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Annotated List of Regulations and Guidance Applicable to Temporary Storage of Commercial Low-Level Radioactive Waste

National Low-Level Waste Management Program

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ANNOTATED LIST OF REGULATIONS AND GUIDANCE APPLICABLE TO TEMPORARY STORAGE OF COMMERCIAL LOW-LEVEL RADIOACTIVE WASTE

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National Low-Level Waste Management Program
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ABSTRACT

Compliance with the Low-Level Radioactive Waste Policy Amendments Act of 1985 (the Act) (Public Law 99-240), requires that States be responsible for the management and disposal of low-level radioactive waste (LLW) generated within their borders on January 1, 1993. Many States have indicated that they will not have LLW disposal capacity by the deadline and will need to consider other waste management options. A major option will be temporary storage of LLW.

This document was prepared to help current and potential LLW storage management systems comply with applicable regulations. A list of major agencies and Federal laws applicable to storage of LLW and an annotated listing of regulations, guidance, and reference material applicable to temporary storage of LLW are provided. Also, the regulations and guidance are categorized into seven major areas of applicability concerning temporary storage of LLW.

When considering temporary storage, States and compact regions have two broad options: (1) storage by the generators and brokers at the point of generation or collection, and (2) storage at a centralized temporary storage facility. Centralized temporary storage could take place at more than one facility, and States could choose to combine the options with some centralized storage and some storage at the generators.

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ANNOTATED LIST OF REGULATIONS AND GUIDANCE APPLICABLE TO TEMPORARY STORAGE OF COMMERCIAL LOW-LEVEL RADIOACTIVE WASTE

1. INTRODUCTION

Beginning on January 1, 1993, the Low-Level Radioactive Waste Policy Amendments Act of 1985 (the Act) makes States responsible for managing commercial low-level radioactive waste (LLW) generated within their borders. Also as a result of the Act, the three operating LLW disposal facilities located in Washington, Nevada, and South Carolina will close or may deny access to LLW generators outside their borders after December 31, 1992.

In spite of substantial incentives and penalties, many States may be unable to establish permanent disposal capacity for their LLW beginning in 1993. As a result, various States have begun examining alternative management techniques while awaiting the establishment of permanent disposal. One of the options being considered is temporary storage of LLW.

When considering temporary storage, States and compact regions have two broad options: (1) storage by the generators and brokers at the point of generation or collection, and (2) storage at a centralized temporary storage facility. Centralized temporary storage could take place at more than one facility, and States could choose to combine the options with some centralized storage and some storage at the generators.

To help States develop LLW management systems, this report provides an updated source of information on agencies, laws, regulations, and guides applicable to temporary storage of LLW.

This report is divided into three sections.

1. Major agencies and responsibilities

2. Major Federal laws applicable to temporary storage of LLW

3. Annotated list of regulations and guidance applicable to temporary storage of LLW.

2. MAJOR AGENCIES AND RESPONSIBILITIES

In order for an entity to comply with laws and regulations and receive guidance concerning temporary storage of LLW, the following list of agencies and their responsibilities is provided.

Local and State Governments

- Local and State laws and regulations
- Land use
- Zoning
- Ownership and liability
- Permits and licenses
- Enforcement and inspection
- Applicable codes and standards

U.S. Nuclear Regulatory Commission (NRC)

- Licenses and regulates waste storage and disposal under NRC and Environmental Protection Agency (EPA) limits
- Guidance

U.S. Environmental Protection Agency

- Environmental standards, including mixed waste and radiation standards
- Regulations and guidance

U.S. Department of Labor (DOL), Occupational Safety and Health Administration

- Occupational safety and health standards
- Safety and health regulations for construction

U.S. Department of Transportation (DOT)

- Packaging and security

3. MAJOR FEDERAL LAWS APPLICABLE TO TEMPORARY STORAGE OF LLW

The following is a list of major Federal laws applicable to temporary storage of LLW.

3.1 Federal Laws

1. Atomic Energy Act of 1954 (AEA), as amended (Public Law 83-703)

2. Clean Air Act (CAA) (Public Law 91-604)

3. Clean Water Act (CWA) (Public Law 92-500)

4. Comprehensive Environmental Response, Compensation Liability Act (CERCLA) (Public Law 96-510)
   Superfund Amendments and Reauthorization Act (SARA,) 1986
   Emergency Planning and Community Right to Know Act (EPCRA), 1986

5. Energy Reorganization Act of 1974 (ERA) (Public Law 93-438)

6. Hazardous Materials Transportation Act (HMTA) (Public Law 93-633)

7. Low-Level Radioactive Waste Policy Act of 1980 (LLRWPA) (Public Law 96-573)

8. Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) (Public Law 99-240)

9. National Environmental Policy Act (NEPA) (Public Law 91-190)

10. Occupational Safety and Health Act (OSHA) (Public Law 91-596)

11. Resource Conservation and Recovery Act (RCRA) (Public Law 94-580)

12. Safe Drinking Water Act (SDWA) (Public Law 93-523)

13. Toxic Substances Control Act (TSCA) (Public Law 94-469)

3.2 Related Laws

Federal laws that could affect the selection of LLW storage sites within protected areas include

1. Wilderness Act of 1964 (Public Law 88-577)
2. Wild and Scenic Rivers Act (Public Law 90-542)
3. Endangered Species Act (Public Law 93-205)
4. National Wildlife Refuge Act (Public Law 89-669)
5. Laws Establishing National Parks, Historic Properties--Preservation (Public Law 89-665)
6. Archaeological and Historical Preservation Act (Public Law 93-291).

4. REGULATIONS AND GUIDANCE APPLICABLE TO TEMPORARY STORAGE OF LOW-LEVEL RADIOACTIVE WASTES

Federal regulations are listed in the Code of Federal Regulations (CFR), such as 10 CFR 61. The prefix number denotes the subject area. For example:

1. Number 10 has been assigned to Energy

2. Number 40 to the protection of the Environment

3. Number 49 to Transportation

4. Number 29 to Labor, which includes the Occupational Safety and Health Administration.

4.1 Nuclear Regulatory Commission Regulations and Guidance

In general, the NRC develops rules and guidance for civilian radioactive wastes based on research by the NRC and its contractors. Regulations are listed in Title 10, Code of Federal Regulations (10 CFR).

4.1.1 Nuclear Regulatory Commission Regulations

1. "Rules of Practice for Domestic Licensing Proceedings," 10 CFR Part 2, U.S. Nuclear Regulatory Commission, current May 1, 1991.

   Part 2 in Title 10 CFR governs the conduct of all proceedings, (other than export and import licensing proceedings described in Part 110) under the AEA of 1954, as amended, and the ERA of 1974, for: "(a) Granting, suspending, revoking, amending, or taking other action with respect to any license, construction permit, or application to transfer a license; (b) imposing civil penalties under Section 234 of the Act; and (c) public rulemaking."

2. "Nondiscrimination in Federally Assisted NRC Programs," 10 CFR Part 4, U.S. Nuclear Regulatory Commission, current May 1, 1991.

Part 4 in Title 10 CFR implements:

(a) Provisions of the Civil Rights Act of 1964 and the ERA of 1974, which relate to nondiscrimination with respect to race, color, national origin, or sex in any program of activity receiving Federal financial assistance from NRC; (b) Provisions of the Rehabilitation Act of 1973, as amended, which relates to nondiscrimination with respect to the handicapped in any program or activity receiving Federal financial assistance; and (c) Provisions of the Age Discrimination Act of 1975, as amended, which relates to nondiscrimination on the basis of age in any program or activity receiving Federal financial assistance.

3. "Notices, Instructions, and Reports to Workers: Inspection and Reports," 10 CFR Part 19, U.S. Nuclear Regulatory Commission, current May 1, 1991.

Part 19 in Title 10 CFR establishes requirements for notices, instructions, and reports by licensees to individuals participating in licensed activities and options available to these individuals in connection with NRC inspections of licensees to ascertain compliance with the provisions of the AEA of 1954, as amended, the ERA of 1974, and regulations, orders, and licenses thereunder regarding radiological working conditions. The regulations in this part also establish the rights and responsibilities of the NRC and individuals during interviews compelled by subpoena, as part of agency inspections or investigations pursuant to Section 161c of the AEA of 1954, as amended, on any matter within the NRC jurisdiction.

4. "Standards for Protection against Radiation," 10 CFR Part 20, U.S. Nuclear Regulatory Commission, current May 1, 1991.

Part 20 in Title 10 CFR establishes standards for protection against radiation hazards arising from activities under licenses issued by the Nuclear Regulatory Commission.

The regulations in this part control the possession, use, and transfer of licensed material by any licensee in such a manner that the total dose to an individual (not including exposures to radiation from natural background sources or medical diagnosis and therapy) does not exceed the standards of radiation protection prescribed in these regulations.

In addition to complying with the requirements set forth in this part, persons engaged in activities under licenses issued by the NRC must make every reasonable effort to

maintain radiation exposures and releases of radioactive materials in effluent to unrestricted areas as low as is reasonably achievable (ALARA).

10 CFR 20.311 are requirements designed to control transfers of radioactive waste intended for disposal at a land disposal facility, to establish a manifest tracking system, and to supplement existing requirements concerning transfers and record keeping for such wastes (see NRC IF No. 88-16).

5. "Reporting of Defects and Noncompliance," 10 CFR Part 21, U.S. Nuclear Regulatory Commission, current May 1, 1991.

The regulations in 10 CFR 21 establish procedures and requirements for implementation of Section 206 of the ERA of 1974. That section requires any individual director or responsible officer of a firm constructing, owning, operating, or supplying the components of any facility or activity that is licensed or otherwise regulated pursuant to the AEA of 1954, as amended, or the ERA of 1974, to notify the NRC if: (a) information reasonably indicates that the facility, activity, or basic component supplied to such facility or activity fails to comply with the AEA of 1954, as amended, or any applicable rule, regulation, order, or license of the NRC relating to substantial safety hazards, or (b) if that the facility, activity, or basis component supplied to such facility or activity contains defects that could create a substantial safety hazard. The responsible officer must immediately notify the NRC of such failure to comply or such defect, unless that person has actual knowledge that the NRC has been adequately informed of such defect or failure to comply.

6. "Rules of General Applicability to Domestic Licensing of Byproduct Material," 10 CFR Part 30, U.S. Nuclear Regulatory Commission, current May 1991.

This part prescribes rules applicable to all persons in the United States who govern domestic licensing of byproduct material under the AEA of 1954, as amended, and under Title II of the ERA of 1974, and exemptions from the domestic licensing requirements permitted by Section 81 of the Act.

> Except for persons exempt as provided in this part and Part 150 of this chapter, no person shall manufacture, produce, transfer, receive, acquire, own, possess, or use byproduct material except as authorized in a specific or general license issued pursuant to the regulations in this chapter.

7. "Domestic Licensing of Source Material," 10 CFR Part 40, U.S. Nuclear Regulatory Commission, current May 1991.

The regulations in this part (a) establish procedures and criteria for the issuance of licenses to receive title to, receive, possess, use, transfer, or deliver source and byproduct materials, as defined in this part, and (b) establish and provide for the terms and conditions upon which the NRC will issue these licenses.

These regulations also provide for the disposal of byproduct material and for the long-term care and custody of byproduct material and residual radioactive material.

The following are defined in this part as

> "Byproduct Material"--The tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.
>
> "Source Material"--Means uranium or thorium, or any combination thereof, in any physical or chemical form.

