DRAFT

10 CFR PART 61: DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE AND LOW-ACTIVITY BULK SOLID WASTE

This is a preliminary draft of 10 CFR Part 61, prepared by the staff of the Nuclear Regulatory Commission. 10 CFR Part 61 will set out the licensing procedures, performance objectives and technical criteria for disposal of low-level waste into a disposal facility sited on land.

11/5/79

10 CFR Part 61: Disposal of Low-Level Radioactive Waste and Low-Activity Bulk Solid Waste

		Page
SUBPART A:	GENERAL PROVISIONS	
61.10	Purpose	1
61.12	Scope	1
61.14	Definitions	2
61.16	Communications	11
61.18	Interpretations	11
61.20	General disposal requirement	11
61.22	Exemptions	12
SUBPART B:	LICENSE APPLICATION AND ACTIONS ON APPLICATION	
61.24	Activities requiring license	12
61.26	Notice of intent	13
61.28	Application for licensee--financial information	15
61.30	Application for licensee--safety and environment report	18
61.32	Application for license--site operations manual	25
61.34	Application for license--site closure and decommissioning plan	25
61.36	Filing of applications for licenses; oath or affirmation	26
61.38	Public inspection of application	28
61.40	Elimination of repetition	28
61.42	Updating of application	28

Page

SUBPART C: PARTICIPATION BY STATE GOVERNMENTS

61.44 Early notice..... 29

61.46 Filing of proposal for State participation..... 29

61.48 Approval of proposal..... 31

61.50 Assistance to Agreement States..... 32

SUBPART D: CONDITIONS AND ACTIONS ON LICENSE

61.52 Issuances of licenses..... 33

61.54 Receipt of waste..... 36

61.56 General license conditions..... 37

61.58 Specific license conditions..... 39

61.60 Changes, tests, and experiments..... 40

61.62 License renewals..... 42

61.64 Amendment of license..... 43

61.66 Application for closure..... 44

61.68 Post-closure observation and maintenance..... 45

61.70 Termination of license..... 46

SUBPART E: TESTS, INSPECTION, AND ENFORCEMENT

61.72 Tests at licensed disposal facilities..... 47

61.74 Commission inspections of disposal facilities..... 47

61.76 Violations..... 48

Page

SUBPART F: MANIFESTS, RECORDS, REPORTS, QUALITY ASSURANCE, AND AUDITS

61.78 Manifests..... 48

61.80 Maintenance of records and reports..... 50

61.82 Quality assurance program..... 52

61.84 Audit requirements for disposal facility operators..... 53

SUBPART G: WASTE PERFORMANCE

61.86 Waste form, packaging, and content..... 53

61.88 Volume reduction..... 57

61.90 Chemical content of LLW..... 57

SUBPART H: TECHNICAL REQUIREMENTS FOR AN LLW DISPOSAL FACILITY

61.92 Purpose..... 57

61.94 Long-term performance objectives..... 58

61.96 Site suitability..... 60

61.98 Facility design and operation..... 63

61.100 Segregation of waste..... 68

61.102 Environmental monitoring-applicant..... 69

61.104 Site closure and stabilization..... 71

SUBPART I: PHYSICAL SECURITY

61.106 Physical security..... 72

Page

SUBPART J: REQUIREMENTS ON WASTE PROCESSORS AND INDEPENDENT WASTE PROCESSORS

61.108 Purpose and scope..... 74

61.110 General requirements..... 74

61.112 Operating procedures..... 74

61.114 Tests..... 75

61.116 Audits..... 76

61.118 Additional requirements on independent waste processors..... 76

SUBPART K: DISPOSAL OF LOW-ACTIVITY BULK SOLID WASTE..... 77

Attachment:

Draft Technical Basis for Supporting Additional Technical Criteria and Regulatory Guides to Implement this Part for Land Burial of LLW.

61.10 Purpose.

The regulations contained in this part are issued pursuant to the Atomic Energy Act of 1954, as amended and the Energy Reorganization Act of 1974 and:

(a) Establish the requirement and performance objectives for management and disposal of low-level radioactive wastes (LLW) into a disposal facility sited on land; establish the procedures and criteria for the issuance of licenses to receive, possess, and dispose of low-level waste; establish and provide the terms and conditions upon which the Commission will issue such licenses; and establish criteria for low-level waste form, content, and performance for acceptance by a licensee for disposal.

(b) Establish requirements on process controls, measurements, recordkeeping, reporting, and auditing for licensees who process LLW in order to place the LLW into a form acceptable for disposal into an LLW disposal facility.*

(c) Establish requirements on siting, constructing, operating, closing, and finanacing a facility for disposing of low-activity bulk solid waste.

61.12 Scope.

(a) Except as provided in Section 61.22 (Exemptions) and in Part 150 of this chapter, the regulations in Subparts A through I, inclusive, apply to all persons who receive, possess, and dispose of LLW into an LLW disposal facility.

Note: Parts 30, 40, 50 and 70, will be revised to require licensees to describe their programs for meeting the criteria set forth in this Part.

(b) The regulations in Subpart J of this part apply to all persons who produce or process LLW and transfer such waste to an LLW disposal facility for disposal.

(c) The regulations in Subpart K of this part apply to all persons who receive, possess and dispose of low-activity bulk solid waste.

61.14 Definitions.

"Act" means the Atomic Energy Act of 1954 (68 Stat. 919), including any amendments thereto.

"Agency" means the Environmental Protection Agency (EPA) or its duly authorized representatives.

"Agreement State" means any State with which the Atomic Energy Commission or the Nuclear Regulatory Commission has entered into an effective agreement under subsection 274(b) of the Act.

"Alternative sites" are those candidate sites which are specifically compared to the proposed site.

A "buffer zone" means the real property controlled by the licensee, which is not used for waste disposal purposes, but which completely encompasses the area used by the licensee for waste disposal.

"Byproduct material" means byproduct material as defined in the regulations contained in Part 30 of this chapter.

"Candidate sites" are those sites within the region of interest, considered in the comparative evaluation of sites for a low-level waste disposal facility, that are judged to be among the best that can reasonably be found for the siting of a low-level waste disposal facility.

"Commission" means the Nuclear Regulatory Commission and its duly authorized representatives.

"Commencement of construction" means any clearing of land, excavation, or other substantial action that would adversely affect the natural environment of a site but does not include necessary borings or other tests to determine site characteristics or other preconstruction monitoring to establish background information related to the suitability of a site or to the protection of environmental values.

"Department" means the Department of Energy (DOE) or its duly authorized representatives.

"Decommissioning" of an LLW disposal facility means the final operational activities carried out at a disposal facility after completion of active waste receipt and disposal operations to:

(1) Dismantle site structures.

(2) Decontaminate site surfaces and remaining structures;

(3) Conduct final closure and stabilization of the site (facility) and emplaced LLW; and

(4) carry out any other activities to prepare the site for postoperational care and transfer to the site owner (including an observation period and transfer of all funds set aside for post-operational activities).

"Dewatering" refers to a specific process to drain, siphon or otherwise remove contained water from resins, slurries, or sludges

"Director" means the Director of the Office of Nuclear Material Safety and Safeguards."

"Disposal" means confinement, permanent isolation, or removal of radioactive waste from mankind and his environment with no provisions made for subsequent retrieval.

"Engineered barriers" are man-made devices to contain or limit the movement of waste material from an LLW facility. Engineered barriers may include, for example, waste forms, waste packages, means to restrict the contact of water with the waste material, or means to retard the movement of the waste by water.

An "environmentally preferred alternative site" is an alternative site at which the adverse environmental impacts are sufficiently less than at the proposed site that environmental preference for the alternative site can be established.

"Free liquid" is uncombined liquid not bound by the solid matrix of a solid waste mass.

A "free-standing" waste form is one with a definite volume and shape, bounded by a stable surface of distinct outline on all sides and capable of retaining its structural integrity without need of a container.

"Funding for Decommissioning, Post-Operational Maintenance, Surveillance and Monitoring" means the amount of money that must accrue during the operational life of a disposal facility to provide sufficient funds for decommissioning and for routine post-operational surveillance and monitoring activities. It also includes the amount of cash reserves and performance bonds which should be available to finance corrective actions at a site both during and after operations.

"Institutional controls" are activities or devices which involve the performance of functions by human beings to limit contact between the waste and humans.

"Leaching" is the process of removal or separation of soluble components from a solid by contact with water or other liquids.

"License" means a license issued under the regulations in Parts 30, 40, 50. 60, 61, or 70 of this chapter. "Licensee" means the holder of such license.

"Low-activity bulk solids" waste means any source, byproduct, or special nuclear material that is characteristically (1) homogeneously dispersed in small concentrations throughout large volumes of inert material, and (2) difficult to appreciably concentrate or reduce in volume. Low-activity bulk solid waste includes waste materials such as slags or tailings from nuclear fuel fabrication plants, for example, but does not include uranium mill tailings or combustible material such as papers or rags.

"Low-Level Waste (LLW) or "Low-Level Radioactive Waste" means any source, byproduct, or special nuclear material that: (1) meets waste acceptance criteria of Subpart G, (2) may be processed to a form meeting the acceptance criteria of subpart G, and (3) may be received for disposal into an LLW disposal facility.

LLW does not include:

(a) high-level waste, as defined in Appendix F of Part 50 of this chapter;

(b) irradiated nuclear reactor fuel;

(c) uranium mill tailings, as defined in Part 40 of this Chapter;

(d) waste material containing or contaminated with radionuclides in concentrations exceeding the concentrations allowed by the Commission in waste to be disposed of as LLW;

(e) Radioactivity in effluents released to unrestricted areas and to sanitary sewer systems as defined in Sections 20.106 and 20.303 of Part 20 of this chapter.

(f) Low-activity bulk solid waste.

"Natural Barriers" include the natural characteristics of a disposal facility site or surface and subsurface composition that serves to impede the movement of waste material. Natural barriers may include, for example, the location of the waste remote from an aquifer, or the sorptive capability of the soil surrounding the waste.

"Person" means (1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, Government agency other than the Commission or the Department, except that the Department shall be considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to the Section 202 of the Energy Reorganization Act of 1974 (88 Stat. 1244), any State or any political subdivision of or any political entity within a State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and (2) any legal successor, representative, agent or agency of the foregoing.

The "proposed site" is the candidate site selected and submitted by the applicant to NRC as the proposed location for a low-level waste disposal facility.

"Post-Operational Maintenance" means the activities conducted at an LLW disposal facility site after its decommissioning and prior to transfer to a custodial agency to ensure that the facility continues to safely contain the emplaced wastes.

"Reconnaissance level information" is any information or analysis that can be retrieved or generated without the performance of new, comprehensive, site-specific investigations. Reconnaissance level information includes relevant scientific literature, reports of government or private research agencies, consultation with experts, short-term field investigations, and analysis performed using such information. The amount of reconnaissance level information required and the extent of analyses should be matched to (1) the importance and magnitude of the potential impact and (2) whether the decision is one of identifying a region of interest, identifying candidate sites, or selecting a proposed site.

"Region of interest" is the geographic area considered in searching for candidate sites.

"Segregation of waste" means the actions taken by the applicant to (1) identify the characteristics of the as-received LLW, including the waste type, form, chemical content, and radionuclide content and concentration, and (2)

direct the LLW to separate disposal methods or separate storage and disposal locations within the facility as may be required to assure safety and compliance with paragraph 61.94 (Long-term performance objectives).

"Site" means the real property, including the buffer zone, on which an LLW disposal facility may be located. A site used for an LLW disposal facility includes a boundary and a buffer zone and the property controlled by the licensee.

"Site characterization" means the program of exploration and research, both in the laboratory and in the field, undertaken to establish the ranges of those parameters used to determine the suitability of a particular site as compared to the criteria of Section H of this part. Site characterization may include borings, surface excavations, excavation of exploratory shafts, subsurface lateral excavations and borings, and in-situ testing; but does not include construction.

"Site design" means the method(s) used by the operator for effective utilization of the site including layout, construction and preparation, surface grading, drainage, or other engineering improvements and controls.

"Site monitoring" means the procedures for the monitoring of the site and environment to assess quality of site operations and performance and to detect and quantify levels and types of radioactivity in the environment. A specific site program stipulates the types of samples, points at which samples are taken, the frequency of sampling and types of analyses conducted on samples to

verify the effectiveness of a site and operations to safely contain the waste disposed of at the site. It includes preoperational, operational, and post-operational phases.

"Site operations" means the routine day-to-day activities carried out by the site operator for the receipt, storage, treatment, and disposal of waste.

"Site suitability" means the capability of the various physical, chemical, hydrological, geological, and other characteristics of a disposal site to safely contain the radioactive waste expected to be disposed of at the site based on an analysis of the characteristics.

The "s[illegible]ce of candidate sites" is comprised of the proposed site and all (at least 3) alternative sites.

"Source material" means source material as defined in the regulations contained in Part 40 of this chapter.

"Special nuclear material" means special nuclear material as defined in the regulations contained in Part 70 of this chapter.

"Terminate a license" means action by the commission to relieve the licensee of any further legal responsbility for the site.

"Waste solidification" means conversion of waste to an essentially dry and chemically, thermally, biologically, and radiolytically stable solid

having the capability of restricting the mobility of the radioactive waste both within and away from the solid matrix.

61.16 Communications.

Except where otherwise specified, all communications and reports concerning the regulations in this part and applications filed under them should be addressed to the Director, Division of Waste Management, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Communications, reports, and applications may be delivered in person to the Commission's offices at 1717 H Street, NW, Washington, DC or 7915 Eastern Avenue, Silver Spring, Maryland.

61.18 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be considered binding upon the Commission.

61.20 General disposal requirement.

(a) No person may receive, possess, process, transfer, or dispose of low-level waste except:

(1) As provided in the regulations in this part and in Part 20;

(2) By transfer to an authorized recipient as provided in the regulations in Parts 30, 40, 50, 60, 70, and 150 of this Chapter, whichever may be applicable.

(b) LLW disposal facilities shall only be sited on land owned by the Federal or State government. The disposal facility shall include a buffer zone which shall completely surround the area of the emplaced waste and shall also be owned by the State or Federal Government. In the case of any sites currently owned by the State prior to termination of the disposal facility license, the title to and the responsibility for the site shall be transferred to the Federal government,* unless other arrangements are established between the Federal and State government and the applicant.

61.22 Exemptions.

The Commission may, upon application by any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest.

SUBPART B: LICENSE APPLICATION AND ACTIONS ON APPLICATION

61.24 Activities requiring license.

Except for persons exempt as provided in paragraph 61.22 this part and in Part 150 of this chapter, no person shall receive, possess, and dispose of low-level waste except as authorized in a specific license issued pursuant to

*This will require Authorizing Legislation by Congress

the regulations in this chapter. Specific licenses are issued to named persons upon applications filed pursuant to the regulations in this part and other parts of the regulations in this chapter.

61.26 Notice of intent.

(a) The applicant shall provide NRC staff with a "notice of intent" to tender an application for a license for a low-level waste disposal facility either:

(1) at least three (3) months before tendering the application, or

(2) at least three (3) months before beginning detailed studies on environmental impact and site safety at the proposed site, whichever occurs earlier.

(b) If an applicant fails to provide a notice of intent within the time specified, NRC will not docket the tendered application for three (3) months where no detailed studies of the proposed site have been performed or 6 months where such studies have been performed. As soon as practicable after tendering, NRC will publish a summary of the information specified in subparagraph (c) below in the Federal Register and will notify the Governor and the State legislature of the State containing the proposed site.

(c) The notice of intent shall include the following information:

(1) The full name of the applicant.

(2) The address and telephone number of the applicant.

(3) A description of the business or occupation of the applica..

(4) (i) If the applicant is an individual, state citizenship and age.

(ii) If the applicant is a partnership, state name, citizenship, and address of each partner and the principal location where the partnership does business.

(iii) If the applicant is a corporation or an unincorporated association, state: (1) the State where it is incorporated or organized and the principal location where it does business, and (2) the names, addresses, and citizenship of its directors and principal officers.

(iv) If the applicant is acting as an agent or representative of another person in filing the application, identify the principal and furnish information required under this paragraph with respect to such principal.

(5) A summary description of the proposed project, including the type of facility, the size (capacity) of the facility, the types of LLW proposed for disposal into the facility, and any plans for onsite waste processing activities.

(6) A general description of the decision process used to select the region of interest and the slate of candidate sites, including the proposed site and at least three alternative sites, which the applicant judges to be among the best that can reasonably be found in his region of interest for the siting of an LLW disposal facility. (Reconnaissance level information can normally be used for the selection of the slate of candidate sites and identification of the proposed site).

(7) A description of the applicant's plans to characterize the proposed site.

(8) A description of the applicant's plans to involve State and local government in the proposed project.

(9) Any other issues related to the proposed project which the applicant wishes the staff to review.

61.28 Application for license--financial information.

(a) The application shall provide information sufficient to demonstrate to the Commission the financial qualifications of the applicant to carry out, in accordance with the regulations in this chapter, the activities for which the license is sought. The information shall show that the applicant either possesses the necessary funds or that the applicant has reasonable assurance of obtaining the necessary funds, or by a combination of the two, so that the applicant will have the necessary funds to cover the estimated construction costs of the facility as well as the estimated operating costs over the planned

operating life of the facility. This information may be provided in a report separate from the other information required for licensing an LLW disposal facility.

(b) The application shall provide assurances that sufficient funds will be available to carry out decommissioning of the site, including: (1) decontamination or dismantlement of site surfaces or site structures; and (2) final closure and stabilization of the site (facility) and emplaced LLW so that following transfer of the site to the site owner, the need for ongoing active maintenance is eliminated and only passive care, surveillance and monitoring are required. Such assurances shall take the form of financial surety arrangements established by the applicant and will be based on cost estimates in an approved plan for site decommissioning submitted by the applicant in accordance with paragraph 61.34. The surety will also cover the payment of the charge for post-operational maintenance surveillance and monitoring required in paragraph (c) below. In establishing specific surety arrangements, the licensee's cost estimates shall take into account total capital costs that would be incurred if an independent contractor were hired to perform the decommissioning and closure work. In order to avoid unnecessary duplication and expense, the Commission will accept financial sureties that have been consolidated with earmarked financial or surety arrangements established to meet requirements of other Federal or State agencies and/or local governing bodies for such decommissioning, decontamination, closure and stabilization, and post-operational site maintenance, surveillance and monitoring. The licensee's surety mechanism will be reviewed from time to time by the Commission (generally at the time of license renewal) to assure sufficient funds for completion of the closure and decommissioning plan if the

work has to be performed by a State or Federal regulatory authority. The amount of surety liability should change in accordance with the predicted cost of future closure and stabilization. Factors affecting closure and stabilization cost estimates include: inflation; increases in the amount of disturbed land; and closure and stabilization that has already been accomplished. This will yield a surety that is at least sufficient at all times to cover the costs of decommissioning and closure of the areas that are expected to be disturbed before the next license renewal. The term of the surety mechanism must be open ended. Liability under the surety mechanism shall remain in effect until the closure and stabilization program has been completed, approved and the license terminated. Financial surety arrangements generally acceptable to the Commission include: (1) surety bonds, (2) cash deposits, (3) certificates of deposit, (4) deposits of government securities, (5) letters or lines of credit, and (6) combinations of the above or such other types of arrangements as may be approved by the Commission.

(c) A charge sufficient to cover the costs of 100 years of post-operational surveillance and monitoring by the site owner shall be paid by each disposal facility licensee to the general treasury of the United States or to an appropriate State agency prior to the termination of the disposal facility license.* The total charge to cover the costs of such surveillance and monitoring shall be such that, with an assumed 1% annual real interest

*This provision may require new legislation.

rate, the collected funds will yield interest in an amount sufficient to cover the annual costs of site surveillance and monitoring. The inflation rate to be used is that indicated by the change in the Consumer Price Index published by the U.S. Department of Labor, Bureau of Labor Statistics. Specific requirements for surveillance and monitoring projected to be needed for individual disposal methods are discussed in appendices to this part.

61.30 Application for licensee--safety and environmental report.

The application shall consist of a safety and environmental report which shall include the following information:

(a) An update of the information submitted as part of the notice of intent required in paragraph 61.26 of this part, including:

(1) any changes in the proposed activities since the submission of the notice of intent;

(2) a description of the scope and depth of State and local government involvement in the proposed activities as well as summaries of any resolutions resulting from principal meetings, correspondence or consultations.

(3) A final description of the slate of candidate sites and the decision process and rationale for choosing the proposed site. The slate of candidate sites should be described in sufficient detail to allow NRC staff to determine:

(i) whether it is reasonably probable that a candidate site proposed by the applicant will meet the site suitability requirements of Subpart H;

(ii) whether sufficient diversity exists in the applicant's slate of candidate sites; and

(iii) whether there is an obviously superior alternative site.

(b) The site closure and decommissioning plan required under paragraph 61.34.

(c) Information sufficient to meet the requirements for Environmental Reports in Part 51 of this Chapter.

(d) A detailed technical description of the proposed LLW disposal facility and operations, including:

(1) A description of the proposed LLW disposal facility indentifying the proposed site of the LLW disposal facility, and the character of the proposed activities.

(2) Proposed schedules for construction, receipt of waste, and emplacement of waste at the proposed LLW disposal facility.

(3) A description of the kind, amount, and specification of the radioactive material proposed to be used and the LLW proposed to be disposed of at the LLW disposal facility.

(4) A detailed description and analysis of the site at which the proposed LLW disposal facility is to be located with appropriate attention to those features that might affect facility design. The assessment shall contain an analysis of the geology, hydrology, geochemistry, meteorology, and demography of the site and their impact on the suitability of the proposed LLW facility for disposal of LLW. For purposes of bounding potential impacts from the proposed facility, it will be assumed that the facility will be operated at the maximum capacity and rate of receipt of LLW stated in the application.

(5) A description and discussion of disposal facility structures, systems, and components, both surface and subsurface, and their relationship to the proposed operations.

(6) A description and conservative analysis of the applicant's use of engineered and natural barriers to assure containment of LLW and compliance with the facility performance objectives of Subpart H of this Part, and to assure minimum maintenance is needed at the site by the site owner following site closure.

(7) A discussion of guides, other codes and standards approved by the NRC staff that the applicant proposes to apply to the design, construction, operation, closure and stabilization of the LLW disposal facility.

(8) A list of proposed license conditions in accordance with Section 61.58 of this part together with a summary statement of the bases or reasons for such conditions.

(9) A description of the applicant's program for control and monitoring of radioactive and chemical effluents and occupational radiation exposures to maintain such effluents and exposures as low as reasonably achievable, and in accordance with Part 20 of this chapter. The program description will include:

(i) Radioactive or chemical action levels, applicant actions, and follow up actions.

