

|                     |              |                                            |
|---------------------|--------------|--------------------------------------------|
| <b>WASTE STREAM</b> | <b>5B313</b> | <b>HAL Store and Evaporation Plant LLW</b> |
|---------------------|--------------|--------------------------------------------|

**SITE** Dounreay

**SITE OWNER** Nuclear Decommissioning Authority

**WASTE CUSTODIAN** Nuclear Restoration Services Ltd (NRS)

**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 - 31.3.2026       | = 24.5 |                               |                            |
|                        | 1.4.2026 - 31.3.2027       | = 24.5 |                               |                            |
|                        | 1.4.2027 - 31.3.2028       | = 24.5 |                               |                            |
|                        | 1.4.2028 - 31.3.2029       | = 24.5 |                               |                            |
|                        | 1.4.2029 - 31.3.2030       | = 24.5 |                               |                            |
|                        | 1.4.2030 - 31.3.2031       | = 27.8 |                               |                            |
|                        | 1.4.2031 - 31.3.2032       | = 28.7 |                               |                            |
|                        | 1.4.2032 - 31.3.2033       | = 28.0 |                               |                            |
|                        | 1.4.2033 - 31.3.2034       | = 27.9 |                               |                            |
|                        | 1.4.2034 - 31.3.2035       | = 27.9 |                               |                            |
|                        | 1.4.2035 - 31.3.2036       | = 27.9 |                               |                            |
|                        | 1.4.2036 - 31.3.2037       | = 28.0 |                               |                            |
|                        | 1.4.2037 - 31.3.2038       | = 27.9 |                               |                            |
|                        | 1.4.2038 - 31.3.2039       | = 27.9 |                               |                            |
|                        | 1.4.2039 - 31.3.2040       | = 27.9 |                               |                            |
|                        | 1.4.2040 - 31.3.2041       | = 28.0 |                               |                            |
|                        | 1.4.2041 - 31.3.2042       | = 27.9 |                               |                            |
|                        | 1.4.2042 - 31.3.2043       | = 27.9 |                               |                            |
|                        | 1.4.2043 - 31.3.2044       | = 27.9 |                               |                            |
|                        | 1.4.2044 - 31.3.2045       | = 28.0 |                               |                            |
|                        | 1.4.2045 - 31.3.2046       | = 28.2 |                               |                            |
|                        | 1.4.2046 - 31.3.2047       | = 30.2 |                               |                            |
|                        | 1.4.2047 - 31.3.2048       | = 31.7 |                               |                            |
|                        | 1.4.2048 - 31.3.2049       | = 31.8 |                               |                            |
|                        | 1.4.2049 - 31.3.2050       | = 31.8 |                               |                            |
|                        | 1.4.2050 - 31.3.2051       | = 33.4 |                               |                            |
|                        | 1.4.2051 - 31.3.2052       | = 30.8 |                               |                            |
|                        | 1.4.2052 - 31.3.2053       | = 31.1 |                               |                            |
|                        | 1.4.2053 - 31.3.2054       | = 31.7 |                               |                            |
|                        | 1.4.2054 - 31.3.2055       | = 32.0 |                               |                            |
|                        | 1.4.2055 - 31.3.2056       | = 32.8 |                               |                            |
|                        | 1.4.2056 - 31.3.2057       | = 34.6 |                               |                            |
|                        | 1.4.2057 - 31.3.2058       | = 34.3 |                               |                            |
|                        | 1.4.2058 - 31.3.2059       | = 32.0 |                               |                            |
|                        | 1.4.2059 - 31.3.2060       | = 32.0 |                               |                            |
|                        | 1.4.2060 - 31.3.2061       | = 31.9 |                               |                            |
|                        | 1.4.2061 - 31.3.2062       | = 32.8 |                               |                            |
|                        | 1.4.2062 - 31.3.2063       | = 30.5 |                               |                            |
|                        | 1.4.2063 - 31.3.2064       | = 30.5 |                               |                            |
|                        | 1.4.2064 - 31.3.2065       | = 42.2 |                               |                            |
|                        | 1.4.2065 - 31.3.2066       | = 50.4 |                               |                            |
|                        | 1.4.2066 - 31.3.2067       | = 46.5 |                               |                            |
|                        | 1.4.2067 - 31.3.2068       | = 46.5 |                               |                            |
|                        | 1.4.2068 - 31.3.2069       | = 9.1  |                               |                            |
| Total future arisings: | <b>1341.2</b>              |        |                               |                            |
| Total waste volume:    | <b>1341.2</b>              |        |                               |                            |

