

|                     |             |                                    |
|---------------------|-------------|------------------------------------|
| <b>WASTE STREAM</b> | <b>3T07</b> | <b>LLW Evaporator Concentrates</b> |
|---------------------|-------------|------------------------------------|

**SITE** Hinkley Point C  
**SITE OWNER** NNB GenCo (HPC) Ltd  
**WASTE CUSTODIAN** NNB GenCo (HPC) Ltd  
**WASTE TYPE** LLW  
 Is the waste subject to Scottish Policy: No

**WASTE VOLUMES**

|                   |                           | Reported           |
|-------------------|---------------------------|--------------------|
| Stocks:           | At 1.4.2022.....          | 0m <sup>3</sup>    |
| Future arisings - | 1.4.2027 - 31.3.2028..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2028 - 31.3.2029..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2029 - 31.3.2030..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2030 - 31.3.2031..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2031 - 31.3.2032..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2032 - 31.3.2033..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2033 - 31.3.2034..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2034 - 31.3.2035..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2035 - 31.3.2036..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2036 - 31.3.2037..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2037 - 31.3.2038..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2038 - 31.3.2039..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2039 - 31.3.2040..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2040 - 31.3.2041..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2041 - 31.3.2042..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2042 - 31.3.2043..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2043 - 31.3.2044..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2044 - 31.3.2045..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2045 - 31.3.2046..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2046 - 31.3.2047..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2047 - 31.3.2048..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2048 - 31.3.2049..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2049 - 31.3.2050..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2050 - 31.3.2051..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2051 - 31.3.2052..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2052 - 31.3.2053..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2053 - 31.3.2054..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2054 - 31.3.2055..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2055 - 31.3.2056..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2056 - 31.3.2057..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2057 - 31.3.2058..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2058 - 31.3.2059..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2059 - 31.3.2060..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2060 - 31.3.2061..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2061 - 31.3.2062..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2062 - 31.3.2063..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2063 - 31.3.2064..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2064 - 31.3.2065..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2065 - 31.3.2066..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2066 - 31.3.2067..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2067 - 31.3.2068..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2068 - 31.3.2069..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2069 - 31.3.2070..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2070 - 31.3.2071..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2071 - 31.3.2072..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2072 - 31.3.2073..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2073 - 31.3.2074..... | ~6.0m <sup>3</sup> |
|                   | 1.4.2074 - 31.3.2075..... | ~6.0m <sup>3</sup> |

**WASTE STREAM****3T07****LLW Evaporator Concentrates**

|                           |                     |
|---------------------------|---------------------|
| 1.4.2075 - 31.3.2076..... | ~6.0 m <sup>3</sup> |
| 1.4.2076 - 31.3.2077..... | ~6.0 m <sup>3</sup> |
| 1.4.2077 - 31.3.2078..... | ~6.0 m <sup>3</sup> |
| 1.4.2078 - 31.3.2079..... | ~6.0 m <sup>3</sup> |
| 1.4.2079 - 31.3.2080..... | ~6.0 m <sup>3</sup> |
| 1.4.2080 - 31.3.2081..... | ~6.0 m <sup>3</sup> |
| 1.4.2081 - 31.3.2082..... | ~6.0 m <sup>3</sup> |
| 1.4.2082 - 31.3.2083..... | ~6.0 m <sup>3</sup> |
| 1.4.2083 - 31.3.2084..... | ~6.0 m <sup>3</sup> |
| 1.4.2084 - 31.3.2085..... | ~6.0 m <sup>3</sup> |
| 1.4.2085 - 31.3.2086..... | ~6.0 m <sup>3</sup> |
| 1.4.2086 - 31.3.2087..... | ~6.0 m <sup>3</sup> |

Total future arisings: 360.0 m<sup>3</sup>

Total waste volume: 360.0 m<sup>3</sup>

Comment on volumes: All future arisings, no legacy waste No uncertainty data currently available.

Uncertainty factors on volumes: Stock (upper): x Arisings (upper) x 1.0  
 Stock (lower): x Arisings (lower) x 1.0

**WASTE SOURCE**

The UK EPR provides for the use of an evaporator to minimise radioactive liquid effluents arising from the TEU [LWPS]. Evaporation will be used to minimise the discharge of active aqueous effluents. Evaporation of effluents results in the production of a sludge-like concentrate that will contain the bulk of the radioactivity initially present in aqueous effluent streams as activated metal oxides.

**PHYSICAL CHARACTERISTICS**

General description: The UK EPR provides for the use of an evaporator to minimise radioactive liquid effluents arising from the Liquid waste processing system [LWPS]. Evaporation will be used to minimise the discharge of active aqueous effluents. Evaporation of effluents results in the production of a sludge-like concentrate that will contain the bulk of the radioactivity initially present in aqueous effluent streams as activated metal oxides.

