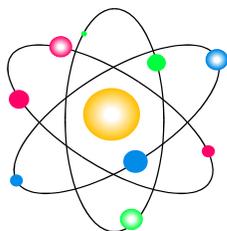

IOWA DEPARTMENT OF PUBLIC HEALTH

RADIOACTIVE MATERIALS LICENSEE

DECOMMISSIONING INSPECTION PROCEDURE

GUIDE

(Revised 07/01/05)



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RADIOACTIVE MATERIALS LICENSEE DECOMMISSIONING INSPECTION PROCEDURE GUIDE

I. -- INSPECTION OBJECTIVES

To determine if licensed decommissioning activities are being conducted in a manner that will protect the health and safety of workers and the general public.

To determine if licensed decommissioning programs are being conducted according to IDPH requirements.

II. -- INSPECTION REQUIREMENTS

A review of the licensed activities will be commensurate with the scope of and the risks associated with the licensee's program. An evaluation of safety and of compliance with IDPH requirements will be based on direct observation of work activities; interviews with workers; and demonstrations by workers performing tasks regulated by IDPH. In addition, independent measurements of radiation conditions at the facility and a review of licensee records should be completed.

In discussing issues with the licensee and reviewing records, cover the period back to the last inspection. Older records or issues preceding the last inspection should be reviewed if warranted by circumstances such as a history of incidents, non-compliance, or high radiation exposures.

The inspection program should be tailored to each specific licensee. Most materials licensees, for the most part, will not require submittal of a formal decommissioning plan for IDPH review and approval. Some materials licensees, such as medical teletherapy, well loggers, and radiographers, may only require a final status survey report, etc., to effect license termination, and will not require any actual decontamination or dismantling of facilities. Clean-up efforts for most materials licensees will not be a major effort. Some licensees, however, such as manufacturers of radioactive chemicals and certain academic and research institutions, may require significant decommissioning efforts by the licensees and significant inspection activities by the IDPH inspection staff.

Inspectors should review NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination." Portions of the US Department of Energy (DOE) "Decommissioning Handbook" (published by the Office of Environmental Restoration in March 1994) may be beneficial also.

The field notes in Appendices A and B should be used by the inspector for each inspection.

- A. Inspection Requirements Applicable from Operations** -- The inspector should use **all** the inspection requirements applicable, from licensee operations, which carry over to-licensee decommissioning. The inspector should develop an inspection program to observe the adequacy of routine activities that can significantly affect 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

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

- B. Inspection of Key Decommissioning Activities** -- The inspector should develop an inspection program to observe key decommissioning activities being performed by the licensee. Key decommissioning 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:
 - 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:
 - 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 license review of the licensee's decommissioning plan
 3. **Inspections After Remediation** -- Key activities in this stage include:
 - licensee final survey
 - IDPH confirmatory survey
 - site maintenance for restricted use

III. -- INSPECTION GUIDANCE

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

- observations of licensee decommissioning activities in progress
- equipment in use
- facilities and use areas
- the implementation of specific license conditions
- the implementation 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 records such as:

- surveys
- waste disposal
- effluent release
- receipt and transfer of radioactive materials

- training
- use logs
- air sampling

until the inspector is satisfied that the records are being maintained and are complete. Other records, which 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 IDPH 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 IDPH confirmatory survey for release of the site under IDPH regulations. For facilities that will require a final survey, the inspector should begin on this activity early in the decommissioning process. Inspections should start during site characterization to ensure that the site will be remediated consistent with IDPH 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 operations inspection requirements that carry over to decommissioning of major licensed activities, which 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 641-40.55(136C), and posted in accordance with 40.61(136C). Containers of contaminated materials shall be labeled in accordance with 641-40.63(136C) and 40.64(136C). Contaminated materials in buildings shall be secured and controlled by locking buildings, rooms, or areas of use. Contaminated materials in outside areas shall 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 indoor and outdoor areas having contaminated materials shall 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 and sampling locations, frequencies, and applicable limits on levels and concentration of radioactivity are being met. 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 IDPH air samplers or TLDs to verify licensee exposure data.

4. **Management Organization and Controls** -- Review licensee implementation of:
 - 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
 - the decommissioning procedures to be implemented
5. **Essential Systems and Services to Support Decommissioning** -- Verify, through observations in the facility and review of licensee records, which the support systems needed for clean-up and dismantling efforts are functional. These systems include:
 - electrical power;
 - HVAC systems;
 - water supply;
 - in-plant communications systems;
 - liquid and solid contaminated waste systems;
 - sewage treatment plant; and
 - 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, typical key 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:
 - 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 641-39.4(33) or that the licensee has submitted an alternative decommissioning schedule for IDPH 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 641-39.4(26)"g".
- d. **Financial Assurance** - Verify that the financial assurance requirements, including financial instruments, are being maintained in accordance with 641-39.4(26).
- 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, are consonant with IDPH approved decommissioning plans (if required) and industry practice. 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 IDPH-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 IDPH-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 IDPH. 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 IDPH-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 641-39.4(33).
- 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 IDPH 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 IDPH-approved plans and are in place and functional.

