
|---------------------------|--------|--------------------------------------|-------------------------|
| Stainless steel.....      | ~ 0.02 | -                                    |                         |
| Other ferrous metals..... | ~ 92.7 | Mild steel                           |                         |
| Iron.....                 | NE     | -                                    |                         |
| Aluminium.....            | NE     | Pipework, small valves               |                         |
| Beryllium.....            | NE     | -                                    |                         |
| Cobalt.....               | NE     | -                                    |                         |
| Copper.....               | NE     | -                                    |                         |
| Lead.....                 | NE     | -                                    |                         |
| Magnox/Magnesium.....     | NE     | -                                    |                         |
| Nickel.....               | NE     | -                                    |                         |
| Titanium.....             | NE     | -                                    |                         |
| Uranium.....              | NE     | -                                    |                         |
| Zinc.....                 | NE     | -                                    |                         |
| Zircaloy/Zirconium.....   | NE     | -                                    |                         |
| Other metals.....         | NE     | -                                    |                         |

Organics (%wt):

|                                     | (%wt)  | Type(s) and comment | % of total C14 activity |
|-------------------------------------|--------|---------------------|-------------------------|
| Total cellulotics.....              | ~ 2.8  | -                   |                         |
| Paper, cotton.....                  | ~ 2.7  | -                   |                         |
| Wood.....                           | ~ 0.07 | -                   |                         |
| Halogenated plastics.....           | ~ 1.4  | -                   |                         |
| Total non-halogenated plastics..... | ~ 1.4  | -                   |                         |
| Condensation polymers.....          | ~ 0.69 | -                   |                         |
| Others.....                         | ~ 0.69 | -                   |                         |
| Organic ion exchange materials..... | ~ 0    | -                   |                         |
| Total rubber.....                   | ~ 0.69 | -                   |                         |
| Halogenated rubber.....             | ~ 0.34 | -                   |                         |
| Non-halogenated rubber.....         | ~ 0.34 | -                   |                         |
| Hydrocarbons.....                   | ~ 0    | -                   |                         |
| Oil or grease.....                  | ~ 0    | -                   |                         |
| Fuel.....                           | ~ 0    | -                   |                         |
| Asphalt/Tarmac (cont.coal tar)..... | ~ 0    | -                   |                         |
| Asphalt/Tarmac (no coal tar).....   | ~ 0    | -                   |                         |
| Bitumen.....                        | ~ 0    | -                   |                         |
| Others.....                         | ~ 0    | -                   |                         |
| Other organics.....                 | NE     | -                   |                         |

Other materials (%wt):

|                                       | (%wt)  | Type(s) and comment | % of total C14 activity |
|---------------------------------------|--------|---------------------|-------------------------|
| Inorganic ion exchange materials..... | ~ 0    | -                   |                         |
| Inorganic sludges and flocs.....      | ~ 0.34 | -                   |                         |
| Soil.....                             | ~ 0    | -                   |                         |
| Brick/Stone/Rubble.....               | ~ 0.69 | -                   |                         |
| Cementitious material.....            | ~ 0    | -                   |                         |
| Sand.....                             | ~ 0    | -                   |                         |
| Glass/Ceramics.....                   | NE     | -                   |                         |
| Graphite.....                         | ~ 0    | -                   |                         |
| Desiccants/Catalysts.....             | ~ 0    | -                   |                         |
| Asbestos.....                         | ~ 0    | -                   |                         |
| Non/low friable.....                  | 0      | -                   |                         |
| Moderately friable.....               | 0      | -                   |                         |
| Highly friable.....                   | 0      | -                   |                         |
| 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.....  | 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.....                   | -     | -                   |
| Putrescible wastes.....                        | = 0   | -                   |
| Non-putrescible wastes.....                    | = 0   | -                   |
| 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.....             | NE    | -                   |
| Benzene.....                | NE    | -                   |
| Chlorinated solvents.....   | NE    | -                   |
| Formaldehyde.....           | NE    | -                   |
| Organometallics.....        | NE    | -                   |
| Phenol.....                 | = 0   | -                   |
| Styrene.....                | NE    | -                   |
| Tri-butyl phosphate.....    | = 0   | -                   |
| Other organophosphates..... | NE    | -                   |
| Vinyl chloride.....         | = 0   | -                   |
| Arsenic.....                | = 0   | -                   |
| Barium.....                 | NE    | -                   |
| Boron.....                  | = 0   | -                   |
| Boron (in Boral).....       | NE    | -                   |
| Boron (non-Boral).....      | NE    | -                   |
| Cadmium.....                | = 0   | -                   |
| Caesium.....                | NE    | -                   |
| Selenium.....               | = 0   | -                   |
| Chromium.....               | = 0   | -                   |
| Molybdenum.....             | = 0   | -                   |
| Thallium.....               | NE    | -                   |
| Tin.....                    | = 0   | -                   |
| Vanadium.....               | = 0   | -                   |
| Mercury compounds.....      | = 0   | -                   |
| 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    | Present in trace quantities. |
| Total complexing agents.....   | NE    | -                            |