Physical components (%wt): 100% evaporator concentrates

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m<sup>3</sup>): ~1.1

Comment on density: Density of raw waste

**CHEMICAL COMPOSITION**

General description and components (%wt): Sludge-like concentrate that will contain the bulk of the radioactivity initially present in aqueous effluent streams as activated metal oxides. %wt breakdown not yet known.

Chemical state: -

Chemical form of radionuclides: -

Metals and alloys (%wt): If metals also hazardous then reported in the hazardous section.

|                           | (%wt) | Type(s) / Grade(s) with proportions | % of total C14 activity |
|---------------------------|-------|-------------------------------------|-------------------------|
| Stainless steel.....      |       |                                     |                         |
| Other ferrous metals..... | ~5.0  |                                     |                         |
| Iron.....                 |       |                                     |                         |
| Aluminium.....            |       |                                     |                         |
| Beryllium.....            |       |                                     |                         |
| Cobalt.....               |       |                                     |                         |
| Copper.....               |       |                                     |                         |
| Lead.....                 | ~0.03 |                                     |                         |
| Magnox/Magnesium.....     |       |                                     |                         |
| Nickel.....               | <0.01 |                                     |                         |

**WASTE STREAM**

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**LLW Evaporator Concentrates**

|                                     |        |                     |                         |
|-------------------------------------|--------|---------------------|-------------------------|
| Titanium.....                       |        |                     |                         |
| Uranium.....                        |        |                     |                         |
| Zinc.....                           |        |                     |                         |
| Zircaloy/Zirconium.....             |        |                     |                         |
| Other metals.....                   | <0.01  | Sb                  |                         |
| Organics (%wt):                     | -      |                     |                         |
|                                     | (%wt)  | Type(s) and comment | % of total C14 activity |
| Total cellulosics.....              | NE     |                     |                         |
| Paper, cotton.....                  | NE     |                     |                         |
| Wood.....                           | NE     |                     |                         |
| Halogenated plastics .....          | NE     |                     |                         |
| Total non-halogenated plastics..... | NE     |                     |                         |
| Condensation polymers.....          | NE     |                     |                         |
| Others.....                         | NE     |                     |                         |
| Organic ion exchange materials....  | NE     |                     |                         |
| Total rubber.....                   | NE     |                     |                         |
| Halogenated rubber .....            | NE     |                     |                         |
| Non-halogenated rubber.....         | NE     |                     |                         |
| Hydrocarbons.....                   | NE     |                     |                         |
| Oil or grease .....                 | NE     |                     |                         |
| Fuel.....                           | NE     |                     |                         |
| Asphalt/Tarmac (cont.coal tar)...   | NE     |                     |                         |
| Asphalt/Tarmac (no coal tar)....    | NE     |                     |                         |
| Bitumen.....                        | NE     |                     |                         |
| Others.....                         | NE     |                     |                         |
| Other organics.....                 | NE     |                     |                         |
| Other materials (%wt):              | -      |                     |                         |
|                                     | (%wt)  | Type(s) and comment | % of total C14 activity |
| Inorganic ion exchange materials..  |        |                     |                         |
| Inorganic sludges and flocs.....    | ~100.0 |                     |                         |
| Soil.....                           |        |                     |                         |
| Brick/Stone/Rubble.....             |        |                     |                         |
| Cementitious material.....          |        |                     |                         |
| Sand.....                           |        |                     |                         |
| Glass/Ceramics.....                 |        |                     |                         |
| Graphite.....                       |        |                     |                         |
| Desiccants/Catalysts.....           |        |                     |                         |
| Asbestos.....                       |        |                     |                         |
| Non/low friable.....                |        |                     |                         |
| Moderately friable.....             |        |                     |                         |
| Highly friable.....                 |        |                     |                         |

**WASTE STREAM****3T07****LLW Evaporator Concentrates**

Free aqueous liquids.....

Free non-aqueous liquids.....

Powder/Ash.....

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.....                        | NE    |                     |
| Low flash point liquids.....                   | NE    |                     |
| Explosive materials.....                       | NE    |                     |
| Phosphorus.....                                | NE    |                     |
| Hydrides.....                                  | NE    |                     |
| Biological etc. materials.....                 | NE    |                     |
| Biodegradable materials.....                   | NE    |                     |
| Putrescible wastes.....                        | NE    |                     |
| Non-putrescible wastes.....                    | NE    |                     |
| Corrosive materials.....                       | NE    |                     |
| Pyrophoric materials.....                      | NE    |                     |
| Generating toxic gases.....                    | NE    |                     |
| Reacting with water.....                       | NE    |                     |
| Higher activity particles.....                 | NE    |                     |
| Soluble solids as bulk chemical compounds..... | NE    |                     |

