

# NRC INSPECTION MANUAL

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## INSPECTION PROCEDURE 65051

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### LOW-LEVEL RADIOACTIVE WASTE STORAGE FACILITIES

PROGRAM APPLICABILITY: 2512, 2513, 2514, 2515

#### 65051-01 INSPECTION OBJECTIVES

These objectives are intended for the construction and operation of low-level radioactive waste (LLRW) storage facilities at nuclear power plants.

01.01 Determine whether the licensee has provided an adequate safety evaluation for construction and operation of the facility.

01.02 Determine whether quality assurance plans, instructions, and procedures have been established.

01.03 Determine whether adequate construction procedures have been established.

01.04 Determine whether construction of the as-built facility was consistent with NRC requirements and licensee commitments.

01.05 Determine whether changes to organization and staffing because of the LLRW storage facility agree with applicable requirements of the Technical Specifications and with FSAR and other licensee commitments.

01.06 Determine whether an effective training and qualification program exists for personnel assigned to the LLRW storage facility.

01.07 Determine whether adequate procedures have been established for routine operation of the LLRW storage facility.

01.08 Determine whether there have been any changes to the facility and facility operations that could affect effluent monitoring requirements.

#### 65051-02 INSPECTION REQUIREMENTS

02.01 Basis for Construction. Review the licensee's request for a license, 10 CFR 50.59 evaluation, or amendment to the construction permit or operating license for a description of the LLRW storage facility, the radiological safety and environmental aspects of its construction and operation, and of the licensee's commitments to the NRC.

Determine if the submittals and evaluations meet regulatory requirements and are consistent with NRC guidance.

02.02 Quality Assurance. Review the licensee's instructions, procedures, and QA program to determine whether they conform to the licensee's request or 10 CFR 50.59 evaluation and Position C.6, "Quality Assurance for Radwaste Management Systems," of Regulatory Guide 1.143.

Review the licensee's implementation of the instructions, procedures, and QA program for construction of the facility.

If the licensee's QA program calls for auditing facility construction, determine whether audits are being performed and whether adverse audit findings are addressed in a timely fashion.

02.03 Procedures for Construction. Determine if the procedures, plans, and specifications are adequate to control the following activities, where applicable, in accordance with NRC requirements and licensee commitments.

- a. site preparation and foundation
- b. structural concrete and steel
- c. mechanical, electrical, and piping systems
- d. fire protection
- e. security

02.04 Review of Construction. Observe on-going or completed work to determine if construction is consistent with NRC requirements and licensee commitments.

02.05 Organization and Staffing. If changes have been made to the previously reviewed organization and staffing to accommodate the LLRW storage facilities, review these changes to determine if they agree with applicable technical specifications and with FSAR or other licensee commitments.

02.06 Training and Qualification. Review the training and qualification program for personnel assigned to the LLRW storage facility to determine if it meets requirements and has been implemented effectively.

02.07 Startup and Operations Procedures. Review the procedures established for startup and operation of the LLRW storage facility to determine if they are adequate.

02.08 Effluent Monitoring Changes. Review any changes or additions to waste processing and handling operations performed in the storage facility to determine if additional effluent monitoring is required.

### 65051-03 INSPECTION GUIDANCE

General Guidance. Low-level radioactive waste storage facilities are being constructed on or adjacent to nuclear power plants to increase the storage capacity for LLRW generated on site from normal reactor operation and maintenance. Waste may be reduced in volume by onsite volume reduction and solidification systems and packaged before being placed in the LLRW facilities. The construction of the storage facilities will vary; construction will include reinforced concrete structures founded on bedrock or compacted earth, but will have few, if any, safety-related mechanical, electrical, and piping systems. Safety-related features and recommendations for the LLRW facilities are identified in Regulatory Guide 1.143 and Appendix 11.4-A of the Standard Review Plan.

As discussed in Generic Letter 81-38, proposed increases in LLRW storage capacity must be evaluated by the licensee under the provisions of 10 CFR 50.59. If not prohibited by existing licensee conditions, if no unreviewed safety question exists, and if the proposed increased capacity does not exceed the generated waste projected for 5 years, the licensee may provide the added capacity, document the 50.59 evaluation, and report this evaluation to the Commission annually or as specified in the license. If an unreviewed safety question exists or long-term (greater than 5 years) storage is desired, the licensee must apply to NMSS for authority for use under the provisions of 10 CFR 30. The facility change also may require a change in the conditions of the facility license. Facility construction prior to the NRC determination would be performed at the licensee's risk.

This inspection procedure applies to all LLRW storage facilities regardless of whether the facility change was done under 10 CFR 50.59 or a 10 CFR 30 license. The size and complexity of the facility change may vary widely. The regional office should establish the extent of review required to determine whether the design and construction are consistent with requirements and commitments. Use applicable NRC inspection procedures for guidance in performing the inspection.

