

10A NCAC 15 .1650 CLASSIFICATION/RADIOACTIVE WASTE FOR NEAR-SURFACE DISPOSAL

(a) The following are definitions of and special requirements applicable to the different classes of waste:

- (1) "Class A Waste" means radioactive waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A waste shall meet the minimum requirements set forth in Rule .1651(a) of this Section. If Class A waste also meets the stability requirements set forth in Rule .1651(b) of this Section, it is not necessary to segregate the waste for disposal.
- (2) "Class B Waste" means radioactive waste that must meet more rigorous requirements on waste form to ensure stability after disposal. The physical form and characteristics of Class B waste shall meet both the minimum requirements and stability requirements set forth in Rule .1651 of this Section.
- (3) "Class C Waste" means radioactive 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 human intrusion. The physical form and characteristics of Class C waste shall meet both the minimum requirements and stability requirements set forth in Rule .1651 of this Section.

(b) If the waste contains only radionuclides listed in the table in Subparagraph (b)(5) of this Rule, the licensee shall determine the classification as follows:

- (1) If the concentration does not exceed 0.1 times the value in the table in Subparagraph (b)(5) of this Rule, the waste is Class A waste.
- (2) If the concentration exceeds 0.1 times the value in the table in Subparagraph (b)(5) of this Rule, the waste is Class C waste.
- (3) If the concentration exceeds the value in the table in Subparagraph (b)(5) of this Rule, the waste is not generally acceptable for near-surface disposal.
- (4) For wastes containing mixtures of radionuclides listed in the table in Subparagraph (b)(5) of this Rule, the licensee shall determine the concentration by the "sum of fractions rule" described in Paragraph (f) of this Rule.
- (5) The following is the table of long-lived radionuclides and concentrations for use in conjunction with waste classification rules of this Section:

Radionuclide	Concentration	
carbon 14	8	curies/cubic meter
carbon 14 in activated metal	80	curies/cubic meter
nickel 59 in activated metal	220	curies/cubic meter
niobium 94 in activated metal	0	.2curies/cubic meter
technetium 99	3	curies/cubic meter
iodine 129	0.08	curies/cubic meter
radium, and alpha emitting transuranic radionuclides with half-lives greater than five years	100	nanocuries/gram
plutonium 241	3,500	nanocuries/gram
curium 242	20,000	nanocuries/gram

(c) If the waste does not contain any of the radionuclides listed in the table in Subparagraph (b)(5) of this Rule, the licensee shall use the data for short-lived radionuclides and concentrations in the table in Subparagraph (c)(7) of this Rule to determine the classification as follows:

- (1) If the concentration does not exceed the value in column 1, the waste is Class A waste.
- (2) If the concentration exceeds the value in column 1, but does not exceed the value in column 2, the waste is Class B waste.
- (3) If the concentration exceeds the value in column 2, but does not exceed the value in column 3, the waste is Class C waste.
- (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 the table in Subparagraph (c)(7) of this Rule, the total concentration shall be determined by the "sum of the fractions rule" described in Paragraph (f) of this Rule.

- (6) In determining the waste classifications in Subparagraphs (c)(1) through (5) of this Rule, the licensee may disregard any radionuclides not listed in the tables in Subparagraphs (b)(5) and (c)(7) of this Rule.
- (7) The following is the table of short-lived radionuclides for use in conjunction with the waste classification rules of this Section:

radionuclide	concentration in curies/cubic meter		
	column 1	column 2	column 3
total of all radionuclides with less than 5-year half-life	700	see (c)(8)	see (c)(8)
hydrogen 3	40	see (c)(8)	see (c)(8)
cobalt 60	700	see (c)(8)	see (c)(8)
nickel 63	3.5	70	700
nickel 63 in activated metal	35	700	7000
strontium 90	0.04	150	7000
cesium 137	1	44	4600

- (8) There are no limits established for the radionuclides noted by "see (c)(8)" in the table in Subparagraph (c)(7) of this Rule for Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation or transportation, handling, and disposal will limit the concentrations for these wastes. The licensee shall classify these wastes as Class B, unless the concentrations of other radionuclides in the table in Subparagraph (c)(7) of this Rule dictate classification as Class C waste independent of these radionuclides.
- (d) If waste contains a mixture of radionuclides, some of which are listed in the table in Subparagraph (b)(5) of this Rule and some of which are listed in the table in Subparagraph (c)(7) of this Rule, the licensee shall determine the classification and suitability for near-surface disposal as follows:
 - (1) In accordance with Paragraph (b) of this Rule, determine the class and suitability for near-surface disposal for only the radionuclides in the mixture which are listed in the table in Subparagraph (b)(5) of this Rule;
 - (2) In accordance with Paragraph (c) of this Rule, determine the class and suitability for near-surface disposal for only the radionuclides in the mixture which are listed in the table in Subparagraph (c)(7) of this Rule; and
 - (3) Classify the waste as the more restrictive of the two determinations in Subparagraphs (d)(1) and (d)(2) of this Rule where "not generally suitable for near-surface disposal" is the most restrictive and "Class A" is the least restrictive.
- (e) If waste contains none of the radionuclides listed in the tables in Subparagraphs (b)(5) and (c)(7) of this Rule, the licensee shall determine the waste to be Class A waste.
- (f) When required in Paragraphs (b) and (c) of this Rule, the licensee shall use the "sum of the fractions rule" described in Subparagraph (f)(1) of this Rule.
 - (1) For determining the classification for waste that contains a mixture of radionuclides, the licensee shall determine the sum of the fractions by dividing the concentration of each radionuclide by the appropriate limit, where the appropriate limits shall all be taken from the same column of the same table, and by adding the resultant values. 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.
 - (2) The following is an example calculation:
 - (A) A waste contains strontium-90 with a concentration of 50 curies per cubic meter and cesium-137 with a concentration of 22 curies per cubic meter.
 - (B) Since the concentrations of both exceed the values in column 1 of the table in Subparagraph (c)(7) of this Rule, they must be compared with the values in column 2.
 - (C) The strontium-90 fraction is 50/150 or 0.33, the cesium-137 fraction is 22/44 or 0.5, and the sum of the fractions is 0.83; therefore, since the sum is less than 1.0, the waste is Class B waste.
- (g) Provided that there is reasonable assurance that an indirect method can be correlated with actual measurements, the licensee may determine radionuclide concentrations by indirect methods such as use of scaling factors which relate the inferred concentration of one radionuclide to another that is measured or use of radioactive material accountability

records. The licensee may average a radionuclide concentration over the volume of the waste or over the weight of the waste in the case of radionuclides with nanocurie per gram limits specified in the table in Subparagraph (b)(5) of this Rule.

*History Note: Authority G.S. 104E-7(a)(2);
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