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

Comment on arising rates: Arisings dates are based upon Dounreay's Lifetime Plan 2024 as generated at December 2023

Additional information on quantities: -

Uncertainty factors on volumes: Stock (upper): x - Arisings (upper): x 1.20  
Stock (lower): x - Arisings (lower): x 0.80

**WASTE SOURCE** Demolished vessels, pipework and associated civil works from general plant decommissioning.

**PHYSICAL CHARACTERISTICS**

General description: Waste is mostly building materials (cells) with smaller amounts of metal, plastic, rubber etc. Large items will be size reduced during decommissioning.

Changes since waste generated: -

Bulk density (t/m³): = 0.32

Comment on density: Based on actuals data from Dounreay's waste consignment system. Data considered acceptable for 2025 submission

## CHEMICAL COMPOSITION

General description and components (%wt): Aluminium (TR), Asbestos (TR), Asphalt (0.01%), Cementitious material (e.g. concrete) (10.52%), Copper (TR), Fibreglass (1.76%), Glass (TR), Lead (0.85%), Mild Steel (14.21%), Other (3.05%), Paper (31.39%), Plastic (25.84%), Rubber (5.30%), Stainless steel (4.65%), Wood/ Wood composite (2.40%),

Chemical state: Neutral

Sheet metal proportion / thickness: 3.78% by wt of all metals will be sheet from ventilation and ducting. Assumed sheet metal thickness is of a range between 1.6-2.5mm.  
3.47% by wt of all metals will be bulk from tanks and gloveboxes.

Metals and alloys (%wt):

|                           | (%wt)  | Type(s) / Grades(s) with proportions | % of total C14 activity |
|---------------------------|--------|--------------------------------------|-------------------------|
| Stainless steel.....      | = 4.7  | -                                    |                         |
| Other ferrous metals..... | = 14.2 | -                                    |                         |
| Iron.....                 | = 0    | -                                    |                         |
| Aluminium.....            | < 0.01 | -                                    |                         |
| Beryllium.....            | = 0    | -                                    |                         |
| Cobalt.....               | = 0    | -                                    |                         |
| Copper.....               | < 0.01 | -                                    |                         |
| Lead.....                 | = 0.85 | -                                    |                         |
| 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.....                | = 33.8 | -                   |                         |
| Paper, cotton.....                  | = 31.4 | -                   |                         |
| Wood.....                           | = 2.4  | -                   |                         |
| Halogenated plastics.....           | = 12.9 | -                   |                         |
| Total non-halogenated plastics..... | = 12.9 | -                   |                         |
| Condensation polymers.....          | NE     | -                   |                         |
| Others.....                         | NE     | -                   |                         |
| Organic ion exchange materials..... | = 0    | -                   |                         |
| Total rubber.....                   | = 5.3  | -                   |                         |
| Halogenated rubber.....             | NE     | -                   |                         |
| Non-halogenated rubber.....         | NE     | -                   |                         |
| Hydrocarbons.....                   | = 0.01 | -                   |                         |
| Oil or grease.....                  | = 0    | -                   |                         |
| Fuel.....                           | NE     | -                   |                         |
| Asphalt/Tarmac (cont.coal tar)..... | = 0    | -                   |                         |
| Asphalt/Tarmac (no coal tar).....   | = 0.01 | -                   |                         |
| Bitumen.....                        | = 0    | -                   |                         |
| Others.....                         | NE     | -                   |                         |
| Other organics.....                 | = 3.1  | Other 3.05%,        |                         |

Other materials (%wt):

|                                       | (%wt)  | Type(s) and comment            | % of total C14 activity |
|---------------------------------------|--------|--------------------------------|-------------------------|
| Inorganic ion exchange materials..... | = 0    | -                              |                         |
| Inorganic sludges and flocs.....      | = 0    | -                              |                         |
| Soil.....                             | = 0    | -                              |                         |
| Brick/Stone/Rubble.....               | = 0    | -                              |                         |
| Cementitious material.....            | = 10.5 | Cementitious material          |                         |
| Sand.....                             | = 0    | -                              |                         |
| Glass/Ceramics.....                   | = 1.8  | Glass 0.00%, Fibreglass 1.76%, |                         |
| Graphite.....                         | = 0    | -                              |                         |
| Desiccants/Catalysts.....             | = 0    | -                              |                         |
| Asbestos.....                         | < 0.01 | -                              |                         |
| Non/low friable.....                  | NE     | -                              |                         |
| Moderately friable.....               | NE     | -                              |                         |
| Highly friable.....                   | NE     | -                              |                         |
| 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.....  | = 0   | -                   |
| Chloride.....  | NE    | -                   |
| Iodide.....    | NE    | -                   |
| Cyanide.....   | = 0   | -                   |
| Carbonate..... | NE    | -                   |
| Nitrate.....   | NE    | -                   |
| Nitrite.....   | NE    | -                   |
| Phosphate..... | = 0   | -                   |
| Sulphate.....  | = 0   | -                   |
| 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.....                   | = 0   | -                   |
| Putrescible wastes.....                        | NE    | -                   |
| Non-putrescible wastes.....                    | NE    | -                   |
| Corrosive materials.....                       | NE    | -                   |
| Pyrophoric materials.....                      | NE    | -                   |
| Generating toxic gases.....                    | NE    | -                   |
| Reacting with water.....                       | = 0   | -                   |
| Higher activity particles.....                 | NE    | -                   |
| Soluble solids as bulk chemical compounds..... | NE    | -                   |

Hazardous substances / non hazardous pollutants:

|                             | (%wt) | Type(s) and comment |
|-----------------------------|-------|---------------------|
| Acrylamide.....             | NE    | -                   |
| Benzene.....                | = 0   | -                   |
| Chlorinated solvents.....   | NE    | -                   |
| Formaldehyde.....           | NE    | -                   |
| Organometallics.....        | NE    | -                   |
| Phenol.....                 | NE    | -                   |
| Styrene.....                | NE    | -                   |
| Tri-butyl phosphate.....    | NE    | -                   |
| Other organophosphates..... | NE    | -                   |
| Vinyl chloride.....         | NE    | -                   |
| 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):

| No                             |       |                     |
|--------------------------------|-------|---------------------|
|                                | (%wt) | Type(s) and comment |
| EDTA.....                      | NE    | -                   |
| DPTA.....                      | NE    | -                   |
| NTA.....                       | NE    | -                   |
| Polycarboxylic acids.....      | NE    | -                   |
| Other organic complexants..... | NE    | -                   |
| Total complexing agents.....   | = 0   | -                   |

Physical components:

|                                         | Number | Type(s) and comment  |
|-----------------------------------------|--------|----------------------|
| Sources.....                            | = 0    | -                    |
| Electronic & Electrical Equipment (EEE) |        | -                    |
| EEE Type 1.....                         |        | -                    |
| EEE Type 2.....                         |        | -                    |
| EEE Type 3.....                         | = 10   | Vacuums, transducers |
| EEE Type 4.....                         | = 1    | glovebox lamps       |
| 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            | = 79.0          |
| Decay storage                                              |                    |                 |
| Low force compaction                                       |                    |                 |
| Supercompaction (HFC)                                      |                    |                 |
| Incineration                                               |                    |                 |
| Drying/dewatering/liquid separation                        | On-site            | = 92.3          |
| 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:

79% of the waste will be supercompacted in 200L drums before being placed in HHISOs. HHISOs filled with Bulk waste, compacted drums, or a mix of both will be encapsulated before final disposal.

Conditioning method:

LLW will be grouted into non IP rated HHISOs through a dedicated grouting facility.

Conditioning plants:

| Plant Name | Location |
|------------|----------|
|            |          |

Likely conditioning matrix:

Non-standard

Further information on the conditioning matrix:

~35% water content and plasticiser  
NRS Dounreay uses 3:1 PFA:OPC

**Waste Packaging:**

Likely container type:

| Container                            | Waste packaged (vol%) | Waste loading (m³) | Payload (m³) | Number of packages | Estimated start date for packaging |
|--------------------------------------|-----------------------|--------------------|--------------|--------------------|------------------------------------|
| Non IP-2 rated 1/2 Height ISO (DC02) | 100.0                 | 20.9               | 15.6         | 65                 | -                                  |

Range in container waste loading:

The waste loading value is a rough average using previously consigned waste data. Waste loading per ISO can vary significantly, based on how the container is loaded. In general, bulk items leads to a lower waste loading value where as compactable leads to a higher one. Most containers contain a mix of the two.

