
MINNESOTA DEPARTMENT OF HEALTH



REGULATORY GUIDE FOR DECOMMISSIONING

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REGULATORY GUIDE FOR DECOMMISSIONING

Purpose

The purpose of this document is to:

- illustrate the decommissioning process to licensees, and the general public,
- provide guidance to MDH licensees for terminating the most common MDH radioactive materials licenses and to make available methods, acceptable to MDH staff, for implementing specific parts of the decommissioning rules;
- delineate techniques and criteria used by MDH staff in evaluating decommissioning actions;
- provide guidance to MDH staff overseeing decommissioning programs to evaluate a licensee's decommissioning actions; and
- maintain a risk-informed, performance-based, and flexible decommissioning approach
- provide guidance for staff tasked with inspection of decommissioning activities.

This document provides guidance regarding decommissioning leading to termination of a license for facilities that do not require a decommissioning plan. Guidance for radiological programs that are not included in this document can be found in NUREG 1757. "*Consolidated NMSS Decommissioning Guidance.*"

Introduction

Licensees decommissioning their facilities are required to demonstrate to MDH that their proposed methods will ensure that the decommissioning can be conducted safely and that the facility, at the completion of decommissioning activities, will comply with MDH requirements for license termination. MDH staff overseeing the decommissioning program materials sites should use the policies and procedures to evaluate a licensee's decommissioning actions.

This guidance is not a substitute for regulations, and compliance with it is not required. Methods and solutions different than those in this guidance will be acceptable, if they provide a basis for concluding that the decommissioning actions are in compliance with the MDH rules.

The majority of terminated licensees are those that used and possessed sealed sources or relatively limited amounts of unsealed radioactive material. Due to the amounts, forms, and types of radioactive material used by these licensees, most licensees do not need to submit decommissioning plans or perform complex remedial activities to decommission their facilities in accordance with MDH criteria. However, certain licensees need to submit information regarding either (1) the status of their facilities when they request license termination or (2) the activities that they intend to use to remediate their facilities. The types of information required could range from very simple descriptions of the radiological status of the facilities and the disposition of radioactive material possessed by the licensees to, in the case of licensees who proposed license termination under restricted conditions, very detailed descriptions of institutional controls, dose estimates to potential future critical groups, and arrangements to ensure that adequate financial assurance mechanisms are in place at license termination in the form of a detailed decommissioning plan.

The best approach to decommissioning is to develop detailed descriptions of the types of information needed to evaluate proposed decommissioning activities and to tailor the information needed from the licensees based on the complexity and safety significance of the decommissioning project. This approach is implemented through several interactions between MDH staff and licensees.

Timing of the Decommissioning Process

The decommissioning process begins when the licensee determines that decommissioning of all or a portion of a site is necessary or desirable. MDH staff identifies facilities undergoing decommissioning by the activities performed during the operation of the facilities or the types of licensed material possessed by the licensee. Facilities undergoing decommissioning are evaluated based on the amount of residual radioactivity, the location of that material, and the complexity of the activities needed to decommission the

site. The licensees range from a sealed source facility that has not experienced any leakage to a large facility with contamination that would result in the license being terminated with restrictions on future site use and require an environmental impact statement to support the action.

Once the decision has been made to decommission, the next step is to determine what information the licensee needs to provide to demonstrate site conditions successfully. When MDH staff is informed that a licensee has decided to permanently cease licensed operations, or has not conducted licensed activities for a period greater than 24 months, and must decommission all or part of its facility, MDH staff should contact the licensee and determine if the licensee will need to submit a decommissioning plan to support its request for license termination.

Licensed facilities, areas, and buildings convert from "active" status to "decommissioning" status when one of the following occurs:

- The license expires or is revoked by the MDH.
- The licensee decides to permanently cease operations with licensed material at the entire site or in any separate building or outdoor area that contains residual radioactivity, such that the area is unsuitable for release in accordance with MDH requirements.
- Twenty-four (24) months have elapsed since principal activities have been conducted under the license, or
- No principal activities have been conducted in a separate building or outdoor area for a period of 24 months, and residual radioactivity is present that would preclude its release in accordance with MDH requirements.

Within 60 days of the occurrence of any of the above, the licensee is required to inform MDH of the occurrence in writing. In addition, the licensee is required to (a) begin decommissioning the facility, (b) submit within 12 months a decommissioning plan to MDH, and (c) begin decommissioning in accordance with the plan when it is approved by MDH. Unless otherwise approved by MDH, licensees are required to complete decommissioning their facilities within 24 months of initiating decommissioning operations.

The Decommissioning Process

The decommissioning process consists of a series of integrated activities, beginning with the licensee notifying MDH and changing the licensee's program from "active" to "decommissioning" status, and concluding with the termination of the license and release of the site. Depending on several factors, including the type of license, the use of radioactive material at the facility, or past management of radioactive material at the facility, the decommissioning may be either relatively simple and straightforward or complex.