Appendices:

- A. "Materials Decommissioning Inspection Field Notes"
- B. "Final Survey Program Inspection Field Notes"

IOWA DEPARTMENT OF PUBLIC HEALTH
DECOMMISSIONING INSPECTION - FIELD NOTES REPORT

Inspection Report No.: _____ License No.: _____

Licensee (Name and Address):

Licensee Contact: _____ Telephone No.: _____

Last Amendment No.: _____ 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: _____ Normal Reduced Extended

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, a notation ("Note 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 IDPH Inspection Procedures Manual.

1. SUMMARY OF DECOMMISSIONING STATUS

- A. Cessation of licensee operations verified? []Y []N
- B. Licensed materials for operations removed from the site? []Y []N
- C. Decommissioning plan required? []Y []N
- D. Decontamination and dismantling activities required for release of the site? []Y []N
- E. Licensee final survey required? []Y []N
- F. IDPH confirmatory survey required? []Y []N
- G. Criteria for release of site finalized? []Y []N
- H. Compliance with decommissioning timeliness verified? []Y []N
- I. Inspection coordinated with IDPH and other parties? []Y []N

2. INSPECTION AREAS COVERED UNDER THIS INSPECTION

- A. Site security []Y []N
- B. Radiation protection for workers []Y []N
- C. Radiological waste generation, storage, transportation, and disposal []Y []N
- D. Effluent releases and environmental monitoring []Y []N
- E. Management organization and controls []Y []N
- F. Essential systems and services to support decommissioning []Y []N
- G. Specific license conditions for decommissioning []Y []N
- H. Record keeping for decommissioning []Y []N
- I. Financial assurance []Y []N
- J. Other inspection areas: []Y []N

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) | []Y | []N |
| 2. Site characterization | []Y | []N |
| 3. Construction of site features to support decommissioning | []Y | []N |
| 4. Decommissioning timeliness | []Y | []N |
| 5. Other licensee activities: | []Y | []N |

Observations and Remarks:

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

- | | | |
|--|------|------|
| 1. Decontamination and dismantling of buildings | []Y | []N |
| 2. Decontamination and dismantling of other
structures, such as utilities and roads | []Y | []N |
| 3. Decontamination and removal of vegetation, soil, and sediment | []Y | []N |
| 4. Decontamination and removal of surface water | []Y | []N |
| 5. Decontamination and removal of groundwater | []Y | []N |
| 6. Management and on-site storage of radiological waste | []Y | []N |
| 7. Transportation of radiological waste to disposal facility | []Y | []N |
| 8. On-site disposal of radiological waste from decommissioning | []Y | []N |
| 9. Site restoration | []Y | []N |
| 10. Specific license conditions | []Y | []N |
| 11. Activities identified during decommissioning plan review | []Y | []N |
| 12. Other licensee activities: | []Y | []N |

Observations and Remarks:

C. Activities inspected after completion of site remediation:

- | | | |
|--|------|------|
| 1. Certification of waste disposal | []Y | []N |
| 2. Licensee final survey | []Y | []N |
| 3. IDPH confirmatory survey | []Y | []N |
| 4. Site maintenance (if required for restricted use) | []Y | []N |
| 5. Other licensee activities: | []Y | []N |

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 IDPH 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 IDPH license reviewer

2. INSPECTION LICENSEE FINAL SURVEYS

Notes:

- (1) For facilities where an approved decommissioning plan is required, inspections should be made against 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 against sound industry practice and IDPH regulations and guidance.
- (2) Inspection of a licensee's final survey includes independent confirmatory surveys by the inspector or IDPH 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 IDPH has reviewed the report.
- (4) The inspector should identify which inspection areas listed below are performed during each inspection.

- | | | |
|--|-------|-------|
| A. All potential contaminants identified | [] Y | [] N |
| B. Potentially contaminated locations identified, and site areas properly classified as effected or unaffected | [] Y | [] N |
| C. Reclassification of site areas based on survey results | [] Y | [] N |
| D. Release criteria specified and appropriate for site | [] Y | [] N |
| E. Determination of background reaction levels | [] Y | [] N |
| F. Survey instrumentation and calibration | [] Y | [] N |
| G. Survey design appropriate for site, including scanning and sampling for fixed and removable contamination | [] Y | [] N |
| H. Survey procedures and techniques appropriate for site | [] Y | [] N |
| I. Methods and procedures for analyzing samples | [] Y | [] N |
| J. Management organization and controls in place for the final survey | [] Y | [] N |
| K. Qualifications of field survey technicians | [] Y | [] N |
| L. Interpretation of survey results | [] Y | [] N |
| M. Licensee documentation, record keeping, and sample chain of custody | [] Y | [] N |
| N. Independent confirmatory surveys performed by inspector or IDPH contractor | [] Y | [] N |
| O. Final survey quality assurance/quality control | [] Y | [] N |
| P. Other | [] Y | [] N |

Observations and Remarks: