

Content

Title : Regulations on Final Disposal of Low Level Waste and Safety Management of the Facilities **Ch**

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Content : Regulations on Final Disposal of Low Level Waste
and Safety Management of the Facilities

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Chapter 1 General Principles

Article 1 These Regulations are enacted pursuant to Article 21 of the Nuclear

Materials and Radioactive Waste Management Act.

Article 2 The terms used in these Regulations are defined as follows:

1. Solidifying & Packing: refers to transforming the waste into stable solidified waste and encapsulating them into the containers, so as to making the operation of waste packages suitable for loading, unloading, transportation, storage, and disposal.

2. Leaching index: refers to the index of radioactive nuclides' leaching from the solidified waste. Apply the leaching experiment to the solidified waste for ten consecutive times, work out the effective diffusion coefficient of a single nuclide from the experiment data, and work out the common logarithm of the reciprocal of the coefficient to get the mean value of the ten experiments.

3. Final disposal facilities of low level waste (hereinafter shortened as "low level disposal facilities"): refer to the lands, buildings, structures, and equipments used to dispose the low level waste.

4. Multiple barrier: refers to the combination of solidified waste, containers, buffering and backfill materials, engineering structures, and strata as well as natural barriers used by the radioactive waste disposal facilities of to delay the leaching, leakage, and migration of the radioactive nuclides.

5. Disposal control area: refers to the surface and underground space within the range of the disposal facilities of radioactive waste. Permanent monuments or markers shall be set to indicate the borderlines of the disposal control area.

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Chapter 2 Requirements on Final Disposal of Low level Waste

Article 3 According to the concentration of the radioactive nuclides, low level waste is classified as follows:

1. Class A waste: refers to the low level waste the concentration of nuclides of which is not higher than 1/10 of the concentration value in the Annexed Table 1 and not higher than the concentration value in the column 1 of the Annexed Table 2, or

the nuclides contained in which are not listed in Annexed Tables 1 and 2.

2. Class B waste: refers to the low level waste the concentration of nuclides of which is higher than 1/10 of the value listed in the column 1 and not higher than that listed in the column 2 of the Annexed Table 2.

3. Class C waste: refers to the low level waste the concentration of nuclides of which is higher than 1/10 and not higher than the value in the Annexed Table 1, or higher than the value listed in the column 2 but not higher than that listed in the column 3 of the Annexed Table 2.

4. Greater than Class C waste: refers to the low level waste the concentration of nuclides of which is higher than the value in the Annexed Table 1, or higher than the value in the column 3 of the Annexed Table 2.

Article 4 The final disposal of low level waste shall meet the following provisions:

1. Class A waste shall meet the provisions of Article 5. Where Class A waste is disposed together with Class B or C waste, the relevant provisions for Class B or C waste shall be observed.

2. Solidifying & packing shall be performed for Class B waste, and the waste shall meet the provisions of both Article 5 and Article 6. Where Class B waste is disposed together with Class C waste, the relevant provisions for Class C waste shall be observed.

3. Solidifying & packing shall be performed for Class C waste, and the waste shall meet the provisions of both Article 5 and Article 6. Additionally, the engineering design of the disposal area shall be strengthened to ensure the safety of those inadvertent intruders after institutional control period.

4. Greater than Class C waste may not be disposed in the low level disposal facilities waste unless it is approved by the competent authority.

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Article 5 The waste of the low level disposal facilities shall meet the following provisions:

1. The volume of free standing water may not be more than 0.5% of the total volume.

2. Explosion will never occur under normal temperature and normal pressure.

3. Fire endurance shall be provided.

4. No toxic, corrosive or infectious substance is contained.

5. No harmful toxic gas, steam or fume is contained or will be produced.

Article 6 The homogeneous solidifying waste shall meet the following provisions:

1. The single-axis compression strength of cement-solidified waste shall be more than 15kg/cm²; the compression strength of bituminous waste shall be measured by penetration test, and the value of penetration shall be less than 100.

2. The leaching index shall be greater than 6.

3. After the process of water resistance test, the cement-solidified waste shall meet the provisions of Subparagraph 1.

4. After the process of weather resistance test, the provisions of Subparagraph 1 shall be observed.

5. After the process of radiation resistance test, the provisions of Subparagraphs 1 and 2 shall be observed.

6. After the process of bacteria-resistance test, the provisions of

Subparagraph 1 shall be observed.