While the steps may vary for different sites, the basic process is the same. The steps in the process are as follows:

- Stop operations, either in a specific area or building or for the entire facility.
- Notify MDH of the decision within 60 days.
- Determine locations and concentrations of remaining radiological contamination.
- If necessary, develop a decommissioning plan that includes all of the following:
 - the current radiological contamination at the site;
 - the criteria for the final condition of the site;
 - the activities to remediate existing contamination that are not currently authorized by the license;
 - procedures to protect workers;
 - decommissioning cost estimates;
 - the final survey method to demonstrate compliance with MDH criteria; and
 - provides the schedule for remediation activities and license termination.
- Clean up contamination, as needed.
- Conduct Final Status Survey to show compliance with dose limits for license termination.
- Request that MDH terminate the license.

Note that it is important for licensees to notify MDH promptly when operations cease. It is also important that the staff meet with the licensee to discuss the decommissioning requirements early in the process.

Safety Evaluation

The staff should review the technical content of the information provided by the licensee to ensure that the licensee used defensible assumptions and models to calculate the potential dose to the average member of the critical group. The staff should also verify that the licensee provided enough information to allow an independent evaluation of the potential dose resulting from the residual radioactivity after license termination and provided reasonable assurance that the decommissioning option will comply with regulations.

Radiological Criteria for Decommissioning

Dose-based requirements for licensees seeking license termination are found in 4731.2100 to 4731.2200. These regulations establish two final states for licensee termination: unrestricted use and restricted use. In addition MDH requires licensees to maintain ALARA doses. This means the licensee must make every reasonable effort to reduce the dose as far below the specified limits as is practical, taking into account the state of technology and economics.

The use of a dose limit allows both the licensee and the regulator to take site-specific information into account in determining acceptable concentrations of residual radioactivity at the site using dose models and exposure scenarios that are as realistic as necessary.

Unrestricted Use

Residual radioactivity, distinguishable from background, results in a calculated dose from all pathways to the average member of the critical group that is not in excess of 0.25 mSv/y (25 mrem/y).

Restricted Use Conditions

The basic requirement for license termination under restricted use conditions is that the licensee provide institutional controls that limit the calculated dose to 0.25 mSv/year (25 mrem/year). Further, the licensee must reduce residual radioactivity so that if these controls fail, the calculated dose would not exceed 1 mSv/year (100 mrem/year). In rare instances, the calculated dose may exceed 1 mSv/y (100 mrem/year), but it may not exceed 5 mSv/year (500 mrem/year). Additional institutional controls would be established to meet regulatory requirements.

To qualify for license termination under restricted conditions, the licensee must meet all of the criteria:

- Demonstrate that further reductions in residual radioactivity would either cause net environmental harm or are technically or economically not feasible.
- Demonstrate provisions for legally enforceable controls to limit dose to 0.25 mSv/year (25 mrem/year).
- Provide financial assurance to allow a third party to control and maintain the site.
- Demonstrate that advice from affected parties on the adequacy of the proposed institutional controls and financial assurance has been obtained and used in developing the decommissioning plan

Alternative Criteria

In the unlikely event that a licensee is not able to reduce residual radioactivity to a level that limits the calculated dose such that it is not in excess of 0.25 mSv/year (25 mrem/year) with restrictions in place, the licensee may request permission from the MDH to use alternate criteria. In doing so, the licensee must demonstrate all of the following:

- The calculated dose from all man-made sources is unlikely to exceed 100 mrem (1 mSv) per year by identifying these sources and the expected dose from each.

- Institutional controls will minimize the dose from the site.
- The licensee has obtained public advice on the proposed institutional controls and financial assurance.

Licenses That Require No Decommissioning Plan

Group I Licenses

Facilities that typically involve licensed material used in a way that would preclude its release into the environment, would not cause the activation of adjacent materials, or would not have contaminated work areas are:

- Licensees who possessed and used only sealed sources, and whose most recent leak test results are current and demonstrate that the source(s) did not leak while in the licensee's possession; or
- Licensees who possessed and used relatively short-lived radioactive material (i.e., $T_{1/2}$ less than or equal to 120 days) in an unsealed form and, within timeliness constraints, the maximum activity authorized under the license has decayed to less than the quantity specified in 4731.2800, **and** the licensee's survey, performed in accordance with 4731.3085, does not identify any residual levels of radiological contamination greater than decommissioning screening criteria.