8. "Domestic Licensing of Production and Utilization Facilities," 10 CFR, Part 50, U.S. Nuclear Regulatory Commission, current May 1991.

The regulations in this part are promulgated by the NRC pursuant to the AEA of 1954, as amended, and Title II of the ERA of 1974, to provide for the licensing of nuclear production and utilization facilities.

For proposed increases in storage capacity for LLW generated by normal reactor operation and maintenance at power reactor sites, the safety of the proposal must be evaluated by the licensee under the provisions of 10 CFR 50.59.

9. "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," 10 CFR Part 51, U.S. Nuclear Regulatory Commission, current May 1991.

This part contains environmental protection regulations applicable to NRC's domestic licensing and related regulatory functions. These regulations do not apply to export licensing matters or to any environmental effects that NRC's domestic licensing and related regulatory functions may have upon the environment of foreign nations. Subject to these limitations, the regulations in this part implement Section 102 (2) of the NEPA of 1969, as amended.

10. "Licensing Requirements for Land Disposal of Radioactive Wastes," 10 CFR Part 61, U.S. Nuclear Regulatory Commission, current May 1991.

10 CFR Part 61, promulgated in December 1982, establishes performance objectives for commercial disposal sites, sets forth a classification system of waste acceptable for shallow-land disposal, and defines the responsibilities of involved parties in shallow-land disposal of radioactive waste.

Section 61.41 provides the overall performance objective for the safe disposal of LLW in terms of doses--limiting the dose to any member of the public from any release to less than 25 mrems/yr for the whole body, 75 mrems/yr to the thyroid gland, and 25 mrems/yr to any other organ.

Two NRC/technical position papers are available on the following subjects:

a. NRC/Technical Position Paper, "Technical Position on Waste Form," Rev. 1, January 1991.

This document elaborates on the provisions of Section 61.56. Having low concentrations of nuclides, Class A wastes do not have to be stabilized, but must be segregated from Classes B and C wastes on disposal. If Class A wastes are solidified and segregated from Class B and Class C wastes, minimum disposal provisions include free-standing monoliths with a free liquid content no more than 0.5% by volume. If not segregated, Class A wastes must meet the structural stability requirements of Class B and C wastes (see NRC IF No. 89-27).

b. NRC/Technical Position Paper, "Technical Position on Radioactive Waste Classification," Rev. 0, May 1983.

Section 61.55 of 10 CFR Part 61 contains two tables limiting radionuclide concentrations for three classes of wastes considered suitable for near-surface disposal. The classifications take into account the radiological hazard of the nuclides of concern and also provide for wastes containing mixtures of nuclides. Any licensee who transfers waste either to a land disposal facility or to a waste collector must classify the transferred waste. Any licensed waste processor who treats or repackages waste for disposal must also classify those wastes.

11. "Domestic Licensing of Special Nuclear Material," 10 CFR Part 70, U.S. Nuclear Regulatory Commission, current May 1991.

The regulations of this part establish procedures and criteria for the issuance of licenses to receive title to, own, acquire, deliver, receive, possess, use, and initially transfer

special nuclear material, and establish and provide for the terms and conditions upon which the NRC will issue such licenses.

As defined in this part, "special nuclear material" means plutonium, uranium-233, uranium enriched in the isotope 233, or in the isotope 235, and any other material that the NRC, pursuant to the provisions of Section 51 of the Act, determines to be special nuclear material but does not include source material.

12. "Packaging and Transportation of Radioactive Material," 10 CFR Part 71, U.S. Nuclear Regulatory Commission, current May 1991 (see NRC IF No. 84-14).

This part establishes requirements for packaging, preparation for shipment, and transportation of licensed material.

The regulations in this part apply to any licensee authorized by specific license issued by the NRC to receive, possess, use, or transfer licensed material if the licensee delivers that material to a carrier for transport or transports the material outside the confines of the licensee's facility, plant, or other authorized place of use.

When transporting or delivering packages, licensees may be required by a provision of 10 CFR Part 71.5 to conform to certain standards and requirements of the DOT.

13. "Reactor Site Criteria," 10 CFR Part 100, U.S. Nuclear Regulatory Commission, current May 1991.

It is the purpose of this part to describe criteria that guide the NRC in its evaluation of the suitability of proposed sites for stationary power and testing reactors subject to 10 CFR Part 50.

Facility design and operation should ensure that radiological consequences of design basis events (fire, tornado, seismic event, flood) should not exceed a small fraction of 10 CFR 100, i.e., no more than a few rem whole body dose.

14. "Exemptions and Continued Regulatory Authority in Agreement States and in Offshore Waters under Section 274," 10 CFR Part 150, U.S. Nuclear Regulatory Commission, current May 1991.

The regulations in this part provide certain exemptions to persons in Agreement States from the licensing requirements contained in Chapters 6, 7, and 8 under Section 274 of the AEA of 1954, as amended, and from the imposing requirements upon persons who receive, possess, use, or transfer byproduct material, source, or special nuclear material in quantities not sufficient to form a critical mass; and defines activities in Agreement

States and in offshore waters over which the regulatory authority of the NRC extends. The provisions of the Act and NRC regulations apply to all persons in Agreement States and in offshore waters engaging in activities over which the regulatory authority of the NRC extends.

The regulations in this part apply to all States that have entered into agreements with the NRC or the Atomic Energy Commission pursuant to subsection 274b of the Act.

An Agreement State is one that has entered into an agreement with the NRC to regulate specific aspects of activities involving generation, use or disposal of radioactive materials within its borders under Section 274 of the AEA of 1954. The Agreement State's regulations must be consistent with NRC regulations.

4.1.2 Nuclear Regulatory Commission Guides

Supplementing the regulations are NRC documents called Regulatory Guides that provide information on quality assurance, design bases, calculation methods, and the form for reporting.

1. "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluent from Light Water-Cooled Nuclear Power Plants," Regulatory Guide 1.21, U.S. Nuclear Regulatory Commission, revised June 1974.

   The guide describes programs acceptable to the NRC staff for measuring, reporting, and evaluating releases of radioactive materials; and establishes guidelines for classifying and reporting the categories and radioactive level of solid waste in accordance with 10 CFR 50 and 10 CFR 20.

2. "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light Water-Cooled Nuclear Power Plants," Regulatory Guide 1.143, U.S. Nuclear Regulatory Commission, revised October 1979.

   The guide presents design guidance for radioactive waste management systems, structures, and components.

3. "Guidance for Selecting Sites for Near-Surface Disposal of Low-Level Radioactive Waste," Regulatory Guide 4.19, U.S. Nuclear Regulatory Commission, August 1988.

   This guide provides guidance for conducting a site screening investigation. The purposes of the screening are to identify a site or sites that have a high potential for meeting the

site suitability requirements of 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste."

4. "Administrative Guide for Packaging and Transporting Radioactive Material, "Regulatory Guide 7.1, U.S. Nuclear Regulatory Commission, June 1974.

   NRC's regulation 10 CFR 71, "Packaging of Radioactive Material for Transport and Transportation of Radioactive Material under Certain Conditions," applies to licensees of the NRC who transport licensed material or who deliver licensed material to a carrier for transport. In their transport or delivery of packages, licensees may be required by a provision of 10 CFR 71.5 to conform to certain standards and requirements of the DOT.

   This regulatory guide describes a method for NRC licensees to comply with the provision in 71.5 with respect to determining an applicable packaging design, package content limitation, and label that must be applied to the package.

5. "Procedures for Picking Up and Receiving Packages of Radioactive Material (For Comment)," Regulatory Guide 7.3, U.S. Nuclear Regulatory Commission, May 1975.

   This regulatory guide describes a method for NRC licensees to comply with the *provisions in 10 CFR Part 20.205, with respect to arrangements for receipt, pickup, and* monitoring of packages containing radioactive material and with respect to reporting of packages that show evidence of leakage or excessive radiation levels upon receipt.

6. "Radiation Symbol," Regulatory Guide 8.1, U.S. Nuclear Regulatory Commission, February 1973.

   Section 20.203 of 10 CFR Part 20, "Standards for Protection against Radiation," sets forth requirements for caution signs, labels, signals, and controls, including a radiation symbol, to be used in conjunction with specified wording in posting areas where radioactive material or radiation is or may be present and in labeling containers of radioactive material. This guide defines the characteristics of an acceptable radiation symbol.

7. "Guide for Administrative Practices in Radiation Monitoring," Regulatory Guide 8.2, U.S. Nuclear Regulatory Commission, February 1973.

   The NRC's "Standards for Protection Against Radiation," 10 CFR Part 20, requires each licensee to make, or cause to be made, surveys to evaluate radiation hazards (20.201), and to supply and require the use of appropriate personnel monitoring equipment (20.202). Part 20 also sets limits on the exposure of individuals to radiation (20.101,

20.305). Section 20.401 requires each licensee to maintain records of surveys, waste disposal, and the radiation exposures of all individuals for whom personnel monitoring was required under Section 20.202.

This guide also provides general information on radiation monitoring programs for administrative personnel.

8. "Occupational Radiation Exposure Records Systems," Regulatory Guide 8.7, U.S. Nuclear Regulatory Commission, May 1973.

Section 20.401 of 10 CFR Part 20, "Standards for Protection against Radiation," requires licensees to maintain records showing the radiation exposures of all individuals for whom personnel monitoring is required. This guide describes an acceptable program for the systematic generation and retention of records relating to occupational exposure.

9. "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable," Regulatory Guide 8.8, U.S. Nuclear Regulatory Commission, revised June 1978 (Draft OP 618-4, Second Proposed Revision 4, published May 1982.)

The guide outlines information relevant to maintaining occupational doses ALARA, in accordance with 10 CFR 20.

10. "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable," Regulatory Guide 8.10, U.S. Nuclear Regulatory Commission, revised May 1977.

Paragraph 20.1(c) of 10 CFR Part 20 states in part that licensees should make every reasonable effort to maintain radiation exposures as far below the limits specified in that part as practicable. This guide describes to licensees a general operating philosophy as a necessary basis for a program of maintaining occupational exposures to radiation ALARA.

11. "Instruction Concerning Prenatal Radiation Exposure," Regulatory Guide 8.13, U.S. Nuclear Regulatory Commission, Revised December 1987, (Draft OP 031-4, Proposed Revision 2, published August 1981.)

This guide describes the instructions an employer should provide to workers and supervisors concerning biological risks to an exposed embryo/fetus that is under consideration and suggestions for reducing radiation exposure.

This regulatory guide takes into consideration a proposed revision to 10 CFR Part 20, which incorporates the radiation protection guidance for the embryo/fetus approved by the President in January 1987.

12. "Acceptable Programs for Respiratory Protection," Regulatory Guide 8.15, U.S. Nuclear Regulatory Commission, October 1976.

This guide specifies elements of acceptable respiratory protection programs. More detailed advice, including technical needs and background information, may be found in NUREG-0041, *Manual of Respiratory Protection against Airborne Radioactive Materials*; sections are referenced and keyed to appropriate portions of this guide.

13. "Instruction Concerning Risks from Occupational Radiation Exposure," Regulatory Guide 8.29, U.S. Nuclear Regulatory Commission, July 1981.

Section 19.12 of 10 CFR Part 19, "Notices, Instructions, and Reports to Workers; Inspections," requires that instruction be given to all persons working in or frequenting any portion of a restricted area instructed, concerning health protection problems associated with exposure to radioactive materials or radiation.

This guide describes the instruction that should be provided to the worker concerning biological risks from occupational radiation exposure. Additional guides are being or will be developed to address other aspects of radiation protection training.

14. "Compilation of Reporting Requirements for Persons Subject to NRC Regulations," Regulatory Guide 10.1, U.S. Nuclear Regulatory Commission, revised October 1981.

The NRC's regulations set forth in 10 CFR Chapter 1, require the submission of various reports in connection with licensed activities. This guide does not impose additional reporting requirements or give instruction for implementing existing requirements.

The purposes of this guide are (a) to provide a compilation of reporting requirements applicable to the various types of NRC licensees and other persons subject to NRC regulations and (b) to provide information that would assist in the timely and correct distribution of the reports.

4.2 Other Nuclear Regulatory Commission Guidance

The NRC issues generic communications to convey information and operating experience to the industry.

1. *Generic Communications Index: Listings of Communications 1971-1989*, U.S. Nuclear Regulatory Commission, NUREG/CR-4690, SAIC-90/1393, Vol. #1, Rev. 1, May 1991.

   To convey information or operating experience to the industry, the NRC issues generic communications called bulletins (BL), circulares (CR), generic letters (GL), and information notices (IF).

   This report is a generic communications index of all of these reports from 1971 to 1989.

2. "Storage of Low-Level Radioactive Waste at Power Reactor Sites," U.S. Nuclear Regulatory Commission, Generic Letter 81-38, November 10, 1981 (see BNL-NUREG-51841).

   Generic Letter 81-38 provides the NRC's primary guidance on the safety evaluation process applicable to onsite LLW storage. It summarizes the requirements of 10 CFR 50.59. However, it also adds other criteria not contained in Section 50.59, which could necessitate the filing of a new Part 30 license or Part 50 license amendment.

3. "Commercial Storage at Power Reactors of LLW Not Generated by the Utility," U.S. Regulatory Commission, Generic Letter 85-14, August 1, 1985 (see BNL-NUREG-51841).

   For the NRC to consider any proposal for commercial storage at a reactor site, including commercial storage in existing LLW storage facilities, the NRC must be convinced that no significant environmental impact will result and that the commercial storage activities will be consistent with and not compromise safe operation of the licensee's activities, including diverting reactor management attention from the continued safety of reactor operations. A Part 30 license is required for the LLW storage and a Part 50 license amendment may also be required.

4. *Low-Level Radioactive Waste Policy Amendments Act Title Transfer and Possession Provisions*, U.S. Regulatory Commission, SECY-90-318, September 12, 1990.

   SECY-90-318 was prepared to provide an analysis of the issues concerning the title transfer and possession provision of the Amendments Act and to propose options for NRC action. The staff addressed two issues related to onsite LLW storage. The staff will authorize interim (short-term) storage beyond 1996 based on need, but that storage

approvals, needed in 1993, would be authorized for only a single 5-year period using existing guidance, whether at a generator's facility or a State facility. (See U.S. Nuclear Regulatory Commission, "Recommendations on the Title Transfer Provisions of the Low-Level Radioactive Waste Policy Amendments Act of 1985," *Federal Register* Vol. 55, No. 233, page 50064, December 4, 1990.)

5. *Alternative Waste Management Procedures in Case of Denial of Access to Low-Level Radioactive Waste Disposal Sites*, U.S. Nuclear Regulatory Commission, Information Notice No. 89-13, February 8, 1989.

   This notice informs licensees on important recent and potential future events concerning restrictions on disposal of LLW.

   The notice states that licensees who fail to meet milestones may need to prepare for the possibility of restrictions on the disposal of LLW. The notice gives suggested actions to be considered in case of restriction of or denial to LLW disposal sites.

6. *Limitations on The Use of Waste Forms and High-Integrity Containers for the Disposal of Low-Level Radioactive Waste*, U.S. Nuclear Regulatory Commission, Information Notice No. 89-27, March 8, 1989.

   This notice gives reviews from vendor topical reports on the stability of waste forms and high-integrity containers to check for compliance with 10 CFR 61 for burial at LLW disposal sites.

7. *Identifying Waste Generators in Shipments of Low-Level Radioactive Waste to Land Disposal Facilities*, U.S. Nuclear Regulatory Commission, Information Notice No. 88-16, April 22, 1988.

   This notice clarifies 10 CFR Section 20.311 in keeping records and tracking LLW through collection, storage, and disposal operations.

8. *Highlights of Recent Transport Regulatory Revisions by Department of Transportation and the Nuclear Regulatory Commission*, U.S. Nuclear Regulatory Commission, Information Notice No. 84-14, March 2, 1984.

   During 1983, major revisions to nuclear transportation became effective in the United States. Both NRC and DOT have published final amendments in the *Federal Register.* This notice outlines the most prominent changes to 49 CFR and 10 CFR 71.

9. *Segregation of Hazardous and Low-Level Radioactive Wastes*, U.S. Nuclear Regulatory Commission, Information Notice No. 87-03, January 15, 1987.

This notice informs licensees of the importance of keeping LLW segregated from hazardous wastes because of regulatory indecision concerning mixed waste.

10. *Low-Level Radioactive Waste Scaling Factors, 10 CFR, Part 61*, U.S. Nuclear Regulatory Commission, Information Notice No. 86-20, March 28, 1986.

This notice assists licensees in properly determining waste classification scaling factors for different waste streams.

An attachment in the notice describes problems observed by the NRC relative to inappropriate methodologies that are sometimes used by licensees on the application of waste stream scaling factors and provides guidance to avoid those problems.

11. *10 CFR 50.59 Safety Evaluation for Changes to Radioactive Waste Treatment Systems*, U.S. Nuclear Regulatory Commission, Circular No. 80-18, August 22, 1980.

This circular clarifies 10 CFR Section 50.59, which details safety evaluations required whenever changes are made in a facility as described in the Safety Analysis Report.

12. Kempf, C. R., D. R. MacKenzie, and B. S. Bowerman, *Management of Radioactive Mixed Wastes in Commercial Low-Level Radioactive Wastes*, U.S. Regulatory Commission, NUREG/CR-4450, January 1986.

Management options for three generic categories of radioactive mixed waste in commercial LLW are identified and evaluated. These wastes were characterized as part of a Brookhaven National Laboratory study in which LLW generators were surveyed for information on potential chemical hazards in their wastes.

13. Bowerman, B. S., C. R. Kemph, D. R. MacKenzie, B. Siskind, and P. L. Piciulo, *An Analysis of Low-Level Wastes: Review of Hazardous Waste Regulations and Identification of Radioactive Mixed Wastes*, U.S. Regulatory Commission, NUREG/CR-4406, December 1985.

This report reviews the EPA regulations for identifying hazardous wastes, identifies NRC regulatory provisions addressing potential hazardous wastes, and describes potential mixed wastes and current disposal practices for such wastes.

14. Siskind B., D. R. Dougherty, and D. R. Mackenzie, *Extended Storage of Low-Level Radioactive Waste: Potential Problem Areas,* Draft Report, NUREG/CR-4062, BNL-NUREG 51841, December 1984.

If a State or compact does not have adequate disposal capacity for LLW, then extended storage of certain LLW may be necessary. Extended storage of LLW is considered in order to determine areas of concern for the NRC and actions recommended to resolve these concerns. The focus is on the properties and performance of the waste form and waste container. Storage alternatives are considered in order to characterize the likely storage environments for these wastes. The areas of concern are grouped into two categories:

a. Performance of the waste form and/or container during storage (e.g., radiolytic gas generation, radiation-enhanced degradation of polymeric materials, and corrosion).

b. Effects of extended storage on the properties of the waste form and/or container that are important after storage (e.g., radiation-induced embrittlement of high-density polyethylene and the weakening of steel containers resulting from corrosion).

15. Singh, M. H., J. G. Hanchett, and F. W. Hasselberg, *Glossary of Terms: Nuclear Power and Radiation,* U.S. Nuclear Regulatory Commission, NUREG-0770, June 1981.

Glossary of Terms: Nuclear Power and Radiation is a compilation of terms and concepts commonly used in the nuclear power field that are defined to assist the news media and members of the public in understanding this complex technology. The glossary was compiled from a variety of internal and external sources by the NRC Office of Inspection and Enforcement and the Office of Public Affairs.

16. "Extended Interim Storage of Low-Level Radioactive Waste by Fuel Cycle and Materials Licensees," U.S. Nuclear Regulatory Commission, NRC Information Notice No. 90-09, February 5, 1990.

This information notice provides guidance to fuel cycle and materials licensees on information needed in license amendment requests to authorize extended interim storage of LLW at licensed operations. The NRC previously provided guidance on storage of LLW at nuclear power plant sites in Generic Letters 81-38 and 85-14. However, until now NRC has not provided similar guidance for fuel cycle and materials licensees.

17. Siefken, D., G. Pangburn, R. Pennifill, and R.J. Starmer, *Site Suitability, Selection and Characterization*, U.S. Nuclear Regulatory Commission, NUREG-0902, April 1982.

This report provides guidance in site suitability, selection, and characterization of LLW disposal facilities.

18. *Quality Assurance Guidance for a Low-Level Radioactive Waste Disposal Facility*, U.S. Nuclear Regulatory Commission, NUREG-1293, April 1991.

This document provides guidance to an applicant on meeting the quality control (QC) requirements of 10 CFR 61.12 for LLW disposal facilities. The report establishes QA guidance for the design, construction, and operation of these facilities.

19. *Standard Format and Content of a License Application for a Low-Level Radioactive Waste Disposal Facility*, U.S. Nuclear Regulatory Commission, Rev. 2, NUREG-1199, January 1991.

This document discusses the information to be provided in the Safety Analysis Report and establishes a uniform format for presenting the information required to meet the licensing requirements required by 10 CFR Part 61.

20. "Labeling Requirements for Transporting Multi-Hazard Radioactive Materials," U.S. Nuclear Regulatory Commission, Information Notice No. 91-35, June 7, 1991.

This notice is provided to inform licensees of DOT requirements for labeling packages containing hazardous materials that meet the definition of more than one hazard (e.g., radioactive and poison).

21. "Below Regulatory Concern; Policy Statement," U.S. Nuclear Regulatory Commission, 55 *Federal Register* 27,522, July 3, 1990 (see 56 FR 36,068, July 30, 1991).

This policy statement establishes the framework within which the NRC will formulate rules or make licensing decisions to exempt certain practices involving small quantities of radioactive material from some or all regulatory controls.

The policy statement establishes a consistent risk framework for regulatory exemption decisions, ensures an adequate and consistent level of protection of the public in their use of radioactive materials, and focuses the nation's resources on reducing the most significant radiological risks from practices under NRC's jurisdiction.

22. "Radioactive Material; Below Regulatory Concern (BRC) Policy Statement Implementation Deferral," U.S. Regulatory Commission, 56 *Federal Register* 36,068, July 30, 1991.

The NRC has declared a moratorium on the implementation of the BRC Policy and has approved the initiation of a phased consensus-building process on BRC issues (below).

a. *Evaluation of the Feasibility of Initiating A Consensus Process to Address Issues Related to the Below Regulatory Concern Policy, U.S. Regulatory Commission*, SECY-91-132, June 28, 1991.

The NRC has approved the initiation of a phased consensus-building process similar to that outlined in SECY-91-132 provided that, prior to proceeding beyond the core group phase, (a) representatives of all parties who have demonstrated a major interest in the BRC policy are willing to participate and (b) all such parties agree to defer action on other avenues of relief (e.g., legislative and judicial relief) during the consensus process. NRC is establishing a target date of December 1992 as the closure date for the consensus body to provide its final advice on BRC issues to the NRC.

4.3 Environmental Protection Agency Regulations and Guidance

In general, rules on protecting the environment are provided by the EPA. Regulations are listed in 40 CFR.

4.3.1 Environmental Protection Agency Regulations

1. "Environmental Protection Agency Regulations on Public Participation in Programs under the Resource Conservation and Recovery Act, the Safe Drinking Water Act, and the Clean Water Act," 40 CFR Part 25, U.S. Environmental Protection Agency, 1991.

This part sets forth minimum requirements and suggested program elements for public participation in activities under the CWA, RCRA, and the SDWA.

Basic requirements and suggested program elements for public information, public notification, and public consultation are in Section 25.4. These requirements are intended to foster public awareness and open processes of government decision making.

2. "Environmental Radiation Protection Standards for Nuclear Power Operations," 40 CFR Part 190, U.S. Environmental Protection Agency, 1977.

   The provisions of this part apply to radiation doses received by members of the public in the general environment and to radioactive materials introduced into the general environment as the result of operations that are part of a nuclear fuel cycle.

3. Draft proposed 40 CFR 193--"Environmental Radiation Protection Standards for LLW Disposal, Advanced Notice of Proposed Rulemaking," *Federal Register*, 48(170): 39563, August 31, 1983 (Technical Report EPA 520/1-85, in press, Washington, D.C.).

   The proposed 40 CFR Part 193 would establish individual radiation exposure limits for defining LLW with sufficiently low levels of radioactivity to be considered BRC in regard to their radiation hazard.

   The present draft of 40 CFR 193 provides some additional protection beyond 10 CFR 61 relative to storage of LLW:

   1. EPA's draft proposed standards would apply to exposures from direct radiation as well as releases of "radioactive material" or "effluents"; Part 61 only applies to the latter two terms.

   2. EPA's draft proposed standards would apply to "away from generator," or centralized, storage facilities as well as onsite storage of LLW at the disposal site. Part 61.43, "Protection of individuals during operations," applies only to operations at the land disposal facility.

4.3.2 Resource Conservation and Recovery Act

Congress has enacted as national policy the mandate that hazardous waste will be treated, stored, and disposed of so as to minimize the present and future threat to human health and the environment. The EPA and States have sought to implement this mandate in complex regulations issued under the RCRA.

The 1990 draft Annual Report to Congress states: "Mixed waste is low-level radioactive waste that contains materials that: (1) are either listed as hazardous waste in Subpart D of 40 CFR 261; or (2) cause the waste to exhibit any of the hazardous waste characteristics identified in Subpart C of 40 CFR 261. The term "mixed waste" refers exclusively to commercially generated low-level radioactive mixed waste."

Mixed waste is regulated separately and concurrently under the AEA and RCRA. The provisions of the AEA are implemented by the NRC or an Agreement State, and the provisions of RCRA are implemented by the EPA or an authorized State program.

1. "Hazardous Waste Management System: General," 40 CFR Part 260, U.S. Environmental Protection Agency, current July 1, 1990.

   This part provides definitions of terms, general standards, and overview information applicable to Parts 260 through 265 and 268 of this chapter.

2. "Identification and Listing of Hazardous Waste," 40 CFR Part 261, U.S. Environmental Protection Agency, current July 1, 1990.

   This part identifies solid wastes that are subject to regulation as hazardous wastes under Parts 262 through 265, 268, and Parts 270, 271, and 124 of this chapter and are subject to the notification requirements of Section 3010 of RCRA.

   Subpart C identifies characteristics of hazardous waste including ignitability, corrosivity, reactivity, and extraction procedure (EP) toxicity. Appendix IV of 40 CFR Part 261 has been reserved for radioactive waste test methods. Subpart D lists particular hazardous wastes.

   Appendix H--The toxicity characteristic is often referred to as "EP toxicity," after the extraction procedure used in the prescribed test. EPA has also developed the "Toxicity Characteristic Leaching Procedure" (TCLP) to test for organic contaminants as part of the land disposal ban program.

   a. Toxicity Characteristic Leaching Procedure (TCLP)," *Federal Register*, March 29, 1990.

      "The major significance of the TCLP is that it adds a number of common organic compounds to the list of constituents used in determining if a waste has the characteristic of toxicity. Use of the TCLP will cause more waste to become classified as hazardous, which in turn will cause more radioactive waste to become mixed waste."

3. "Standards Applicable to Generators of Hazardous Waste," 40 CFR Part 262, U.S. Environmental Protection Agency, current July 1, 1990.

   These regulations establish standards for generators of hazardous waste.

A generator who treats, stores, or disposes of hazardous waste must comply with the sections of this part with respect to that waste: Subpart A, Section 262.11, for determining whether or not a hazardous waste is being generated, and Section 262.12 for obtaining a EPA identification number; Subpart B, the manifest (cradle to grave); Subpart C, Pretransport requirements, including Section 262.34 for accumulation of hazardous waste; and Subpart D, Section 262.40 for record keeping.

40 CFR Part 262.34 (a) states that hazardous waste may be accumulated onsite for up to 90 days without a RCRA permit (Part 264) or interim status (Part 265). Subject to some other requirements, Part 262.34(d) provides that generators of between 100 kilograms and 1000 kilograms of hazardous waste in a calendar month may accumulate hazardous waste onsite for 180 days without a permit or interim status. If the limited quantities of waste in Subsection (d) must be transported more than 200 miles, the accumulation time limit is 270 days. Beyond these times, the facility must receive a permit as a storage facility.

4. "Standards Applicable to Transporters of Hazardous Waste," 40 CFR Part 263, U.S. Environmental Protection Agency, current March 1, 1990.

These regulations establish standards that apply to persons transporting hazardous waste within the United States if the transportation requires a manifest under 40 CFR Part 262.

These regulations do not apply to onsite transportation of hazardous waste by generators or by owners or operators of permitted hazardous waste management facilities.

5. "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," 40 CFR Part 264, U.S. Environmental Protection Agency, current March 1, 1990.

This part establishes minimum national standards that define the acceptable management of hazardous waste.

The standards in this part apply to owners and operators of all facilities that treat, store, or dispose of hazardous waste, and establishes a permit program for owners and operators of hazardous waste treatment, storage. and disposal facilities.

40 CFR Part 264 Subpart I addresses the use and management of containers and is applicable to interim storage facilities. Section 264.174 requires a minimum of a weekly inspection of areas where containers are stored. This is one of the requirements that is of potential concern when high radiation levels are present around storage containers.

Section 264.175 specifies the containment system that must be present for the storage of containers. Ignitable or reactive waste containers are discussed in Section 264.176. Section 264.177 provides special requirements for incompatible wastes.

6. "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," 40 CFR Part 265, U.S. Environmental Protection Agency, current March 1, 1990.

   This part establishes minimum national standards that define the acceptable management of hazardous waste during the period of interim status and until certification of final closure, or if the facility is subject to post-closure responsibilities are fulfilled.

   The standards of this part apply to owners and operators of facilities that treat, store, or dispose of hazardous waste who have fully complied with the requirements for interim status under Section 3005(e) of RCRA and Part 270.10 of this chapter until either a permit is issued under Section 3005 of RCRA or until applicable Part 265 closure and post-closure responsibilities are fulfilled, and to those owners and operators of facilities in existence since November 19, 1980, who have failed to provide timely notification as required by Section 3010(a) of RCRA and/or failed to file Part A of the permit application as required by 40 CFR 270.10(e) and (g).

7. "Land Disposal Restrictions," 40 CFR Part 268, U.S. Environmental Protection Agency, current March 1, 1990.

   This part identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which an otherwise prohibited waste may continue to be disposed of on land.

   EPA established a national capacity variance for mixed low-level wastes until May 8, 1992. The regulations establish different effective dates, depending on the type of waste, after which land disposal of untreated hazardous waste is prohibited. Examples of waste types with different effective dates for the land disposal restrictions include solvents and dioxin, the California list waste, and the "scheduled thirds waste." The "scheduled thirds waste" include categories of waste for which EPA established treatment standards over a 3-year schedule mandated by Congress. Mixed waste in which the hazardous component is a first-, second-, or third-third waste has been granted an extension to the effective date when land disposal is restricted, unless waste meets the treatment standard, until May 8, 1992.

40 CFR 268.50--This section prohibits storage of land banned wastes unless it is done only to accumulate "such quantities of hazardous waste as necessary to facilitate proper recovery, treatment, or disposal" and in conformance with other parts of the regulations.

The *Federal Register* notice (below) that promulgated the third-third rulemaking discusses the issue of mixed waste in some detail. In this notice EPA acknowledges the current situation regarding mixed waste. Disposal and treatment options for mixed waste are limited, yet the regulation 40 CFR 268.50 prohibits the storage of untreated mixed waste. Recognizing a situation where compliance may not be possible, EPA indicated that it would issue a policy on storage of mixed waste within 90 days (55 FR 22673). The 90 day deadline for issuing this policy on mixed waste storage passed on August 6, 1990 (see "Policy on Enforcement," 56 FR 42,730, August 29, 1991).

a. "Third-Third Rulemaking," Final Rule, 55 *Federal Register* 22520, June 1, 1990. (Amendment 55 *Federal Register* 3864, January 31, 1991).

As directed by Congress, the EPA is in the process of restricting all untreated hazardous waste from land disposal. The third-third rulemaking is one of the final steps in this process. Waste that is restricted from land disposal, so called "land ban waste," must be treated to eliminate or reduce its hazard using the best demonstrated available technology (BDAT) prior to land disposal.

8. "EPA Administered Permit Programs: The Hazardous Waste Permit Program," 40 CFR Part 270, U.S. Environmental Protection Agency, current March 1, 1990.

These permit regulations establish provisions for the hazardous waste permit program under Subtitle C of RCRA, as amended. They apply to EPA and to approved States to the extent provided in Part 271.

9. "Requirements for Authorization of State Hazardous Wastes Programs," 40 CFR Part 271, U.S. Environmental Protection Agency, current March 1, 1991.

This part specifies the procedures EPA will follow in approving, revising, and withdrawing approval of State programs and the requirements State programs must meet to be approved under RCRA.

10. "Approved State Hazardous Waste Management Programs," 40 CFR Part 272, U.S. Environmental Protection Agency, current March 1, 1990.

This part sets forth the applicable State hazardous waste management programs under RCRA.

11. "Emergency Planning and Notification," 40 CFR Part 355, U.S. Environmental Protection Agency, July 28, 1990.

    This regulation establishes the list of extremely hazardous substances, threshold planning quantities, and facility notification responsibilities necessary for the development and implementation of State and local emergency response plans.

4.3.3 Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA or Superfund provides funding and enforcement authority to clean up the thousands of hazardous waste sites created in the United States in the past and to respond to hazardous substance spills.

With respect to hazardous waste, CERCLA joins the RCRA to provide wrap around coverage. Generally, RCRA establishes a cradle-to-grave regulatory program for present hazardous waste activities; CERCLA establishes a comprehensive response program for past hazardous waste activities.

When developing LLW storage facilities, the possibility of CERCLA involvement should be included in early planning of these projects.

4.3.4 National Environmental Policy Act

This act declares a national environmental policy and promotes consideration of environmental concerns by Federal agencies. NEPA is divided into two titles. Title I declares a national environmental policy and goals, provides a method for accomplishing these goals, and includes some guidance on the fundamental question of how NEPA relates to other Federal laws. Title II creates the Council on Environmental Quality (CEQ) and defines its responsibilities. In turn, CEQ has promulgated regulations that guide the NEPA process.

1. "National Environmental Policy Act--Regulations," 40 CFR Part 1500- 1508, U.S. Environmental Protection Agency, current May 1991.

   These regulations guide the determination of whether or not environmental impact statements are required and their preparation.

4.3.5 Safe Drinking Water Act

The purpose of the SDWA is to protect the quality of drinking water in the United States. Objectives are (a) regulation of public drinking water systems and (b) protection of underground sources of drinking water.

This law requires the EPA to establish maximum permissible concentrations of radionuclides that sources or potential sources of drinking water may contain.

1. "National Primary Drinking Water Regulations," 40 CFR Part 141, U.S. Environmental Protection Agency, current January 1991.

   This part establishes primary drinking water regulations pursuant to Section 1412 of the Public Health Service Act, as amended by the SDWA (Public Law 93-523) and related regulations applicable to public water systems (see 56 FR No. 138, July 18, 1991).

   40 CFR 141.15--Maximum contaminant level for radium 226, 228-gross alpha particle in community water systems

   40 CFR 141.16--Maximum contaminant level for beta particle and photon from manmade radionuclides in community water systems

   40 CFR 141.25--Analytical methods for radioactivity

   40 CFR 141.26--Monitoring frequency for radiation in community water systems.

4.3.6 Clean Air Act

This CAA statute federalized air pollution control regulation and made health protection the basis for much of that regulation. This established the National Ambient Air Quality Standards (NAAQS).

Particularly dangerous air pollutants that may not be emitted by enough sources to justify an NAAQS are dealt with by national emission standards for hazardous pollutants (NESHAPS). The pollutants are those that "may reasonably be anticipated to result in an increase in mortality, or an increase in serious irreversible, or incapacitating reversible illness." EPA has adopted standards for arsenic, asbestos, beryllium, mercury, radionuclides, and vinyl chloride.

"Clean Air Act Amendments of 1977," Public Law 95-95, Section 301 of this law, which is the revised Section 302 of Public Law 91-604, "Clean Air Amendments of 1970," mandates the addition

of radionuclides to the list of hazardous air pollutants in Federal regulations. The EPA was authorized to promulgate clean air regulations.

1. "Listing of Certain Unregulated Pollutants," (Clean Air Act, PL 101-549, November 15, 1990), *Environmental Reporter* 71:1153, The Bureau of National Affairs, Washington, D.C., April 4, 1991.

   Section 122.(a), Not later than 2 years after date of enactment of this section and after notice and opportunity for public hearing, the Administrator shall review all available relevant information and determine whether or not emissions of radioactive pollutants, cadmium, arsenic and polycyclic organic matter into the ambient air will cause, or contribute to, air pollution that may reasonably be anticipated to endanger public health. If the Administrator makes an affirmative determination with respect to any such substance, he shall simultaneously with such determination include such substance in the list published under Section 108(a)(1) or 112(b)(1)(A), or shall include each category of stationary sources emitting such substance in significant amounts in the list published under Section 111(b)(1)(A), or take any combination of actions.

2. "Environmental Protection Agency Regulations on National Emission Standards for Hazardous Air Pollutants (NESHAPS)," 40 CFR Part 61, U.S. Environmental Protection Agency, April 24, 1991.

   Subpart I--National Emission Standards from Radionuclide Emissions from Facilities Licensed by the Nuclear Regulatory Commission.

   Emissions of radionuclides, including iodine, to the ambient air from a facility regulated under this subpart shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr.

   Emissions of iodine to the ambient air from a facility regulated under this subpart shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 3 mrem/yr.

4.3.7 Clean Water Act

The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters.

Among the main elements of the CWA are (a) a system of minimum national effluent standards for each industry, (b) water quality standards, (c) a discharge permit program where these

standards are translated into enforceable limitations [National Pollutant Discharge Elimination System (NPDES)] and (d) provisions for special problems such as toxic chemicals and oil spills.

"Administered Permit Programs: The National Pollutant Discharge Elimination System," 40 CFR Part 122, Environmental Protection Agency, April 1991.

These regulations contain provisions for the NPDES program under Sections 318, 402 and 405 of the CWA.

These regulations cover basic EPA permitting requirements. Subpart B of 40 CFR 122--Permit Application And Special NPDES Program Requirements.

Appendix D, Table IV of 40 CFR 122, lists conventional and nonconventional pollutants that must be tested by existing dischargers, if they are expected to be present.

4.3.8 Environmental Protection Agency Guides

1. "Environmental Protection Agency/Nuclear Regulatory Commission Guidance on Identification of Low-Level Radioactive and Hazardous Waste," (52 *Federal Register* 11147, April 7, 1987), *Environmental Reporter* 21:4461, The Bureau of National Affairs, Washington, D.C., May 15, 1987.

   The subject of this memorandum is Joint EPA/NRC Guidance on the Definition and Identification of Commercial Mixed Low-Level Radioactive and Hazardous Waste.

   As a supplement to the Guidance on the Definition and Identification of Commercial Mixed Low-Level Radioactive and Hazardous Waste (mixed LLW), answers to anticipated questions are included to clarify obscure points and to stimulate additional questions from potential mixed LLW generators.

2. "Environmental Protection Agency Radiation Protection Guidance," (52 *Federal Register* 3526, February 4, 1987), *Environmental Reporter* 21:4441, The Bureau of National Affairs, Washington, D.C., February 27, 1987.

   This memorandum transmits recommendations that would update previous guidance to Federal agencies for the protection of workers exposed to ionizing radiation.

3. "Environmental Protection Agency Radiation Overview and Strategy," *Environmental Reporter* 51-1669, The Bureau of National Affairs, Washington, D.C., December 8, 1989.

   Overview and strategy of EPA's mandate to protect the public health and environment from adverse effects of radiation exposure.

4. "Memorandum of Understanding between the Environmental Protection Agency and the Nuclear Regulatory Commission on Radionuclide Emissions," (45 *Federal Register* 72981 November 3, 1980), *Environmental Reporter* 41:2621, The Bureau of National Affairs, Washington, D.C., January 1, 1981.

   In accordance with Section 122(c)(2) of the CAA, as amended in 1977, and to minimize duplication of effort and conserve resources in the regulation of radionuclide emissions to air from sources or facilities licensed by NRC, EPA, and the NRC agrees to the following: (a) establishing standards and (b) implementing and enforcing standards.

5. "Permit Writers' Guidance Manual for Hazardous Waste Land Storage and Disposal Facilities: Phase I Criteria for Location Acceptability and Existing Applicable Regulations," U.S. Environmental Protection Agency, OSWER Directive 9472.00-1, February 1985.

   "Criteria for Identifying Areas of Vulnerable Hydrogeology under the Resource Conservation and Recovery Act," U.S. Environmental Protection Agency, OSWER Directive 9472.00-2A, July 1986.

   Section 3004 (0)(7) of RCRA requires the EPA to "specify criteria for the acceptable location of new and existing treatment, storage, and disposal facilities as necessary to protect human health and the environment." The above EPA guidance documents related to location standards and preferences have been issued. These documents represent the agency's interpretation of what constitutes favorable and unfavorable hydrogeological settings.

6. "Combined NRC-EPA Siting Guidelines for Disposal of Commercial Mixed Low-Level Radioactive and Hazardous Waste," U.S. Environmental Protection Agency, OSWER Directive 9480.00-14, June 1987.

   The guidance draws heavily from NRC's criteria contained in 10 CFR 61. In addition to the regulatory requirements of 40 CFR 264.18, EPA's influence on the joint guidance relates to the information needed for geological and hydrological characterization.

7. Galpin, F. L., J. M. Gruhlke, and W. F. Holcomb, "EPA's Low-Level Radioactive Waste Standards Program: Development Overview -1987," U.S. Environmental Protection Agency, Office of Radiation Programs, Washington, D.C. 20460, 1987 (see *Waste Management*, Vol. 1, 1987, p. 323).

   The EPA LLW standard is intended to cover disposal of all AEA materials not covered by other EPA standards. This standard has several important and closely related areas, one of which is LLW predisposal operations and management. This includes limits on radiation exposure to individuals during processing, management, and storage of LLW.

8. "Policy on Enforcement of RCRA Section 3004(J) Storage Prohibition at Facilities Generating Mixed Radioactive/Hazardous Wastes," U.S. Environmental Protection Agency, 56 *Federal Register* 42,730, August 29, 1991.

   The EPA has decided not to enforce RCRA land disposal restrictions (Section 3004) for mixed radioactive/hazardous waste for 2 years, since neither treatment nor disposal is available for such wastes. The new policy acknowledges the physical impossibility of enforcing the land-ban restrictions for these wastes. Generators of less than 1,000 ft^3/year of mixed waste will be allowed to continue operating without interference so long as they are managing wastes in a responsible manner. The policy will terminate December 31, 1993.

4.4 Department of Labor

The 29 CFR, Parts 1910 and 1926 include all U.S. Department of Labor (DOL) regulations on the safety and welfare of personnel from occupational exposure.

4.4.1 Occupational Safety And Health Act

1. "Occupational Safety and Health Standards," 29 CFR Part 1910, Department of Labor, Revised July 1, 1989.

   The act and regulations sets a goal to ensure that "no employee will suffer material impairment of health or functional capacity" from a lifetime of occupational exposure.

   In general, coverage of the act extends to all employers and their employees in the 50 States and to all territories under Federal government jurisdiction. An employer is defined as any "person engaged in a business affecting commerce who has employees but does not include the United States or any State or political subdivision of a State."

The three main roles of OSHA are (a) setting safety and health standards, (b) enforcing standards through Federal and State inspectors, and (c) public education and consultation.

Subpart G, 29 CFR 1910.96, "Occupational Health and Environmental Control (Ionizing Radiation)"--Steps taken for protection of individuals from ionizing radiation.

Subpart H, 29 CFR 1910.120, "Hazardous Materials (Hazardous Waste Operations and Emergency Response)"--This section covers employers and employees engaged in the following operations: (a) Hazardous substance response operations under CERCLA of 1980 as amended; (b) major corrective actions taken in cleanup operations under the RCRA of 1976 as amended; (c) operations involving hazardous waste storage, disposal and treatment facilities regulated under 40 CFR, Parts 264 and 265 pursuant to RCRA; (d) hazardous waste operations sites that have been designated for cleanup by State or local governmental authorities; and (e) emergency response operations.

Subpart Z, 29 CFR 1910.1200, "Toxic and Hazardous Substances (Hazard Communications)"-- An important OSHA rulemaking is the Hazard Communication (HAZCOM) Regulation. This standard, sometimes known as the "worker right to know" rule, provides that hazardous chemicals must be labeled, material safety data sheets (MSDS) on hazards be prepared, and workers and customers should be informed of potential chemical risks.

2. "Safety and Health Regulations for Construction," 29 CFR Part 1926, Department of Labor, May 1991.

This part sets forth the safety and health standards promulgated by the Secretary of Labor for construction and related activities. This includes the evaluation of the safety of the operations for protection of property and personnel involved.

Subpart D, 29 CFR 1926.53, "Occupational Health and Environmental Controls (Ionizing Radiation)"--In construction and related activities that involve use sources of ionizing radiation and the pertinent provisions of the "Atomic Energy Commission Standards for Protection against Radiation" (10 CFR Part 20) relating to protection against occupational radiation exposure shall apply.

4.5 Department of Transportation

Title 49, Parts 100-199, of the CFR, includes all DOT regulations on the transport of hazardous materials including radioactive materials (see NRC IF No. 84-14).

1. "Hazardous Materials Program Procedures," 49 CFR Part 107, Department of Transportation, current March 1991.

   This part prescribes procedures utilized by the Research and Special Programs Administration, the Office of Hazardous Materials Transportation, and the Office of Chief Counsel in carrying out their duties under the laws pertaining to the transportation of hazardous materials.

   49 CFR 107.30 et seq.--Procedure and standards for the review of any State or local regulations on the transport of hazardous materials, including radioactive materials. Standards include consistency with Federal law and rules and consideration of whether compliance with a State or local law is possible.

2. "General Information, Regulation, and Definitions," 49 CFR Part 171, Department of Transportation, Current June 1, 1991.

   This part prescribes the requirements of DOE governing the transportation of hazardous materials and the manufacture, fabrication, marking, maintenance, reconditioning, repairing, or testing of a packaging or container that is represented, marked, certified, or sold for use in such transportation of hazardous materials.

3. "Hazardous Materials Tables, Hazardous Materials Communications Requirements, and Emergency Response Information Requirements," 49 CFR Part 172, Department of Transportation, current May 1, 1991.

   Lists tables of hazardous materials, their description, proper shipping name, class, label, packaging, and other requirements.

   49 CFR 172.203(d), Shipping Papers--Shipping papers for radioactive materials must include the name of the shipper, name of radionuclides being shipped, amount of activity in each package, and labeling and warnings.

   49 CFR 172.403, Labeling--Labeling for each package, overpack, or freight container for radioactive materials must have a standardized label, coded for the degree of radiological hazard, that shows radionuclide content and amount of activity in curies.

   49 CFR 172.556, Placards--Each motor vehicle, railcar, and freight container for radioactive materials must be placarded on each end and each side. Placards must be of a standardized design and color.

4. "Shippers--General Requirements for Shipments and Packaging," 49 CFR Part 173, Department of Transportation, current May 1991.

   49 CFR 173--Includes key definitions, classification of radionuclides, classifications for transport packages, packaging standards, and standards limiting radiological hazards at the package surface.

   49 CFR 173.4--General requirements for shipping and packaging.

5. "Memorandum of Understanding between Department of Transportation and Nuclear Regulatory Commission," *Federal Register* 38690, July 2, 1979.

   This agreement delineates the respective responsibilities of the DOT and NRC for the regulation of safety when transporting radioactive materials.

   Under the MOU, the DOT is responsible for regulating safety in transporting all hazardous materials, including radioactive materials; the NRC is responsible for regulating safety in receipt, possession, use, and transfer of these materials. The NRC also reviews and approves or rejects package designs for high concentration low-level radioactive materials. The term "radioactive materials" is defined to include radioactive wastes.

4.6 Additional References

Additional information is available that is applicable LLW temporary storage.

1. *Low-Level Waste Bibliographic Index*, National Low-Level Waste Management Program, DOE/LLW-94, February 1990.

   The *Low-Level Waste Bibliographic Index* is published on a semiannual basis and contains a copy of every abstract currently contained in the LLW Bibliographic System data base. The index provides a means of retrieving information contained in the data base without using a computer interface.

2. *Low-Level Radioactive Waste Volume Reduction and Stabilization Technologies Resource Manual*, National Low-Level Waste Management Program, DOE/LLW-76T, December 1988.

   This manual on volume reduction and stabilization technologies is intended to serve as a resource document to policy personnel at the State or regional level. The manual

provides concise descriptions of currently available and promising methods of volume reduction and stabilization of low-level radioactive waste.

3. "Low-Level Radioactive Waste--Regulation,"Midwest Interstate LLW Commission, Fact sheet, September 1986.

   This fact sheet lists Federal regulatory agencies and their jurisdictions regarding LLW.

4. *A Planner's Guide to the Transport of Low-Level Radioactive Waste*, National Low-Level Waste Management Program, DOE/LLW-37T, January 1985.

   Discussion of issues in the packaging and transport of radioactive materials and wastes. Appendix B includes a summary of CFR for the transport of radioactive materials.

5. *Understanding Low-Level Radioactive Waste*, National Low-Level Waste Management Program, DOE/LLW-2, October 1983.

   A basic discussion of low-level radioactive waste management involving technical, political, and institutional factors. This resource book contains general information on this subject.

6. *Methods to Decrease Low-Level Waste Generation*, Low-Level Radioactive Waste Management Handbook Series, National Low-Level Waste Management Program, DOE/LLW-13Tb, December 1982.

   The Pacific Northwest Laboratory has conducted a study of methods to decrease the generation of LLW. This study makes these methods available to waste generators, which assists in reducing the generation of LLW that might require storage and ultimate disposal.

7. Bird, M. V. and J. D. Thompson, *Conceptual Design Report For Regional Low-Level Waste Interim Storage Site,* EGG-WM-5434, March 1986.

   To provide information on interim storage for LLW, the Low-Level Waste Management Program has undertaken the conceptual design of such a facility.

8. *Managing Low-Level Radioactive Wastes: A Technical Analysis*, National Low-Level Waste Management Program, LLWMP-7 DE83 012493, June 1981.

   This is a reference document that analyzes technical issues in LLW management. This reference document was prepared to assist government officials, industry, public interest groups, and interested citizens in learning more about waste management issues.

Issues examined in the body of this reference document include waste classification, waste volume reduction, waste packaging, storage, and disposal options.

9. *Alternatives for the Onsite Retention of Low-Level Radwaste at Nuclear Power Plants*, Atomic Industrial Forum, Inc. (AIF), National Environmental Studies Project (NESP), AIF/NESP-015R, 1978.

   The Atomic Industrial Forum's National Environmental Studies Project sponsored this study to provide the nuclear power industry and its regulators with engineering information on the engineering feasibility, generic environmental effects, and regulatory aspects of storing or disposing of light water reactor LLW at reactor sites.

10. Holeman, G. R., "Anticipated Problems with Interim Storage of Low-Level Radioactive Waste Generated By Biomedical Research Programs," *Proceedings of the Symposium on Waste Management at Tucson, Arizona, February 24 - February 26, 1991*, Vol. 2, pp. 243-246.

    Problems associated with storage of biomedical LLW include waste form and container integrity. The site-specific criteria related to acceptable waste form and containers is not currently available for developing burial sites; therefore, it is important for volume reduction efforts to result in a stable waste form. Many of the problems specific to the storage of LLW being generated by biomedical research programs may be solved by incineration. Recommendations for generators faced with interim storage include (a) become involved in the local politics of waste management, (b) develop LLW management plans, (c) minimize the waste volume requiring interim storage, and (d) utilize volume reduction techniques to the fullest extent possible.

11. Fuller, M. R., "Onsite Storage of Low-Level Radioactive Waste at Vermont Yankee," *Proceedings of the Symposium on Waste Management at Tucson, Arizona, 1990*, pp. 369-375.

    This paper concerns storage of LLW at Vermont Yankee Nuclear Power Plant located in Vernon, Vermont. On January 31, 1989, Vermont Yankee was restricted from the three U.S. LLW burial facilities. Having anticipated this, Vermont Yankee planned to provide long-term temporary storage of LLW onsite. This paper outlines

    a. Steps taken to establish the most cost-effective method for storing the waste.

    b. Performance of a 10 CFR 50.59 safety evaluation.

    c. Preparation of the storage area and installation of storage containers.

d. Operation of the facility including dose calculations, shielding considerations, problems experienced, and advice for others who may want to pursue a similar course of action.

12. Kemph, C. R., D. R. MacKenzie, P. L. Piciulo, B. S. Bowerman, and B. Siskind, "Management of Radioactive Mixed Wastes in Commercial Low-Level Wastes," Department of Nuclear Energy, Brookhaven National Laboratory, Upton, New York 11973 (see *Waste Management*, Vol. 1, 1986, p. 503).

Potential mixed wastes in commercial LLW have been identified, and management options applicable to these wastes have been evaluated. Both the identification and management evaluation have necessarily been based on review of NRC and EPA regulations and recommendations. The underlying intent of both agencies is protection of man and/or environment, but differences may occur in the means by which intent is achieved. Apparent discrepancies, data gaps, and unresolved issues that have surfaced during the course of this work are discussed.

13. Mallory, C. W., and R. DiSibio, "Integration of Interim Storage and the Permanent Disposal of Low-Level Radioactive Waste," *Proceedings of the Symposium on Waste Management at Tucson, Arizona, March 24 - March 28, 1985*, Vol. 2, pp. 123-126.

A modularized system for the packaging and disposal of LLW has been developed. This system uses hexagonal, reinforced concrete modules to package the waste in a structurally stable form. The modules are closely packed into the disposal unit to virtually eliminate subsidence. The same modules can also be used for onsite storage of waste. This approach for onsite storage of waste is less expensive than using storage buildings. It also reduces handling and eliminates the need to dispose of modules used for storage alone. An overpack is required to allow the concrete modules to meet the regulations for transporting radioactive material.

14. Murray, T. M., and B. D. Guilbeault, "Waste Package Corrosion Considerations for Onsite Storage," *Proceedings of the Symposium on Waste Management at Tucson, Arizona, March 11 - March 15, 1984*, Vol. 2, p. 431.

Waste package corrosion will diminish onsite storage safety. This paper is a primer on radioactive waste package corrosion. Eight forms of corrosion are characterized: uniform attack, localized attack, galvanic attack, velocity phenomena, fretting, intergranular attack, dealloying attack, and cracking phenomena. Site corrosion testing is reviewed, and general corrosion prevention schemes are presented.

15. Lesurf, J. E., D. H. Charlesworth, and H. N. Isaac, "Processing, Storage, and Disposal of Low- and Intermediate-Level Waste in Canada," *Proceedings of the Symposium on Waste Management at Tucson, Arizona, March 11 - March 15, 1984*, Vol. 2, p. 437.

Canadian procedures and developments in the management of low- and intermediate-level waste are briefly discussed. Practical experience with solid and liquid volume reduction techniques, interim storage techniques, and centralized waste operations is reviewed.

16. Miskimin, P. A., S. C., and Cossel, "The Comprehensive Waste Management System and Unique Approach to Onsite LLW Storage," *Proceedings of the Symposium on Waste Management at Tucson, Arizona, March 11 - March 15, 1984,* Vol. 2, pp. 511-518.

A systematic technical and economic evaluation of LLW products, services, and operating practices has been performed. This evaluation has resulted in an improved understanding of the entire LLW cycle and included technical evaluations of existing and proposed LLW processing, solidification, and volume reduction systems and equipment, important insights into the economics of the LLW cycle, and identification of waste generator needs that require cost-effective engineered solutions. The body of knowledge generated by the analysis, methodologies developed, and the included products and services are collectively referred to as the Comprehensive Waste Management System (CWMS).

Included in the system is the determination of costs for various plant specific onsite LLW storage options that have been programmed for an IBM-PC.

17. Dufrane, K. H., "Radioactive Waste Onsite Storage Alternative," *Proceedings of the Symposium on Waste Management at Tucson, Arizona, February 27 - March 3, 1983*, Vol. 1, pp. 283-289.

A low cost but effective onsite storage alternative, compared to a expensive storage building, is the use of onsite storage containers (OSSC) when and if required. Radioactive waste is only stored in OSSC if a disposal site is not available. A small number of OSSCs would be purchased initially just to assure immediate access to storage. Only in the unlikely event of total disposal sites closure would additional OSSCs have to be obtained, and even this is cost effective. With two or three months of storage available onsite, production lead time is sufficient for the delivery of additional units at a rate faster than the waste can be produced.

18. Gardner, D. A., et al., "Modular Interim Waste Storage Building for Low-Level Radwaste," *Proceedings of the Symposium on Waste Management at Tucson, Arizona, February 27 - March 3, 1983*, Volume 1, pp. 273-277.

Cygna Energy Services has developed a modular interim waste storage building design that emphasizes low cost, design simplicity, commercial construction techniques, rapid construction time, and licensability.

19. Brown, H., *The Low-Level Waste Handbook: A User's Guide To The Low-Level Radioactive Waste Policy Amendments Act of 1985*, National Governors' Association Center for Policy Research, November 1986.

This document gives a section-by-section analysis of the LLRWPAA of 1985. The law is included as Appendix E of the handbook.

20. R. J. Beaudry, "Prepare for Onsite Storage of Nuclear Radwaste," *Power* 127(8), 51-54, 1983.

This article reports how Detroit Edison designed and built an onsite storage facility for LLW. The site, Enrico Fermi 2, a nuclear plant on the western shore of Lake Erie, made the storage facility very efficient and safe, with minimal exposure to wastes.

21. National Low-Level Radioactive Waste Management Program, *Managing Commercial Low-Level Radioactive Waste Beyond 1992; Issues and Potential Problems of Temporary Storage*, EGG-LLW-8843, 91-1, 1991.

This technical bulletin provides a comprehensive list of issues and potential problem areas that States and compact regions may face when considering LLW temporary storage beyond 1992 including mixed waste, either at the point of waste generation or collection or at a centralized temporary storage facility.

22. National Low-Level Radioactive Waste Management Program, *Mixed Waste Disposal Facility Implementation Plan*, DOE/LLW-110, October 1990.

The *Mixed Waste Disposal Facility Implementation Plan* is designed to provide States and compacts with an easy-to-use resource manual concerning mixed waste.

This plan is intended to provide States and compacts with an understanding of the requirements controlling the management of LLW and hazardous waste. An understanding of the regulatory framework for mixed waste disposal will assist States and compacts in carrying out their responsibilities under the LLRWPAA. While this

implementation plan primarily addresses disposal, it also provides information on treatment and storage of mixed waste.

23. National Low-Level Radioactive Waste Management Program, *Low-Level Radioactive Waste Shipping Document Requirements*, DOE/ID/12476-1, September 1987.

Three Federal agencies have requirements for shipping documents for LLW shipments. These are the NRC requirements for a manifest for shipments of LLW, the U.S. DOT requirements for a shipping paper for shipments of hazardous materials (which includes LLW), and the Interstate Commerce Commission (ICC) requirements for a bill of lading for shipments made by common carrier. These requirements are identified and analyzed in this report. Existing LLW manifests have combined NRC and the DOT requirements on one form, and the ICC bill of lading is a separate form.

24. National Low-Level Radioactive Waste Management Program, *Criteria Needs for Siting, Licensing, Operation, Closure, Stabilization, and Decommissioning of Shallow Land Disposal Sites for Radioactive Waste,* DOE/LLW-4T, November 1982.

The material in this document is the work of the Conference Committee on Natural Radioactivity Contamination Problems. This committee had the special charge to develop criteria needs for the siting, licensing, operation, closure, stabilization, and termination of active institutional control of commercial LLW disposal facilities.

This document should be useful to all agencies and groups having standard setting and/or enforcement responsibilities for the management of LLW waste.

25. National Low-Level Waste Management Program, *Environmental Monitoring for Low-Level Waste Disposal Sites,* DOE/LLW-13Tg, January 1983.

This document was prepared to provide the practical information necessary to design and conduct an environmental monitoring program at a LLW disposal site.

A review is made of the purposes, objectives, and principles of environmental monitoring programs and their design.

This document would be applicable to temporary storage facilities.

26. National Low-Level Waste Management Program, Draft, *Low-Level Radioactive Waste Temporary Storage Issues*, DOE/LLW-141, March 1991

This report presents a brief overview of temporary LLW storage alternatives, support services, regulatory framework, and LLW storage issues.

Appendix A

List of Acronyms

APPENDIX A

LIST OF ACRONYMS

AEA	Atomic Energy Act
AEC	Atomic Energy Commission
AIF	Atomic Industrial Forum
ALARA	As Low as Reasonably Achievable
BDAT	Best Demonstrated Available Technology
BL	NRC Bulletins
BRC	Below Regulatory Concern
BNL	Brookhaven National Laboratory
BTP	Branch Technical Position
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CR	NRC Circular
CWA	Clean Water Act
CWMS	Comprehensive Waste Management System
DOE	Department of Energy
DOL	Department of Labor
DOT	Department of Transportation
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERA	Energy Reorganization Act

EPCRA	Emergency Planning and Community Right To Know Act
GL	NRC Generic Letters
HAZCOM	Hazard Communications
HMTA	Hazard Material Transportation Act
HSWA	Hazard and Solid Waste Amendments
HWM	Hazard Waste Management
ICC	Interstate Commerce Commission
IF	NRC Information Notices
INEL	Idaho National Engineering Laboratory
IWSB	Interim Waste Storage Building
LDR	Land Disposal Restrictions
LLW	Low-Level Radioactive Waste
LLWMP	Low-Level Radioactive Waste Management Program
LLRWPAA	Low-Level Radioactive Waste Policy Amendments Act
MCL	Maximum Contaminant Level
MOU	Memorandum of Understanding
MSDS	Material Safety Data Sheets
NAAQS	National Ambient Air Quality Standards
NARM	Naturally-Occurring and Accelerator-Produced Radioactive Material
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NESP	National Environmental Studies Project
NMSS	Office of Nuclear Material Safety and Safeguards
NORM	Naturally Occurring Radioactive Materials
NPDES	National Pollutant Discharge Elimination System

NRC	Nuclear Regulatory Commission
NUREG	Nuclear Regulatory Commission guidance document
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
OSSC	Onsite Storage Containers
OSWER	Office of Solid Waste and Emergency Response
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RES	Office of Nuclear Regulatory Research
SAR	Safety Analysis Report
SARA	Superfund Amendment and Reauthorization Act
SDWA	Safe Drinking Water Act
SECA	Secretary of Energy Notice
SQG	Small Quantity Generator
TCLP	Toxicity Characteristic Leaching Procedure
TR	NRC Topical Report
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, and Disposal
WM	Waste Management

Appendix B

Guidance Applicable to Temporary Storage of LLW

APPENDIX B

GUIDANCE APPLICABLE TO TEMPORARY STORAGE OF LLW

Major regulations and guidance applicable to the temporary storage of low-level radioactive waste (LLW) are listed into areas to which they most apply. With each listing, a page number (pp) is given of where the annotated entry can be found within the document.

1. Planning, Siting Process, Design, and Construction of LLW Storage Facilities

Regulations

10 CFR 2, "Rules of Practice for Domestic Licensing Proceedings" (6)

10 CFR 4, "Nondiscrimination in Federally Assisted NRC Programs" (7)

10 CFR 20, "Standards for Protection Against Radiation" (7)

10 CFR 21, "Reporting of Defects and Noncompliance" (8)

10 CFR 100, "Reactor Site Criteria" (11)

40 CFR 260, "Hazardous Waste Management System: General" (23)

40 CFR 261, "Identification and Listing of Hazardous Waste" (22, 23)

40 CFR 268, "Land Disposal Restrictions" (25)

40 CFR 270, "EPA Administered Permit Programs: The Hazardous Waste Permit Program" (26)

40 CFR 271, "Requirements for Authorization of State Hazardous Wastes Programs" (26)

40 CFR 272, "Approved State Hazardous Waste Management Programs" (26)

40 CFR 355, "Emergency Planning and Notification" (27)

40 CFR 1500-1508, "National Environmental Policy Act--Regulations" (27)

Guidance

NRC Guide 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, Components Installed in Light Water-Cooled Nuclear Power Plants" (12)

CERCLA, "Possibility of CERCLA Involvement" (27)

EPA Overview & Strategy, "Radiation Overview and Strategy to Environment" (29, 31)

NRC/EPA MOU, "MOU Between NRC and EPA on Radionuclide Emissions" (29)

Midwest Interstate LLRW Commission, "LLW Regulation" (36)

DOE/LLW-37T, *A Planner's Guide to the Transport of LLW* (36)

DOE/LLW-13Tb, *Methods to Decrease Low-Level Waste Generation* (36)

EGG-WM-5434, *Conceptual Design Report for Regional Low-Level Waste Interim Storage Site* (36)

LLWMP-7 DE83 012493, *Managing Low-Level Radioactive Wastes: A Technical Analysis* (36)

AIF/NESP-015R, *Alternatives for the Onsite Retention of LLRW at Nuclear Power Plants* (37)

NUREG/CR-4450, *Management of Radioactive Mixed Wastes in Commercial Low-Level Wastes* (18)

NUREG/CR-4406, *Review of Hazardous Waste Regulations and Identification of Radioactive Mixed Wastes* (18)

BNL-NUREG-51841, *Extended Storage of Low-Level Radioactive Waste: Potential Problem Areas* (19)

NUREG-0770, *Glossary of Terms: Nuclear Power and Radiation* (19)

SECY-90-318, *LLRWPAA Title Transfer and Possession Provisions* (16)

DOE/LLW-94, *Low-Level Waste Bibliographic Index* (35)

DOE/LLW-76T, *LLWR Volume Reduction and Stabilization* (35)

DOE/LLW-2, *Understanding Low-Level Radioactive Waste* (36)

Waste Management (WM) 1991, "Anticipated Problems with Interim Biomedical Research Programs" (37)

WM 1990, "Onsite Storage of LLW at Vermont Yankee" (37)

WM 1986, "Management of Radioactive Mixed Wastes in Commercial Low-Level Wastes" (36)

WM 1985, "Integration of Interim Storage and the Permanent Disposal of Low-Level Radioactive Waste" (38)

WM 1984, "Waste Package Corrosion Considerations for Onsite Storage" (38)

WM 1984, "Processing, Storage, and Disposal of Low-And Intermediate-Level Waste in Canada" (39)

WM 1984, "The Comprehensive Waste Management System and Unique Approach to On-Site LLW Storage" (39)

WM 1983, "Radioactive Waste Onsite Storage Alternative" (39)

WM 1983, "Modular Interim Waste Storage Building for LLW" (40)

National Governors' Association, *The Low-Level Waste Handbook: Guide to the Low-Level Radioactive Waste Policy Amendments Act of 1985* (40)

Power 127 (8), "Prepare for Onsite Storage of Nuclear Radwaste" (40)

NUREG-0902, *Site Suitability, Selection, and Characterization* (20)

NUREG-1293, *Quality Assurance Guidance for a LLW Disposal Facility* (20)

Joint EPA/NRC Guidance, "Siting Guidelines for Disposal of LLW and Hazardous Wastes" (31)

NRC Guide 4.19, "Guidance for Selecting Sites for Near-Surface Disposal of LLW" (12)

EGG-LLW-8843, 91-1, *Managing Commercial LLW Beyond 1992: Issues and Potential Problems of Temporary Storage* (40)

DOE/LLW-110, *Mixed Waste Disposal Facility Implementation Plan* (40)

DOE/LLW-4T, *Criteria Needs for Siting, Licensing, Operation, Closure, Stabilization, and Decommissioning of Shallow Land Disposal Sites for Radioactive Waste* (41)

DOE/LLW-13Tg, *Environmental Monitoring for LLW Disposal Sites* (41)

DOE/LLW-141, *Low-Level Radioactive Waste Temporary Storage Issues* (41)