Other information on packaging and conditioning:

The waste will be loaded into an alternative non-IP2 rated LLW Disposal HHISO for transfer to the Dounreay LLW Disposal Facility. Each HHISO may have LLW items from other wastestreams in the final HHISO.

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

$$= 2.0$$

Conditioned density comment:

This value is the midpoint between a range of densities going from 1.49 - 2.47. These were taken from HHISOs disposed of in NRSD LLW Disposal Vaults.

**Management Routes:**

| Disposal Route                                                                     | Stream volume % | Raw density t/m <sup>3</sup> | 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: Yes

| Baseline Management Route | Opportunity Management Route | Stream volume (%) | Opportunity Confidence | Comment                                                                                                                                                                                                                                                                                                                          |
|---------------------------|------------------------------|-------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dounreay LLWDV            | Incineration facility        | < 79.0            | GREEN                  | This opportunity is still at an early stage of development. A small scale trial has taken place. This can potentially divert up to all compactable LLW. The incinerables waste route 79% is theoretical maximum based on 100% drummed LLW being suitable for incineration. The 79% is subject to further review by NRS Dounreay. |
| Dounreay LLWDV            | Metal treatment facility     | < 7.7             | GREEN                  | Trials have progressed to open the Metal Treatment Route. It is expected that the waste route will open in 2025. The metallic waste treatment route 7.7% remains indicative and is subject to further review and characterisation by NRS Dounreay.                                                                               |

#### RADIOACTIVITY

Source: Contaminated/activated items/concrete from HAL storage plant.

Uncertainty: Within a factor of ten.

Measurement of radioactivities: From Consignor's records

Chemical form of radionuclides:

- H-3: Potentially present but at very low concentrations.
- C-14: Potentially present but at very low concentrations.
- Cl-36: Not likely to be present
- Se-79: Potentially present but at very low concentrations.
- Tc-99: Potentially present but at very low concentrations.
- I-129: Potentially present but at very low concentrations.
- Ra: Potentially present but at very low concentrations
- Th: Potentially present but at very low concentrations
- U: Present at low concentrations as contamination (nitrate).
- Np: Potentially present but at very low concentrations.
- Pu: Present at low concentrations as contamination (nitrate).

