



REGULATORY GUIDE 12

GUIDE FOR THE PREPARATION OF REQUEST FOR EXTENDED INTERIM STORAGE OF LOW-LEVEL RADIOACTIVE WASTE

1. INTRODUCTION

This guide describes the type of information that the Office of Radiological Health (Department) staff needs to evaluate a request for extended interim storage of low-level radioactive waste of a current licensee as authorized by Title 180, "Control of Radiation."

The following outline was developed to assist the licensee in preparing an amendment request, if needed, to authorize extended interim storage of low-level radioactive waste (LLW). The term "extended interim storage" is to be interpreted as storage of LLW above the activity and authorized location for storage on an existing specific license. Many of the following items should already exist in the licensee's operating and emergency procedures. Any activities (i.e., compaction, processing, or treating) associated with the handling of LLW must be specifically authorized by the license, or an amendment to the license will also be necessary in order for the licensee to conduct these activities. The licensee may not process any waste from another licensee without specific authorization from the Department on both licenses.

2. IDENTIFICATION OF WASTE

In order to determine whether or not an amendment to the license is needed to store LLW, the licensee should complete the following to identify the LLW by radionuclide and activity that will be generated, estimate the volume of LLW that will be generated and must be managed by extended interim storage, and evaluate current storage limitations for adequacy to manage the volume of LLW estimated to require storage during the interim period.

Although it is unknown when a disposal facility will be available, a licensee should evaluate their storage requirements for a period of five (5) years. Estimates of LLW generation should be based on the previous five (5) years data on generation of LLW.

NEBRASKA DEPARTMENT OF HEALTH & HUMAN SERVICES REGULATION AND LICENSURE, REGULATORY GUIDES

Regulatory Guides are issued to describe and make available to the public acceptable methods of implementing specific parts of Title 180 Nebraska regulations, "Control of Radiation", to delineate techniques used by the staff in evaluating specific problems or postulated accidents, or to provide guidance to applicants, licensees, or registrants. Regulatory Guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the Nebraska Department of Health and Human Services Office of Radiological Health, to make necessary determination to issue or continue a license or certificate of registration.

Comments and suggestions for improvements in these Regulatory Guides are encouraged at all times and they will be revised, as appropriate, to accommodate comments and to reflect new information or experience. Comments should be sent to the Nebraska Department of Health and Human Services, Office of Radiological Health, 301 Centennial Mall South, P.O. Box 95026, Lincoln, NE 69509.

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(Rev 4) 7-2009

- A.** For the current year and each of the previous four (4) years, identify (by radionuclide and activity authorizations on the license) the total amount of LLW generated and categorize as to whether it is stored, transferred for disposal, disposed of via a specific provision of Title 180, or held for decay in terms of the following parameters:

<u>Parameters</u>	<u>Total</u>	<u>Stored</u>	<u>Transferred</u>	<u>Disposed or Transferred for Disposal</u>	<u>Decayed</u>
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1. Activity
(curies)
2. Weight
(pounds)
3. Volume
(cubic feet)

- B.** Using the data (for the current year and the four (4) previous years) and the format from A above, project the generation of each category of LLW for each year of the next five years. If there are any situations (new projects, conclusion of old projects, anticipated expansion, process changes that result in less generation of LLW, etc.) that may impact or alter the above projected estimates, they should be specified and may be factored into the projections. Since disposal or transfer for disposal may no longer be an option, the component of LLW previously assigned to that category should now be allocated to the "Stored", "Transferred", and/or "Decayed" categories.

- C.** Determine the current storage limitations in terms of activity and location for all LLW that will need to be stored.

- D.** Sum the projections from B above for categories "Stored" and "Decayed". Compare these sums with authorization limits and determine the possession limit increases needed for extended interim storage of LLW.

- E.** Characterize the LLW to be stored by:

1. Volume of waste by class (as defined in 180 NAC 4, Appendix 4-E)
2. Physical form of waste
 - a. solid, explain if finely divided and capable of resuspension as an aerosol if disturbed.
 - b. liquid, explain volatility (i.e., aqueous iodines are hazardous if not contained).
 - c. gas, explain construction of containers (H-3 can leak through many container materials).
3. Additional hazardous non-radiological properties of LLW
 - a. biological/pathogenic
 - b. corrosive
 - c. flammable
 - d. other

3. DISPOSAL PLANS

This section can only be completely addressed when the date is known when a disposal site will become operational. However, the licensee should at least consider the following:

- A. Specify when current disposal options (e.g., shipment for permanent disposal, transfer to waste broker, etc.) will no longer be used by licensee and/or current storage capacity will no longer be available and when on-site, extended interim storage will begin.
- B. After 5 years from the date of authorization for extended interim storage, submit a plan for evaluation of interim storage or permanent disposal options.

4. PHYSICAL DESCRIPTION OF STORAGE AREA, DESIGN AND SHIELDING

- A. Identify the location of the LLW storage area, including a legal survey description.

Provide a map identifying the location of the proposed site and any landmarks (e.g., highway intersections, distance from community, etc.) used to identify the location of the site.

Provide a description of the location (plot drawings). The description of the site should provide the dimensions of the property and accurately depict the location of the facility structure(s). The description of the site should also indicate the nature of the adjacent properties (e.g., vacant land, businesses, residence, etc.) and the distance of the proposed facility structure(s) to the property line and adjacent businesses or residences. The site description should also indicate the location of and distance from creeks, culverts and drainages.

- B. Specify the type of building or other location in which the LLW will be stored. The facility description and drawings should provide the dimensions of the proposed facility structure(s) and a detailed floor plan. Identify on the floor plan intended uses of areas adjacent to areas where LLW will be located. The licensee should accurately identify and describe the LLW handling, processing and storage areas. These descriptions should include the dimensions of the facility construction, and foundation details. Including drawings and specifications for ventilation including filtration, plumbing, and fire suppression systems, and physical security systems to prevent unauthorized entry into the storage area. The construction details should identify and describe the shielding used (if any is required) in various areas where radioactive waste is received, stored and processed (provide calculations, including all assumptions used to determine adequacy, to support shielding). If drains are located in the storage area, the licensee should consider blocking them. Berming around the storage area is required if liquids are being stored, and should also be considered for other waste forms.

The applicant should indicate if the facility is in a 100 year floodplain and describe how the engineering design of the facility will serve to minimize and control potential LLW migration into surface waters and ground water, through direct runoff or uncontrolled releases to flood control systems or sanitary sewers, soils, and the atmosphere.

- C. Specify the maximum volume of LLW that can be stored in the proposed waste storage area taking into account accessibility to waste, aisles, walkways and compare to the estimate of the total LLW to be generated as determined in 2.B. of this guide.
- D. Describe how the storage facility will mitigate the effects of temperature and humidity on the LLW and the containers.
- E. If other hazards are a present or potential threat, please describe them.

5. PACKAGING AND CONTAINER INTEGRITY

- A.** Describe the containers used to store LLW and provide the following information on each type container:
1. Provide the specifications for each type of container (e.g., size, corrosion resistance, type of coating if metal, type of closure, seals, liners, etc).
 2. Identify and describe the effects of the components (radiological, biological and chemical) of the LLW and the LLW's decay products on the containers. For example, if the LLW contains, or its decay products will result in, acidic or caustic components, describe the effects of these products on the storage containers. Also, if the waste and/or its decay products will result in the generation of gases, identify the gases expected to be produced and describe their effects on the storage containers and the proposed method for management of the gaseous products. Specific regulations for classification and characteristics of LLW are found in 180 NAC 4,-Appendix 4-E.
 3. Identify and describe the effects of temperature and humidity on the storage containers.
 4. Describe the labeling to be used on containers of LLW. Depending on the size of the operation, labeling may be expected to include identification of contents by radionuclide, date of closure, category of waste, (A, B or C), etc.
- B.** Describe the procedures to ensure that the containers are the type specified in A.1 and are labeled according to the description in A.4.
- C.** Describe the program for periodic waste storage inspections and inventories. This program should include surveys, air monitoring, condition of storage container(s), wipes of storage containers and storage areas, inventories, general review of safety protocol, and any other measures to detect possible leaks.
- D.** Describe the procedures and equipment for handling, repairing or repackaging containers of LLW.

6. RADIATION PROTECTION

A radiation protection program is now required for all licensees per 180 NAC 4-004. The following can be used as a checklist of the areas that should, as a minimum, be part of the licensee's procedures. These areas are in addition to the licensee's operating and emergency procedures.

A. Administrative Procedures

1. Internal Inspections

Describe the inspections performed by the licensee to ensure that operating and emergency procedures are being conducted according to the stated procedures.

2. Internal Audits

Describe the audits made of records to ensure that the required information is being recorded and maintained in accordance with the licensee's procedures and the requirements of the Department, and that the radiation safety program is operating properly (e.g., review of personnel records to determine that appropriate persons are included in the personnel monitoring program and that exposures are within acceptable levels, reviews of survey and

Regulatory Guide 12 – (Rev 4)

wipe records, air monitoring data, etc.).

3. ALARA Program

The applicant/licensee should describe its policy with respect to maintaining exposure as low as reasonably achievable. This should also include a description of the measures taken to achieve this goal.

4. Postings and Notifications

Provide the guidelines for restricting access to areas where LLW is used or stored and for posting warning signs as required by 180 NAC 4-033 and 4-034 and 4-035.

5. Accountability

Describe the procedures for maintaining an inventory of the LLW and accounting for the material during receipt, handling, storage, and transfer. Provide a copy of the forms to be used and instructions to personnel responsible for accounting for the LLW. Inventory should include description of activity in each barrel, location and identification number for each barrel in the storage area.

6. Records Management

Specify who is responsible for management of the records and where the records will be kept.

B. Radiation Protection Program

1. Effluent Control Techniques

Describe procedures employed to meet the requirement for water and air as specified in 180 NAC 4-014.

2. Contamination Control

Describe the procedures employed to prevent or reduce the probability of contamination of equipment, areas, and personnel, or the release of material to unrestricted areas. These may be described separately as preventive and remedial measures.

a. Preventive Measures and Equipment

Describe the contamination control procedures for personnel and equipment. This description should specify the procedures employed for each function involving handling of LLW, including surveys of material on receipt, repackaging, and prior to transport, safety precautions to be employed when handling LLW; types of safety equipment to be employed for specific procedures (e.g., protective clothing such as gloves, anti-contamination suits or respiratory protection devices, etc.); training provided to employees to prevent ingestion and inhalation of radioactive materials, and methods to keep radiation exposure to levels as low as reasonably achievable.

b. Remedial Measures

Describe the spill, detection, and cleanup plans for the facility and for associated transportation, if applicable. These plans should also describe the procedures for managing spills, contamination, and radiation accidents.

3. Exposure Monitoring

Provide the procedures for monitoring personnel exposure. As a minimum, describe the type of personnel monitoring device(s) used, exchange frequency, when and how worn, and where the devices are kept when not being worn.

4. Surveys

Describe the radiation surveys, including wipes and air monitoring, that will be performed, specifying the areas and personnel surveyed, frequency of surveys that will be performed, who will perform the surveys and the types of instruments used and action levels. Include in this description the details for recording the results of the survey and where the records will be maintained and actions taken when action levels are exceeded.

5. Emergency Procedures

Describe the emergency procedures pertaining to transportation accidents, spills, loss of power or ventilation system, fire, etc., detailing the procedures to be followed in each event including individuals to be notified and appropriate telephone numbers, action to be taken to identify areas of contamination and restricting access to the area, etc.

6. Environmental Monitoring

Describe the environmental monitoring that will be done in the area surrounding the facility. This may include air sampling, surface and ground water sampling, ambient radiation levels, soil, plants, and animals. The licensee should state the depth to ground water.

C. Instrumentation and Quality Assurance

1. Describe the type of survey instrumentation, make, model number, frequency of calibration, provider of calibration service, and documentation of calibration.
2. A description of the equipment used to count the wipes should be described along with the method for calibrating the counting instrument, and documentation of the calibration procedure.
3. Air sampling equipment, frequency of calibration, calibration methodology, and documentation of calibration.

D. Operating Procedures

The applicant/licensee should provide procedures describing the following aspects of their LLW operations: handling, storage, segregation, identification, inspection, transfer, and transportation (e.g., securing containers, shipping papers, etc.) of LLW. These procedures should include a flow diagram of the radioactive waste processing/storage operations, a description and accurate drawings of processing equipment (including any LLW compactors), a description of any special handling techniques employed, and a description of the facilities and equipment for repackaging leaking and/or damaged containers.

7. TRAINING

Provide a description of the technical qualifications, including training and experience of the applicant's staff who will have access to the waste storage areas; and minimum training and experience requirements for these personnel. In addition provide a description of the personnel training and annual training program.

8. DECONTAMINATION AND DECOMMISSIONING

The applicant should describe its plan for decontaminating the facility once waste has been removed for disposal. The plan should address acceptable radiation and contamination levels, equipment, personnel training requirements and procedures.