NUREG/CR-4690, *Generic Communications Index: Listings of Communications 1971-1989* (16)

NRC IF 89-13, *Alternative Waste Management Procedures In Case of Denial of Access to LLW Disposal Sites* (17)

NRC IF 89-27, *Limitations on The Use of Waste Forms and High Integrity Containers for the Disposal of Low-Level Radioactive Waste* (17)

NRC IF 88-16, *Identifying Waste Generators In Shipments of Low-Level Waste to Land Disposal Facilities* (17)

NRC IF 87-03, *Segregation of Hazardous and Low-Level Radioactive Wastes* (18)

NRC IF 86-20, *Low-Level Radioactive Waste Scaling Factors for in Compliance with 10 CFR, Part 61* (18)

NRC Policy Statement, *Below Regulatory Concern* (20)

EPA, *Third-Third Rulemaking* (26)

EPA, *Listing of Certain Unregulated Pollutants* (29)

EPA, *EPA's Low-Level Radioactive Waste Standards Program* (32)

EPA, *Policy on Enforcement of RCRA Section 3004 (J) Storage Prohibition at Facilities Generating Mixed Radioactive/Hazardous Waste* (32)

2. Licensing of LLW Storage Facilities

Regulations

10 CFR 2, "Rules of Practice for Domestic Licensing Proceedings" (6)

10 CFR 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material" (8)

10 CFR 40, "Domestic Licensing of Source Material" (9)

10 CFR 50, "Domestic Licensing of Production and Utilization Facilities" (9)

10 CFR 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions" (9)

10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Wastes" (10)

10 CFR 70, "Domestic Licensing of Special Nuclear Material" (10)

10 CFR 150, "Exemptions and Continued Regulatory Authority in Agreement States and in Offshore Waters under Section 274" (11)

Guidance

NRC Guide 10.1, "Compilation of Reporting Requirements for Persons Subject to NRC Regulations" (15)

SECY-90-318, *LLRWPAA Title Transfer and Possession Provisions* (16)

BNL-NUREG-51841, *Extended Storage of Low-Level Radioactive Waste: Potential Problem Areas* (16)

Generic Letter 81-38, "Storage of LLW at Power Reactor Sites" (16)

Generic Letter 85-14, "Commercial Storage at Power Reactors of LLW not Generated by the Utility" (19)

NRC IF NO. 90-09, "Extended Interim Storage of Low-Level Radioactive Waste by Fuel Cycle and Materials Licensees" (19)

EPA Memo, "Permit Writers Guidance Manual for Hazardous Waste Storage and Disposal Facilities" (30, 31)

DOE/LLW-4T, *Criteria Needs for Siting, Licensing, Operation, Closure, Stabilization, and Decommissioning of Shallow Land Disposal Sites for Radioactive Waste* (41)

NUREG-1199, *Standard Format and Content of a License Application for a Low-Level Radioactive Waste Disposal Facility* (20)

NUREG/CR-4690, *Generic Communications Index: Listings of Communications 1971-1989* (16)

NRC IF 86-20, *Low-Level Radioactive Waste Scaling Factors for in Compliance with 10 CFR, Part 61* (18)

NRC IF 80-18, *10 CFR 50.59 Safety Evaluation for Changes to Radioactive Waste Treatment Systems* (18)

NRC Policy Statement, *Below Regulatory Concern* (20)

3. Environmental Impacts, Health, and Welfare of Man from LLW Storage Facilities

Regulations

10 CFR 20, " Standards for Protection Against Radiation" (7)

10 CFR 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions" (9)

40 CFR 25, "Environmental Protection Agency Regulations on Public Participation in Programs under RCRA, SDWA, and CWA" (21)

40 CFR 190, "Environmental Radiation Protection Standards for Nuclear Power Operations" (22)

40 CFR 193, "Environmental Radiation Protection Standards for LLW Disposal" (Proposed) (22)

40 CFR 260, "Hazardous Waste Management System: General" (23)

40 CFR 1500-1508, "National Environmental Policy Act—Regulations" (27)

40 CFR 141, "National Primary Drinking Water Regulations" (28)

40 CFR 61, "EPA Regulations on National Emission Standards for Hazardous Air Pollutants" (10)

40 CFR 122, "Administered Permit Programs (NPDES)" (30)

Guidance

NRC Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluent from Light Water-Cooled Nuclear Power Plants" (12)

EPA Overview & Strategy, "Radiation Overview and Strategy to Protect the Public Health and Environment" (29, 31)

NRC/EPA MOU, "MOU Between NRC and EPA on Radionuclide Emissions" (29, 31)

DOE/LLW-13Tg, *Environmental Monitoring for LLW Disposal Sites* (41)

NRC IF 86-20, *Low-Level Radioactive Waste Scaling Factors for in Compliance with 10 CFR, Part 61* (18)

NRC Policy Statement, *Below Regulatory Concern* (20)

EPA, *Third-Third Rulemaking* (26)

EPA, *Listing of Certain Unregulated Pollutants* (29)

EPA, *EPA's Low-Level Radioactive Waste Standards Program* (32)

EPA, *Policy on Enforcement of RCRA Section 3004 (J) Storage Prohibition at Facilities Generating Mixed Radioactive/Hazardous Waste* (32)

4. Occupational Health and Welfare Concerning LLW Storage Facilities

Regulations

10 CFR 4, "Nondiscrimination in Federally Assisted Commission Programs" (7)

10 CFR 19, "Notices, Instructions and Reports to Workers: Inspection and Reports" (7)

10 CFR 20, "Standards for Protection Against Radiation" (7)

10 CFR 21, "Reporting of Defects and Noncompliance" (8)

40 CFR 193, "Environmental Radiation Protection Standards for LLW Disposal" (Proposed) (22)

29 CFR 1910, "Occupational Safety and Health Standards" (32)

29 CFR 1926, "Safety and Health Regulations for Construction" (33)

Guidance

NRC Guide 8.1, "Radiation Symbol" (13)

NRC Guide 8.2, "Guide for Administrative Practices in Radiation Monitoring" (13)

NRC Guide 8.7, "Occupational Radiation Exposure Records Systems" (14)

NRC Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Is Reasonably Achievable" (14)

NRC Guide 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable" (14)

NRC Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure" (14)

NRC Guide 8.15, "Acceptable Programs for Respiratory Protection" (15)

NRC Guide 8.29, "Instruction Concerning Risks from Occupational Radiation Exposure" (15, B-2)

EPA Memo, "EPA Radiation Protection Guidance" (30, 31)

NRC IF 86-20, *Low-Level Radioactive Waste Scaling Factors for in Compliance with 10 CFR, Part 61* (18)

NRC Policy Statement, *Below Regulatory Concern* (20)

EPA, *Listing of Certain Unregulated Pollutants* (29)

5. Operation of LLW Storage Facilities

Regulations

10 CFR 4, "Nondiscrimination in Federally Assisted Commission Programs" (7)

10 CFR 19, "Notices, Instructions and Reports to Workers: Inspection and Reports" (7)

10 CFR 20, "Standards for Protection Against Radiation" (7)

10 CFR 21, "Reporting of Defects and Noncompliance" (8)

40 CFR 262, "Standards Applicable to Generators of Hazardous Wastes" (23)

40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities" (24)

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities" (25)

40 CFR 141, "National Primary Drinking Water Regulations" (28)

Guidance

NRC Guide 7.3, "Procedures for Picking Up and Receiving Packages of Radioactive Material" (13)

NRC Guide 8.1, "Radiation Symbol" (13)

NRC Guide 8.2, "Guide for Administrative Practices in Radiation Monitoring" (13)

NRC Guide 8.7, "Occupational Radiation Exposure Records Systems" (14)

NRC Guide 8.8, "Information Relevant to Ensuring That Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Is Reasonably Achievable" (14)

NRC Guide 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable" (14)

NRC Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure" (14)

NRC Guide 8.15, "Acceptable Programs for Respiratory Protection" (15)

NRC Guide 8.29, "Instruction Concerning Risks from Occupational Radiation Exposure" (15, B-2)

CERCLA, "Possibility of CERCLA Involvement" (27)

EPA/NRC MOU, "Guidance on Identification of LLW and Hazardous Waste" (30)

EPA Memo, "EPA Radiation Protection Guidance" (?)

NRC/EPA MOU, "MOU Between NRC and EPA on Radionuclide Emissions" (31)

Generic Letter 81-38, "Storage of LLW at Power Reactor Sites" (16)

Generic Letter 85-14, "Commercial Storage at Power Reactors of LLW not Generated by the Utility" (19)

SECY-90-318, *LLRWPAA Title Transfer and Possession Provisions* (16)

DOE/LLW-76T, *LLRW Volume Reduction and Stabilization* (35)

NUREG-1293, *Quality Assurance Guidance for a LLW Disposal Facility* (20)

EPA Memo, "Permit Writers Guidance Manual for Hazardous Waste Storage and Disposal Facilities" (30, 31)

DOE/LLW-4T, *Criteria Needs for Siting, Licensing, Operation, Closure, Stabilization, and Decommissioning of Shallow Land Disposal Sites for Radioactive Waste* (41)

DOE/LLW-13Tg, *Environmental Monitoring for LLW Disposal Sites* (41)

NRC IF 89-13, *Alternative Waste Management Procedures In Case of Denial of Access to LLW Disposal Sites* (17)

NRC IF 89-27, *Limitations on The Use of Waste Forms and High Integrity Containers for the Disposal of Low-Level Radioactive Waste* (17)

NRC IF 88-16, *Identifying Waste Generators In Shipments of Low-Level Waste to Land Disposal Facilities* (17)

NRC IF 86-20, *Low-Level Radioactive Waste Scaling Factors for in Compliance with 10 CFR, Part 61* (18)

NRC IF 80-18, *10 CFR 50.59 Safety Evaluation for Changes to Radioactive Waste Treatment Systems* (18)

EPA, *Third-Third Rulemaking* (26)

6. Waste Classification, Form, Packaging and Transportation Concerning LLW Storage Facilities

Regulations

10 CFR 20, "Standards for Protection Against Radiation" (7)

10 CFR 21, "Reporting of Defects and Noncompliance" (8)

10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Wastes" (10)

10 CFR 71, "Packaging and Transportation of Radioactive Material" (11)

40 CFR 263, "Standards Applicable to Transporters of Hazardous Waste" (24)

49 CFR 107, "Hazardous Materials Program Procedures" (34)

49 CFR 171, "General Information, Regulations, and Definitions, DOT" (34)

49 CFR 172, "Hazardous Materials Tables, Hazardous Materials Communications Requirements, and Emergency Response Information Requirements" (34)

49 CFR 173, "General Requirements for Shipping and Packaging" (35)

Guidance

NRC Guide 7.1, "Guide for Packaging and Transporting Radioactive Material" (13)

NRC Guide 7.3, "Procedures for Picking Up and Receiving Packages of Radioactive Material" (13)

NRC/Tech. Paper, "Technical Position on Waste Form" (10)

NRC/Tech. Paper, "Technical Position on Radioactive Waste Classification" (10)

NRC/DOE MOU, "Regulation of Safety in Transportation of Radioactive Materials" (35)

DOE/LLW-37T, *A Planner's Guide to Transport of LLW* (36)

IF NO. 91-35, "Labeling Requirements for Transporting Multi-Hazard Radioactive Materials" (20)

DOE/ID/12476-1, *LLW Shipping Document Requirements* (41)

NRC IF 89-27, *Limitations on The Use of Waste Forms and High Integrity Containers for the Disposal of Low-Level Radioactive Waste* (17)

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