(ii) Conduct of waste receipt, handling, repackaging, disposal, and closure operations and their relation to personnel exposures

(iii) Criteria for decontamination of vehicles, site areas and facilities, and site equipment,

(iv) A description of equipment and instrumentation to ensure personnel safety.

(10) A description of the site physical security arrangements in accordance with Subpart I.

(11) Plans for coping with radiological emergencies and personnel injuries at all times after commencement of construction and prior to termination of the license. As a minimum such plans shall include the appropriate elements contained in Section IV of Appendix E to Part 50 of this chapter.

(12) The following information concerning the activities at the disposal facility:

(i) The organizational structure of the applicant, both offsite and onsite, including a description of any delegations of authority and assignments of responsibilities, whether in the form of administrative directives, contract provisions, or otherwise.

(ii) Managerial and administrative controls to be used to ensure safety, including identification by name and position of key individuals who have responsibility for safety at and operation of the disposal facility, and those who have stop work authority within the management structure.

(iii) The technical qualifications, including training and experience of the applicant and members of the applicant's staff to engage in the proposed activities in accordance with the regulations in this chapter.

(iv) A description of the personnel training program.

(v) Plans for conduct of normal activities, including:

(A) Receipt, handling, temporary storage, and disposal of LLW;

(B) Maintenance of the facility;

(C) Managerial review and audit of activities pursuant to paragraph 61.84.

(vi) Plans for any uses of the disposal facility for purposes other than disposal of LLW, with an analysis of the effects, if any, that such uses may have on safety; and

(vii) A commitment by the applicant to maintain an adequate complement of trained facility personnel to safely carry out LLW receipt, handling, and disposal operations at all times such operations are in progress.

(13) An analysis of the potential chemical and radiological hazards to an individual on and offsite which result from release of LLW to the site and surrounding areas due to accidents and natural phenomena.

(14) A description of the applicant's quality control program for site operations.

(e) If the application contains information of the type described in paragraph 2.790 of part 2 of this chapter which the applicant wishes withheld from public disclosure, such information shall be submitted with the application under separate cover, along with a justification for withholding the information.

(f) Depending upon the disposal method utilized by the applicant and the design of the disposal facility, additional information may be required by the Commission. Such information may include:

(1) An identification of those structures, systems, and components of the disposal facility, both surface and subsurface, which require demonstration to confirm the adequacy of the design.

(2) A description of the equipment to be installed to maintain control over radioactive materials in gaseous and liquid effluents produced during normal operations and expected operational occurrences. The description shall identify the design objectives, and the means to be employed, for keeping levels of radioactive material in effluents to unrestricted areas as low as reasonably achievable and within the limits shown in Part 20 of this chapter. The description shall include:

(i) An estimate of:

(A) The quantity of each of the principal radionuclides expected to be released annually to unrestricted areas in liquid effluents produced during normal facility operations.

(B) The quantity of each of the principal radionuclides expected to be released annually to unrestricted areas in gaseous effluents produced during normal facility operations.

(ii) Information sufficient to assure that releases of nonradioactive liquid or gaseous effluents meet pertinent air quality standards promulgated by Federal or State agencies.

(iii) A general description of the provisions for packaging, storage, and disposal of solid wastes containing radioactive materials resulting from treatment of gaseous and liquid effluents and from other sources.

(3) Any other information as may be required by the Commission and relevant to safety or potential environmental impacts of the facility.

61.32 Application for license - site operations manual

Each applicant shall submit a site operations manual for approval by the NRC staff prior to issuance of a license. The manual shall be available to all site personnel and shall contain specific instructions and procedures for site personnel to safely carry out operations at the facility and to implement license conditions and licensee commitments made in support of the application. Any subsequents revisions to the manuel will be subject to NRC review and approval.

61.34 Application for license-site closure and decommissioning plan.

(a) Each application shall include a preliminary site closure and decommissioning plan to prepare the facility for transfer to the site owner following the end of its operational life. The site owner shall be either the Federal government or the government of the State in which the proposed site is to be located, if such arrangements with the State have been made. The plan shall be submitted as part of a Safety and Environmental Report prepared in accordance with paragraph 61.30 above. The plan shall:

(1) Be consistent with the standards and criteria of Subpart H of this Part.

(2) Give precedence to long-term waste containment and stability over less costly alternatives.

(3) Include preliminary estimates of costs, environmental impacts, data needs, personnel needs, material and equipment needs, planned documentation and quality control.

(4) Include a detailed plan for waste emplacement, expected waste capacities, planned final surface contours, and buffer zone.

(5) Include provisions for a period of port-closure observation.

(b) From time to time (generally during applications for renewals), the Commission will require updating of the plan. A final version of the plan must be approved by the Commission and fully implemented by the applicant prior to termination of the license.

61.36 Filing of applications for licensees; oath or affirmation.

(a) Place of filing. Each application for a license under this part, or amendment thereof, should be filed with: The Director, Division of Waste Management, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Applications, communications, reports, and correspondence may be delivered in person at the Commission's offices at 7915 Eastern Avenue, Silver Spring, MD., or 1717 H Street NW., Washington, DC

(b) Oath or affirmation. Each application for a license or license amendment, including amendments to such applications, shall be executed in three signed originals by the applicant or duly authorized officer thereof under oath or affirmation.

(c) Number of copies of applications. Each filing of an application for a license or license amendment under this part (including amendments to such applications) shall include in addition to three signed originals the required documents listed in Table I in the number of copies specified.

Table I: Required Licensing Documents

Section	Document	Number of Copies
	Notice of intent	25(a)
	Safety and environmental report	150
	Report of installation and procedure changes pursuant to paragraph 61.60	12(b)
	Application for termination of license	25(b)
	Amendment to license	25(a)
	Site operational manual	25(c)

(a) Plus three signed originals.

(b) Plus one signed original.

(c) Physical security plans should be held exempt from public disclosure pursuant to 10 CFR 2.790 (d).

(d) Fees. The application, amendment, and inspection fees applicable to a license covering the receipt and disposal of LLW in an LLW disposal facility are those shown in part 170 of this chapter.

61.38 Public inspection of applications.

Applications or documents submitted to the Commission in connection with applications shall be made available for public inspection in accordance with provisions of the regulations contained in Part 2 and Part 9 of this chapter.

61.40 Elimination of repetition.

In its application or other information furnished in support of the application, the applicant may incorporate by reference information contained in previous applications, statements, or reports filed with the Commission: PROVIDED, that such references are clear and specific.

61.42 Updating of application.

(a) The application shall be as complete as possible in the light of information that is reasonably available at the time of submission.

(b) The applicant shall update, in a timely manner, its application, as appropriate, so as to permit the Commission to review, prior to issuance of a license, substantial changes in the activities proposed to be carried out or significant new information regarding the safety or environmental impacts of the proposed activities.

SUBPART C: PARTICIPATION BY STATE GOVERNMENTS

61.44 Early notice.

(a) Upon publication in the Federal Register of a summary of the information contained in the applicant's notice of intent to submit an application for an LLW disposal facility, and upon the request of a State, the Director shall make available NRC staff to consult with representatives of State governments on matters concerning the information submitted by the applicant, to keep the representatives informed of the Director's view on the progress of staff review of the application, and notify them of any subsequent meetings or further consultations with the applicant, as desired.

(b) Requests for consultation shall be made in writing to the Director.

(c) The Director also shall respond to written questions or comments from the States, as appropriate, on the information submitted by the applicant. Copies of such questions or comments and their responses will be made available in the Public Document Room, 1717 H Street, Washington, D.C. and will be transmitted to the applicant.

61.46 Filing of proposals for state participation.

(a) Upon publication in the Federal Register of a summary of the information contained in the applicant's notice of intent to submit an application for an LLW disposal facility and upon request of a State, the Director shall make available NRC staff to discuss with representatives of the State applicable NRC regulations, licensing procedures, potential schedules, and the type and scope of State activities in the license review permitted by law. In addition,

staff will be made available to cooperate with the State in developing proposals for participation by the State in the license review.

(b) At any time following publication in the Federal Register of such a notice as above, but no later than 120 days following docketing of an application submitted under paragraph 61.36 of this part, States potentially affected by siting of a disposal facility operations area at the selected site may submit to the Director a proposal for State participation in the review of the license application. A State may also submit to the Director a proposal for State participation in the review of any subsequent application for license renewal or amendment.

(c) Proposals for participation in the review shall be signed by the Governor of the State submitting the proposal and shall at minimum contain the following information:

(1) A general description of how the State wishes to participate in the review, specifically identifying those issues which it wishes to review.

(2) A description of material and information which the State plans to submit to the NRC staff for consideration in the review. A tentative schedule referencing steps in the review and calendar dates for planned submittals should be included.

(3) A description including funding estimates of any work that the State proposes to perform for the Commission, under contract, in support of the review.

(4) A description of State plans to facilitate local government and citizen participation.

(5) A preliminary estimate of the types and extent of impacts which the State expects should a disposal facility be located as proposed.

(d) If the State desires educational or information services (seminars, public meetings) or other actions from the NRC such as establishment of additional Public Document Rooms or employment or exchange of State personnel under the Intergovernmental Personnel Act, these shall be included with the proposal.

61.48 Approval of proposals.

(a) Upon receipt of a proposal submitted in accordance with paragraph 61.46 for participation in the license review from a State, the Director will arrange for a meeting between the representatives of the State and the NRC staff to discuss the proposal and suggest any changes which the Director feels are needed to ensure the beneficial participation by the State.

(b) Subject to the availability of funds, the Director will approve all or any part of a proposal, as may be modified through the meeting of subparagraph (a) above, if the Director determines that:

(1) The proposed activities are authorized by law and are suitable in light of the type and magnitude of impacts which the State may bear; and

(2) The proposed activities:

(i) Will enhance communications between NRC and the State; and

(ii) Will contribute productively to the license review.; and

(c) The decision of the Director shall be transmitted in writing to the Governor of the originating State. A copy of the decision will be made available at the Public Document Room. If all or any part of a proposal is rejected, the decision will state the reason for the rejection.

(d) A copy of all proposals received shall be made available at the Public Document Room.

61.50 Assistance to Agreement States.

(a) Upon the written request from the Director of the Agreement State agency responsible for radiological health, the Director may furnish technical assistance to the State in reviewing:

(1) The likely short- and long-term environmental impacts and consequences resulting from siting, constructing, operating, and closing a new LLW disposal facility;

(2) Any significant amendment to a license at an existing LLW disposal facility;

(3) Any major modifications of any existing site which may be subject to a State license renewal application or license termination; or

(4) Any major disposal activity licensed by the State.

(b) Technical assistance may take the form of staff review and comments on material supplied by the State, or an NRC staff report on environmental data furnished to NRC by the State.

(c) The scope of the technical assistance would be arranged jointly by representatives of the State and NRC, and a mutually agreeable schedule for funding the technical assistance established. The scope of NRC assistance will be contingent upon the availability of personnel and funds and will be consistent with NRC's regulations and agency role as defined in the Act.

SUBPART D: CONDITIONS AND ACTIONS ON LICENSE

61.52 Issuances of licenses.

(a) Upon consideration of an application submitted and updated under this part and subject to the conditions of paragraphs (b) - (d) below, the Commission may authorize construction and issue a license for a LLW disposal facility. The authorization and license may be of such form and contain such conditions and limitations as the Commission deems necessary or appropriate to protect the health of the public and to minimize danger to life and property. Commencement of construction prior to commission authorization shall be grounds for denial of a license.