| WASTE STREAM 5B313 HAL Store and Evaporation Plant 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                                                    |                            |                |                 |                | Gd 153           |                            |                |                 |                |
| Be 10                                                  |                            |                |                 |                | Ho 163           |                            |                |                 |                |
| C 14                                                   |                            |                |                 |                | 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                                                  |                            |                |                 |                | Ti 204           |                            |                |                 |                |
| Mn 54                                                  |                            |                |                 |                | Pb 205           |                            |                |                 |                |
| Fe 55                                                  |                            |                |                 |                | Pb 210           |                            |                | = 2.51E-17      | C C 2          |
| Co 60                                                  |                            |                |                 |                | Bi 208           |                            |                |                 |                |
| Ni 59                                                  |                            |                |                 |                | Bi 210m          |                            |                |                 |                |
| Ni 63                                                  |                            |                |                 |                | Po 210           |                            |                | = 1.52E-17      | C C 2          |
| Zn 65                                                  |                            |                |                 |                | Ra 223           |                            |                | = 2.38E-17      | C C 2          |
| Se 79                                                  |                            |                |                 |                | Ra 225           |                            |                | = 5.58E-16      | C C 2          |
| Kr 81                                                  |                            |                |                 |                | Ra 226           |                            |                | = 8.35E-16      | C C 2          |
| Kr 85                                                  |                            |                |                 |                | Ra 228           |                            |                | = 4.44E-22      | C C 2          |
| Rb 87                                                  |                            |                |                 |                | Ac 227           |                            |                | = 2.58E-17      | C C 2          |
| Sr 90                                                  |                            |                | = 7.41E-06      | C C 2          | Th 227           |                            |                | = 2.42E-17      | C C 2          |
| Zr 93                                                  |                            |                |                 |                | Th 228           |                            |                | = 7.40E-12      | C C 2          |
| Nb 91                                                  |                            |                |                 |                | Th 229           |                            |                | = 5.69E-16      | C C 2          |
| Nb 92                                                  |                            |                |                 |                | Th 230           |                            |                | = 1.29E-12      | C C 2          |
| Nb 93m                                                 |                            |                |                 |                | Th 232           |                            |                | = 2.76E-21      | C C 2          |
| Nb 94                                                  |                            |                |                 |                | Th 234           |                            |                | = 6.33E-09      | C C 2          |
| Mo 93                                                  |                            |                |                 |                | Pa 231           |                            |                | = 5.57E-16      | C C 2          |
| Tc 97                                                  |                            |                |                 |                | Pa 233           |                            |                | = 2.39E-12      | C C 2          |
| Tc 99                                                  |                            |                | = 1.92E-08      | C C 2          | U 232            |                            |                | = 1.10E-11      | C C 2          |
| Ru 106                                                 |                            |                | = 1.88E-10      | C C 2          | U 233            |                            |                | = 2.01E-12      | C C 2          |
| Pd 107                                                 |                            |                |                 |                | U 234            |                            |                | = 4.66E-08      | C C 2          |
| Ag 108m                                                |                            |                |                 |                | U 235            |                            |                | = 8.79E-12      | C C 2          |
| Ag 110m                                                |                            |                |                 |                | U 236            |                            |                | = 1.87E-11      | C C 2          |
| Cd 109                                                 |                            |                |                 |                | U 238            |                            |                | = 6.33E-09      | C C 2          |
| Cd 113m                                                |                            |                |                 |                | Np 237           |                            |                | = 2.48E-12      | C C 2          |
| Sn 119m                                                |                            |                |                 |                | Pu 236           |                            |                |                 |                |
| Sn 121m                                                |                            |                |                 |                | Pu 238           |                            |                | = 8.96E-06      | C C 2          |
| Sn 123                                                 |                            |                |                 |                | Pu 239           |                            |                | = 5.97E-07      | C C 2          |
| Sn 126                                                 |                            |                |                 |                | Pu 240           |                            |                | = 6.06E-07      | C C 2          |
| Sb 125                                                 |                            |                | = 1.37E-09      | C C 2          | Pu 241           |                            |                | = 1.14E-05      | C C 2          |
| Sb 126                                                 |                            |                |                 |                | Pu 242           |                            |                | = 1.12E-13      | C C 2          |
| Te 125m                                                |                            |                | = 3.24E-10      | C C 2          | Am 241           |                            |                | = 2.57E-06      | C C 2          |
| Te 127m                                                |                            |                |                 |                | Am 242m          |                            |                | = 1.19E-07      | C C 2          |
| I 129                                                  |                            |                |                 |                | Am 243           |                            |                | = 3.77E-09      | C C 2          |
| Cs 134                                                 |                            |                | = 8.78E-10      | C C 2          | Cm 242           |                            |                | = 9.90E-08      | C C 2          |
| Cs 135                                                 |                            |                |                 |                | Cm 243           |                            |                | = 2.40E-08      | C C 2          |
| Cs 137                                                 |                            |                | = 2.19E-05      | C C 2          | Cm 244           |                            |                | = 7.05E-08      | C C 2          |
| Ba 133                                                 |                            |                |                 |                | Cm 245           |                            |                |                 |                |
| La 137                                                 |                            |                |                 |                | Cm 246           |                            |                |                 |                |
| La 138                                                 |                            |                |                 |                | Cm 248           |                            |                |                 |                |
| Ce 144                                                 |                            |                |                 |                | Cf 249           |                            |                |                 |                |
| Pm 145                                                 |                            |                |                 |                | Cf 250           |                            |                |                 |                |
| Pm 147                                                 |                            |                | = 1.18E-07      | C C 2          | Cf 251           |                            |                |                 |                |
| Sm 147                                                 |                            |                | 6.43E-18        | C C 2          | Cf 252           |                            |                |                 |                |
| Sm 151                                                 |                            |                | = 1.16E-06      | C C 2          | Unsp a           |                            |                |                 |                |
| Eu 152                                                 |                            |                |                 |                | Unsp b/g         |                            |                |                 |                |
| Eu 154                                                 |                            |                | = 2.74E-07      | C C 2          | <b>Total a</b>   | <b>0</b>                   | <b>*</b>       | <b>1.30E-05</b> | <b>*</b>       |
| Eu 155                                                 |                            |                | = 2.86E-07      | C C 2          | <b>Total b/g</b> | <b>0</b>                   | <b>*</b>       | <b>4.27E-05</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