Termination of these licenses would not require the licensee to submit a decommissioning plan. The following licensee actions are required:

- Notify MDH.
- Dispose of the licensed material in accordance with MDH requirements, usually by returning the material to the manufacturer.
- For other than sealed sources, perform a radiation survey and submit the results, or demonstrate that the facility, or portion of the facility, meets MDH criteria for unrestricted use.
- For all sealed sources, including those no longer in licensee's possession, provide to MDH results from the most recent leak tests demonstrating there has been no leakage.
- Transfer the decommissioning records, as appropriate, or affirm that they are not required to retain or transfer these records.
- Submit a "Certificate of Disposition of Materials," or equivalent information to MDH. Written confirmation from the recipient that the material has been transferred should be included

Simplified Survey Procedures

The licensee should establish a method to identify individual measurement/sampling points on each surface in the indoor area that was involved in licensed material use. At a minimum, the licensee's termination survey should consist of the following:

- One hundred percent scanning of all surfaces in the area of the facility where licensed material was used or stored, using an appropriate radiation detection instrument (including scan sensitivity);
- Evaluations for total and removable radioactive material at each area exhibiting elevated radiation levels, or at a frequency of one wipe comprising 100 cm² per 300 ft²; and
- Evaluations of radiation levels at one meter above surfaces.

Particular attention should be afforded any drains, air vents, or other fixtures or equipment that may have become contaminated during licensed material use. This is especially significant in situations where renovations have occurred and potentially contaminated areas may be inaccessible under current conditions.

MDH staff should:

- Determine that the facility meets the appropriate criteria.

- Initiate initial processing of the decommissioning action.
- Review, after verifying the disposition of the licensed material, the information submitted by the licensee to demonstrate that its facility is suitable for unrestricted use.
- Review leak test results, verify that the type and number of identified sources are in agreement and the most recent leak test results are current and indicate that the sources did not leak.
- Review licensee's survey, paying particular attention to anomalies such as the use of inappropriate radiation survey and analytical instrumentation, incomplete evaluation of radioactive material use/storage areas, and spurious survey results.
- Contact the licensee if the leak test results are inconclusive with respect to the condition of the sealed sources.

An environmental assessment for termination of the license is not necessary.

Group 2 Licenses

Some facilities may have residual radiological contamination present in building surfaces and soils. However, licensees may be able to demonstrate that their facilities meet the provisions of 4731.2100 ("Radiological Criteria for Unrestricted Use"). Additionally, licensees typically possess historical records of material receipt, use, and disposal, such that quantifying past radiological material possession and use may be developed with a high degree of confidence. Furthermore, these licensees have radiological survey records that characterize the residual radiological contamination levels present within the facilities and at their sites. That is, they are able to demonstrate residual radiological contamination levels without more sophisticated survey procedures (greater than those used for operational surveys) or dose modeling. These licensees do not need to use site-specific parameters or establish site-specific DCGLs in order to demonstrate acceptability for release of their sites.

Activities that may fall this category are:

- The licensee possessed and used only sealed sources, but the most recent leak tests indicate that the sources leaked.
- The licensee used unsealed radioactive material, and the licensee's survey demonstrated that levels of radiological contamination on building surfaces or surface soils are less than decommissioning screening criteria.

These licensees did not have releases into the environment in excess of MDH limits and did not activate adjacent materials. Because levels of persistent contamination of work areas, building surfaces, and limited surface soil contamination may exist, decommissioning efforts differ from those listed above.

Typical licensees in this category are:

- licensees who can demonstrate compliance with 4731.2100 ("Radiological Criteria for Unrestricted Use"); and
- licensees who possess and use only sealed sources that cannot demonstrate current leak-tight integrity.

These licensees are not required to develop a decommissioning plan for the following reasons:

- Decommissioning workers would not be entering areas normally occupied where surface contamination and radiation levels are significantly higher than routinely encountered during operation.
- Procedures would involve techniques applied routinely during cleanup or maintenance operations.
- Procedures would not result in significantly greater airborne concentrations of radioactive materials than are present during operation.
- Procedures would not result in significantly greater releases of radioactive material to the environment than those associated with operation.

Licenses using small quantities of C-14 or H-3 may be decommissioned under this category depending on the total activity of C-14 or H-3 possessed under the license and the authorized use of the radioactive material.

Although submission of a decommissioning plan is not required for decommissioning, these licenses are required to determine the radiological status of their facility and demonstrate that their facility meets MDH requirements for unrestricted use. This is accomplished by remediating the site as necessary, performing a radiation survey, and conducting dose evaluations.

The following licensee actions are required:

- Notify MDH.
- Dispose of the licensed material in accordance with MDH requirements, usually by returning sealed sources to the manufacturer or disposing of licensed material as outlined in MDH regulations.
- For all sealed sources, including sources no longer in the licensee's possession, provide to MDH results from the most recent leak tests.
- Transfer the decommissioning records discussed, as appropriate, or affirm that they are not required to retain or transfer these records.
- Determine the radiological status of the facility and perform further remediation, if necessary, to meet MDH screening criteria for unrestricted use.
- Demonstrate that the facility, or portion of the facility, meets MDH criteria for unrestricted use.
- Submit a "Certificate of Disposition of Materials," or equivalent information to MDH. Written confirmation from the recipient to confirm that the material has been transferred should be included.

In performing the decommissioning of its facility, the licensee should first identify any areas in the facility that were involved in licensed material use by reviewing facility records and conducting a survey of the licensed material use area. This survey should be similar to the routine contamination surveys conducted under the licensee's radiological safety plan. The licensee should then remediate all surfaces in the areas at the facility that were involved in licensed material use or storage and dispose of all radioactive material and waste as discussed in 4731.2400. If a survey is required to demonstrate that its facility is suitable for unrestricted use, the licensee should design the survey so it is of sufficient scope and quality.

MDH should:

- Determine whether the decommissioning meets the criteria summarized above.
- Initiate initial processing of the decommissioning action
- Upon receipt of the radiation survey from the licensee, perform a "completeness" review to determine whether the radiation survey contains sufficient type and quality of information to begin the in-depth technical review.
- Review the radiation survey to ensure that it adequately demonstrates that the facility is suitable for unrestricted use.
- Ensure that the licensee has transferred the decommissioning records, as appropriate, or has affirmed that they are not required to retain or transfer these records.
- As the final step in terminating the license, notify the licensee by license amendment after MDH has verified the suitability of its facility for unrestricted use.

NUREG – 1757 should be used to determine the appropriate decommissioning procedures for licensees with more complex radiological programs.

Decommissioning Plan Review

If a decommissioning plan is required, licensees are strongly encouraged to meet with MDH prior to the submittal of their plan and at any stage in this process. A decommissioning plan is required if one is

specified in the existing license or if new activities or procedures—those not currently authorized in the license—are needed to conduct remediation. The decommissioning plan is processed as follows:

- MDH meets with licensee to determine which items in the Decommissioning Plan Evaluation Checklist in are applicable.
- Licensee submits decommissioning plan for all or part of the facility.
- MDH conducts an acceptance review to decide if the plan is complete:
- MDH determines if there is sufficient information to evaluate the proposed decommissioning alternative:
 - current condition of site;
 - release criteria and important values (e.g., residual concentrations);
 - land use scenario and critical group(s); and
 - final survey plan.
- If the decommissioning plan is not complete, the licensee is informed in writing.
- After acceptance for technical review, MDH conducts a detailed evaluation of the plan from environmental and safety perspectives.
- If the information in the plan is not sufficient for MDH to complete the environment and safety reviews, additional information is requested.
- When the licensee revises the plan; the revised plan is reviewed, as above.
- MDH issues license amendment approving the decommissioning plan.
- Upon approval, the licensee implements the plan.
- MDH should conduct in-process inspections to verify compliance.
- At the completion of remediation, the licensee conducts a final status survey to demonstrate compliance with license termination criteria.
- MDH verifies the survey by one or more of the following:
 - QA/QC reviews;
 - side-by-side or split sampling; and
 - independent, confirmatory surveys.
- If the survey does not demonstrate compliance, additional remediation and/or surveys are required.
- When the survey demonstrates compliance with release criteria, MDH terminates, or modifies the license for partial site release.

More detailed guidance for Decommissioning Plans can be found in NUREG 1757. "*Consolidated NMSS Decommissioning Guidance*."

INSPECTIONS

The inspector should use *all* the inspection requirements from the licensee's operations that carry over to decommissioning. The inspector should develop an inspection program to observe the adequacy of routine activities that can significantly effect the health and safety of workers and the public and the environment around the licensee's operations.

Some of the most important inspection elements should include:

- security and control of contaminated material
- radiation protection for workers
- radiological waste generation, storage, transportation, and disposal
- effluent releases and environmental monitoring
- management organization and controls
- essential systems and services to support decommissioning

Aside from the inspection activities described above, the inspector should also use other parts of the MDH Inspection Field Notes that are routinely used on typical inspections and which are included in the Inspection Procedures Manual.

Inspection of Key Decommissioning Activities

The inspector should develop an inspection program to observe key decommissioning activities being performed by the licensee. Key activities occur in all phases of the decommissioning process and include the following for facilities requiring significant decommissioning activities, such as building dismantling, soil removal, and groundwater cleanup:

- 1. Inspections Before Dismantling** -- This is the pre-decommissioning activity and decommissioning planning stage after the shutdown of operations and before dismantling and remediation. Essential activities and conditions may include the following:
 - Removal of licensed materials from the facility (if required by license condition)
 - Compliance with decommissioning timeliness requirements
 - Compliance with record keeping requirements for decommissioning
 - Implementation of the licensee's decommissioning organization and approved plans
 - Site characterization
 - Construction of site features to support decommissioning

- 2. Inspections During Dismantling and Remediation** -- This is the stage when the site is actively being cleaned-up. Key activities include the following:
 - Decontamination and dismantling of structures
 - Decontamination and remediation of soil, sediment, surface waters, and groundwater
 - Waste management and on-site storage
 - Transportation and off-site disposal of wastes
 - On-site disposal of waste
 - Restoration of the site
 - Inspection activities identified during the review of the licensee's decommissioning plan

- 3. Inspections After Remediation** -- Key activities in this stage include the following:
 - Licensee final survey
 - MDH confirmatory survey
 - Site maintenance for restricted use

INSPECTION GUIDANCE

Primary indicators of the licensee's overall radiation safety program include the following:

- Observations of licensee decommissioning activities in progress
- Equipment in use
- Facilities and use areas
- The implementation of specific license conditions
- The implementation of approved decommissioning plans and procedures

Review of licensee records will also contribute to the evaluation of the licensee's program. In reviewing records, look for trends, such as increasing doses or effluent releases. The inspector should randomly examine the following records until he or she is satisfied that the records are being maintained and are complete.

- Surveys
- Waste disposal
- Effluent release
- Receipt and transfer of radioactive materials
- Training
- Use logs
- Air sampling

Other records that are more closely related to health and safety (such as personnel dose-monitoring records and incident reports) should be examined in their entirety.

Many of the inspection activities required during decommissioning are similar to inspection activities conducted at operating facilities. The guidance given in this section, therefore, includes references to other sections of the MDH Inspection Procedures Manual that are applicable to materials decommissioning.

A major part of inspection activities will be related to evaluating the licensee's final survey and performing the MDH confirmatory survey for release of the site under MDH regulations. For facilities that will require a final survey, the inspector should begin this activity early in the decommissioning process. Inspections should start during site characterization to ensure that the site will be remediated consistent with MDH requirements and the licensee's approved decommissioning plan.

A. Inspection Requirements Applicable From Operations -- Many inspection activities will follow directly from those used during licensee operations. Review the licensee's decommissioning plan and supporting documents for licensee activities that are similar to those performed during operations. Then develop the inspection program to carry over to decommissioning the applicable inspection activities used during operations. Tailor the inspection program to meet licensee-specific conditions.

Some of the requirements that carry over to decommissioning of major licensed activities that require dismantling and remediation are described below:

1. Security and Control of Contaminated Material -- Physical security of the site should be maintained, as necessary, for licensees undergoing decommissioning. Assess licensee security and control of contaminated material throughout the decommissioning process.

Verify that contaminated material is secured and controlled in accordance with 4731.2290, and posted in accordance with 4731.2310. Containers of contaminated materials should be labeled in accordance with 4731.2330. Contaminated materials in buildings should be secured and controlled by locking buildings, rooms, or areas of use. Contaminated materials in outside areas should be secured and controlled by fencing or soil covers. Eight-foot cyclone-type fencing is generally acceptable. Other fencing types, such as barbed wire fences, may be sufficient in low-population, rural areas. Three to four-foot thick soil covers over contaminated soil, slag, or tailing piles are also generally acceptable. Access to buildings, rooms, or outdoor areas having contaminated materials should be limited only to individuals having the licensee's or responsible party's permission for access.

2. Radiation Protection for Workers -- Inspect the licensee's approved health physics procedures, as implemented in the field, to determine that the approved program is being implemented and to establish the degree of potential for exposures. Tailor subsequent inspections to concentrate on identified areas of risk.

3. Effluent Releases/Environmental Monitoring -- Verify that licensee off-site monitoring has been established, and that the following are being met: sampling locations, frequencies, and applicable limits on levels and concentrations of radioactivity. The potential for off-site release may be lower during decommissioning than during operations, but inspections for off-site releases should continue to be performed during decommissioning. Evaluate the need for installing MDH air samplers or TLDs to verify licensee exposure data.

4. **Management Organization and Controls** -- Review licensee implementation of the following:
 - Approved plans and programs
 - Regulatory requirements
 - License conditions for the management and control of decommissioning of the facility
 - The organization in place for the decommissioning project
 - Designation and qualification of the radiation safety officer
 - The QA program and annual review
 - Records control and storage
 - Internal review and audit
 - Safety committee
 - Procedure control for cleanup operations
 - Decommissioning procedures to be implemented

5. **Essential Systems and Services to Support Decommissioning** -- Verify, through observations in the facility and review of licensee records, that the support systems needed for clean-up and dismantling efforts are functional. These systems include the following:
 - Electrical power
 - HVAC systems
 - Water supply
 - In-plant communications systems
 - Liquid and solid contaminated waste systems
 - Sewage treatment plant
 - In-plant lighting

6. **Documentation of Inspections** -- Fully document all visits to and inspections of each site undergoing decommissioning. Radioactive materials at the site present potential health and safety hazards until the site is remediated and the license is terminated.

B. Inspection of Key Decommissioning Activities -- Identify all significant or key licensee activities of a particular site undergoing decommissioning, including before, during, and after remediation. Develop an inspection program to focus on activities where potential health and safety problems may occur, especially accounting for high-risk activities. The frequency of inspections should be based on both the inspection frequency used during operations and the particular set of decommissioning activities to be performed by the licensee. Major decommissioning activities are given below. Complete the checklist of key decommissioning activities in Appendix A as part of your inspection report.