(b) Authorization for construction and license for a LLW disposal facility may be issued if there is reasonable assurance that the proposed LLW disposal facility will be sited, designed, safely operated, decommissioned, and closed in accordance with the regulations in this Part with minimal need by the site owner for active post-operational maintenance. In making this determination, the Commission will consider whether:

(1) The application for license meets the standards and requirements of the act and the regulations in this Part.

(2) The types, forms, and amounts of LLW described in the application and any conditions to the application are appropriate for disposal into the facility.

(3) The proposed facility site, design, and operations meet the requirements of Subpart H of this part.

(4) The applicant's environmental monitoring and surveillance program meet the requirements of Subpart H of this Part.

(5) The applicant's decommissioning and closure plan and its financing pursuant to paragraph 61.34 are adequate.

(6) The applicant is qualified by reason of training and experience to conduct the operations covered by the regulation in this part.

(7) The applicant's personnel training program is adequate to ensure efficient and safe handling and disposal of radioactive waste during normal as well as abnormal conditions.

(8) The applicant is financially qualified to engage in the proposed activities in accordance with the regulations in this part.

(9) The applicant's physical security plan is adequate.

(10) The applicant's plans for coping with personnel injuries or potential radiological emergencies are adequate to protect health and to minimize danger to life or property.

(11) The applicant's organizational structure, and managerial and administrative controls are adequate to ensure safety.

(12) The applicant's quality control program is adequate.

(c) Before commencement of construction of the facility, the Director of the Office of Nuclear Materials Safety and Safeguards or his designee, shall have concluded that on the basis of information filed and evaluations made pursuant to Part 51 of this chapter, and after weighing the environmental, economic, technical, and other benefits against environmental costs and considering available alternatives, that the action called for is the issuance of the proposed license, with any appropriate conditions to protect environmental values.

(d) No license will be issued by the Commission to any person within the United States if the Commission finds that the issuance of such a license would be inimical to the common defense and security or would constitute an unreasonable risk to the health and safety of the public.

61.54 Receipt of waste.

(a) Following authorization to construct and issuance of a license for a LLW disposal facility and after the construction of the disposal facility has sufficiently progressed to allow the licensee to safely receive and dispose of LLW in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission, the licensee shall notify the Commission that he intends to start operations to receive, possess, and dispose of LLW at the facility. The notification shall be filed in accordance with paragraph 61.36 of this part and shall include:

(1) any additional geologic, hydrologic, meteorologic, or other data obtained during construction.

(2) a discussion of the construction of the facility in accordance with the facility design.

(3) results of demonstration programs carried out to confirm the adequacy of design.

(4) a discussion of any substantial changes in the activities proposed to be carried out or significant new information regarding the environmental impacts or safety of the proposed activities; and

(5) other information bearing on the Commission's authorizing receipt and disposal of LLW that was not available at the time a license was issued.

61.56 General license conditions.

(a) A license issued pursuant to this Part shall include such conditions as the Commission finds to be necessary to protect the health and safety of the public and applicant employees, the common defense and security, and environmental values.

(b) The following shall be deemed conditions in every license issued:

(1) No license issued under this part, or any right thereunder, shall be transferred, assigned, or in any manner disposed of, either voluntarily, directly or indirectly, through transfer of control of the license to any person, unless the Commission shall, after securing full information, find that the transfer is in accordance with the provisions of the Atomic Energy Act and give its consent in writing in the form of a license amendment.

(2) The licensee shall at any time before termination of the license upon request of the Commission, submit written statements, signed under oath or affirmation, to enable the Commission to determine whether or not the license should be modified, suspended, or revoked.

(3) The licensee shall be subject to the provisions of the Atomic Energy Act now or hearafter in effect, and to all rules, regulations, and orders of the Commission. The terms and conditions of the license shall be subject to

amendment, revision, or modification, by reason of amendments to, or by reason of rules, regulations, and orders issued in accordance with the terms of the Atomic Energy Act.

(4) Any license may be revoked, suspended or modified in whole or in part for any material false statement in the application or any statement of fact required under Section 182 of the Act, or because of conditions revealed by such application or statement of fact or any report, record, or inspection or other means which would warrant the Commission to refuse to grant a license to the original application, or for failure to operate the facility is accordance with the terms of the license, or any violation of, or failure to observe any of the terms and conditions of the Act, or any regulation, license or order of the Commission.

(5) Prior to the receipt of LLW for storage or disposal at the facility, the licensee shall have in effect an NRC-approved program covering the training of facility personnel. The NRC shall inspect to determine whether the licensee has an adequate training program and a sufficient number of trained personnel at the disposal facility to safely carry out the licensed operations.

(7) Before the licensee may receive and dispose of any waste under this license, he shall notify the Commission and the Commission shall perform an inspection to determine that all license conditions applicable to initiation of operations have been complied with.

61.58 Specific license conditions.

(a) A license issued under this Part shall include license conditions derived from the analyses and evaluations included in the application, including amendments and changes made before a license is issued, together with such additional conditions as the Commission finds appropriate.

(b) License conditions may include but not necessarily be limited to items in the following categories:

(1) Restrictions as to the physical and chemical form and radioisotopic content and concentration of radioactive waste;

(2) Restrictions as to size, shape, and materials and methods of construction of radioactive waste form and packaging;

(3) Restrictions as to the location, size, configuration, construction, and physical characteristics (e.g., physical or chemical properties) of the emplacement medium;

(4) Restrictions as to the amount of waste permitted per unit volume of emplacement space considering the physical and chemical characteristics of the waste, the emplacement medium, and the disposal method;

(5) Requirements relating to test, calibration, or inspection to assure that the foregoing restrictions are observed;

(6) Controls to be applied to restrict access and to avoid disturbance to the site;

(7) Controls to be applied to maintain and protect the health and safety of the public and site employees;

(8) Administrative controls, which are the provisions relating to organization and management, procedures, recordkeeping, quality assurance, review and audit, and reporting necessary to assure that activities at the facility are conducted in a safe manner and in conformity with Commission regulations and with other license conditions.

(c) At the initiative of the Commission or the applicant, any license may be amended to include conditions of the scope and content which would be required if a new license were being issued.

61.60 Changes, tests, and experiments.

(a) Following issuance of a license to receive, possess, and dispose of LLW subject to the Commission's regulations at an LLW disposal facility, the applicant may, upon notification to the Commission but without prior Commission approval and subject to the provisions of subparagraph (b) below:

(1) Make changes in the disposal facility as described in the application;

(2) Make changes in the procedures as described in the application; or

(3) Conduct tests or experiments not described in the application.

(b) Prior Commission approval is required if the proposed change, test, or experiment:

(1) Involves a potential change in a license condition;

(2) Has the potential to increase releases of radioactive material to unrestricted areas or otherwise cause a potential decrease in the protection of the health and safety of individuals in unrestricted areas now or in the future; or

(3) Has the potential to increase radiological exposures to site personnel, or otherwise cause a potential decrease in operational safety.

(c) The applicant shall maintain records of change in the disposal facility operations area and of changes in procedures made pursuant to this section, to the extent that such changes constitute changes in the disposal facility or procedures as described in the application. Records of tests and experiments carried out pursuant to subparagraph (a) of this paragraph shall also be maintained. These records shall include a written safety evaluation which provides the basis for the determination that the change, test, or experiment does not involve conditions described in subparagraph (b) above. The applicant shall furnish to the appropriate NRC Regional Office shown in

Appendix D of Part 20 of this chapter, with copies to the Director of Inspection and Enforcement, and the Director of the Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, within thirty days following the changes, tests, or experiments, a report containing a brief description of such changes, tests, and experiments, including a summary of the safety evaluation of each.

61.62 License renewals.

(1) At five year intervals following authorization to receive and dispose of radioactive waste, the applicant shall submit a report to the Commission which includes the following information:

(a) A summary of radioactive material disposed of, the amount of disposal space used in the facility to date, and the amount of disposal space left available under the conditions of the license.

(b) Data on monitoring, surveillance, personnel exposures, and site performance history collected during the previous five years.

(c) Any proposed changes or modifications to licensed procedures to receive, possess, store, or dispose of radioactive waste.

(d) An analysis of potential improvements in technology for handling and disposing of radioactive waste with the intent of further reducing potential exposures or release of material to levels as low as reasonably achievable.

(e) An updated site closure plan that reflects the current condition of the site and state of technology.

(2) Each license will be issued for a fixed period of time to be specified in the license but not to exceed five years. At least 30 days prior to license expiration, the applicant shall file an application for renewal. The application shall meet the requirements of this part regarding issuance of new licenses. Information contained in previous applications, statements or reports filed with the Commission under the license may be incorporated by reference: Provided, that such references are clear and specific. In any case in which a licensee, not less than 30 days prior to expiration of his existing license, has filed an application in proper form for renewal of a license, such existing license whall not expire until the application for a renewal has been finally determined by the Commission.

61.64 Amendment of license.

(a) Application for amendment to a license may be filed with the Commission fully describing the changes desired and including an environmental and safety analysis of the potential impacts of the changes.

(2) In determining whether an amendment to a license will be approved, the Commission will be guided by the considerations that govern the issuance of the initial license, to the extent applicable and appropriate.

61.66 Application for closure.

(a) When the disposal facility has been filled to licensed capacity, or as otherwise directed by the Commission but prior to final closure, the applicant shall submit an application to amend the license for closure. This closure amendment shall include a final update and specific details of the site closure and decommissioning plan included as part of the license application submitted under Subpart B of this chapter, including:

(1) Any additional geologic, hydrologic, and other site data pertinent to the long-term containment of implaced radioactive wastes obtained during the operational period.

(2) The results of tests, experiments, and any other analyses relating to backfill of excavated areas, closure and sealing, waste migration and interaction with emplacent media, history of facility performance, and any other tests, experiments, or analysis pertinent to the long-term containment of emplaced waste within the disposal facility.

(3) Any proposed substantial revision of plans for:

(i) Decontamination and/or dismantlement of surface facilites;

(ii) Backfilling of excavated areas and sealing of shafts, if applicable;

(iii) Stabilization of the site for long-term care with minimal maintenance.

(4) Any significant new information regarding the environmental impact of closure activities and long-term containment capability.

(b) Upon review and consideration of an application to amend the license for closure submitted in accordance with subparagraph (a) above, the Commission may issue an amendment authorizing closure if it determines that the following conditions are met:

(1) There is reasonable assurance that closure will effect the long-term containment of the emplaced radioactive wastes.

(2) The authorization to close will not be inimical to the common defense and security.

61.68 Post closure observation and maintenance.

Following closure as authorized in paragraph 61.66 the applicant shall maintain the site until the applicant can provide reasonable assurance that the site requires only passive care by the site owner with minimal need for ongoing active maintenance. NRC anticipates that this period of post-closure observation and maintenance shall require a minimum of 5 years. During this period, the license for the disposal facility remains in effect until the license is terminated by the Commission in accordance with paragraph 61.70.

61.70 Termination of license.

(a) Following closure and the period of post-closure observation and maintenance the applicant may apply for an amendment to terminate the license.

(b) Such application for amendment shall be filed, and will be reviewed, in accordance with the provisions of paragraph 61.64 and subparagraph (c) below.

(c) A license shall be terminated only when the Commission finds with respect to the disposal facility:

(1) That the final disposition of the disposal facility has been made in conformance with the applicant's site closure and stabilization plan, as amended and approved as part of the license.

(2) That reasonable assurance has been provided by the applicant that the site requires only passive care by the site owner with minimal need for active site maintenance.