Hazardous substances / non hazardous pollutants: -

|                           | (%wt) | Type(s) and comment |
|---------------------------|-------|---------------------|
| Acrylamide.....           |       |                     |
| Benzene.....              | <0.01 |                     |
| Chlorinated solvents..... |       |                     |
| Formaldehyde.....         |       |                     |
| Organometallics.....      |       |                     |

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|                                       |       |
|---------------------------------------|-------|
| Phenol.....                           |       |
| Styrene.....                          |       |
| Tri-butyl phosphate.....              |       |
| Other organophosphates.....           |       |
| Vinyl chloride.....                   |       |
| Arsenic.....                          | <0.01 |
| Barium.....                           |       |
| Boron.....                            | ~4.2  |
| Boron (in Boral).....                 |       |
| Boron (non-Boral).....                |       |
| Cadmium.....                          | <0.01 |
| Caesium.....                          |       |
| Selenium.....                         | <0.01 |
| Chromium.....                         | <0.01 |
| Molybdenum.....                       |       |
| Thallium.....                         |       |
| Tin.....                              |       |
| Vanadium.....                         |       |
| Mercury compounds.....                | <0.01 |
| Others.....                           | <0.01 |
| Electronic Electrical Equipment (EEE) |       |
| EEE Type 1.....                       |       |
| EEE Type 2.....                       |       |
| EEE Type 3.....                       |       |
| EEE Type 4.....                       |       |
| EEE Type 5.....                       |       |

Complexing agents (%wt):      Yes

(%wt)      Type(s) and comment

|                                |  |
|--------------------------------|--|
| EDTA.....                      |  |
| DPTA.....                      |  |
| NTA.....                       |  |
| Polycarboxylic acids.....      |  |
| Other organic complexants..... |  |
| Total complexing agents.....   |  |

Very low level of carboxylic acids used in decontamination processes

Potential for the waste to      No.  
contain discrete items:**TREATMENT, PACKAGING AND DISPOSAL**

**WASTE STREAM**

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**LLW Evaporator Concentrates**

Planned on-site / off-site treatment(s):

| Treatment  | On-site / Off site | Stream volume % |
|--|--------------------|-----------------|
| Low force compaction<br>Supercompaction (HFC)<br>Incineration<br>Solidification<br>Decontamination<br>Metal treatment<br>Size reduction<br>Decay storage<br>Recycling / reuse<br>Other / various<br>None | On-site            | 100.0           |

Comment on planned treatments:

Encapsulation

**Disposal Routes:**

| Disposal Route  | Stream volume % | Disposal density t/m3 |
|---|-----------------|-----------------------|
| Expected to be consigned to the LLW Repository<br>Expected to be consigned to a Landfill Facility<br>Expected to be consigned to an On-Site Disposal Facility<br>Expected to be consigned to an Incineration Facility<br>Expected to be consigned to a Metal Treatment Facility<br>Expected to be consigned as Out of Scope<br>Expected to be recycled / reused<br>Disposal route not known | 100.0           | NE                    |

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

**Upcoming (2022/23-2024/25) Waste Routing (if expected to change from above):**

| Disposal Route  | Stream volume % |         |         |
|---|-----------------|---------|---------|
|   | 2022/23         | 2023/24 | 2024/25 |
| Expected to be consigned to the LLW Repository<br>Expected to be consigned to a Landfill Facility<br>Expected to be consigned to an On-Site Disposal Facility<br>Expected to be consigned to an Incineration Facility<br>Expected to be consigned to a Metal Treatment Facility<br>Expected to be consigned as Out of Scope<br>Expected to be recycled / reused<br>Disposal route not known |                 |         |         |

**Opportunities for alternative disposal routing:** -

| Baseline Management Route | Opportunity Management Route | Stream volume (%) | Estimated Date that Opportunity will be realised | Opportunity Confidence | Comment |
|---------------------------|------------------------------|-------------------|--|------------------------|---------|
| -                         | -                            | -                 | -  | -                      | -       |

**Waste Packaging for Disposal:**

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| Container  | Stream volume % | Waste loading m <sup>3</sup> | Number of packages |
|--|-----------------|------------------------------|--------------------|
| 1/3 Height IP-1 ISO<br>2/3 Height IP-2 ISO<br>1/2 Height WAMAC IP-2 ISO<br>1/2 Height IP-2 Disposal/Re-usable ISO<br>2m box (no shielding)<br>4m box (no shielding)<br>Other | 100.0           | ~2.9                         | 125                |

Other information: -

**Waste Planned for Disposal at the LLW Repository:**

Container voidage: -

Waste Characterisation Form (WCH): The waste meets the LLWR's Waste Acceptance Criteria (WAC).  
The waste does not have a current WCH.

Waste consigned for disposal to LLWR in year of generation: No. Held in tanks until enough for a campaign

**Non-Containerised Waste for In-Vault Grouting:**

Stream volume (%): -

Waste stream variation: -

Bounding cuboidal volume:

Inaccessible voidage: -

Other information: -

**RADIOACTIVITY**

Source: The UK EPR provides for the use of an evaporator to minimise radioactive liquid effluents arising from the TEU [LWPS]. Evaporation will be used to minimise the discharge of active aqueous effluents. Evaporation of effluents results in the production of a sludge-like concentrate that will contain the bulk of the radioactivity initially present in aqueous effluent streams as activated metal oxides.

Uncertainty: -

Definition of total alpha and total beta/gamma: In addition to the individual radionuclides which have been quantified the total beta gamma value accounts for relevant radionuclides which have been identified but not quantified individually. Total alpha may include some relevant radionuclides however which ones and in what quantity is not known at this stage.

Measurement of radioactivities: -

Other information: -

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**LLW Evaporator Concentrates**

| Nuclide | Mean radioactivity, TBq/m <sup>3</sup> |                |                 |                | Nuclide          | Mean radioactivity, TBq/m <sup>3</sup> |                |                 |                |
|---------|--|----------------|-----------------|----------------|------------------|--|----------------|-----------------|----------------|
|         | Waste at 1.4.2022                      | Bands and Code | Future arisings | Bands and Code |                  | Waste at 1.4.2022                      | Bands and Code | Future arisings | Bands and Code |
| H 3     |  |                | ~1E-03          | BB 2           | Gd 153           |  |                |                 |                |
| Be 10   |  |                |                 |                | Ho 163           |  |                |                 |                |
| C 14    |  |                | ~7.37E-06       | BB 2           | 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   |  |                |                 |                | Tl 204           |  |                |                 |                |
| Mn 54   |  |                |                 | 6              | Pb 205           |  |                |                 |                |
| Fe 55   |  |                |                 | 6              | Pb 210           |  |                |                 |                |
| Co 60   |  |                | ~6.7E-04        | BB 2           | Bi 208           |  |                |                 |                |
| Ni 59   |  |                |                 |                | Bi 210m          |  |                |                 |                |
| Ni 63   |  |                |                 | 6              | Po 210           |  |                |                 |                |
| Zn 65   |  |                |                 | 6              | Ra 223           |  |                |                 |                |
| Se 79   |  |                |                 |                | Ra 225           |  |                |                 |                |
| Kr 81   |  |                |                 |                | Ra 226           |  |                |                 |                |
| Kr 85   |  |                |                 |                | Ra 228           |  |                |                 |                |
| Rb 87   |  |                |                 |                | Ac 227           |  |                |                 |                |
| Sr 90   |  |                |                 |                | Th 227           |  |                |                 |                |
| Zr 93   |  |                |                 |                | Th 228           |  |                |                 |                |
| Nb 91   |  |                |                 |                | Th 229           |  |                |                 |                |
| Nb 92   |  |                |                 |                | Th 230           |  |                |                 |                |
| Nb 93m  |  |                |                 |                | Th 232           |  |                |                 |                |
| Nb 94   |  |                |                 |                | Th 234           |  |                |                 |                |
| Mo 93   |  |                |                 |                | Pa 231           |  |                |                 |                |
| Tc 97   |  |                |                 |                | Pa 233           |  |                |                 |                |
| Tc 99   |  |                |                 |                | U 232            |  |                |                 |                |
| Ru 106  |  |                |                 |                | U 233            |  |                |                 |                |
| Pd 107  |  |                |                 |                | U 234            |  |                |                 |                |
| Ag 108m |  |                |                 |                | U 235            |  |                |                 |                |
| Ag 110m |  |                |                 | 6              | 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  |  |                |                 |                | Pu 241           |  |                |                 |                |
| Sb 126  |  |                |                 | 6              | Pu 242           |  |                |                 |                |
| Te 125m |  |                |                 |                | Am 241           |  |                |                 |                |
| Te 127m |  |                |                 |                | Am 242m          |  |                |                 |                |
| I 129   |  |                | ~3.43E-11       | BB 2           | Am 243           |  |                |                 |                |
| Cs 134  |  |                |                 | 6              | Cm 242           |  |                |                 |                |
| Cs 135  |  |                |                 |                | Cm 243           |  |                |                 |                |
| Cs 137  |  |                |                 | 6              | 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  |  |                |                 |                | Other a          |  |                |                 |                |
| Eu 152  |  |                |                 |                | Other b/g        |  |                |                 |                |
| Eu 154  |  |                |                 |                | <b>Total a</b>   | <b>0</b>                               |                | ~1.01E-07       | <b>BB 2</b>    |
| Eu 155  |  |                |                 |                | <b>Total b/g</b> | <b>0</b>                               |                | ~3.59E-03       | <b>BB 2</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 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