

| WASTE STREAM | 7D23 | Devonport RA Hard Trash (for Disposal to NWS) |
|--------------|------|-----------------------------------------------|
|--------------|------|-----------------------------------------------|

**SITE** HMNB Devonport

**SITE OWNER** Ministry of Defence (MOD)

**WASTE CUSTODIAN** Babcock International Group

**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                | = 24.8       |                               |                            |
| Future arisings:       | 1.4.2025 - 31.3.2028       | ~ 31.4       |                               |                            |
|                        | 1.4.2028 - 31.3.2031       | ~ 31.4       |                               |                            |
|                        | 1.4.2031 - 31.3.2034       | ~ 31.4       |                               |                            |
| Total future arisings: |                            | <b>94.1</b>  |                               |                            |
| Total waste volume:    |                            | <b>118.9</b> |                               |                            |

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

Comment on arising rates: Arisings are dependent upon the level of submarine refit and maintenance activity that is carried out. Including operational waste and disposal of redundant large assets.

Additional information on quantities: Arisings have been calculated using best available data. Quantities have been calculated using previous disposals data and new scheduling tools, to be as accurate as possible.

Uncertainty factors on volumes: Stock (upper): x 1.20 Arisings (upper): x 2.00  
Stock (lower): x 0.80 Arisings (lower): x 0.50

**WASTE SOURCE** The waste is produced as a consequence of the general support of Naval nuclear propulsion programme e.g. reactor plant maintenance and refuelling operations.

#### PHYSICAL CHARACTERISTICS

General description: Solid low level waste for disposal to the NWS, comprising metal items of varying size from contaminated tools to large plant items. Other items include metal pipes, valves, swarf, glass and thermal lagging materials and mild steel waste drums. All items derive from the submarines or from shore based facilities. Large items do occasionally originate from the nuclear submarine reactor plant or from support services. In these instances the item will be classified as non-compactable waste and will be packed into half height ISO containers, or other container, as agreed by NWS Ltd, for disposal as non-compactable waste.

Changes since waste generated: Material may have been size reduced to fit within 200l drum. Certain large items of hard waste could be consigned as being non-compactable waste should they satisfy the NWS CFA.

Bulk density (t/m<sup>3</sup>): = 0.82

Comment on density: The average density of hard trash, both drummed and redundant assets, averages at 0.82 t/m<sup>3</sup>.

#### CHEMICAL COMPOSITION

General description and components (%wt): The waste consists of mainly metallic components primarily stainless steel. There are lesser amounts of mild steel, iron and also aluminium. Drums are mild steel. Other constituents of the stream are calcium silicate lagging, glass. There will be small amounts of polythene within drums along with other soft organics, e.g. paper.

Chemical state: Neutral

Sheet metal proportion / thickness: Large primary circuit components will be classed as non-compactable waste and will be disposed of in half height ISO containers, or other, as agreed with NWS Ltd. Difficult to provide dimensional information. Total percentage of waste <<10% of current arisings.

Metals and alloys (%wt):

|                           | (%wt)  | Type(s) / Grades(s) with proportions                                                                                                          | % of total C14 activity |
|---------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Stainless steel.....      | P      | 316L stainless steel                                                                                                                          |                         |
| Other ferrous metals..... | ~ 83.8 | Mild steel drum                                                                                                                               |                         |
| Iron.....                 | -      | -                                                                                                                                             |                         |
| Aluminium.....            | -      | -                                                                                                                                             |                         |
| Beryllium.....            | -      | -                                                                                                                                             |                         |
| Cobalt.....               | P      | In the form of mild/stainless steel and potentially small quantities of Stellite 3 & 6 alloy in cast and bar form.                            |                         |
| Copper.....               | -      | -                                                                                                                                             |                         |
| Lead.....                 | -      | -                                                                                                                                             |                         |
| Magnox/Magnesium.....     | -      | -                                                                                                                                             |                         |
| Nickel.....               | -      | -                                                                                                                                             |                         |
| Titanium.....             | P      | Potential for small quantities of Stellite 6 alloy in cast and bar form and certain plant components.                                         |                         |
| Uranium.....              | -      | -                                                                                                                                             |                         |
| Zinc.....                 | ~ 0.11 | As a metal in solid form.                                                                                                                     |                         |
| Zircaloy/Zirconium.....   | -      | -                                                                                                                                             |                         |
| Other metals.....         | ~ 10.1 | Stellite 3 & 6 can present in very small proportions in hardened alloys and certain valve seats. Other metals include Chromium and Molybdenum |                         |

Organics (%wt):

|                                     | (%wt) | Type(s) and comment | % of total C14 activity |
|-------------------------------------|-------|---------------------|-------------------------|
| Total cellulose.....                | ~ 1.0 | Paper/cotton.       |                         |
| Paper, cotton.....                  | ~ 1.0 | -                   |                         |
| Wood.....                           | = 0   | -                   |                         |
| Halogenated plastics.....           | = 0   | -                   |                         |
| Total non-halogenated plastics..... | = 2.0 | Polythene           |                         |
| Condensation polymers.....          | = 0   | -                   |                         |
| Others.....                         | = 2.0 | Polythene           |                         |
| Organic ion exchange materials..... | = 0   | -                   |                         |
| Total rubber.....                   | = 1.0 | -                   |                         |
| Halogenated rubber.....             | = 0   | -                   |                         |
| Non-halogenated rubber.....         | = 1.0 | -                   |                         |
| 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.....      | = 0    | -                   |                         |
| Soil.....                             | = 0    | -                   |                         |
| Brick/Stone/Rubble.....               | ~ 0.50 | -                   |                         |
| Cementitious material.....            | ~ 0.50 | -                   |                         |
| Sand.....                             | -      | -                   |                         |
| Glass/Ceramics.....                   | ~ 1.0  | Glass               |                         |
| Graphite.....                         | = 0    | -                   |                         |
| Desiccants/Catalysts.....             | -      | -                   |                         |
| Asbestos.....                         | = 0    | -                   |                         |
| Non/low friable.....                  | -      | -                   |                         |
| Moderately friable.....               | -      | -                   |                         |
| Highly friable.....                   | -      | -                   |                         |
| 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.....  | = 0   | -                   |
| Iodide.....    | = 0   | -                   |
| Cyanide.....   | = 0   | -                   |
| Carbonate..... | = 0   | -                   |
| Nitrate.....   | = 0   | -                   |
| Nitrite.....   | = 0   | -                   |
| Phosphate..... | = 0   | -                   |
| Sulphate.....  | = 0   | -                   |
| Sulphide.....  | = 0   | -                   |

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.....                   | < 1.0 | -                   |
| Putrescible wastes.....                        | = 0   | -                   |
| Non-putrescible wastes.....                    | ~ 1.0 | -                   |
| Corrosive materials.....                       | = 0   | -                   |
| Pyrophoric materials.....                      | = 0   | -                   |
| Generating toxic gases.....                    | = 0   | -                   |
| Reacting with water.....                       | TR    | -                   |
| Higher activity particles.....                 | NE    | -                   |
| Soluble solids as bulk chemical compounds..... | = 0   | -                   |

Hazardous substances / non hazardous pollutants:

|                             | (%wt) | Type(s) and comment |
|-----------------------------|-------|---------------------|
| Acrylamide.....             |       | -                   |
| Benzene.....                | = 0   | -                   |
| Chlorinated solvents.....   |       | -                   |
| Formaldehyde.....           |       | -                   |
| Organometallics.....        |       | -                   |
| Phenol.....                 | = 0   | -                   |
| Styrene.....                |       | -                   |
| Tri-butyl phosphate.....    | = 0   | -                   |
| Other organophosphates..... |       | -                   |
| Vinyl chloride.....         | = 0   | -                   |
| Arsenic.....                | = 0   | -                   |
| Barium.....                 |       | -                   |
| Boron.....                  | NE    | -                   |
| Boron (in Boral).....       | NE    | -                   |
| Boron (non-Boral).....      | NE    | -                   |
| Cadmium.....                | = 0   | -                   |
| Caesium.....                |       | -                   |
| Selenium.....               | = 0   | -                   |
| Chromium.....               | ~ 8.8 | -                   |
| Molybdenum.....             | ~ 1.4 | -                   |
| Thallium.....               |       | -                   |
| Tin.....                    | = 0   | -                   |
| Vanadium.....               | = 0   | -                   |
| Mercury compounds.....      |       | -                   |
| Others.....                 | NE    | -                   |

Complexing agents (%wt):

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

Physical components:

|                                         | Number | Type(s) and comment |
|-----------------------------------------|--------|---------------------|
| Sources.....                            | = 0    | -                   |
| Electronic & Electrical Equipment (EEE) |        | -                   |
| EEE Type 1.....                         | = 0    | -                   |
| EEE Type 2.....                         | = 0    | -                   |
| EEE Type 3.....                         | = 0    | -                   |
| EEE Type 4.....                         | = 0    | -                   |
| EEE Type 5.....                         | = 0    | -                   |

## 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           | ~ 8.2           |
| Incineration                                               | Off-site           | ~ 17.4          |
| Drying/dewatering/liquid separation                        |                    |                 |
| Tie down/fixatives/strippable coating/painting application |                    |                 |
| Decontamination                                            |                    |                 |
| Metal treatment                                            |                    |                 |
| Recycling / reuse                                          | Off-site           | ~ 59.6          |
| Thermal treatment, including vitrification                 |                    |                 |
| Encapsulation                                              |                    |                 |
| Polymer encapsulation                                      |                    |                 |
| Other physical treatment                                   |                    |                 |
| Other chemical treatment                                   |                    |                 |
| Containerisation                                           |                    |                 |
| Treatment not yet determined                               |                    |                 |
| None                                                       | Off-site           | ~ 14.8          |

Comments on planned treatments:

Approximate stream volumes derived from waste consignments during the most recent reportable period. These stream volumes are subject to change depending on trade controls.

Conditioning method:

Compactable Waste - Drums of compactable hard trash which are not suitable for alternative treatments will be subjected to high-force compaction. A typical conditioning factor for 7D23 drums is 0.33 relative to the original displaced volume of the 200 litre drum. Non-compactable waste - Large items and other non-compactable hard waste are considered unsuitable for low or high-force compaction will be consigned for disposal or alternative treatment without conditioning.

Conditioning plants:

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

Likely conditioning matrix:

Unknown

Further information on the conditioning matrix:

Supercompacted waste not suitable for recycling will be loaded and grouted into final disposal container.

### 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) | 23.0                  | 39.4               | 13.0         | 1                  | -                                  |

Range in container waste loading: As stated previously, volumes can vary due to emergent projects or disposal of waste subject to trade controls.

Other information on packaging and conditioning:

A typical conditioning factor for 7D23 drums is 0.33 relative to the original displaced volume of the 200 litre drum. It is assumed each 1/2 Height IP-2 Disposal/ Reusable ISO (TC01/TC02) will approximatively have a 13m³ waste loading which equates to approximately 39 m³ of raw waste

Conditioned density (t/m³):

~~ 0.27

Conditioned density comment:

Conditioned density based on bulk density with relative 0.33 conditioning factor applied to waste drum. Value is very approximate.

**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) |                 |                              |            |
| 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                                     | ~ 23.0          | ~ 0.82                       |            |
| 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                               | ~ 17.4          | ~ 0.82                       |            |
| Expected to be consigned to a Metal Treatment Facility                             |                 |                              |            |
| Expected to be Out of Scope                                                        |                 |                              |            |
| Expected to be recycled / reused                                                   | ~ 59.6          | ~ 0.82                       |            |
| Disposal route not known                                                           |                 |                              |            |

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

**Opportunities for alternative disposal routing:** Not yet determined

| Baseline Management Route | Opportunity Management Route | Stream volume (%) | Opportunity Confidence | Comment |
|---------------------------|------------------------------|-------------------|------------------------|---------|
| -                         | -                            | -                 | -                      | -       |

**RADIOACTIVITY**

**Source:** Contamination of plant items through contact with the submarine primary plant. Minor neutron activation of components can also occur. Major nuclides at time of generation are Fe-55 (34%), Co-60 (41%), C-14 (5%), Mn-54 (1.3%), Ni-63 (1.6%) and others.

**Uncertainty:** A drum monitor assesses the gamma activity of the waste using a eight segment - helical scan HPGe gamma spectroscopy system. The system accuracy is assessed to be ±20% of gamma activity. Activity of other beta/gamma nuclides associated with the waste is assessed using a generic fingerprint relative to the measured Co-60 activity. Accuracy of the total activity measurement and assessment is considered to be within 50%.

**Measurement of radioactivities:** Co-60 is measured directly by the drum monitor system using segmented gamma spectroscopy. Other gamma emitters will also be detected if present within the waste. The fingerprint has been derived by the use of best available sampling information and accepted international practice to determine correlations and relationships. All other nuclides are determined relative to Co-60 activity. Specific activity figures have been derived from current stock data and represent a reasonably consistent waste origin, therefore future arisings, which are expected to remain consistent, can only be estimated based on the same SA estimated figure i.e. the values are specific activity not total activity (which would vary depending on expected volume).

**Chemical form of radionuclides:** H-3: Potential to be present as tritiated water adhered to internal surface of pipes (0.4% of total activity).  
C-14: Present in waste in various chemical forms, predominately carbonate, (5% of total activity iaw extant WCH).

Cl-36: -  
Se-79: -  
Tc-99: -  
I-129: -  
Ra: -  
Th: -  
U: -  
Np: -  
Pu: -

| WASTE STREAM |                            | 7D23              |                 | Devonport RA Hard Trash (for Disposal to NWS) |                  |                            |                   |                 |                   |
|--------------|----------------------------|-------------------|-----------------|-----------------------------------------------|------------------|----------------------------|-------------------|-----------------|-------------------|
| Nuclide      | Mean radioactivity, TBq/m³ |                   |                 |                                               | Nuclide          | Mean radioactivity, TBq/m³ |                   |                 |                   |
|              | Waste at<br>1.4.2025       | Bands and<br>Code | Future Arisings | Bands and<br>Code                             |                  | Waste at<br>1.4.2025       | Bands and<br>Code | Future Arisings | Bands and<br>Code |
| H 3          | ~ 5.01E-07                 | B B 2             | ~ 5.01E-07      | C C 2                                         | Gd 153           |                            |                   |                 |                   |
| Be 10        |                            |                   |                 |                                               | Ho 163           |                            |                   |                 |                   |
| C 14         | ~ 1.36E-05                 | B B 2             | ~ 1.36E-05      | C C 2                                         | Ho 166m          |                            |                   |                 |                   |
| Na 22        | ~ 3.51E-11                 | B B 2             | ~ 3.51E-11      | C C 2                                         | Tm 170           |                            |                   |                 |                   |
| Al 26        |                            |                   |                 |                                               | Tm 171           |                            |                   |                 |                   |
| Cl 36        | ~ 3.04E-09                 | B B 2             | ~ 3.04E-09      | C C 2                                         | Lu 174           |                            |                   |                 |                   |
| Ar 39        |                            |                   |                 |                                               | Lu 176           |                            |                   |                 |                   |
| Ar 42        |                            |                   |                 |                                               | Hf 178n          |                            |                   |                 |                   |
| K 40         |                            |                   |                 |                                               | Hf 182           |                            |                   |                 |                   |
| Ca 41        |                            |                   |                 |                                               | Pt 193           |                            |                   |                 |                   |
| Mn 53        |                            |                   |                 |                                               | Tl 204           |                            |                   |                 |                   |
| Mn 54        | ~ 5.43E-09                 | B B 2             | ~ 5.43E-09      | C C 2                                         | Pb 205           |                            |                   |                 |                   |
| Fe 55        | ~ 4.23E-06                 | B B 2             | ~ 4.23E-06      | C C 2                                         | Pb 210           |                            |                   |                 |                   |
| Co 60        | ~ 2.12E-05                 | B B 2             | ~ 2.12E-05      | C C 2                                         | Bi 208           |                            |                   |                 |                   |
| Ni 59        | ~ 4.31E-08                 | B B 2             | ~ 4.31E-08      | C C 2                                         | Bi 210m          |                            |                   |                 |                   |
| Ni 63        | ~ 3.92E-06                 | B B 2             | ~ 3.92E-06      | C C 2                                         | Po 210           |                            |                   |                 |                   |
| Zn 65        | ~ 3.14E-08                 | B B 2             | ~ 3.14E-08      | C C 2                                         | Ra 223           |                            |                   |                 |                   |
| Se 79        |                            |                   |                 |                                               | Ra 225           |                            |                   |                 |                   |
| Kr 81        |                            |                   |                 |                                               | Ra 226           |                            |                   |                 |                   |
| Kr 85        |                            |                   |                 |                                               | Ra 228           |                            |                   |                 |                   |
| Rb 87        |                            |                   |                 |                                               | Ac 227           |                            |                   |                 |                   |
| Sr 90        | ~ 1.45E-09                 | B B 2             | ~ 1.45E-09      | C C 2                                         | Th 227           |                            |                   |                 |                   |
| Zr 93        |                            |                   |                 |                                               | Th 228           |                            |                   |                 |                   |
| Nb 91        |                            |                   |                 |                                               | Th 229           |                            |                   |                 |                   |
| Nb 92        |                            |                   |                 |                                               | Th 230           |                            |                   |                 |                   |
| Nb 93m       |                            |                   |                 |                                               | Th 232           |                            |                   |                 |                   |
| Nb 94        |                            |                   |                 |                                               | Th 234           |                            |                   |                 |                   |