1. Inspections Before Dismantling

- a. **Pre-decommissioning Conditions** - Verify that all requirements preceding actual facility remediation are in place, including the following:
 - Licensed material used during operations has been removed from the site (if required by license condition).
 - Specific license conditions pertaining to the pre-decommissioning stage have been put in place by the licensee.
 - Essential systems and services to support decommissioning activities are in place.

- b. **Timeliness Requirements** - Verify that decommissioning schedules are consistent with decommissioning timeliness requirements in 4731.0600 or that the licensee has submitted an alternative decommissioning schedule for MDH approval.

- c. **Record keeping** - Verify that record keeping for information important to the safe and effective decommissioning of the facility is consistent with the record keeping requirements in 4731.3080 subpart 7.
- d. **Financial Assurance** - Verify that the financial assurance requirements, including financial instruments, are being maintained in accordance with 4731.3080.
- e. **Site Characterization** - Verify that site characterization activities are being conducted according to all applicable radiation protection procedures. Conduct at least one inspection with the licensee while the licensee is performing characterization. Where possible and warranted, conduct side-by-side measurements with the licensee and take independent measurements for comparison with licensee results. Under special circumstances, the inspector should split samples with the licensee during site characterization where necessary to confirm the adequacy and validity of licensee measurements. Evaluate how the results of the planned site characterization will lead to successful site remediation and the licensee's final survey.
- f. **Construction of Site Features to Support Decommissioning** - Verify that the construction of features to support decommissioning is consonant with MDH approved decommissioning plans (if required) and industry standard. Verify that they do not compromise health and safety considerations of workers and the public. Consider such items as:
 - new loading docks
 - roads
 - rail spurs
 - drainage ditches
- g. **Other license conditions and Approved Plans** - Verify that licensee activities conform to specific license conditions and licensee programs and procedures. Audit licensee performance on high-risk activities, as needed.

2. Inspections During Dismantling and Remediation

- a. **Decontamination and Dismantling of Structures** -- Verify, by field observation and record reviews, that licensee activities to decontaminate and dismantle structures are being performed consonant with MDH-approved plans (if required) and industry standards. Structures should include:
 - buildings
 - above and below ground utilities
 - treatment lagoons
 - other man-made structures used or effected by the licensee
- b. **Decontamination and Remediation of Soil, Sediment, Surface Waters, and Groundwater** -- Verify, by field observation and licensee record reviews, that decontamination and remediation of soil, sediment, surface waters, and groundwater are being performed consonant with MDH-approved plans and industry standards. Inspect licensee activities on-site and inspect off-site in areas that may have been contaminated by licensee operations.
- c. **Radioactive Waste Management** -- Confirm that the licensee is maintaining adequate waste management controls related to the release and disposal of liquid, airborne, and solid wastes. Radioactive wastes generated during decommissioning must be disposed of in a manner approved by MDH. Some of the radioactive wastes generated during decommissioning include:

- building materials
- process and facility equipment
- concrete rubble
- filters
- trash
- sludge
- material from the waste treatment lagoons
- soil and vegetation
- groundwater
- surface water

- d. **Low-Level Radioactive Waste Storage** -- During decommissioning, large quantities of low-level waste may be temporarily stored on-site before shipment to a licensed disposal facility. Confirm that the waste is stored in accordance with license conditions.
- e. **Transportation of Wastes** -- Review the specifics of the licensee's packaging and transportation activities to determine which elements will be inspected. It would be prudent to discuss the regulations and the inspection procedure early with the licensee. For facilities that have large amounts of contaminated materials to ship off-site, transportation of material may continue throughout the decommissioning process. Contaminated materials for off-site disposal must be packaged in accordance with DOT regulations published in 40 CFR Parts 173-178.
- f. **Restoration of Site** -- Verify that the licensee has restored the site to meet license conditions and specifications in MDH-approved plans.
- g. **Activities Identified during Review of Decommissioning Plan** -- Plan to inspect any other significant activities or conditions that may have been specified in the licensee's decommissioning plan or license.

3. Inspections After Remediation

- a. **Certification of Waste Disposal** - Verify that the licensee has submitted information regarding the disposition of all licensed material according to Chapter 4731.3085.
- b. **Licensee Final Survey Program** - There are many elements of the licensee's final survey program that need to be inspected during the licensee's final survey program to confirm the acceptability of the licensee's survey results. These elements should also be inspected after submittal of the licensee's final survey report. See Appendix B, "Final Survey Program Inspection Field Notes," for detailed guidance on inspecting licensee final surveys, including conducting independent MDH confirmatory surveys where necessary.
- c. **Site Maintenance for Restricted Use** - If the site is to be released for restricted use, verify that all conditions limiting use of the site conform to license conditions, and that MDH-approved plans and are in place and functional.