In general, because the safety significance of LLRW storage facilities--especially for low-level dry waste storage--is low, extensive inspection efforts are not warranted. Factors to consider when determining the inspection scope include: size of the structure(s), complexity of design or construction, type of radioactive waste to be stored (wet, solidified wet, or dry low-level), within or outside the plant protected area, and the extent of prior NRC review. Consequently, the guidance of this procedure should be applied in a graded approach consistent with the potential for impact of facility operation on personnel health and safety onsite and offsite.

Note that any facility that provides licensee's additional onsite storage as discussed in Generic Letter 81-38 is a storage facility and should be reviewed against criteria contained in this procedure regardless of what the facility is called (e.g., a storage facility may be called a "holding facility").

If storage facilities also include limited radwaste processing functions (e.g., trash sorting or compaction), the reviews of those functions should be in accordance with normal review requirements for the particular processing functions involved.

The responsibilities for licensing and inspection of LLRW storage facilities are as follows:

- a. NMSS receives and reviews each application for a 10 CFR 30 license for a storage facility.
- b. NRR receives and reviews requests for changes in the technical specifications that may be required for operation of waste processing operations incorporated within a new storage facility. In general a change in technical specifications is not required if radioactive liquid or gaseous effluents resulting from waste processing operations within the facility are routed to existing effluent systems and released through existing monitored release points. However, a change in technical specifications is required if new effluent release points result from waste processing operations in the new facility.
- c. IE/DI develops the policies and procedures relating to inspections of these facilities.
- d. The regional offices conduct the onsite inspections of these facilities.

Some potential problems from extended storage of LLRW are discussed in NUREG/CR-4062. These potential problems involve internal and external corrosion of

steel containers, radiation-induced embrittlement of stored polyethylene containers, radiolytic gas generation from stored polyethylene containers, radiolytic gas generation from stored ion-exchange resins and bituminized wastes, and biodegradation of institutional wastes. The specific circumstances under which these potential problems may arise are identified.

Generic Letter 85-14 provides information on proposals for commercial storage at power reactor sites of LLRW not generated by the utility. This generic letter makes clear that the NRC is opposed to any activity at a nuclear reactor site which is not generally supportive of activities authorized by the operating license or construction permit and which may divert the attention of licensee management from its primary task of safe operation or construction of the power reactor. Accordingly, interim storage of LLRW within the exclusion area of a reactor site as defined in 10 CFR 100.3(a) will be subject to NRC jurisdiction regardless of whether or not the reactor is located in an Agreement State, pursuant to the regulatory policy expressed in 10 CFR 150.15(a)(1). Within Agreement States, the Agreement State has the licensing authority for locations outside the exclusion areas.

### 03.01 Specific Guidance

- a. Inspection Requirement 02.01, Basis for Construction. Determine which method the licensee is using to authorize construction of the facility (i.e., 10 CFR 50.59 evaluation or 10 CFR 30 license).

If the LLRW storage facility is being constructed under the provisions of 10 CFR 50.59, review the evaluation for conformance with IE Circular 80-18.

There are no criteria for acceptability of 10 CFR 50.59 evaluations other than the statement in Generic Letter 81-38 that the NRC will judge the adequacy of the licensee's 50.59 evaluation based on the licensee's "compliance" with the radiological safety guidance enclosed with that generic letter.

More general guidance for inspectors on 50.59 evaluations is provided in IE Manual Part 9800, "10 CFR 50.59."

NRR has provided guidance to power reactor facilities in Generic Letter 81-38. This letter informs the licensee that proposals for an increase in the LLRW storage capacity must be evaluated under 10 CFR 50.59 provided that (1) existing license conditions or technical specifications do not prohibit increased storage, (2) no unreviewed safety question exists, and (3) the proposed increased storage capacity does not exceed the generated waste projected for 5 years. Additional guidance for the 50.59 safety evaluations of radioactive waste treatment systems was provided in IE Circular No. 80-18.

The licensee's evaluation should address all potential release pathways including direct exposures and provide a clear basis for the quantities and duration of material stored on site. If the quantities and duration of storage exceed the criteria for interim contingency storage contained in the enclosure to Generic Letter 81-38, the licensee may need to license the facility.

General design guidance for LLRW storage facilities is contained in the enclosure to Generic Letter 81-38, Regulatory Guide 1.143, and SRP, Appendix 11.4-A. If the licensee is constructing the facility through the licensing process, review those submittals to determine that they provide an adequate basis for construction of the facility. Problems should be discussed with the licensee and the appropriate NRC licensing personnel (i.e., NMSS or NRR). The review should focus on potential radioactivity release pathways and direct radiation exposure to personnel on site.

and off site. Previous or current onsite inspection experience should be used to gauge the adequacy of the licensee's submittals.

- b. Inspection Requirement 02.02, Quality Assurance. The licensee's QA program should conform to that described in the 10 CFR 50.59 evaluation or license request. Regulatory Guide 1.143, Regulatory Position C.6, outlines a QA program that is acceptable to the NRC staff. As noted therein, a QA program sufficient to ensure that all design, construction, and testing provisions are met should be established and documented, recognizing that the impact of these systems on safety is limited.
- c. Inspection Requirement 02.03, Procedures for Construction. Review established procedures to determine if the procedures, plans, and specifications are adequate to control the following activities, where applicable. Appropriate inspection procedures should be used to determine adequacy. The following areas should be addressed:
  - 1. site preparation and foundation
  - 2. structural concrete and steel
  - 3. mechanical, electrical, and piping systems
  - 4. fire protection
  - 5. security

In Regulatory Guide 1.43, the seismic design guidance for systems and structures and the guidance for QA of radwaste systems generally apply to LLRW storage facilities. Note that Section B.1.4 of Regulatory Guide 1.143 states that equipment and components used to collect, process, and store solid radwaste need not be designed to the seismic criteria in Position C.5 of the guide. However, if liquid waste were stored, the building foundation and walls would have to meet the seismic criteria of Position C.5.

Non-safety-related construction may be in accordance with local building codes.

- d. Inspection Requirement 02.04, Review of Construction. Observe on going or completed work to determine if procedures, licensee commitments, and license conditions are implemented.

The construction review should ensure that the requirements of 10 CFR 50, Appendix A, and General Design Criteria 1, 63, and 64 are properly addressed. These and other appropriate criteria should be applied on a graded approach commensurate with the health and safety significance of the facility.

Note that storage-only facilities may not have a ventilation system or one with dampers. Therefore auto-closure dampers are not generally required for storage-only facilities.

- e. Inspection Requirement 02.05, Organization and Staffing. This inspection requirement is intended to complement not duplicate other inspections of organization and staffing.

Using appropriate inspection procedures (e.g., 36700, 83522, or 83722), review the existing or proposed changes in organization and staffing made to accommodate the operations in the LLRW storage facility. Determine if the

organization and staffing will provide for safe operation of the LLRW storage facility.

The organization and staffing should meet applicable NRC requirements and licensee commitments.

- f. Inspection Requirement 02.06, Training and Qualification. This inspection requirement is intended to complement not duplicate other inspections of training and qualifications which may cover training and qualifications of all personnel assigned to the LLRW facility.

Using appropriate inspection procedures (e.g., 41400, 83523, or 83723), review the existing or proposed training and qualification program to determine if the program provides effective training and qualification of personnel associated with the LLRW storage facility. Training should encompass applicable license requirements. Personnel normally associated with such a facility include: chemistry controls, radiological controls, radwaste operations and maintenance personnel; laborers; and possibly auxiliary operators. Training records should be reviewed to verify program implementation.

Determine whether the staff of the facility is essentially full-time or whether individuals, including supervisors, are rotated through the positions. In general, the greater experience of a full-time (dedicated) staff results in a better qualified staff.

Inspections of training and qualification should be in accordance with the NRC policy statement on training and qualification of nuclear power plant personnel.

- g. Inspection Requirement 02.07, Startup and Operating Procedures. Review and discuss with appropriate licensee personnel the procedures that will be or have been established for startup and operation of the LLRW storage facility. Procedures that may be appropriate include:

1. Facility operating procedures (e.g., HVAC, fire protection).
2. Procedures and criteria for transferring the waste to the facility and storing it in the facility. Particular attention to the adequacy of the procedures for transfer may be needed if the LLRW facility is located outside the protected area (as defined in 10 CFR 73).
3. Routine radiological survey and monitoring requirements.

The licensee's survey and monitoring program should ensure (as appropriate) compliance with 10 CFR Sections 20.101, 20.105, and 20.106, 20.201, and 20.202.

No installed air monitoring is required for dry-waste storage-only facilities. Occasional air monitoring, with portable air samplers, may be required for compliance with 10 CFR 20.103 and 20.201 when there is a potential for airborne radioactivity.

Guidance in this area also is contained in Generic Letter 81-38, Section IV(C)5.

4. Maintenance of facility operations within bounds of the 10 CFR 50.59 evaluation, licensee conditions, and regulatory requirements.

For example, the procedures should provide assurance that facility operation will result in compliance with 10 CFR 20.105, 20.106, and 20.207.

5. Routine radiological controls (e.g., 10 CFR 20.202 and 20.207).
6. Monitoring of stored waste in the facility.

Acceptable programs are described in the enclosure to Generic Letter 81-38. Note that the 5-year storage criterion discussed in the generic letter relates to the need for licensing of additional onsite storage.