| Mo 93        | ~ 1.11E-09                 | B B 2             | ~ 1.11E-09      | C C 2                                         | Pa 231           |                            |                   |                 |                   |
| Tc 97        |                            |                   |                 |                                               | Pa 233           |                            |                   |                 |                   |
| Tc 99        | ~ 9.90E-11                 | B B 2             | ~ 9.90E-11      | C C 2                                         | U 232            |                            |                   |                 |                   |
| Ru 106       |                            |                   |                 |                                               | U 233            |                            |                   |                 |                   |
| Pd 107       |                            |                   |                 |                                               | U 234            |                            |                   |                 |                   |
| Ag 108m      | ~ 9.07E-09                 | B B 2             | ~ 9.07E-09      | C C 2                                         | U 235            |                            |                   |                 |                   |
| Ag 110m      | ~ 1.30E-08                 | B B 2             | ~ 1.30E-08      | C C 2                                         | U 236            |                            |                   |                 |                   |
| Cd 109       |                            |                   |                 |                                               | U 238            |                            |                   |                 |                   |
| Cd 113m      |                            |                   |                 |                                               | Np 237           |                            |                   |                 |                   |
| Sn 119m      |                            |                   |                 |                                               | Pu 236           |                            |                   |                 |                   |
| Sn 121m      |                            |                   |                 |                                               | Pu 238           |                            |                   |                 |                   |
| Sn 123       |                            |                   |                 |                                               | Pu 239           |                            |                   |                 |                   |
| Sn 126       |                            |                   |                 |                                               | Pu 240           |                            |                   |                 |                   |
| Sb 125       | ~ 4.70E-08                 | B B 2             | ~ 4.70E-08      | C C 2                                         | Pu 241           |                            |                   |                 |                   |
| Sb 126       |                            |                   |                 |                                               | Pu 242           |                            |                   |                 |                   |
| Te 125m      |                            |                   |                 |                                               | Am 241           | ~ 4.66E-08                 | B B 2             | ~ 4.66E-08      | C C 2             |
| Te 127m      |                            |                   |                 |                                               | Am 242m          |                            |                   |                 |                   |
| I 129        | ~ 7.31E-09                 | B B 2             | ~ 7.31E-09      | C C 2                                         | Am 243           |                            |                   |                 |                   |
| Cs 134       | ~ 1.52E-09                 | B B 2             | ~ 1.52E-09      | C C 2                                         | Cm 242           |                            |                   |                 |                   |
| Cs 135       |                            |                   |                 |                                               | Cm 243           |                            |                   |                 |                   |
| Cs 137       | ~ 1.47E-07                 | B B 2             | ~ 1.47E-07      | C C 2                                         | Cm 244           |                            |                   |                 |                   |
| Ba 133       |                            |                   |                 |                                               | Cm 245           |                            |                   |                 |                   |
| La 137       |                            |                   |                 |                                               | Cm 246           |                            |                   |                 |                   |
| La 138       |                            |                   |                 |                                               | Cm 248           |                            |                   |                 |                   |
| Ce 144       |                            |                   |                 |                                               | Cf 249           |                            |                   |                 |                   |
| Pm 145       |                            |                   |                 |                                               | Cf 250           |                            |                   |                 |                   |
| Pm 147       |                            |                   |                 |                                               | Cf 251           |                            |                   |                 |                   |
| Sm 147       |                            |                   |                 |                                               | Cf 252           |                            |                   |                 |                   |
| Sm 151       |                            |                   |                 |                                               | Unsp a           |                            |                   |                 |                   |
| Eu 152       | ~ 4.45E-09                 | B B 2             | ~ 4.45E-09      | C C 2                                         | Unsp b/g         | ~ 4.16E-09                 | B B 2             | ~ 4.16E-09      | C C 2             |
| Eu 154       | ~ 1.37E-06                 | B B 2             | ~ 1.37E-06      | C C 2                                         | <b>Total a</b>   | <b>4.66E-08</b>            | *                 | <b>4.66E-08</b> | *                 |
| Eu 155       | ~ 1.45E-08                 | B B 2             | ~ 1.45E-08      | C C 2                                         | <b>Total b/g</b> | <b>4.51E-05</b>            | *                 | <b>4.51E-05</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