

## **SRP 1 - "ROAD MAP" FOR REVIEWING LICENSE APPLICATIONS FOR A NEAR-SURFACE LLW DISPOSAL FACILITY UNDER 10 CFR PART 61**

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### **ABSTRACT**

The provisions of 10 CFR Part 61 are used by the Nuclear Regulatory Commission, and followed by Agreement States, to regulate the licensing of near-surface LLW disposal facilities. Part 61 specifies both the content of license applications and the standards to be met for the issuance of a license. NUREG-1200 - Standard Review Plan for the Review of a License Application for a Low-Level Radioactive Waste Disposal Facility (the SRP) specifies procedures and criteria for reviewing license applications. Agreement States and prospective applicants have requested guidance ("a road map") which relates the SRP to Part 61 and to its application in the evaluation of license applications. SRP 1 - "The Licensing Process" has been added to the SRP to respond to this request. SRP 1 describes the licensing process and relates specific SRPs to specific provisions of Part 61.

### **DEVELOPMENT OF REGULATIONS FOR LOW-LEVEL RADIOACTIVE WASTE DISPOSAL**

The Nuclear Regulatory Commission's regulation in 10 CFR 61 - Licensing for the Land Disposal of Radioactive Waste first became applicable to prospective low-level radioactive waste (LLW) disposal facility licensees on January 26, 1983. Four years later, in January, 1987, the NRC published the first editions of two related documents: NUREG-1199 - Standard Format and Content of a License Application for a Low-Level Radioactive Waste Disposal Facility (the SFC) and NUREG-1200 - Standard Review Plan for the Review of a License Application for a Low-Level Radioactive Waste Disposal Facility (the SRP) to guide the preparation and review, respectively, of applications submitted under 10 CFR Part 61 for the construction and operation of near-surface LLW disposal facilities. Both documents follow identical structures addressing in detail 67 topics in eleven chapters. A partial list of concerns addressed include operator qualifications and management capabilities; site investigations, design, and construction; operating practices; quality assurance and financial assurances. Soon after the publication of these documents, Agreement State regulators and potential site operators requested assistance from NRC in understanding how each review requirement was related to a specific provision of Part 61 and how those review provisions were meant to be applied. Regulators and potential licensees alike asked NRC for a "road map" for using the SRP.

### **DEVELOPMENT OF THE ROAD MAP**

In response to these requests, the Commission directed the staff to prepare a "road map" that would:

1. Discuss the internal connections and relationships of Part 61;
2. Show how the findings required for the issuance of a license under 10 CFR 61.23 satisfy the performance objectives of 10 CFR 61.41-44 and other conditions required for the issuance of a license; and
3. Demonstrate how the evaluations of the SRP contribute to making the findings required under 10 CFR 61.23.

The resulting "road map" was designated SRP 1 - "The Licensing Process", and added to the SRP as a bridging chapter between the "Preface" and the first chapter of individual reviews. The first public draft of SRP - 1 was distributed for comment by Agreement States in late 1991 in a package which also contained drafts of revisions to some previously published sections of the SRP. The proposed revisions to published review sections included clarifications related to surface water hydrology, design of below ground vaults and earth mounded concrete bunkers, site operations and associated measures for radiation protection, quality assurance, and provision of financial assurances. Final SRP modifications responding to the comments received are nearly complete, and will be included in an SRP revision scheduled for publication in September.

### **CONTENT OF SRP 1 - "THE LICENSING PROCESS"**

SRP 1 begins by discussing the hierarchical approach to regulation of LLW disposal and the essential role played by 10 CFR Part 61 in a hierarchy that extends from Federal statutes at the top to information, at the base, about actions proposed by the applicant to achieve conformance with the requirements of the statutes. The "road map" then discusses the process followed in reviewing a license application and includes graphics which illustrate the flow of information from applicant to regulator. Although dialogue between applicant and regulator is recognized to occur throughout the process, the multiple paths such dialogue might follow are, for simplicity, omitted from the flow charts even though the essential contribution of such dialogue to mutual understanding is fully recognized. SRP 1 contains a review of those sections of 10 CFR Part 61 which directly affect licensing, showing by a diagram how the elements of information required for a license application respond to specific standards for the issuance of a license, and it contains a matrix which relates specific requirements of 10 CFR Part 61 to the individual review plans within the SRP which singly or in combination satisfy those Part 61 requirements.

### **THE HIERARCHICAL APPROACH TO REGULATION OF LLW DISPOSAL**

10 CFR Part 61 is a central component within a hierarchical structure for regulating the disposal of LLW; a structure

which has, at its apex, the obligation to satisfy Federal statutes governing civilian uses of nuclear energy, and at its foundation, a description by the applicant of the plans and procedures by which it intends to support the achievement of the legislative goals of the Atomic Energy Act and subsequent legislation which stand at the apex. Intervening levels of the hierarchy include the performance objectives and licensing standards of 10 CFR Part 61 and the guidance provided by NRC through its publications and through direct assistance to applicants. See Fig. 1. In this hierarchical structure, the goals project downward, while the applicant's actions must support the goals.

#### HIERARCHICAL APPROACH TO LICENSING LLW DISPOSAL

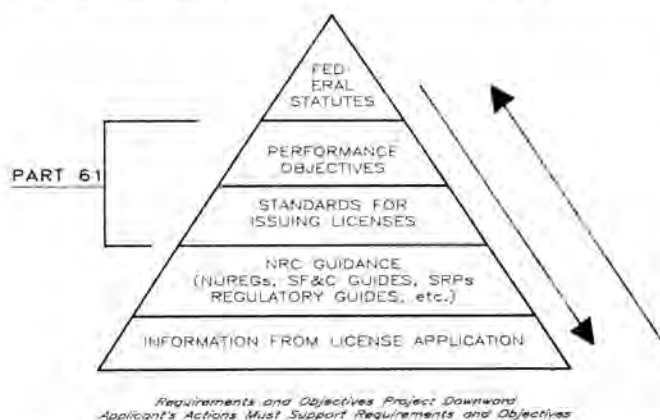


Fig. 1. Hierarchical approach to licensing LLW disposal.

#### OPERATION OF THE LICENSING PROCESS

Evaluation of an application under 10 CFR Part 61 encompasses both administrative processes and technical review. The administrative processes are themselves described in NUREG-1274 - Review Process for Low-Level Radioactive Waste Disposal License Application Under Low-Level Radioactive Waste Policy Amendments Act. Those administrative processes concern eligibility for participation in the review process by outside groups such as Indian tribes, opportunities to comment upon review reports, and presentation of appeals. Their discussion exceeds the intended technical scope of SRP 1 although their importance is acknowledged. For the operation of the technical aspects of the review, Fig. 2 illustrates the flow of information that occurs beginning with the pre-submittal activities of the applicant and terminates with a licensing decision by the regulatory authority. As already noted, only the primary routes of information flow, from applicant to regulator, are shown. Questions, responses, counter-questions and feedback occur everywhere in the process, but for clarity are not depicted in Fig. 2.

Examination of Fig. 2 shows that once the applicant has collected, analyzed, and presented its data, it must prepare and submit to NRC two reports in parallel, the safety analysis report (SAR) required by 10 CFR 61.10 and the environmental report (ER) required by 10 CFR 51.45. Both reports are subject to preliminary acceptance review and verification, and once accepted, are then reviewed formally under NUREG-1200, the SRP for radiological safety, and NUREG-1300, Environmental Standard Review Plan for the Review of a

License Application for a Low-Level Radioactive Waste Disposal Facility. The findings under each separate review are assembled by the regulator into the safety evaluation report (SER) required by 10 CFR 61.23 and the environmental impact statement (EIS) required under 10 CFR 51.70 through 10 CFR 51.97. It is important to note that satisfaction of the requirement for preparation of an EIS is in itself a requirement of 10 CFR 61.23(l). Under the administrative procedures described by NUREG-1274, there are opportunities for review of these documents in the draft state before they are finalized. All stages of the review for radiological safety - the SAR, the radiological safety review under the SRP, and the final SER - must take guidance from, and be responsive to, the performance objectives set out in 10 CFR 61.41 through 10 CFR 61.44. After NRC completes work on the SER and the EIS, it may make its decision on the issuance of a license. Under administrative procedures, there are opportunities for review and appeal of the licensing decision.

#### INTER-RELATIONSHIPS WITHIN 10 CFR PART 61

Among their requirements, the Commission directed the staff to discuss the internal connections and relationships of Part 61, and to show how the findings required for the issuance of a license under 10 CFR 61.23 satisfy the performance objectives and other conditions for the issuance of a license.

Figure 3, and Table I which accompanies it, respond to these requirements. Figure 3 shows the correlations between the regulatory requirements for preparation, submittal and review of a license application, and Table I supplements Fig. 3 by itemizing additional technical, administrative, financial and environmental requirements which cannot be conveniently shown on Fig. 3.

In 10 CFR Part 61, Sections 61.10 through 61.16 describe the required contents of the SAR which is prepared by the applicant, and sections 61.23(a) through 61.23(l) describe the requirements for the issuance of a license which must be shown to be satisfied by the SER which is prepared by the regulator. Figure 3 shows that for every requirement for information in the SAR there is a counterpart standard for the issuance of a license which must be satisfied in the SER, and that both the SAR and the SER must take guidance from the performance objectives of sections 61.41 through 61.44. The importance of the performance objectives is reinforced by their repetition in sections 61.23(b) through 61.23(e). In addition, sections 61.23(f), 61.23(g) and 61.23(h) further specify additional technical, institutional and financial requirements which are detailed in sections 61.50 through 61.57, 61.59, and 61.61 through 61.63 respectively; and sections 61.23(i), 61.23(j), and 61.23(l) specify other parts of Chapter 10 of the Code of Federal Regulations which address physical security, criticality safety and environmental matters which must also be satisfied. Table I itemizes these additional requirements.

Figure 3 and Table I thus show how the sections of 10 CFR Part 61 are related internally, and how individual requirements for information to be included in a license application correspond to specific standards for the issuance of a license which must be satisfied.

#### CORRELATION OF INDIVIDUAL SRPs TO PART 61 REQUIREMENTS

Because individual SRPs address details of facility planning, construction, operation and closure they are issue-oriented in contrast to the licensing standards of 10 CFR 61.23

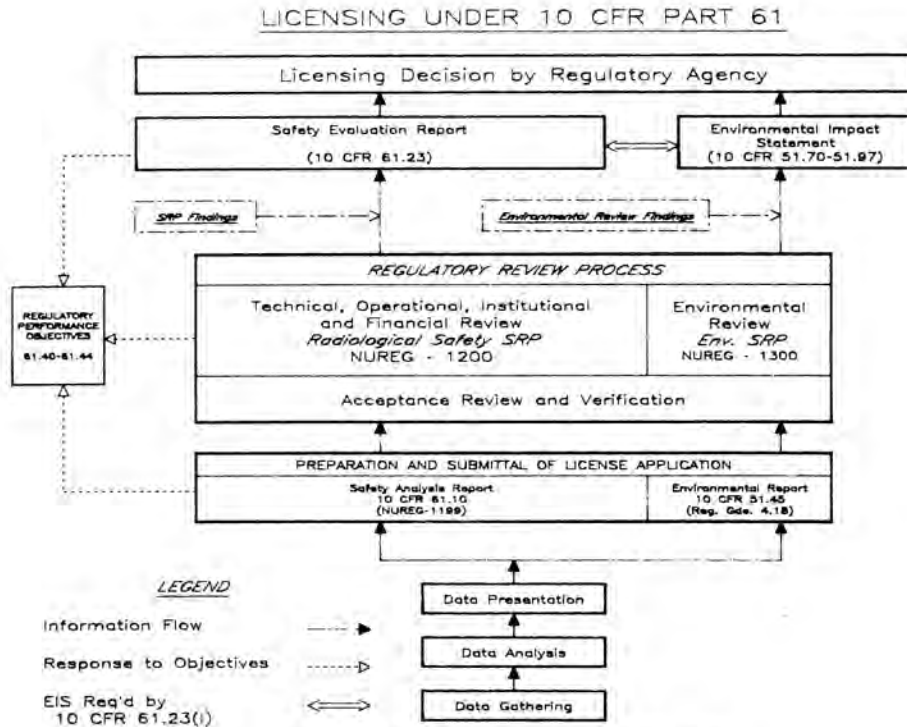


Fig. 2. Licensing under 10 CFR Part 61.

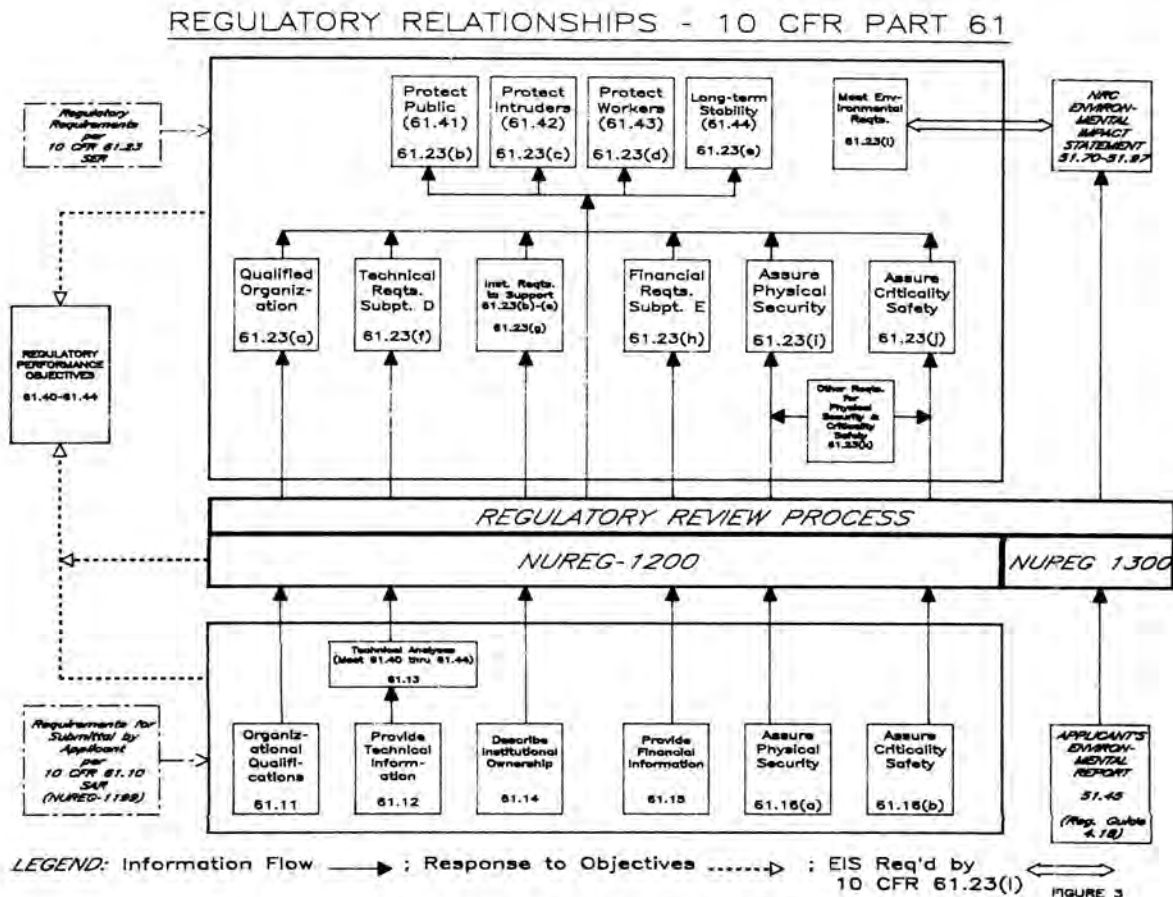


Fig. 3. Regulatory relationships - 10 CFR Part 61.