Physical components:

|                                         | Number | Type(s) and comment |
|-----------------------------------------|--------|---------------------|
| Sources.....                            | = 0    | -                   |
| 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                                             |                    |                 |
| Decay storage                                              |                    |                 |
| Low force compaction                                       |                    |                 |
| Supercompaction (HFC)                                      | Off-site           | ~ 1.6           |
| Incineration                                               | Off-site           | ~ 9.2           |
| Drying/dewatering/liquid separation                        |                    |                 |
| Tie down/fixatives/strippable coating/painting application |                    |                 |
| Decontamination                                            |                    |                 |
| Metal treatment                                            | Off-site           | ~ 87.3          |
| Recycling / reuse                                          |                    |                 |
| Thermal treatment, including vitrification                 |                    |                 |
| Encapsulation                                              |                    |                 |
| Polymer encapsulation                                      |                    |                 |
| Other physical treatment                                   |                    |                 |
| Other chemical treatment                                   |                    |                 |
| Containerisation                                           |                    |                 |
| Treatment not yet determined                               |                    |                 |
| None                                                       | Off-site           | ~ 1.9           |

Comments on planned treatments:

In line with the waste hierarchy, wastes will be treated preferentially by incineration, metal decontamination/melting, supercompaction, optimal packaging in HHISOs or immobilisation by encapsulation where necessary, prior to ultimate disposal at the LLW Repository. These treatments will be carried out off-site under contract with companies such as LLWR Ltd, Cyclife, Tradebe Inutec. The percentages are based on the history of consignments across the fleet of EDF Energy Nuclear Generation stations.

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 (m³) | Payload (m³) | Number of packages | Estimated start date for packaging |
|----------------------------------------------------|-----------------------|--------------------|--------------|--------------------|------------------------------------|
| 1/2 Height IP-2 Disposal/Re-usable ISO (TC01/TC02) | 3.5                   | 15.5               | 18.3         | 3                  | 2031                               |

Range in container waste loading:

Other information on packaging and conditioning:

Waste loading is representative of the raw waste following further planned treatments. Supercompaction assumed to reduce volume to 20% of original. Solidification assumed to increase volume to 300% of original. No treatment results in the same volume.

Conditioned density (t/m³):

-

Conditioned density comment:

-

### 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) |                 |                  |            |
| 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                                     | ~ 3.5           |                  |            |
| 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                               | ~ 9.2           |                  |            |
| Expected to be consigned to a Metal Treatment Facility                             | ~ 87.3          |                  |            |
| 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: Activation and/or contamination of mixed materials from facility area

Uncertainty: Approximate estimates have been made of the total specific activities.

Measurement of radioactivities: Calculations based on operational wastestreams. More detailed characterisation work will be undertaken as the arising of the waste gets closer.

Chemical form of radionuclides: H-3: To be Determined  
C-14: To be Determined  
Cl-36: To be Determined  
Se-79: To be Determined  
Tc-99: To be Determined  
I-129: To be Determined  
Ra: To be Determined  
Th: To be Determined  
U: To be Determined  
Np: To be Determined  
Pu: To be Determined