The 5-year criterion is not a regulatory limit (requirement) for waste storage. However, the 5-year criterion was intended to provide one measure of safe storage and also to encourage timely disposal at authorized burial sites. Therefore, waste stored in these facilities beyond the 5-year period should be identified. If an inspector finds that waste in one of these facilities has been stored for more than 5 years, the inspector should determine the reason the waste has been stored more than 5 years and whether this storage is a deviation from a licensee commitment made in the safety evaluation pursuant to 10 CFR 50.59 and in the updated FSAR [10 CFR 50.71(e)]. This information should be included in the inspection report.

In general, it should not be assumed that waste containers will not leak. See guidance enclosed with Generic Letter 81-38. This guidance includes provisions for periodic visual inspections of container integrity and provisions for reprocessing or repackaging in the event of container failure.

General guidance for review of the need for licensee monitoring of hydrogen concentrations of stored waste is included as Appendix I to this procedure.

The guidance contained in IE Information Notice No. 83-14 and other applicable information notices should be used when examining waste and its stability.

7. Radioactive effluent monitoring and report.
8. Procedures for identification, labeling, accountability, and handling of the stored waste.

Procedures should ensure that a complete and accurate description of the waste be provided, including controls for radioactive waste containing substances that may require special handling such as certain chemicals and oil.

9. Maintenance of records and reports in accordance with licensee commitments and regulatory requirements.
- h. Inspection Requirement 02.08, Effluent Monitoring Changes. A low-level radioactive waste storage facility may have been originally designed as a storage-only facility that would involve no effluent monitoring requirements. However, the licensee may decide at a later date to conduct such activities as dry-active waste segregation, solid-waste compaction, repackaging, or waste processing that were not considered in the original evaluation. These changes could result in a new effluent release pathway that would necessitate monitoring requirements being added to the technical specifications in order to comply with 10 CFR 50, Appendix A, GDC 63 and 64. Specific questions as to whether effluent monitoring is required for a particular operation should be referred to NRR.

#### 65051-04 REFERENCES

Generic Letter 81-38, "Storage of Low-Level Radioactive Wastes at Power Reactor Sites," November 10, 1981.

Generic Letter 85-14, "Commercial Storage of Low-Level Radioactive Waste Not Generated by the Utility," August 1, 1985.

IE Circular No. 80-18, "10 CFR 50.59 Safety Evaluations for Changes to Radioactive Waste Treatment Systems," August 22, 1980.

IE Information Notice No. 83-14, "Dewatered Spent Ion-Exchange Resin Susceptibility to Exothermic Chemical Reactions," March 21, 1983.

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

NUREG-0800, Standard Review Plan, Appendix 11.4-A, "Design Guidance for Temporary Onsite Storage of Low-Level Radioactive Waste," July 1981.

Siskind, B., et al., "Extended Storage of Low-Level Radioactive Waste: Potential Problem Areas," NUREG/CR-4062 (BNL-NUREG-51841), December 1985.

Commission Policy Statement on Training and Qualification of Nuclear Power Plant Personnel, 50 FR 11147, March 20, 1985.

"NRC Responsibilities for Policy Statement on Training and Qualification," memorandum from H. R. Denton and J. M. Taylor to Regional Administrators, August 14, 1985.

END

Appendix



## APPENDIX I

### CONSIDERATION OF HYDROGEN GENERATION IN WASTE

In general there is considerable uncertainty in data available for predicting hydrogen generation rates for the various waste forms. Given the following assumptions, it is important that consideration be given in the design and operation of a LLRW storage facility to control of any significant amounts of combustible gas generated:

- that the "as packaged for storage" waste will eventually be transported to a disposal facility; and that
- at the time of transport the utility will have no inclination to repackage or reprocess the material.

Given those assumptions, the licensee, in designing its storage facility should consider the existing and relevant requirements for transport packages pursuant to the NRC Certificates of Compliance (COC) for low-level wastes as "LSA exceeding Type A quantity." Each COC for specific package designs for such material contains a requirement that the material ". . . must be shipped within 10 days after preparation and closure or within 10 days after venting."

Given the fact that NMSS has expressed this concern over combustible gas buildup during transport, it is logical that some consideration be given to potential gas buildup from sealed packages during storage. This is not apparently of concern for "LSA waste not exceeding a Type A quantity," such as DAW, Class A wastes, where no COC is involved.

Accordingly, the licensee should consider the potential for combustible gas buildup within sealed packages of materials such as filters, resins, and sludges and whether the storage package needs to be provided with a passive venting feature or a capability for periodic venting (which obviously will be required no more than 10 days before transportation). The evaluation should consider whether the rate of air change is adequate in any closed storage areas.

Whether or not hydrogen monitoring is required in a monitoring program for the storage facility will depend on the results of the evaluation outlined above. However, it appears that generally it would not be needed.

END