(3) That the termination of the license is authorized by law, including Sections 57, 62, and 81 of the Atomic Energy Act, as amended.

(4) That transfer to the site owner of title of the facility has been effected.

(5) That transfer to the site owner of the funds and necessary records for long-term care has been effected.

(6) That the surveillance and monitoring program is in place for implementation by the site owner.

SUBPART E: TESTS, INSPECTION, AND ENFORCEMENT

61.72 Tests at licensed disposal facilities.

(a) Each Licensee shall perform, or permit the Commission to perform, such tests as the Commission deems appropriate or necessary for the administration of the regulations in this Part, including tests of:

(1) LLW and facilities wherein LLW is received, possessed, handled, treated, stored, or disposed of;

(2) Radiation detection and monitoring instruments; and

(3) Other equipment and devices used in connection with the receipt, possession, handling, treatment, storage, or disposal of LLW.

61.74 Commission inspections of disposal facilities.

(a) Each licensee shall afford to the Commission at all reasonable times opportunity to inspect LLW and the premises, equipment, operations, and facilities wherein LLW is received, possessed, handled, treated, stored, or disposed of.

(b) Each licensee shall make available to the Commission for inspection, upon reasonable notice, records kept by him pursuant to the regulations in this chapter.

61.76 Violations.

An injunction or other court order may be obtained prohibiting any violation of any provision of the Atomic Energy Act of 1954, as amended, or Title II of the Energy Reorganization Act of 1974, or any regulation or order issued thereunder. A court order may be obtained for the payment of a civil penalty imposed pursuant to Section 234 of the Act for violation of Section 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Act, or Section 206 of the Energy Reorganization Act of 1974, or any rule, regulation, or order issued thereunder, or any term, condition, or limitation of any license issued thereunder, or for any violation for which a license may be revoked under Section 186 of the Act. Any person who willfully violates any provision of the Act or any regulation or order issued thereunder may be guilty of a crime and, upon conviction, may be punished by fine or imprisonment or both, as provided by law.

SUBPART F: MANIFESTS, RECORDS, REPORTS, QUALITY ASSURANCE, AND AUDITS

61.78 Manifests.

(a) Each shipment of LLW accepted for disposal into a licensed LLW disposal facility shall include a shipment manifest providing a record of the name, addresses, and telephone number of the person generating the LLW as well as a record of the name, address, and telephone number of the person transporting the LLW to the disposal facility. The manifest shall also record the types of

waste, the waste volume, mass, radionuclide concentration and content, chemical content and composition, solidification agent, or other information as may be required by the Commission. (A sample manifest is included as Figure 1.)

(b) Each manifest shall include the following certification by the waste generator: "This is to certify that the above-named materials are properly classified, described, packaged, marked, and labeled and are in proper conditions for transportation according to the applicable regulations of the Department of Transportation and the U. S. Nuclear Regulatory Commission." The information on the manifest shall be certified by having an authorized representative of the waste generator sign and date it.

(c) Following acceptance of a shipment of LLW accompanied by a manifest, each operator of a licensed LLW disposal facility shall record on the shipment manifest the date of receipt of the waste, the date of disposal of the waste, the relative location in the facility where the waste is disposed of, the condition of the waste packages as received, and any evidence of leaking or damaged packages or radiation or contamination levels in excess of limits specified in DOT and NRC regulations. The operator shall also briefly describe any repackaging operations of any of the waste packages included in the shipment, plus any other information required by NRC as an operating condition (See Figure 1 for a sample manifest.).

(d) The information recorded on the shipment manifest shall be certified by an authorized representative of the disposal facility operator who shall sign and date the manifest. The certification shall read as follows: "This

is to certify that the above named materials have been received, classified, handled, stored, and disposed of in compliance with NRC regulations and all site conditions."

(e) The disposal facility operator shall keep at least one copy of each shipment manifest received at the disposal facility site in accordance with the record keeping requirements of paragraph 61.80. Within 30 days following disposal of the waste included in the waste shipment, the disposal facility operator shall also provide copies of the manifest to persons or agencies specified by NRC. At a minimum the following copies are required:

(1) one copy to the waste generator;

(2) one copy to the waste transporter;

(3) one copy to the NRC;

61.80 Maintenance of records and reports.

(a) Each licensee shall maintain such records and make such reports in connection with the licensed activities as may be required by the conditions of the license or by the rules, regulations, and orders of the Commission. As a minimum, records to be kept by the disposal facility operator shall include the following:

(1) personnel exposures;

(2) receipt and disposal of LLW;

(3) data from the facility monitoring and surveillance program;

(4) personnel training;

(5) quality control and audit program.

(b) Each licensee who transfers or receives for disposal special nuclear material contained in LLW shall comply with the reporting requirements of paragraph 70.54 (Nuclear Material Transfer Reports.).

(c) Each licensee shall, upon each issuance of its annual financial report, including the certified financial statements, file a copy thereof with the Commission.

(d) Records which are required by the regulations in this part or by license conditions shall be maintained for a period specified by the appropriate regulation or license condition. If a retention period is not otherwise specified, such records shall be maintained and transferred as a condition of license termination to the site owner unless the Commission otherwise authorizes their disposition.

(e) Records which must be maintained pursuant to this part may be the original or a reproduced copy or microfilm if such reproduced copy or microfilm is duly authenticated by authorized personnel and the microfilm is capable of

producing a clear and legible copy after storage for the period specified by Commission regulations.

(f) If there is a conflict between the Commission's regulations in this part, license condition, or other written Commission approval or authorization pertaining to the retention period for the same type of record, the retention period specified in the regulations in this part for such records shall apply unless the Commission, pursuant to paragraph 61.22 has granted an exemption from the record retention requirements specified in the regulations in this part.

(g) Notwithstanding subparagraphs (a) through (f) above copies of records of the facility location and the quantity of LLW contained in the facility will be transferred prior to license termination to the chief executive of the nearest municipality, the chief executive of the county in which the facility is located, the county zoning board or land development and planning agency, and the State Governor.

61.82 Quality Assurance program.

Each licensee shall plan and carry out an onsite quality assurnace program to assure that licensed activities, including site investigation and preparation, facility operation, facility monitoring and surveillance, and facility closure, are carried out in accordance with Commission regulations, the application, and any license conditions.

61.84 Audit requirements for disposal facility operators.

(a) Each licensee shall carry out a comprehensive system of planned and periodic management audits to:

(1) Verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program; and

(2) Review operating procedures and past exposure recores, facility inspections, and surveillance of the operations being performed.

(b) The audits shall be performed in accordance with written procedures or check lists by appropriately trained personnel not having direct responsinility in the areas being audited;

(c) Audit results shall be documented and reviewed by management having responsibility in the area audited. A record of the audit program including followup actions shall be permanently maintained by the applicant and be available for NRC inspection; and

(d) Follow up action, including correction and reauditing of deficient areas, shall be taken where indicated.

SUBPART G: WASTE PERFORMANCE

61.86 Waste form and packaging.

LLW accepted for disposal at a licensed LLW disposal facility shall meet the following minimum requirements:

(a) The waste form and packaging shall meet (1) all applicable transportation requirements of the Commission (10 CFR 71) and the Department of Transportation (49 CFR), and (2) all applicable disposal facility license conditions.

(b) Except as authorized by subparagraph (d) below, all LLW accepted for disposal into an LLW disposal facility must be packaged. To the extent practicable; (1) LLW shall be in a free-standing form which is not readily dispersible, degradable, or soluble. Void spaces within the waste form and package shall be minimized. Dry compacted trash may be exempt from the requirement to be in free-standing form.

(c) All packaged LLW accepted for disposal shall

at a minimum meet the water spray, free drop, compression, and penetration tests of 49 CFR 127.611 for Type A packages without deformation, loss or dispersal of the contents, or an increase in the maximum radiation levels recorded or calculated at the external surface of the package.

(d) Large solid items such as machinery containing surface or induced integral contamination for which packaging would lead to a significantly inefficient use of disposal facility space and for which further attempts at volume reduction would be impracticable, may be accepted unpackaged for disposal into the disposal facility upon specific authorization by license amendment and provided such disposal is conducted in a safe and environmentally acceptable manner.

(e) Except as authorized in subparagraph (f) below, LLW shall be in a dry solid form containing not more than 0.5% or 1 gallon of free liquid per container, whichever is less of noncorrosive liquids. Liquids that have been immobilized by only the addition of absorbent materials such as diatomaceous earth or vermiculite are not acceptable waste forms for disposal. Except as authorized in subparagraphs (f) and (g) below, liquids including evaporator bottoms, filter sludges, resins and slurries shall be immobilized by solidification. The solidified product shall be in a dry free standing, homogeneous, monolithic matrix which is not readily dispersible, friable, or soluble, and contain not more than 0.5% or 1 gallon of free liquid per container, whichever is less, of noncorroesive liquids.

(f) Liquids may be accepted for disposal into an LLW disposal facility provided there is no other practicable means to immobilize or solidify the liquid, as required in subparagraph (e) provided there is specific Commission authorization by license amendment and provided reasonable assurance can be given that the liquid will be completely contained in the disposal facility throughout the time the liquid waste remains a radiological hazard (e.g., Resonable assurance may be demonstrated by use of high integrity containers).

(g) Low activity dewatered resins and dewatered resins in a high integrity container may be accepted for disposal into a LLW disposal facility provided there is specific Commission authorization by license amendment. Dewatered resins shall contain not more than 0.5% or 1 gallon, whichever is less, of noncorroesive liquid.

(h) The waste form shall not be liable to cause fires through friction, absorption of moisture, spontaneous chemical changes, or retained heat from manufacturing or processing, or when ignited burns so vigorously and persistently as to create a hazard during handling, storage, and disposal.

(i) The waste form shall not contain untreated oxidizing material, including chlorates, permanganates, inorganic peroxide, nitro-carbo-nitrates, nitrates, or any other material readily yielding oxygen in sufficient quantity to stimulate the combustion of organic material.

(j) LLW accepted for disposal at an LLW disposal facility shall not be so reactive that the waste:

(1) Is normally unstable and readily undergoes violent chemical change without detonating; reacts violently with water or forms potentially explosive mixtures with water; generates or decomposes to form sufficient explosive or toxic gases, vapors, or fumes to be a hazard; or is a cyanide or sulfide bearing waste which can generate toxic gases, vapors, or fumes when exposed to mild acidic or basic conditions.

(2) Is readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures, or which reacts exposively with water.

(3) Is an explosive, i.e., is any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion with substantially instantaneous release of gas and heat.

(k) LLW accepted for disposal shall not be in the form of compressed gas at greater than 1.5 atmospheres unless by specific amendment to a disposal facility license for a specific situation, reasonable assurance can be given that the gas will be completely contained throughout the time the gas remains a hazard.

(l) LLW containing biological, pathogenic, or infectious material shall be treated to minimize the potential hazard of this material.

61.88 Volume reduction.

LLW accepted for disposal at an LLW disposal facility shall be reduced in volume to the extent practicable.

61.90 Content of LLW.

No person shall transfer LLW to a LLW disposal facility unless the waste is of a chemical and physical form that contains radionuclides and radionuclide concentrations which the LLW disposal facility licensee may receive for disposal. Chelating or organic material shall be treated to eliminate the potential for interaction with radionuclides forming stable complexes which may increase the mobility of the radionuclides.

SUBPART H: TECHNICAL REQUIREMENTS FOR A LLW DISPOSAL FACILITY

61.92 Purpose.

(a) This subpart contains the general technical criteria applicable to an LLW disposal facility sited on land. Additional criteria for individual disposal methods are contained in appendices to this part.

(b) The Commission will apply the technical criteria in this Subpart and in appendices to this Part in making findings that the activities authorized by a license to site, design, construct, operate, and close a disposal facility or receive waste material for disposal into the facility, or any amendment thereof, will not constitute unreasonable risk to the health and safety of the public and environment.

(c) Omissions in the technical criteria contained in this Subpart or in the appendices to this part do not relieve an applicant from the requirement of providing the necessary safety features in the design of a specific facility.

61.94 Long-term performance objectives.

LLW disposal facilities shall be sited, designed, operated, closed, and maintained by the applicant so that the LLW is contained within the disposal facility and that any potential releases from the facility and exposures to man are within the limits established in the performance objectives below, and are furthermore as low as reasonably achievable. During operation of the facility, potential exposures to site personnel and to the public shall be as low as reasonably achievable and within the limits established in Part 20 of this chapter and the generally applicable environmental standards and Criteria as may be established by the Environmental Protection Agency. However, primary emphasis shall be given to the long-term performance of the facility, as opposed to short-term considerations and conveniences such as minimizing transportation, land aquisition, or disposal costs. The long-term performance of the disposal facility will be provided by a site-specific system of barriers to LLW migration and which may include, but not necessarily be limited to:

the waste form, the waste container, engineering design, engineered barriers, natural characteristics of the site and its environs, and control of land upon which the facility is sited. The effect of variation on the effectiveness of the parameters should be analyzed when assessing whether the performance objectives will be met at a particular site.

(a) The disposal facility shall be sited, designed, operated, closed, and maintained by the applicant so that following license termination, there is no need for active on-going site maintenance by the site owner.

(b) In the absence of unplanned natural processes or human contact with the LLW disposal facility, calculated contaminant levels in groundwater at the site boundary shall not exceed (1) the maximum contaminant levels established in the National Primary Drinking Water Standards, or (2) the generally applicable environmental standards and criteria for LLW disposal as may be established by the Environmental Protection Agency.

(c) In the event of human-induced reclamation activities following license termination, or reasonably forseeable but unplanned natural processes, calculated potential exposures to individuals and populations shall not exceed the limits established in Part 20 of this chapter. Institutional controls may be relied on for a limited time following LLW disposal to preclude reclamation activities at the LLW disposal facility. However, for purposes of calculation these controls shall not be relied upon for more than 100 years following termination of the license.

61.96 Site suitability.

(a) The characteristics of a proposed site shall be investigated in sufficient scope and detail to provide reasonable assurance that they are sufficiently well understood to permit, and not so complex to preclude, a thorough evaluation of the proposed site.

(b) The site shall be evaluated with respect to the present and potential future character and activities of the human population of the region. Such evaluation, which should include consideration of present and projected future uses of land, water, and natural resources within the region, shall take into account any special characteristics which may influence the ability of the site to contain LLW.

(c) The overall hydrogeologic environment of the area surrounding the disposal facility shall, upon consideration of individual site characteristics acting in combination, act to minimize and control LLW migration through groundwater. Examples of individual site characteristics which are desirable in achieving this include long groundwater residence time, lowgroundwater flow rates, high sorptive characteristics, and low potential for groundwater intrusion and circulation.

(d) The applicant shall provide sufficient information to determine with reasonable assurance that:

(1) No part of the facility is located in a 500-year floodplain, regulatory floodway, coastal high hazard area, or wetland as defined by the Environmental Protection Agency in 40 CFR 250.43-1.

(2) The portion of the facility where the LLW is emplaced is sited so that the natural grade elevation of the facility surface is above that of the calculated water level resulting from floods, dam failures, wave action, or any other credible natural or man-produced event which could innundate and compromise the integrity of the disposal facility.

(3) The facility is located so that the depth or location of any water bearing formation in the area of the disposal facility site, whether perennial or otherwise, is such that groundwater intrusion into the waste placed into the disposal facility is improbable.

(4) The facility is not located in the recharge area of a sole source aquifer designated pursuant to Section 1424(e) of the Safe Drinking Water Act (Public Law 93-523); unless it can be demonstrated with reasonable assurance that the facility will be designed, constructed, operated, closed, and maintained after closure so that the long-term performance objectives of paragraph 61.94 will be met.

(5) The facility is not located so as to be likely to jeopardize the continued existence of endangered and threatened species as listed pursuant to the Endangered Species Act of 1973 (16 U. S. C. 1530 et seq.) in 50 CFR; nor result in the destruction or adverse modification of their critical habitat as contained in 50 CFR Part 17, Subpart F: Critical Habitat, 1760 et. seq.

(6) The facility is located so that the operation of nearby municipal, government, or commercial facilities will not adversely impact the containment capability of the disposal facility, nor mask the environmental monitoring and surveillance program.

(7) The facility site is not located in an area where surface geologic processes such as mass wasting, erosion, slumping, landsliding, weathering, sea level fluctuations, or glaciation could significantly enhance LLW transport from the facility.

(8) The facility site is free of solution features, unseated faults, fractured bedrock, shale deposits or fractured formations, or formations containing sand lens, breccia pipes, or other permeable anomalies which could cause a significant increase in potential LLW migration from the facility.

(9) The facility is located in an area where surface water due to precipitation drains freely and does not collect or pond on the site surface, nor saturate the surface of the land, to the extent that such actions may cause an increase in potential LLW migration from the facility.

(10) The disposal facility neither contains capable faults, nor is located near enough to a capable fault so that the overall rate of LLW migration could increase as a result of seismic activity.

(11) The disposal facility is not located in an area having a peak horizontal ground acceleration of greater than 0.25 g with a recurrence interval of less

than 500 years (note: a 500 year recurrence interval is equivalent to a 90% probability that the ground acceleration will not be exceeded in 50 years).

61.98 Facility design and operation.

(a) The design and operation of the disposal facility shall be such that:

(1) The performance objectives established in paragraph 61.94 of this subpart are met;

(2) Releases of nonradiological noxious materials from the facility are minimized;

(3) Radiation levels, concentrations, and potential exposures offsite due to airborne releases during operations are within the limits established in applicable EPA standards and in Part 20 of this chapter and are maintained as low as reasonably achievable as provided for in specific procedures established by the applicant for LLW handling and disposal.

(b) The design and operation of the disposal facility shall be compatible with the objectives of the site closure and decommissioning plan submitted as part of the application for license.

(c) The facility shall be designed to enhance and improve the ability of the natural characteristics of the site to confine the waste after disposal.

Such improvements may include measures to direct surface water away from disposal areas or measures to minimize the potential for erosion. Independent and diverse engineering barriers will be provided, as necessary, to complement natural barriers in minimizing potential releases from the facility and in complying with the performance objectives of this part.

(d) The facility shall be designed and operated so that, during the operational phase in addition to the long-term post-operational phase of the facility: (1) intrusion of water into the disposal facility is minimized; and (2) contact of water with the received, stored, and disposed of waste is minimized.

(e) The facility shall be designed and operated in such a manner so that dispersion of excavated material, either by wind or water action, is minimized.

(f) Controls and procedures shall be established at the disposal facility to:

(1) Conduct operations in compliance with NRC regulations and all license conditions;

(2) Maintain contamination of personnel, vehicles, equipment, clothing, buildings, and other site areas as low as reasonably achievable, but within specified limits.

(3) Monitor potential releases of effluents during operations and to maintain such releases to levels as low as reasonably achievable, but within limits specified in applicable EPA standards and in Part 20.

(4) Repackage, as necessary, contaminated and damaged or leaking LLW packages prior to disposal. Incoming packages shall be inspected for compliance with all license conditions and regulatory requirements.

(5) Maintain records and submit reports in compliance with paragraph 61.80.

(6) Maintain a site-specific training program.

(7) Maintain equipment and procedures for emergency or abnormal situations and treatment of injured and/or contaminated personnel.

(8) Maintain site security.

(9) Maintain a quality assurance program on all phases of site design and operation,

(10) Maintain onsite equipment and instrumentation in good working order and repair.

(11) Maintain a program for independent management review and audit of all phases of site design and operation.

(12) Maintain a site environmental monitoring and surveillance program.

(g) A site-specific program shall be implemented to protect the health and safety of site personnel and to maintain personnel exposures to within the limits set in Part 20 of this Chapter, but furthermore as low as reasonably achievable. At a minimum, the program shall include the following:

(1) Training,

(2) Monitoring of radiation exposures of all personnel or site visitors,

(3) Surveys of receipt, handling, and disposal operations,

(4) Controls to preclude personnel or equipment from leaving a restricted area prior to a radiation survey and the removal of contamination if detected, and

(5) Specific, written procedures for receiving, handling, and disposing of LLW, which at a minimum describes:

(i) The waste handling equipment and radiation monitoring equipment required, as well as the use of this equipment and instrumentation;

(ii) The personnel required and their duties;

(iii) The operations to be performed;

(iv) Methods to effectively use time, shielding, and distance to minimize exposures;

(v) Action levels and contingency plans;

(vi) Protective clothing to be worn by site personnel.

(6) Plans and equipment for safely handling emergencies or abnormal situations,

(7) A formal management review and audit of the program, to be conducted periodically.

(h) The applicant shall implement and maintain a site surveillance program which shall include, but not necessarily be limited to:

(1) Daily visual inspections of the site and site operations by the site management.

(2) Periodic site surveys to maintain contamination of personnel, vehicles, equipment, clothing, buildings, and other site areas to levels as low as reasonably achievable and within specified limits.

(3) Periodic inspection of fences or other barriers to unauthorized site ingress, plus any site equipment and instrumentation important to physical security.

(4) Periodic inspections of natural and engineered surface and (applicable) subsurface features and barriers for damage, weathering, erosion, gullying, cracking, uplift, or subsidence to the extent that such occurrences may reduce the ability of the facility to protect the health and safety of the public and site personnel or comply with paragraph 61.94 (long-term performance objectives).

(5) Procedures to correct abnormalities or potentially unsafe conditions as may be determined through the above surveys and inspections, including provisions to resurvey and reinspect any corrections made.

(6) Procedures for maintaining records of all surveys and inspections made as part of the site surveillance program. Such records shall be kept in a suitable form for NRC inspection.

61.100 Segregation of waste

(a) The applicant shall apply sufficient controls on the receipt, acceptance, handling, storage, and disposal of LLW to enable him to segregate the received LLW and to apply specific disposal methods or use specific locations on the site to assure safety and compliance with the long-term performance objectives of paragraph 61.94. Such controls shall include:

(1) Restrictions on the radiological and chemical content and concentration of LLW accepted for disposal by the disposal method authorized at the facility.

(2) Specific requirements for disposal of LLW based on the types, forms, chemical content, and radionuclide content and its concentration in the LLW received.

(b) Controls applied under this paragraph shall be subject to specific written procedures promulgated by the applicant, and shall be subject to confirmation through the quality assurance and management review and audit programs.

61.102 Environmental monitoring applicant.

(a) At least one full year prior to any major site construction, a preoperational monitoring program shall be conducted to provide baseline data on the proposed LLW disposal facility site and its environs. Throughout the construction, operation, closure, and post-closure maintenance and observation of the disposal facility, an operational monitoring program shall be put into effect and maintained by the applicant until the license for the disposal facility is terminated by NRC.

(b) The following will be considered by the applicant in establishing the environmental monitoring program:

(1) The location and design of the facility as well as the geomorphological, meteorological, hydrological, and demographic characteristics of the site and the area surrounding the site.

(2) The diversity and significance of potential pathways to man.

(3) The radioisotopic and chemical content of the LLW received for disposal.

(c) Based upon the above considerations of site investigation and analysis, the applicant shall provide reasonable assurance that sampling locations for the monitoring program are adequately located and sufficiently extensive, and samples are collected and analyzed in sufficient frequency to:

(1) Demonstrate compliance with applicable standards and regulations.

(2) Evaluate environmental impacts of operations.

(3) Provide an early indication of movement of emplaced LLW.

(4) Evaluate potential long-term effects.

(d) Radioisotope and chemical concentrations requiring action (i.e., action levels) for the monitoring program shall be established by the applicant. In the event that these action levels are exceeded, the applicant shall take

steps to verify the samples taken, determine whether the detected levels are caused by LLW movement from the facility, and correct or mitigate the LLW movement detected.

(e) Monitoring systems established by the applicant shall not reduce the ability of the LLW disposal facility to contain LLW.

61.104 Site closure, and stabilization.

(a) Each application for a license to operate a low level waste disposal facility shall include a site closure and decommissioning plan that shall include details of decontaminating and/or dismantling operations, closure and stabilization procedures to be implemented, environmental monitoring programs, licensing requirements, record keeping, use of site history and operational experience, and institutional requirements. The plan shall provide reasonable assurance that the low-level waste disposal facility shall be in such a condition at the time the facility license is terminated and control of the facility is transferred to the custodial organization that:

(1) The low-level waste disposal facility is stabilized so that following site closure and license termination, the need for site maintenance is eliminated.

(2) A monitoring program based on the stabilization plan is established for implementation by the site owner.

(3) The rate of potential releases of radionuclides through air and ground and surface water pathways are below levels set forth in paragragh 61.94 (Long-term Performance Objectives) of this Part.

(4) Direct gamma radiation at the site surface from the wastes disposed of into the disposal facility is at background levels.

(5) A secure passive site security system that requires minimal maintenance is put in place. Stable long-lasting marking devices of low value shall be placed upon the surface which shall indicate the location and nature of the LLW disposed of in the facility.

(6) A buffer zone is established around the site.

(7) The potential for erosion of the facility or loss of facility integrity due to factors such as groundwater, surface water, wind, subsidence, and frost action is minimized.

SUBPART I: PHYSICAL SECURITY

61.106 Physical security.

(a) The disposal facility shall be designed and operated, and administrative procedures and controls provided by the applicant, to protect against potential acts of sabotage to the disposal facility or theft of radioactive material from the disposal facility, which could potentially endanger public health and safety and property.

(b) Measures used by the applicant to ensure compliance with subparagraph (a) above shall include but not necessarily be limited to:

(1) A passive barrier to entry and exit (e.g., a fence) to the disposal facility with controlled access points;

(2) A system for positive identification of individuals entering and leaving the disposal facility;

(3) A system for monitoring individuals, including applicant personnel, and vehicles while on the facility site as well as when leaving the facility;

(4) Communication with local, State, and Federal law enforcement agencies and emergency services.

(c) Procedures for periodically reviewing and auditing the implementation and effectiveness of subparagraphs (a) and (b) above shall be provided and implemented by the applicant.

SUBPART J: REQUIREMENTS ON WASTE PROCESSORS AND INDEPENDENT WASTE PROCESSORS

61.108 Purpose and scope.

(a) As used in this subpart:

(1) A "Waste Processor" is anyone licensed under Parts 30, 40, 50, 61, or 70 under this chapter, and produces LLW which meets the waste form, packaging,

(2) Establish and maintain a quality assurance program to assure compliance with waste form, packaging and content acceptance criteria pursuant to Subpart G.

(3) Establish a measurement and control program, including sampling for radionuclide content and specific activity, determination of mass, volume, and chemical content, and assurance of solidification.

(4) Accompany the transfer of the LLW to an LLW disposal facility with a manifest document containing the information discussed in paragraph 61.78(a) and (b).

61.114 Tests.

(a) All waste processors and independent waste processors shall perform such tests as the Commission deems appropriate or necessary for determining compliance with the waste form, packaging, and content acceptance criteria pursuant to Subpart G including tests on:

(1) LLW form, and packaging.

(2) Radiation detection, measurement and monitoring instruments.

(3) Other equipment and devices used for the processing and packaging of LLW, including effluent treatment and control equipment.

and content acceptance criteria pursuant to subpart G of this part, but, produces such LLW incidental to the main processes or activities licensed (e.g., a nuclear power plant produces LLW incidental to generating electricity).

(2) An "independent waste processor" is anyone licensed under this part who operates a facility which receives and takes title to LLW (which may be generated from a number of different NRC or Agreement State licensees), processes the LLW, and places the LLW into a form and package which meets the LLW acceptance criteria pursuant to subpart G of this part.

(b) This subpart establishes requirements on waste processors and independent waste processors who produce LLW for transfer for disposal at an LLW disposal facility licensed under this part or by an Agreement State pursuant to Part 150.

61.110 General requirements

Waste processors and independent waste processors shall not transfer LLW for disposal at a LLW disposal facility licensed under this Part or by an Agreement State pursuant to Part 150 unless the LLW meets the waste form, packaging and content acceptance criteria pursuant to Subpart G.

61.112 Operating procedures.

(a) All waste processors and independent waste processors shall:

(1) Establish and maintain operating procedures and controls adequate to assure safe handling, processing, solidifying, and packaging of LLW.

61.116 Audits.

(a) All waste processors and independent waste processors shall establish and maintain an audit program to assure the waste form, packaging, and content meet the waste form packaging, and content criteria of Subpart G.

(b) The audits shall be performed in accordance with written procedures or check lists by appropriately trained personnel not having direct responsibility in the areas being audited.

(c) Audit results shall be documented and reviewed by management having responsibility in the area audited. A record of the audit program shall be permanently maintained by the applicant and be available for NRC inspections.

(d) Followup action, including correction and reauditing of deficient areas, shall be taken where indicated.

61.118 Additional requirements on independent waste processors.

(a) All independent waste processors shall apply sufficient controls on the receipt and acceptance of LLW as may be required or appropriate to ensure safety. Such controls shall include:

(1) Restrictions on the types, forms, and chemical and radionuclide content and concentration of the as-received LLW.

(2) Restrictions or requirements on waste packaging, including the requirement that all as-received waste packages must comply with applicable DOT transportation regulations.

(3) Identification and certification by the waste generator of the type, form, chemical content, and radionuclide content and concentration of the as-received LLW.

(b) All independent waste processors licensed under this part shall conduct operations in compliance with the appropriate requirements of paragraph 61.98 (f) and (g).

SUBPART K: DISPOSAL OF LOW-ACTIVITY BULK SOLID WASTE

To be added later (basically modeled after the proposed uranium mill tailings regulation)

DRAFT TECHNICAL BASIS FOR SUPPORTING ADDITIONAL TECHNICAL CRITERIA AND REGULATORY GUIDES TO IMPLEMENT THIS PART FOR LAND BURIAL OF LOW LEVEL WASTES

Introduction

This document provides additional guidance and technical criteria for design, operation, closure, and post-operational care of a LLW disposal facility using land burial as a disposal method. General criteria for a LLW disposal facility are provided in the main body of this Part, and are applicable whether or not additional criteria are so stated here. For purposes of this document, a land burial disposal facility is a disposal facility in which LLW is emplaced into the ground above the water table, and then covered with a minimum of three meters of cover material. Depending upon the radionuclide content of the LLW, additional cover material up to 15 meters may be required. Disposal into excavated trenches is the technique generally utilized, although the guidelines apply equally well to disposal variations such as the use of caissons or slit trenches. Engineered barriers as well as natural barriers are used to contain the disposed of LLW.

NRC believes that in establishing criteria for the design, operation, and closure of a land disposal facility, flexibility is needed to account for the nature of the waste and of site specific conditions. For example, facilities sited in humid environments require programs to manage water while facilities sited in arid environments may require less extensive water management programs but more extensive measures to control wind erosion. The overall goals of siting, design, operation, and closing a LLW disposal facility are (1) to assure LLW confinement, and (2) to leave the disposal facility in a condition following closure that requires only passive care by the site owner. As many passive barriers, both engineered and natural, as feasible should be used to

preclude radionuclide movement from the facility, taking into account social and technical considerations. Short-term economic considerations are generally of secondary importance to the achievement of the above goals.

I. Siting.

(a) Land burial facilities should be sited in low-population areas having small topographic relief and where disruption and dispersion of the site surface by natural forces are eliminated or reduced to the maximum extent reasonably achievable. Preferred sites are those having gradual natural slopes in the range of 2 to 10 degrees to preclude ponding of rainwater and to promote gradual runoff without erosion. Erosion and weathering of the site should not be proceeding at a rate which could significantly effect the character of the land surface during the next few hundred years. Movement of groundwater in the underlying aquifer should be monodirectional (e.g., there should be no groundwater breaks beneath the site) and hydraulic gradients should be low.

(b) The ion exchange capacity of the site soil beneath the buried waste, combined with the distance from the buried waste to the underlying aquifer should serve to provide a long residence time for radionuclide migration from the waste to the acquifer. The highest recorded depth of the groundwater table should be a minimum of three meters below the maximum depth of disposed LLW. Depending upon site conditions such as local meteorology and the degree of seasonal fluctuation in the groundwater table, and upon the level and extent of the background information provided by the applicant, additional distance between the buried LLW and the water table may be required.

(c) Preferred sites are those having a hydrogeologic environment and stratigraphy in which the movement of percolating water can be readily predicted. The underlying site media should therefore be generally homogeneous and simple,

containing a minimum of layered strata containing highly permeable zones. The LLW emplaced in the disposal trench should be separated from fractured zones such as fractured bedrock by a thickness of geologic material of low permeability sufficient to retard the migration of radionuclides into the fractured zone, but no closer than three meters from waste. Subsurface flow should be such that flow lines from the burial area are directed away from fractured zones.

(d) The site should be devoid of surface waters and should be preferentially located sufficiently far away (generally a minimum of one kilometer) to provide for several hundred years of residence time for radionuclides potentially migrating to a surface water body.

II. Design and Operations

(a) The design and operation of the disposal facility shall be principally directed toward (1) isolation of the disposed of LLW from water, and (2) preparing the site so that following decommissioning of the disposal facility, the need for active site maintenance by the site owner is eliminated. The activities performed by the applicant to achieve these goals is dependent upon waste content of site-specific conditions.

(b) The nature and ion exchange capability of the geologic media surrounding the emplaced LLW shall be such to greatly reduce (1) the potential migration of radionuclides both vertically and horizontally from the emplaced LLW, and (2) potential horizontal influx of percolating H_2O into the emplaced LLW. Should significant portions of the strata contain zones having permeabilities of greater than about 1×10^{-5} cm/sec, the applicant should consider means to reduce the permeability of the soil around the emplaced LLW. This can be accomplished by constructing low permeability (e.g., less than 1×10^{-7} cm/sec) walls around

the LLW, and/or lining the walls and bottom of the excavated areas with low permeability material.

(c) The emplaced LLW should be provided with means to quickly remove any accumulated water. For LLW disposed of in facilities sited in humid environments (e.g., above about 10 inches of rainfall a year) a recommended practice is to place a one foot thick layer of highly permeable material such as sand and gravel beneath the emplaced LLW to channel any percolating water to a sump where the water can be removed via a drain pipe. Emplacement operations should allow rainwater to drain away from the waste where it can be removed. Any water contacting the LLW shall be collected, analyzed, treated, and released or solidified and disposed of onsite.

