**Section 340.1052 Classification of Radioactive Waste for Land Disposal**

a) Considerations. Determination of the classification of radioactive waste involves two considerations. First, consideration must be given to the concentration of long-lived radionuclides (and their shorter-lived precursors) whose potential hazard will persist long after such precautions as institutional controls, improved waste form and deeper disposal have ceased to be effective. These precautions delay the time when long-lived radionuclides could cause exposures. In addition, the magnitude of the potential dose is limited by the concentration and availability of the radionuclide at the time of exposure. Second, consideration must be given to the concentration of shorter-lived radionuclides for which requirements on institutional controls, waste form and disposal methods are effective.

b) Classes of waste.

1) Class A waste is waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A waste must meet the minimum requirements set forth in Section 340.1055(a) of this Part. If Class A waste also meets the stability requirements set forth in Section 340.1055(b) of this Part, it is not necessary to segregate the waste for disposal.

2) Class B waste is waste that must meet more rigorous requirements on waste form to ensure stability (as defined in 32 Ill. Adm. Code 601.20) after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in Section 340.1055 of this Part.

3) Class C waste is waste that not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in Section 340.1055 of this Part.

c) Classification determined by long-lived radionuclides. If the radioactive waste contains only radionuclides listed in Table 1 of this Section, classification shall be determined as follows:

1) If the concentration does not exceed 0.1 times the value in Table 1, the waste is Class A.

2) If the concentration exceeds 0.1 times the value in Table 1, but does not exceed the value in Table 1, the waste is Class C.

3) If the concentration exceeds the value in Table 1, the waste is not generally acceptable for land disposal.

4) For wastes containing mixtures of radionuclides listed in Table 1, the total concentration shall be determined by the sum of fractions rule described in subsection (g) of this Section.

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| Table 1 |
| Radionuclide | Concentration curies/cubic meter |
| C-14 | 8 |
| C-14 in activated metal | 80 |
| Ni-59 in activated metal | 220 |
| Nb-94 in activated metal | 0.2 |
| Tc-99 | 3 |
| I-129 | 0.08 |
| Alpha emitting transuranic radionuclides with half-life greater than five years | 100 |
| Pu-241 | 3,500 |
| Cm-242 | 20,000 |
| Ra-226 | 100 |

AGENCY NOTE: Units are nanocuries per gram.

d) Classification determined by short-lived radionuclides. If the waste does not contain any of the radionuclides listed in Table 1, classification shall be determined based on the concentrations shown in Table 2 of this Section. However, as specified in subsection (f) of this Section, if radioactive waste does not contain any nuclides listed in either Table 1 or Table 2, it is Class A.

1) If the concentration does not exceed the value in Column 1, the waste is Class A.

2) If the concentration exceeds the value in Column 1 but does not exceed the value in Column 2, the waste is Class B.

3) If the concentration exceeds the value in Column 2 but does not exceed the value in Column 3, the waste is Class C.

4) If the concentration exceeds the value in Column 3, the waste is not generally acceptable for near-surface disposal.

5) For wastes containing mixtures of the radionuclides listed in Table 2, the total concentration shall be determined by the sum of fractions rule described in subsection (g) of this Section.

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| Table 2 |
| Radionuclide | Concentration (curies/cubic meter) |
| Column 1 | Column 2 | Column 3 |
| Total of all radionuclides with less than 5-year half-life | 700 | – | –  |
| H-3 | 40 | –  | –  |
| Co-60 | 700 | –  | –  |
| Ni-63 | 3.5 | 70 | 700 |
| Ni-63 in activated metal | 35 | 700 | 7000 |
| Sr-90 | 0.04 | 150 | 7000 |
| Cs-137 | 1 | 44 | 4600 |

AGENCY NOTE: There are no limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling and disposal will limit the concentrations for these wastes. These wastes shall be Class B unless the concentrations of other radionuclides in Table 2 determine the waste to be Class C independent of these radionuclides.

e) Classification determined by both long- and short-lived radionuclides. If the radioactive waste contains a mixture of radionuclides, some of which are listed in Table 1 and some of which are listed in Table 2, classification shall be determined as follows:

1) If the concentration of a radionuclide listed in Table 1 is less than 0.1 times the value listed in Table 1, the class shall be that determined by the concentration of radionuclides listed in Table 2.

2) If the concentration of a radionuclide listed in Table 1 exceeds 0.1 times the value listed in Table 1, but does not exceed the value in Table 1, the waste shall be Class C, provided the concentration of radionuclides listed in Table 2 does not exceed the value shown in Column 3 of Table 2.

f) Classification of wastes with radionuclides other than those listed in Tables 1 and 2. If the waste does not contain any radionuclides listed in either Tables 1 or 2, it is Class A.

g) The sum of the fractions rule for mixtures of radionuclides. For determining classification for waste that contains a mixture of radionuclides, it is necessary to determine the sum of fractions by dividing each radionuclide's concentration by the appropriate limit and adding the resulting values. The appropriate limits must all be taken from the same column of the same table. The sum of the fractions for the column must be less than 1.0 if the waste class is to be determined by that column. Example: A waste contains Sr-90 in a concentration of 50 Ci/m3 and Cs-137 in a concentration of 22 Ci/m3. Since the concentrations both exceed the values in Column 1, Table 2, they must be compared to Column 2 values. For Sr-90 fraction, 50/150 = 0.33, for Cs-137 fraction, 22/44 = 0.5; the sum of the fractions = 0.83. Since the sum is less than 1.0, the waste is Class B.

h) Determination of concentrations in wastes. The concentration of a radionuclide may be determined by indirect methods such as use of scaling factors which relate the inferred concentration of one radionuclide to another that is measured, or radionuclide material accountability, if there is reasonable assurance that the indirect methods can be correlated with actual measurements. The concentration of a radionuclide may be averaged over the volume of the waste, or weight of the waste if the units are expressed as nano-curies per gram.

(Source: Amended at 29 Ill. Reg. 20841, effective December 16, 2005)