The items, methods, and standards of the tests referred to in the Subparagraphs 1, 3 of Article 5 and above Subparagraphs are shown in the Annexed Table 3.

Chapter 3 Requirements on the Sites and Design of the Final Disposal Facilities

Article 7 The sites of low level disposal facilities shall meet the following

provisions:

1. Area must be avoided in active faulting or other areas likely to influence the safety of the disposal facilities.

2. Area must be avoided where the geochemical conditions are

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unfavorable for effectively suppressing the diffusion of radioactive nuclides, and it is likely to endanger the disposal facilities.

3. Area must be avoided where the surface and underground hydrographic conditions and geology are likely to endanger the disposal facilities.

4. Area must be avoided in the ecological protection areas that are already known or announced by the government.

5. Area must be avoided in the areas of known important natural resources or announced by the government as national resources.

6. Area must be avoided in the historical protection areas that are known or announced by the government.

7. Area must be avoided in the areas of high population density and development potentials.

Article 8 The design of low level disposal facilities shall ensure the annual

effective equivalent dose caused to a general public outside the facilities are not more than 0.25mSv, and confirm to the as low as reasonably achievable principle.

Article 9 Multiple barriers shall be designed in the low level disposal facilities, and the waste shall be disposed in different sections according to their class.

Article 10 The design of the safety system and component of low level disposal facilities shall meet the following provisions:

1. Inspection, maintenance, and test can be performed.

2. Protective measures can be taken for expectable natural disasters.

3. The function of emergency response shall be provided.

4. The function of mutual substitute or redundant shall be provided.

Article 11 Before the closure of low level disposal facilities, the drainage and

anti-infiltration design shall be able to prevent the waste from contacting with the accumulated water or infiltrated water.

Article 12 The security and alarm design of low level disposal facilities shall

be able to prevent any individual inadvertently intruding into the disposal site and occupying the site.

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Chapter 4 Safety Requirements on Disposal Operation of Low level Waste

Article 13 Once closure of low level disposal facilities, consideration shall be

given to the land reuse after the active institutional controls are removed.

Article 14 After the low level disposal facilities are sealed, the disposal

control

area shall be observed and monitored for not less than five years.

Article 15 The design, manufacturing, installation, test, and maintenance records of the important structures, system, and components of low level disposal facilities shall be retained permanently for reference.

Chapter 5 Supplementary Provisions

Article 16 The operators of low level disposal facilities shall acquire the ownership of or the rights to use the lands in the disposal control areas before to construct the disposal facilities.

Article 17 The operators of low level disposal facilities shall renew the safety

analysis report once every five years during the operation period, and submit the report to the competent authority for review and approval.

Article 18 These Regulations will take effect as of the date of promulgation.

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Annexed Table 1: Concentration Value of Single Long-lived Nuclides

Radionuclide Concentration

14C 0.30 TBq/m³

14C (in activated metal) 3.0 TBq/m³

59Ni (in activated metal) 8.1 TBq/m³

94Nb (in activated metal) 0.0074 TBq/m³

99Tc 0.11 TBq/m³

129I 0.0030 TBq/m³

TRU (Alpha emitting transuranic nuclides with half-life greater than 5 years)

3.7 kBq/g

241Pu 130 kBq/g

242Cm 740kBq/g

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Annexed Table 2: Concentration Values of Single Short-lived Nuclides

Radionuclide Concentration (TBq/m³)

Col. 1 Col. 2 Col. 3

Total of all nuclides with less than

5 year half-life 26 Note 1 Note 1

3H 1.5 Note 1 Note 1

60Co 26 Note 1 Note 1

63Ni 0.13 2.6 26

63Ni (in activated metal) 1.3 26 260

90Sr 0.0015 5.6 260

137Cs 0.037 1.6 170

Note 1: 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 nuclides in Table 2 determine the waste to the Class C independent of these nuclides.

Note 2: Classification of mixtures of radionuclides:

If there are mixtures of radionuclides in the low level waste, the following inequation shall be used to classify them.

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Where,
Ci: the concentration of the No.i nuclide.
Ci,0: the concentration of Class 0 of No.i nuclide (0=A, B, C).
n: the number of the nuclides contained.
If the above inequation is satisfied, then the waste can be classified into
Class 0 (0=A, B, C).

Data Source : Nuclear Safety Commission Laws and Regulations Retrieving System