(d) Operations must include a significant effort to minimize void spaces between the disposal of LLW packages so as to prevent collapse of the trench cover. Measures to accomplish this may include special emplacement techniques, waste segregation, compaction of the waste, and filling the spaces between the waste packages with a non-compressible hardening material such as asphalt or grout. Special care must be taken to preclude voids when disposing of unpackaged waste material such as machinery which if packaged before burial would lead to inefficient use of facility space and subsequent collapse of the cover material.

(e) For waste suitable for disposal by shallow land burial (see Section III below), a minimum of three meters of covered material should separate the disposed of LLW and the land surface. The cover shall be mounded to facilitate surface water runoff. For waste suitable for disposal by intermediate depth burial, a minimum of 10 meters of cover material should separate the disposed of LLW and the land surface. This cover material should incorporate a barrier to prevent contact of the waste by infiltrating rainwater. For humid

sites, this barrier should cover the entire area used for disposal of LLW and should be composed of a natural in-place clay moisture barrier at least three feet (1 meter) thick and having a permeability of less than or equal 1×10^{-7} cm/sec. A 6-inch layer of sand and gravel overlying the barrier should be then added to ensure that the barrier is kept moist and to help direct precipitating water. For sites where evapotranspiration exceeds rainfall by greater than 20 inches a year, an increased depth of cover (6 meters) may be all that is required to preclude rainfall contact with the LLW.

(f) Following LLW disposal and application of the cover material, the excavated and filled area should approximate the original grade of the slope, but no steeper than 10% grade. Low spots which may serve to pond surface water shall be eliminated. The top 6 inches of the overburden should normally consist of top soil to support a shallow rooted grass cover to stabilize the cover material from wind and water erosion. A hardy type of local grass growing dense enough to choke out other types of potentially deeper-rooted grasses or plants is preferred. If the site is located in an area where there is insufficient rainfall to support a grass cover, the site should instead be stabilized by a layer of six inches (minimum) of riprap.

(g) The site design shall include diversion structures (e.g., dykes, drainage ditches) constructed so that surface water runoff during operations will be prevented from contacting the LLW as it is being stored and disposed of. (Diversion structures, however, shall not be depended upon to provide long-term protection of the closed site.) The design of the facility shall also include means to shield the LLW, both prior to, during, and after emplacement of the LLW into the ground from contact with rainwater or snowmelt. This can be accomplished by covering the stored and disposed of LLW with portable awnings

or tarpaulins until the natural in-place soil barrier can be emplaced over the LLW.

(h) The disposed of LLW shall be located by placement of fixed, long-lasting markers keyed to bench marks and indicating the activity and quantity of the LLW buried plus any other information as may be required.

III. Waste Segregation.

(a) In accepting and disposing of LLW, consideration must be given to both the chemical and radionuclide content of the waste. LLW containing radionuclides in concentrations exceeding those tabulated below are generally not acceptable for disposal by shallow land burial (e.g., a minimum of three meters of cover material over the disposed of LLW), although higher concentrations may be acceptable provided that sufficient barriers to reclaimer intrusion are provided by the applicant. Higher concentrations may also be acceptable depending upon the form of the LLW, and the special distribution of the radionuclides of interest within the waste. In addition, evaluation of site-specific characteristics may result in more restrictive acceptable radionuclide concentrations or disposal facility radionuclide inventories, based on an evaluation of groundwater migration.

(b) LLW exceeding radionuclide concentrations for shallow land burial may be disposed of by intermediate depth burial or another disposal method providing an equivalent degree of isolation. (For intermediate depth burial, a minimum of 10 meters of cover material must separate LLW and the earth's surface). Acceptable radionuclide concentration and site inventories for intermediate depth burial are generally limited on a site-specific basis.

(c) LLW received at the site and containing chelating agents, toluene, xylene, biological, or pathogenic material shall be segregated from other LLW

Radionuclide Concentration Guidelines for Disposal by Shallow Land Burial

Nuclide	Concentration (Ci/m^3)
^{3}H	460
^{14}C	2.4E-3
^{55}Fe	-
^{60}Co	1.9E+3
^{90}Sr	0.02
^{99}Tc	0.1
^{129}I	0.3
^{135}Cs	0.2
^{137}Cs	1.3
^{235}U	0.03
^{238}U	0.03
*^{237}Np	0.03
*^{238}Pu	0.4
*^{239}Pu	0.1
*^{240}Pu	0.1
*^{241}Pu	0.6E3
*^{242}Pu	0.1
*^{241}Am	0.4
*^{243}Am	0.3
*^{242}Cm	-
*^{244}Cm	170

*The concentrations (as well as those for the non-transuranic nuclides) have been obtained from NRC's waste classification study and are included herein as an example. Although the study shows that these concentrations may be acceptable, the disposal of transuranic radionuclides at all commercial and governmental sites is currently limited to concentrations less than 10 nCi/gm of waste.

received at the site, stored separately at the disposal facility, and disposed of separately from other LLW received at the site.

IV. Environmental Monitoring Program--applicant.

(a) The environmental monitoring program established by the applicant shall be based upon site-specific conditions but should include samples taken at least quarterly of groundwater, soil, and vegetation. Groundwater monitoring stations should be located onsite both hydraulic upgradient and downgradient from the disposed of waste. Multiple sampling points at different depths are encouraged. In addition, samples from at least two of the closest off-site private, public, or livestock water supplies should be obtained. Soil and vegetation samples should be taken onsite at locations downwind of the prevailing wind patterns as well as from the complete and capped trenches. Samples should be analyzed for radioactivity content in addition to the requirements for non-radioactive pollutant sampling as stipulated in 40 CFR 250.43-8(c)(5).

(b) At least quarterly, the applicant should sample the zone of aeration between the bottom of the emplaced LLW and the surface of the watertable. Piezometers of other equipment intended to collect such samples should therefore be installed prior to emplacement of the LLW.

(c) Samples from burrowing animals indigenous to the area should be collected at least semi-annually.

(d) At least monthly, sumps should be checked to determine whether water has collected in them. If so, the water should be removed, solidified, and disposed of onsite, and measures taken to eliminate the cause of accumulated water. Also at least monthly, the level of the water table under the site should be recorded at different locations onsite.

(e) At all times during waste disposal or waste processing operations, a continuous air monitor shall be located and operated to detect and measure the potential airborne radioactivity released during these operations.

V. Monitoring--Site owner.

The final disposition of the LLW disposed of into the LLW disposal facility shall be such that the need for ongoing active maintenance is not necessary to preserve confinement. As a minimum, annual site inspections, including site surveillance and environmental monitoring, shall be conducted by site owners to confirm the integrity of the stabilized waste and to determine the need, if any, for maintenance and/or additional monitoring. Results of the inspections shall be reported to the Commission within 60 days following each inspection. The Commission may require more frequent site inspections if, on the basis of a site-specific evaluation, such a need appears necessary based on results of the inspection program or the features of a particular LLW disposal system.

VI. Site Closure and Decommissioning Plan.

(a) All applications to site and operate a land burial facility shall include a site closure and stabilization plan. This plan shall be specific to the site and shall include consideration of site and regional specific parameters as well as any agreements that may have been concluded between the applicant, the site owner, and the health department in the State in which the site is located. The overall objective of the plan is to leave the site in a condition such that the need for active ongoing maintenance is eliminated and only passive surveillance and monitoring are required at the point when the license is terminated. The plan shall be updated at license renewal based on

license consideration of the operating history of the site, the site performance as indicated by the surveillance and monitoring programs, site inventories, anticipated future use of the site, or other factors.

(b) A final version of the site closure and decommissioning plan must be approved by the Commission prior to implementation by the applicant. This does not mean, however, that the applicant should delay implementing the complete plan until the site is filled with LLW. Rather, NRC encourages the applicant to design the facility so that the plan is implemented in stages as the site is filled. This procedure provides a means of determining the effectiveness of the plan as the site is being filled and minimizes the risk of the need for major remedial actions at site closure.

(c) As a minimum, the plan should include the following:

(1) Bury all waste in accordance with the requirements of the license.

(2) Dismantle, decontaminate, as required and dispose of all structures, equipment, and materials that are not to be transferred to the site owner.

(3) Document the arrangements and the status of the arrangements for orderly transfer of site control and for long-term care by the site owner. Also document the agreement, if any, of State or Federal governments to participate in, or accomplish, any objective. Specific funding arrangements to assure the availability of funds to complete the site closure and decommissioning plan must be made in accordance with this part.

(4) Direct gamma radiation from buried wastes should be essentially background.

(5) Demonstrate that the rate of release of radionuclides through air and ground and surface water pathways are at or below acceptable levels. Acceptable levels for water are those set forth in paragraph 61.94, at the site

boundary and EPA drinking water limits at the nearest water supply. Acceptable levels for air are a small fraction of those in 10 CFR Part 20, Appendix B. The EPA environmental standard for disposal of low-level wastes should be used when available.

(6) Render the site suitable for surface activities during custodial care by the site owner. Planned custodial care should be limited to activities such as vegetation control, minor maintenance, and environmental monitoring. Final conditions at the site must be acceptable to the site owner and compatible with its plans for the site.

(7) Demonstrate that all emplaced LLW are above water table levels taking into account the complete history of seasonal fluctuations.

(8) Eliminate the potential for erosion or loss of site or LLW integrity due to factors such as groundwater, surface water, wind, subsidence, and frost action. For example, and overall site surface water management system must be established for humid sites to drain rainwater and snowmelt away from the buried LLW. All slopes must be sufficiently gentle to prevent slumping of gullying. The surface must be stabilized with established short rooted grass, rock, riprap, or slumping of caps does not occur.

(9) Demonstrate that LLW markers are in place, stable, and keyed to benchmarks. Identifying information must be clearly and permanently marked.

(10) Compile and transfer to the site owner complete records of site maintenance and stabilization activities, emplaced LLW elevation and locations (in USGS coordinates), radionuclide inventories, and monitoring data for use during custodial care for unexpected corrective measures and data interpretation.

(11) Establish a buffer zone surrounding the site sufficient to provide space to stabilize slopes, incorporate surface water management features, assure

that future excavations on adjoining areas would not compromise emplaced LLW or site integrity, and providing working space for unexpected mitigating measures in the future. The buffer zone must also be transferred to the custodial agency. The width of the buffer zone will be determined on a site specific basis but may not generally be less than 100 feet.

(12) Provide a secure passive site security system (e.g., a fence) that requires minimum maintenance.

(13) Stabilize the site in a manner to minimize environmental monitoring requirements for a long-term custodial phase and develop a monitoring program based on the stabilization plan for implementation by the site owner.

(14) Investigate the causes of any statistical singificant increases in environmental samples which have occurred during operation and stabilization. In particular, any evidence of unusual or unexpected rates or levels of radionuclide migration in or with the groundwater must be analyzed and corrective measures implemented.

(15) Eliminate the need for active water management measures, such as sump or trench pumping, and treatment of the water to assure that wastes are not leached by standing water in the trenches. Passive systems are preferred. Engineered methods of intercepting contaminated groundwater or diverting groundwater should also be passive.

(16) Evaluate present and zoned activities on adjoining areas to determine their impact on the long-term performance of the site and take reasonable action to minimize the effects. Staff recognizes that these actions would normally be limited to areas under control of the licensee.