LICENSE TERMINATION

As the final step in decommissioning, the licensee shall certify the disposition of all licensed material, including accumulated wastes, and conduct a radiation survey of the premises where the licensed activities were carried out. The licensee must either submit a report of the results of this survey or

demonstrate that the premises are suitable for release in some other manner. This information must be submitted within the 24-month period after notification or approval of the decommissioning plan, if required, unless an alternative schedule has been approved.

In addition to maintaining records important to facility decommissioning, licensees are also required to assure that such records are not lost at license transfer or termination. When a license is transferred, records pertinent to decommissioning must be transferred to the new licensee. Before MDH consents to a license transfer, the licensee is responsible for assuring that the appropriate records have been transferred in accordance with MDH regulations. Before MDH terminates a license, a licensee should transfer all decommissioning records to MDH. MDH staff is responsible for verifying that all of these records were received, before termination of the license.

MDH Record Retention Requirements

The decommissioning process can generate a considerable amount of records, particularly in conducting a final status survey. This section provides general record retention guidance for MDH staff responsible for project management of decommissioning nuclear facilities. The guidance is not meant to capture the totality of MDH staff requirements for record retention and document control; therefore, this section provides an overview of the records that, at a minimum, the MDH reviewer should retain.

The MDH reviewer should ensure, at a minimum, that the following records are retained for decommissioned nuclear facilities:

- all license applications, amendment requests, and renewal requests;
- complete license, including all amendments;
- any licensee request for license termination and all supporting documentation, including plans for completion of decommissioning;
- forms dealing with disposition of material and/or letters from licensees dealing with disposition and status of material;
- any documents dealing with the disposition of waste or other material or residual contamination on the site, including records of onsite burials;
- all documents related to financial assurance for decommissioning, including decommissioning funding plans, certifications of financial assurance for decommissioning, related cost estimates, and records of funding methods;
- records of spills and other unusual occurrences involving the spread of contamination and around the facility, equipment, or site;
- as-built drawings and modifications of structures and equipment in restricted areas where radioactive materials were used or stored and locations of possible inaccessible contamination;
- any additional documents that refer to decommissioning, decontamination, or termination of the license, including interim or partial decommissioning of specific facilities at any time during the history of licensed operations;
- any enforcement documents related to decommissioning and decontamination activities;
- a copy of the final status survey plan and decommissioning plan, if required;
- the final survey status report from the licensee, which should include the following:
 - summary measurements for each survey unit in the final status survey,
 - elevated area (“hot-spot”) evaluations,
 - survey instrument description and calibration records,
 - records of data reductions and comparisons with guidelines, and
 - the results of any investigations to determine the cause of the failure to meet the decommissioning criteria;
- results of site inspections, meeting reports, and correspondence;
- results of closeout surveys and inspections, including split sample collection and evaluation; and
- any other records provided by the licensee at termination in accordance with the preceding section of this volume.

Transmittal of License Termination

Licenses, including expired licenses, will be terminated by written notice to the licensee when the MDH determines that (a) the radioactive material has been properly disposed of, (b) a reasonable effort has been made to eliminate residual radioactive contamination, and (c) either a radiation survey has been performed, or other information is submitted by the licensee which demonstrates that the premises are suitable for release in accordance with MDH requirements.

After a comprehensive review of all decommissioning efforts and documentation, a license amendment to terminate the license must be prepared. The amendment, which has the same approval process as any other licensing action, should reference documents essential to the decommissioning process.

APPENDIX A

MINNESOTA DEPARTMENT OF HEALTH
DECOMMISSIONING INSPECTION - FIELD NOTES REPORT

Inspection Report Number: _____ License Number: _____

Licensee (Name and Address):

Licensee Contact: _____

Telephone Number: _____

Last Amendment Number: _____

Date of Amendment: _____

Priority: _____

Category: _____

Date of last inspection: _____

Date of this inspection: _____

Type of inspection:

- | | |
|--|---|
| <input type="checkbox"/> Announced | <input type="checkbox"/> Unannounced |
| <input type="checkbox"/> Routine | <input type="checkbox"/> Special |
| <input type="checkbox"/> Initial Decommissioning | <input type="checkbox"/> Re-inspection of Decommissioning |

Summary of findings and action:

- No Violation, clear Form 516 or letter issued
 Violation(s), Form 516 or letter issued
 Action on previous Violation(s)

Next inspection date: _____

Inspector: _____
(Signature)

(Date)

Approved: _____
(Signature)

(Date)

Field notes are to be used by the inspector to assist with the performance of the inspection. Note that all areas indicated in the field notes are not required to be addressed during each inspection. However, for those areas not covered during the inspection, the notation "not reviewed" should be made in each section where applicable. Additionally, all areas covered during the inspection should be documented in sufficient detail to describe what activities and/or records the inspector observed. The Decommissioning Procedure for Materials Licensees should be supplemented with the inspection procedures for operating facilities provided in the MDH Inspection Procedures Manual.