**TABLE I**  
Internal Relationships Within 10 CFR Part 61 and Significant External References  
Citations in 10 CFR 61

	Safety Analysis (By Applicant)	Safety Evaluation Report (By NRC)	Expanded Requirements	Subject of Expanded Requirements
Organizational Information	61.11	61.23(a)		
Technical Information & Analysis	61.12	61.23(f)	61.50	Site Suitability
	61.13	61.51		Site Design
			61.52	Operation and Closure
			61.53	Environmental Monitoring
			61.55	Waste Classification
			61.56	Waste Characteristics
			61.57	Labeling
Institutional Information	61.14	61.23(g)	61.59	Institutional Requirements
Financial Information	61.15	61.23(h)	61.61	Applicant Assurances
			61.62	Funding for Closure
			61.63	Funds for Inst. Controls
Physical Security	61.16(a)	61.23(i)	10 CFR 73	Physical Protection
Criticality Safety	61.16(b)	61.23(j)	10 CFR 70.24	Criticality Requirements
Environmental Impact	61.12	61.23(l)	61.53	Environmental Monitoring
			10 CFR 51	Environmental Protection

which are general and broad scale in their coverage. As a consequence, the relationships of specific SRPs, individually or in combination, to any licensing requirement of Part 61 to which they respond may not always be readily apparent. Identification of the relationships between individual sections of the SRP and those performance objectives and standards for the issuance of a license is reviewed below.

For the reviewing staff to concur that the standards for issuance of a license have been met, the requirements of 10 CFR 61.23 must be met in totality. Because the individual SRPs are sharply focused, any one may address some or all of the requirements of 10 CFR 61.23, or alternatively, it may address only portions of one or more requirements. In such cases, combined successful reviews under several individual SRPs may ultimately be necessary for any single requirement to be fully satisfied. Figure 4 visually demonstrates the relationships among the individual requirements of Part 61 and the individual SRPs needed to satisfy them. *(Please note that Fig. 4 is a current draft working document still under review within NRC; the final working document, along with other proposed revisions to NUREG-1200, will formally be made available for public comment by a Notice of Availability which will be published in the Federal Register.)*

In Fig. 4, entries in the left and right margins identify each individual SRP review. The headings across the top of Fig. 4 identify those provisions of Part 61 that affect licensing review; Table II describes the topics covered by those Part 61 provisions. Individual sub-sections are listed where each has an identifiable effect on licensing and is addressed by an individual SRP; where several sub-sections of 10 CFR Part 61 oper-

ate together to produce a unified requirement and can be addressed by a single SRP, only the entire section is identified. Where an individual Part 61 section does not contain a condition requiring review under the SRPs, as for example, protection of the civil rights of employees and rules for participation of States and Indian Tribes in licensing review, it has been omitted from Fig. 4. An "X" at the intersection of a row (related to an SRP) with a column (related to a provision of Part 61) indicates the existence of a relationship where the SRP responds directly to the stated requirement. An "O" indicates an implicit or indirect, but nonetheless important relationship.

Where more than one SRP is identified under any section of Part 61, those SRPs must be taken together to satisfy that regulatory provision; where one SRP is identified with more than one provision of Part 61, that SRP contributes to the satisfaction of each of the Part 61 requirements identified. The presence of multiple markings in a column or row, respectively, demonstrates an interrelationship among several SRPs which may be needed to satisfy an individual provision of Part 61; or alternatively, the capability of one SRP to address more than one provision of Part 61.

#### SUMMARY

SRP 1 discusses NRC's hierarchical approach to licensing LLW disposal facilities, the operation of the licensing process, the internal relationships within Part 61, and the relationships between the requirements of Part 61 and the individual issue-oriented evaluations of the SRP, NUREG-1200.

**TABLE II**  
Topic Summary of 10 CFR Part 61 Provisions Which Affect Licensing

**Subpart B - Licenses**

- § 61.10 Content of application
- § 61.11 General information
  - a. Identity of the applicant.
    - 1. Applicant data.
    - 2. Partnership data.
    - 3. Corporate data.
    - 4. Agent data.
  - b. Qualifications of the applicant.
    - 1. Organizational structure.
    - 2. Technical qualifications.
    - 3. Personnel training program.
    - 4. Staffing plan.
  - c. Description of site and planned operations.
    - 1. Location.
    - 2. Character of activities.
    - 3. Types and quantities of wastes to be managed.
    - 4. Plans for land use other than waste disposal.
    - 5. Facilities and equipment.
  - d. Proposed schedules for construction, receipt, and first disposal of waste.
- § 61.12 Specific technical information - to demonstrate that performance objectives of Part C and technical requirements of Subpart D will be met.
  - a. Description of natural and demographic site characteristics.
  - b. Description of design features.
  - c. Description of design criteria and relation to performance objectives.
  - d. Description of design basis natural events and relation to performance objectives.
  - e. Description of applicable codes and standards.
  - f. Description of construction and operation of proposed facility.
  - g. Description of site closure plan.
  - h. Identification of known natural resources at site.
  - i. Description of radioactive material to be disposed at site.
  - j. Description of QA/QC program to be employed.
  - k. Description of radioactive safety and monitoring program for on-site activities.
  - l. Description of program for monitoring and remediation of off-site (environmental) radioactivity.
  - m. Description of administrative procedures for control of facility.
- § 61.13 Technical analysis - to demonstrate that the performance objectives of Subpart C will be met.
  - a. Demonstrate reasonable assurance that exposure limits of § 61.41 will not be exceeded.
  - b. Demonstrate reasonable assurance of protection of individuals against inadvertent intrusion.
  - c. Demonstrate reasonable assurance of protection of individuals during operations.
  - d. Demonstrate reasonable assurance that there will not be a need for ongoing active maintenance after site closure.
- § 61.14 Institutional information
  - a. Certification by Federal or State government owner that it is prepared to accept post-closure license transfer and assume responsibility for custodial care.
  - b. When site is not owned by Federal or State government, evidence that arrangements have been made for such ownership in fee.
- § 61.15 Financial information - to demonstrate financial ability to operate site and to meet requirements of Subpart E.
- § 61.16 Other information
  - a. Physical security for special nuclear material.
  - b. Criticality safety
- § 61.21 Elimination of repetition - previously supplied information may be incorporated by reference.
- § 61.23 Standards for issuance of a license - the Commission must find that issuance of a license will not be inimical to the common defense and security and will not constitute an unreasonable risk to the health and safety of the public and
  - a. The applicant is qualified by training and experience;
  - b. The performance objectives of § 61.41 will be met;
  - c. The performance objectives of § 61.42 will be met;

TABLE II, CONT'D

- d. The performance objectives of § 61.43 will be met;
- e. The performance objectives of § 61.44 will be met;
- f. There is reasonable assurance that the technical requirements of Subpart D will be met;
- g. There is reasonable assurance that institutional control will persist for the time required to ensure the findings of (b) through (e), above, and that the institutional requirements of § 61.59 will be met;
- h. Financial information meets the requirements of Subpart E;
- i. Physical security for special nuclear material will meet the requirements of 10 CFR Part 73;
- j. Criticality safety for special nuclear material will meet the requirements of 10 CFR 70.24;
- k. Additional information required by the Commission under § 61.16 is adequate; and
- l. The requirements of Subpart A of 10 CFR 51 have been met.

§ 61.24 Conditions of licenses

- h. The Commission may incorporate in any license additional requirements as deemed appropriate.

**Subpart C - Performance Objectives**

§ 61.41 Establishes annual dose limits for radioactive releases to the public.

§ 61.42 Requires protection of inadvertent intruders after removal of institutional controls.

§ 61.43 Site operations must conform to standards for radiation protection set out by 10 CFR Part 20.

§ 61.44 Long-term stability must be achieved after closure.

**Subpart D - Technical Requirements for Land Disposal Facilities**

§ 61.50 Disposal site suitability requirements for land disposal

- a. Disposal site suitability for near surface disposal
  1. Primary emphasis given to isolation of wastes and achievement of long-term performance objectives.
  2. The disposal site shall be capable of being characterized and modelled.
  3. Site to be located so the future population growth and development will not affect achievement of performance objectives.
  4. Sites must avoid locations with exploitable natural resources.
  5. Site must be well-drained and free of flooding or ponding.
  6. Upstream drainage areas must be minimized.
  7. Site shall not permit groundwater intrusion.
  8. No surface discharge from hydrogeological disposal unit within disposal site.
  9. Areas with sub-surface geological activity which could affect achievement of performance objectives must be avoided.
  10. Areas with surface geological activity which could affect achievement of performance objectives must be avoided.
  11. Site must not be located where nearby activities could mask monitoring program.

§ 61.51 Disposal site design for land disposal

- a. Disposal site design for near surface disposal
  1. Design must be directed toward long-term isolation and avoidance of maintenance after closure.
  2. Site design and operation must be compatible with closure and long-term stability.
  3. Site design must complement site natural characteristics to secure achievement of performance objectives.
  4. Covers must be designed to minimize infiltration and resist degradation.
  5. Surface features must be designed to prevent erosion.
  6. Site must be designed to minimize contact of waste with water.

§ 61.52 Land disposal facility operation and disposal site closure

- a. Near surface disposal facility operation and disposal site closure
  1. Unstabilized Class A wastes must be segregated.
  2. Class C wastes must have a minimum cover of 5 meters or be placed behind a 500-year intruder barrier.
  3. All wastes must be disposed of in accordance with paragraphs 4 through 11, below.
  4. Package integrity must be maintained and void spaces filled.
  5. Void spaces must be filled to reduce future subsidence.
  6. Wastes must be placed to limit surface radiation to levels specified by 10 CFR 20.
  7. Boundaries and locations of disposal units must be mapped.
  8. A buffer zone adequate for monitoring and remediation must be maintained.
  9. Approved closure plans must be applied to each disposal unit as it is filled.
  10. Active disposal units must not adversely impact closed disposal units.
  11. Only waste containing radioactive materials shall be disposed of at the site.

## TABLE II, CONT'D

## § 61.53 Environmental monitoring

- a. Applicant must conduct pre-operational monitoring prior to submission of application.
- b. Licensee must have plans for correction of migration of radionuclides.
- c. Monitoring must be conducted during operational phase.
- d. The licensee shall maintain a monitoring system following closure of the site.

## § 61.55 Waste classification

## § 61.56 Waste characteristics

- a. Minimum requirements for all classes of waste to provide health and safety of personnel at waste site.
- b. Requirements for stability of waste.

## § 61.57 Each package must be labeled as Class A, B or C.

## § 61.59 Institutional ownership

- a. Land ownership - Disposal is permitted only on land owned in fee by the Federal or a State government.
- b. Institutional control - Land owner or custodial agency must control site access; institutional control cannot be relied on for more than 100 years.

**Subpart E - Financial Assurances**

## § 61.61 Applicant qualifications and assurances

## § 61.62 Funding for disposal site closure and stabilization

## § 61.63 Financial assurances for institutional controls