| WASTE STREAM 3L115 Care and Maintenance Preparations: Wet Fuel Route LLW |                            |                |                 |                |                  |                            |                |                 |                |
|--------------------------------------------------------------------------|----------------------------|----------------|-----------------|----------------|------------------|----------------------------|----------------|-----------------|----------------|
| 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                                                                      |                            |                | 1.31E-04        | C C 2          | Gd 153           |                            |                |                 |                |
| Be 10                                                                    |                            |                |                 |                | Ho 163           |                            |                |                 |                |
| C 14                                                                     |                            |                | 2.07E-06        | C C 2          | Ho 166m          |                            |                |                 |                |
| Na 22                                                                    |                            |                |                 |                | Tm 170           |                            |                |                 |                |
| Al 26                                                                    |                            |                |                 |                | Tm 171           |                            |                |                 |                |
| Cl 36                                                                    |                            |                | 6.46E-06        | C C 2          | Lu 174           |                            |                |                 |                |
| Ar 39                                                                    |                            |                |                 |                | Lu 176           |                            |                |                 |                |
| Ar 42                                                                    |                            |                |                 |                | Hf 178n          |                            |                |                 |                |
| K 40                                                                     |                            |                |                 |                | Hf 182           |                            |                |                 |                |
| Ca 41                                                                    |                            |                |                 |                | Pt 193           |                            |                |                 |                |
| Mn 53                                                                    |                            |                |                 |                | Ti 204           |                            |                |                 |                |
| Mn 54                                                                    |                            |                | 5.10E-05        | C C 2          | Pb 205           |                            |                |                 |                |
| Fe 55                                                                    |                            |                | 6.00E-05        | C C 2          | Pb 210           |                            |                |                 |                |
| Co 60                                                                    |                            |                | 2.40E-05        | C C 2          | Bi 208           |                            |                |                 |                |
| Ni 59                                                                    |                            |                |                 |                | Bi 210m          |                            |                |                 |                |
| Ni 63                                                                    |                            |                | 6.26E-05        | C C 2          | Po 210           |                            |                |                 |                |
| Zn 65                                                                    |                            |                | 9.78E-07        | C C 2          | Ra 223           |                            |                |                 |                |
| Se 79                                                                    |                            |                |                 |                | Ra 225           |                            |                |                 |                |
| Kr 81                                                                    |                            |                |                 |                | Ra 226           |                            |                |                 |                |
| Kr 85                                                                    |                            |                |                 |                | Ra 228           |                            |                |                 |                |
| Rb 87                                                                    |                            |                |                 |                | Ac 227           |                            |                |                 |                |
| Sr 90                                                                    |                            |                | 1.58E-05        | C C 2          | Th 227           |                            |                |                 |                |
| Zr 93                                                                    |                            |                |                 |                | Th 228           |                            |                |                 |                |
| Nb 91                                                                    |                            |                |                 |                | Th 229           |                            |                |                 |                |
| Nb 92                                                                    |                            |                |                 |                | Th 230           |                            |                |                 |                |
| Nb 93m                                                                   |                            |                |                 |                | Th 232           |                            |                |                 |                |
| Nb 94                                                                    |                            |                | 1.78E-07        | C C 2          | Th 234           |                            |                |                 |                |
| Mo 93                                                                    |                            |                |                 |                | Pa 231           |                            |                |                 |                |
| Tc 97                                                                    |                            |                |                 |                | Pa 233           |                            |                |                 |                |
| Tc 99                                                                    |                            |                |                 |                | U 232            |                            |                |                 |                |
| Ru 106                                                                   |                            |                | 3.67E-06        | C C 2          | U 233            |                            |                |                 |                |
| Pd 107                                                                   |                            |                |                 |                | U 234            |                            |                | 1.60E-08        | C C 2          |
| Ag 108m                                                                  |                            |                | 6.24E-07        | C C 2          | U 235            |                            |                |                 |                |
| Ag 110m                                                                  |                            |                | 1.56E-07        | C C 2          | U 236            |                            |                | 4.00E-09        | C C 2          |
| Cd 109                                                                   |                            |                |                 |                | U 238            |                            |                | 4.00E-09        | C C 2          |
| Cd 113m                                                                  |                            |                |                 |                | Np 237           |                            |                |                 |                |
| Sn 119m                                                                  |                            |                |                 |                | Pu 236           |                            |                |                 |                |
| Sn 121m                                                                  |                            |                |                 |                | Pu 238           |                            |                | 4.68E-06        | C C 2          |
| Sn 123                                                                   |                            |                |                 |                | Pu 239           |                            |                | 2.80E-06        | C C 2          |
| Sn 126                                                                   |                            |                |                 |                | Pu 240           |                            |                | 6.64E-06        | C C 2          |
| Sb 125                                                                   |                            |                | 1.59E-06        | C C 2          | Pu 241           |                            |                | 2.66E-04        | C C 2          |
| Sb 126                                                                   |                            |                |                 |                | Pu 242           |                            |                |                 |                |
| Te 125m                                                                  |                            |                |                 |                | Am 241           |                            |                | 1.97E-05        | C C 2          |
| Te 127m                                                                  |                            |                |                 |                | Am 242m          |                            |                |                 |                |
| I 129                                                                    |                            |                |                 |                | Am 243           |                            |                |                 |                |
| Cs 134                                                                   |                            |                | 8.68E-06        | C C 2          | Cm 242           |                            |                | 4.40E-08        | C C 2          |
| Cs 135                                                                   |                            |                |                 |                | Cm 243           |                            |                | 1.60E-08        | C C 2          |
| Cs 137                                                                   |                            |                | 7.92E-04        | C C 2          | Cm 244           |                            |                | 9.74E-07        | C C 2          |
| Ba 133                                                                   |                            |                | 7.14E-07        | C C 2          | Cm 245           |                            |                |                 |                |
| La 137                                                                   |                            |                |                 |                | Cm 246           |                            |                |                 |                |
| La 138                                                                   |                            |                |                 |                | Cm 248           |                            |                |                 |                |
| Ce 144                                                                   |                            |                | 1.11E-06        | C C 2          | Cf 249           |                            |                |                 |                |
| Pm 145                                                                   |                            |                |                 |                | Cf 250           |                            |                |                 |                |
| Pm 147                                                                   |                            |                | 4.09E-04        | C C 2          | Cf 251           |                            |                |                 |                |
| Sm 147                                                                   |                            |                |                 |                | Cf 252           |                            |                |                 |                |
| Sm 151                                                                   |                            |                |                 |                | Unsp a           |                            |                |                 |                |
| Eu 152                                                                   |                            |                | 1.49E-06        | C C 2          | Unsp b/g         |                            |                | 8.14E-07        | C C 2          |
| Eu 154                                                                   |                            |                | 6.64E-07        | C C 2          | <b>Total a</b>   | <b>0</b>                   | <b>*</b>       | <b>3.49E-05</b> | <b>*</b>       |
| Eu 155                                                                   |                            |                | 4.26E-07        | C C 2          | <b>Total b/g</b> | <b>0</b>                   | <b>*</b>       | <b>1.84E-03</b> | <b>*</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