1. SUMMARY OF DECOMMISSIONING STATUS

- A. Cessation of licensee operations verified? Yes No
- B. Licensed materials for operations removed from the site? Yes No
- C. Decommissioning plan required? Yes No
- D. Decontamination and dismantling activities required for release of the site? Yes No
- E. Licensee final survey required? Yes No
- F. MDH confirmatory survey required? Yes No
- G. Criteria for release of site finalized? Yes No
- H. Compliance with decommissioning timeliness verified? Yes No
- I. Inspection coordinated with MDH and other parties? Yes No

2. INSPECTION AREAS COVERED UNDER THIS INSPECTION

- A. Site security Yes No
- B. Radiation protection for workers Yes No
- C. Radiological waste generation, storage, transportation, and disposal Yes No
- D. Effluent releases and environmental monitoring Yes No
- E. Management organization and controls Yes No
- F. Essential systems and services to support decommissioning Yes No
- G. Specific license conditions for decommissioning Yes No
- H. Record keeping for decommissioning Yes No
- I. Financial assurance Yes No
- J. Other inspection areas: Yes No

Observations and Remarks:

3. INSPECTION OF KEY DECOMMISSIONING ACTIVITIES

A. Licensee activities inspected before dismantling:

- | | | |
|--|------------------------------|-----------------------------|
| 1. Off-site removal of licensed material used in operations (if required by license condition) | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. Site characterization | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. Construction of site features to support decommissioning | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Decommissioning timeliness | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 5. Other licensee activities: | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

Observations and Remarks:

B. Licensee activities inspected during decontamination, dismantling, and site remediation:

- | | | |
|---|------------------------------|-----------------------------|
| 1. Decontamination and dismantling of buildings | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. Decontamination and dismantling of other structures, such as utilities and roads | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. Decontamination and removal of vegetation, soil, and sediment | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Decontamination and removal of surface water | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 5. Decontamination and removal of groundwater | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 6. Management and on-site storage of radiological waste | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 7. Transportation of radiological waste to disposal facility | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 8. On-site disposal of radiological waste from decommissioning site restoration | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 10. Specific license conditions | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 11. Activities identified during decommissioning plan review | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 12. Other licensee activities: | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

Observations and Remarks:

C. Activities inspected after completion of site remediation:

- | | | |
|--|------------------------------|-----------------------------|
| 1. Certification of waste disposal | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. Licensee final survey | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. MDH confirmatory survey | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Site maintenance (if required for restricted use) | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 5. Other licensee activities: | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

Observations and Remarks:

4. VIOLATIONS, AND OTHER ISSUES

Briefly state (1) the requirements and (2) how and when the licensee violated the requirement. For non-cited violations, indicate why the violation was not cited.

**APPENDIX B
FINAL SURVEY PROGRAM INSPECTION FIELD NOTES**

1. STATUS OF LICENSEE FINAL SURVEY

- A. Final survey report submitted to MDH and approved by license reviewer
- B. Previous inspections of licensee final survey program conducted
- C. Final survey report not submitted, licensee final survey in process
- D. Final survey plan submitted and approved by MDH license reviewer

2. INSPECTION LICENSEE FINAL SURVEYS

Notes:

- (1) For facilities where an approved decommissioning plan is required, the inspector should inspect the commitments in the decommissioning plan and the licensee's final survey plan (which would have been approved during license review). For facilities where a decommissioning plan is not required, inspections should be made using sound industry practices and MDH regulations and guidance.
- (2) Inspection of a licensee's final survey includes independent confirmatory surveys by the inspector or MDH contractor.
- (3) For facilities that require a significant decommissioning effort, all the inspection areas listed below should be inspected while the licensee's final survey program is in progress. For small, licensed facilities that do not require a significant decommissioning effort, only some of the inspection areas below may apply. It may not be practical to inspect these areas until after the licensee's final survey is completed; the final survey report has been submitted; and MDH has reviewed the report.
- (4) The inspector should identify which inspection areas listed below are performed during each inspection.

- | | | |
|--|------------------------------|-----------------------------|
| A. All potential contaminants identified | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| B. Potentially contaminated locations identified, and site areas properly classified as effected or unaffected | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| C. Reclassification of site areas based on survey results | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| D. Release criteria specified and appropriate for site | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| E. Determination of background reaction levels | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| F. Survey instrumentation and calibration | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| G. Survey design appropriate for site, including scanning and sampling for fixed and removable contamination | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| H. Survey procedures and techniques appropriate for site | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| I. Methods and procedures for analyzing samples | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| J. Management organization and controls in place for the final survey | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| K. Qualifications of field survey technicians | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| L. Interpretation of survey results | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| M. Licensee documentation, record keeping, and sample chain of custody | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| N. Independent confirmatory surveys performed by inspector or MDH contractor | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| O. Final survey quality assurance/quality control | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| P. Other: | | |

Observations and Remarks:

