

# NRC INSPECTION MANUAL

NMSS/DCB

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Temporary Instruction 2800/026, REVISION 2

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## FOLLOW-UP INSPECTION OF FORMERLY LICENSED SITES IDENTIFIED AS POTENTIALLY CONTAMINATED

APPLICABILITY: 2600 & 2800

### 2800/026-01 OBJECTIVE

To determine the status of formerly licensed sites for which there is inadequate documentation in the docket file to demonstrate that they were properly decommissioned.

### 2800/026-02 BACKGROUND

In 1976, the General Accounting Office (GAO) raised concerns about the decommissioning of sites formerly licensed by the Atomic Energy Commission's (AEC's) regulatory body, which is now the Nuclear Regulatory Commission (NRC). In its response, NRC agreed to reexamine the files of the terminated licenses. Between 1977 and 1982, Oak Ridge National Laboratory (ORNL) reviewed the docket files for all fuel cycle and materials licenses terminated before 1965 (approximately) to verify that all sites had been properly decommissioned. This was done under an interagency agreement with NRC. The files of 16,230 former licensees were reviewed: 12 contaminated sites were identified. All 12 sites had been licensed pursuant to 10 CFR Part 40, and none represented a significant risk to public health and safety. NRC took action to have former licensees decontaminate seven of the sites. The U. S. Department of Energy accepted responsibility for the other five sites, under its Formerly Utilized Site Remedial Action Program.

In 1989, GAO issued a report on NRC decommissioning procedures and criteria. This report raised additional concerns about the decommissioning of formerly licensed sites. On August 3, 1989, Chairman Carr testified to the House Subcommittee on Environment, Energy, and Natural Resources that NRC would review the records of all sites terminated since 1965. ORNL was contracted again to review all docket files retired between 1965 and 1985. This second study required the creation of a computerized inventory of the docket files, in addition to a screen of the files to determine whether all licensed sites had been properly decommissioned. If documentation were inadequate to verify that a formerly licensed site had been properly decommissioned, the status of the site was to be verified by inspection.

ORNL's methodology for identifying licenses of concern uses an expert system to evaluate the likelihood and possible magnitude of contamination. In general, an expert system assigns a score based on the nuclides and quantities of material the licensee was authorized to possess. Site scores are based on the form of the material, and inhalation and ingestion dose factors and decrements for half-life. Scores are modified by information indicating

possible contamination of buildings or the environment. Analyses for sealed sources are simpler, because site scores are based only on the isotopes and quantities authorized, decremented for half-life.

Subsequently, NRC decided that it was necessary to review the files of all terminated licenses (pre-1965 and post-1985) using the same screening criteria and to document their status in one computer inventory. This would improve information retrieval and permit comparison of the review findings for all terminated license files. The staff intends to determine, by inspection, the status of all sites located in non-Agreement States for which there is inadequate decommissioning documentation. The responsibility for sites located in Agreement States will reside with the States, unless the site is associated with a Federal license. The responsibility for closing out Federal licenses will remain with NRC. Licenses for sites identified by ORNL in Agreement States will be referred to the Agreement States for closure.

### 2800/026-03 INSPECTION REQUIREMENTS

03.01 Licenses for non-Federal sites located in Agreement States should be referred to the appropriate State.

03.02 Review the concerns raised by ORNL review of the docket file for the formerly licensed site or sealed source license to determine that there are no errors nor misunderstandings in ORNL's findings. First priority shall be given to sites scoring >300, then sites scoring ≤300, and then sealed source files. Check regional files and institutional memory regarding legitimate concerns raised by ORNL. If necessary, request the former licensee and/or the current site owner to review its files and institutional memory regarding concerns about the site.

03.03 For sites in non-Agreement States, determine whether a site visit is required to resolve any of the Region concerns raised by the docket file review. Coordinate all site visits with the appropriate radiological control program within the State, the former licensee (if possible), and current site owner before the inspection. Explain the specific issues concerning the site status raised by the file review.

03.04 Determine if documentation missing from the docket file can be obtained from additional records that may still be available at the site.

03.05 Survey the site for residual contamination or other radioactive material associated with previous AEC/NRC activities, if necessary, to verify the status of the site. Determine whether remedial actions are required to remove radioactive materials in excess of: the criteria in the "Radiological Criteria for License Termination Rule," effective August 20, 1997. Notify the Decommissioning Branch (DCB)/Nuclear Material Safety and Safeguards (NMSS) promptly of any site found contaminated and obtain NMSS input on plans to proceed.

**NOTE: If significant site contamination is identified, the inspector should contact regional management, before leaving the site, to discuss the need for barriers, postings, and/or administrative controls, to address any immediate health and safety concerns.**

03.06 Monitor the cleanup activities for short-term remedial actions performed by former licensees or current site owners, to ensure they meet the intent of 10 CFR Parts 19 and 20, and verify that the site is decontaminated to levels consistent with the criteria presented in Section 03.05. Coordinate the transfer of

sites requiring long-term remediation to the Site Decommissioning Management Plan (SDMP) or another long-term program, with DCB/NMSS.

03.07 Return the file to the NRC File Center, unless otherwise instructed, when all regional action on a license file is complete.

#### 2800/026-04 GUIDANCE

04.01 The Regions should send each Agreement State a letter providing a complete listing of all sites, located in their State, that require additional followup. The letter should also request that the State notify NRC when each license file is closed, and include a brief explanation of the basis for closing each file. When the Regions receive notification that a State has closed a license file, this information should be transmitted to the point of contact identified in Section 2800/026-08. If requested by a State, the original files may be transmitted to the State to assist in closing out the license file. The license file transmittal letter should include a copy of this Temporary Instruction (TI) to show the State how NRC closes its terminated license files.

04.02 Obtain copies of official documents for the docket file whenever possible. If official documents are not available, verbal confirmation may be used to close out specific concerns about contamination if a record of such conversations is placed in the docket file and neither of the following conditions apply. Verbal confirmation shall not be used as a basis for closing out a concern if --

- a. The concern raised by ORNL involved the sensitivity of the survey instruments originally used; or
- b. The license authorized possession of a large quantity of unsealed material (>100 kilograms of uranium/thorium or >1 curie of long-lived byproduct material such as cobalt-60).

04.03 The inspector should try to arrange mutually agreeable inspection times to ensure that knowledgeable individuals at the site will be available for interview. Non-Agreement States should be invited to accompany the inspector on any site visits.

04.04 Check the institutional memory of site operations by interviewing key personnel from the former licensee; current site owner (if different); or other knowledgeable individuals. For sealed sources, these inquiries should be made by telephone or written correspondence, if possible.

04.05 The initial survey should be a scoping survey to determine whether there is any indication that residual contamination or other radioactive material may be present. If an inspector visits a site for a scoping survey and finds the building(s) is no longer there, a scoping survey should be performed on the available property. If an inspector is denied access to a property to perform a scoping survey, the inspector shall inform management, who will decide on a course of action on a case-by-case basis. Scoping surveys may also be conducted at sites where sealed sources cannot be accounted for through documented or verbal evidence. Inspectors should use professional judgment to determine whether the quantity and activity level of the radioactive material in the sealed source(s) warrant performing a scoping survey. A sample scoping survey plan is provided in Appendix A, including criteria for determining when remediation is required. Guidance on release criteria is provided in Appendix B. Inspectors may also use guidance in Inspection Procedure (IP) 83890 and other routine IPs, as appropriate. If radioactive material is found or if the site is too extensive to permit an inspector to reasonably eliminate the possibility of contamination, a detailed

site survey should be performed. The former licensee or current site owner should be requested to conduct the detailed site survey whenever possible.

04.06 Inspectors should use guidance in IP 83890, "Closeout Inspection and Survey," and other routine inspection procedures as appropriate to monitor remediation activities. Each region shall notify DCB/NMSS promptly of any site found contaminated and discuss transfer of sites requiring long-term remediation to the SDMP or another remediation program. The following criteria should be used to determine which sites should be transferred to SDMP for remediation (see NUREG-1444):

- a. The responsible organization is not financially viable (e.g., unable to pay for decommissioning).
- b. There are settling ponds, burial sites, or large amounts of contaminated soil that will be difficult to decommission.
- c. There are contaminated structures or other permanent facilities that will be difficult to decommission.
- d. There is contamination or potential contamination of the ground water from onsite wastes.
- e. License was previously terminated.

In accordance with SECY-98-155, the following criteria will also be used to add new sites to the SDMP list:

- f. Restricted use sites; or
- g. Complex unrestricted use sites (sites requiring detailed site-specific dose modeling, sites subject to heightened public, state, or Congressional interest).

04.07 No guidance.

#### 2800/026-05 REPORTING REQUIREMENTS

Each region shall document its findings, regarding the specific concerns identified by ORNL, for each site, in quarterly status reports to DCB/NMSS. Regions should provide the type of information shown in the example status report provided in Appendix C (Regions may also use Appendix F of the Decommissioning Handbook). DCB will track each site referred to the region and verify that it is closed out. In addition, each region shall send LLDP: (1) the numbers and names of sites referred to the region for followup; (2) the numbers and names of sites eliminated from concern; (3) the numbers and names of sites found contaminated; (4) the numbers and names of licenses pending a determination; and (5) the number and names of license files closed by Agreement States, if known. This information should be categorized by sites with scores above 300 and sites with scores below 300. This information is required quarterly for the "Quarterly Information Status Report" (see Appendix D for guidance).

Inspections and confirmation surveys should be documented in inspection reports. All site visits, whether for inspection or for other purposes, should be documented, including a description of the site and any controls in place. Status reports and inspection reports shall be forwarded to the contact listed in Section 08 of this TI. Documents demonstrating that a site is suitable for unrestricted use shall be placed in the docket file for that site and sent to the Division of Waste Management (DWM) contact.

2800/026-06 COMPLETION SCHEDULE

The completion schedule for followup inspections of formerly licensed sites will vary depending on the resources available and the number of sites requiring follow-up action.

2800/026-07 EXPIRATION

This TI shall remain in effect until follow-up has been completed on all terminated license files identified as potentially contaminated.

2800/026-08 CONTACT

Questions regarding this TI should be addressed to John Buckley, Project Manager for the Review of Terminated Licenses, at (301) 415-6607.

2800/026-09 STATISTICAL DATA REPORTING

Staff hour expenditures or administrative effort should be charged to Regulatory Information Tracking System (RITS) number 232BM - "Review of Terminated Licenses". Direct inspection effort should be charged to the retired docket number, the item of major interest code (i.e., IMAT - "Materials Inspections"); and the IP element code (i.e., OA - "Other Routine Activities," or OR - "Other Reactive Activities"). Include TI number 2800/026X, with the appropriate status codes P - "Partially Complete," C - "Complete," or R - "Completed By Reference," so staff hour expenditures charged to the TI can be accounted for by site.

Note: The docket number should be listed in the Licensing Tracking System (LTS) with a retired status code 4 to ensure that fee statements are not generated and to allow RITS to recognize the retired docket as being valid for staff time expenditures. Staff should not create fictitious docket numbers for capturing staff-hour data. Contact M. Moriarty, at 301-415-7876, if assistance with LTS is required.

2800/026-10 ORIGINATING ORGANIZATION INFORMATION

10.01 Organizational Responsibility. The Division of Industrial and Medical Nuclear Safety (NMSS/IMNS) initiated this TI. NMSS/DWM prepared Revisions 1 and 2.

10.02 Resource Estimate. The estimated onsite inspection time necessary to interview personnel, check records, and perform an initial scoping survey is 8 hours per site. Actual inspections at a specific site may require substantially more or less time, depending on the circumstances. With trip preparation, travel, and report preparation, the total time required is estimated to average 20 hours.

END

APPENDICES

Appendix A - "Sample Scoping Survey Plan"  
Appendix B - "Guidance on Release Criteria"  
Appendix C - "Example Site Status Report"  
Appendix D - "Input for Quarterly Information Status Report"

APPENDIX A

**SAMPLE SCOPING SURVEY PLAN**

Licensee: **Name**  
**Address**  
**City, State, Zip Code**

Current Owner: (if different from above)

License No.: **XXX-000 (Terminated)**  
Docket No.: **0X0-00000 (Terminated)**

Inspection Dates: **Month, Day, Year**

Inspector(s): **Name(s)**

Purpose of Inspection: **Describe (e.g., To perform a scoping survey to determine whether any radioactive contaminants exist on-site, and if necessary, determine the general extent of residual activity present on building surfaces and grounds, and adjacent off-site areas.)**

I. Determine radionuclide(s) used at the facility:  
**List isotopes.**

A. Review file to determine use areas:  
**Describe areas of use.**

B. Interview previous or current employees:  
**Discuss as applicable.**

II. Identify affected and unaffected areas:  
**Discuss generally.**

A. Affected Areas (Areas that have the potential for contamination):  
**Define (e.g., labs, machine shops, storage areas, manufacturing areas, locker rooms, emission stacks, off-site areas adjacent to release points where material may have been deposited)**

B. Potential Areas (Areas immediately adjacent to affected areas):  
**Define (e.g., loading docks, storage areas, hallways, roofs)**

C. Unaffected Areas (All remaining areas not identified as affected or potentially affected): **Define (e.g., offices, lobbies, bathrooms, parking lots)**

III. Determine survey instruments and efficiency:

A. If only a few nuclides used, determine efficiency for all nuclides:  
**See Sample Instrumentation Worksheet.**

B. If numerous nuclides used --  
1. Determine efficiency of predominately used radionuclides  
or

2. Determine efficiency based on nuclide present in analyzed samples. **See Sample Instrumentation Worksheet.**

C. List instruments to be used:  
**Complete before inspection.**

#### IV. Burial Sites

A. Determine if facility had on-site burials:  
**Discuss (e.g., Based on a review of the docket file and discussions with the former licensee, it was determined that there was no on-site burial.)**

B. If the possibility of subsurface contamination or burials exist, what additional sampling and surveying will be conducted?  
**Describe (e.g., Because it has been determined that on-site burial did exist, ORISE has been contacted to perform surveys of this site.)**

C. Do groundwater monitoring wells exist?  
**Discuss (e.g., Because it has been determined that some on-site burial took place, and on-site groundwater sampling wells exist, water samples will be collected from these wells. In addition, the results of the analysis of previous samples from these wells will be obtained.)**

#### V. Other

A. Photograph site and adjacent areas:  
**Discuss (e.g., Photos will NOT be taken.)**

#### VI. Survey

A. Areas to be surveyed:  
**Describe (e.g., Survey will include floors, drains, pipes, ducts, cracks, lower 2 meters of walls, ventilation system to extent practicable, areas adjacent to release points, and outside areas adjacent to buildings.)**

**Guidelines:**

**Affected areas - 100 percent walkover using 2-meter wide lanes.**

**Potential areas - 50 percent walkover using 2-meter wide lanes.**

**Unaffected areas - 25 percent walkover using 2-meter wide lanes.**

B. Locations for collection of wipes:  
**Describe (e.g., Wipes will be collected at each location of elevated measurements or randomly, if no elevated measurements are found.)**

C. Collection of residue samples:  
**Describe (e.g., Samples will be collected of all residues found with elevated readings, including surfaces under paint. If samples are potentially contaminated with hazardous biological or chemical materials, the regional office will be contacted for any special instructions on sampling and shipping before collecting the sample.)**

D. Collection of soil/sediment samples:

Describe (e.g., Soil/sediment samples will be collected from outside areas where unsealed licensed material was stored, from areas that were formerly settling ponds, at storm and/or sanitary drain outfalls, and in or at the edge of streams or lakes.)

E. Documentation:

See *Survey Plan by Location*.

Describe (e.g., All survey results and locations of elevated readings will be documented with enough detail to be able to relocate any point. Reference will be made to predominant landmarks.)

VII. Identification of Contamination:

A. Provide sufficient information for laboratory personnel to identify/track samples and wipes that were collected:

Describe (e.g., Each sample and wipe will be uniquely identified.)

B. Conduct laboratory analysis:

1. Determine the radiological characteristics of the contamination:

Discuss (e.g., Samples will be evaluated to determine exposure rate, and whether they are an alpha, beta, or gamma emitter.)

2. Determine whether contamination is removable or fixed:

Discuss (e.g., Wipes will be counted to determine whether contamination is fixed or removable.)

3. Determine levels of contamination in samples:

Discuss (e.g., Samples will be counted and results reported to the inspector for evaluation.)



VIII. Evaluate survey and laboratory results:

1. Identify survey data and laboratory sample analysis that exceed the guideline criteria:

Discuss. If activity is identified that exceeds the acceptable license termination screening values presented in the following documents, remediation is required.

1. Supplemental Information on the Implementation of the Final Rule on Radiological Criteria for License Termination, Federal Register, Vol. 63, No. 222, November 18, 1998; and

2. Supplemental Information on the Implementation of the Final Rule on Radiological Criteria for License Termination, Federal Register, Vol. 64, No. 234, December 7, 1999.

See *Sample Instrumentation Worksheet*.

APPROVED BY: \_\_\_\_\_

Branch Chief

Date

# SURVEY PLAN BY LOCATION

## LOCATION 1

Area: *Affected/Potential/Unaffected*

Size: *????? m<sup>2</sup>*

Use: *Describe (e.g., U-235 and natural uranium. Uranium tetrafluoride-magnesium blend was pressed into briquettes using a 3,000 ton Farquhar press.)*

Potential for Contamination: *Discuss. Modify Items 1-4 as necessary.*

1. 50 percent surface scan of floor (If items stored in the building cover more than 50 percent of the floor surface, than all available floor surface area will be scanned.)
2. 100 percent surface scan of cracks in floor, support beams (up to 2m high), and drains
3. 50 percent inlets/openings to ventilation system ducts
4. collect samples of positive areas 2 to 3 times background

## OTHER LOCATIONS ON-SITE

Repeat above (Location 1) as necessary.

**SAMPLE INSTRUMENTATION WORKSHEET**

Inspector: \_\_\_\_\_  
Date: \_\_\_\_\_

Inspection Location: \_\_\_\_\_  
Inspection Date: \_\_\_\_\_

I s o t o p e s                    o f                    I n t e r e s t :

Instrument - Type: \_\_\_\_\_ | Probe:  
Serial #: \_\_\_\_\_ | Serial #:  
NRC #: \_\_\_\_\_ | NRC #:  
Calibration Date: \_\_\_\_\_ | Size (S):  
cm<sup>2</sup>

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Check Source: Isotope: \_\_\_\_\_ Serial No.: \_\_\_\_\_  
NRC Tag No.: \_\_\_\_\_

Half Life ( $T_{1/2}$ ): \_\_\_\_\_ years x 365 = \_\_\_\_\_ days

Date: \_\_\_\_\_ Activity ( $A_0$ ): \_\_\_\_\_  $\mu$ Ci x  $2.2 \times 10^6$  =  
\_\_\_\_\_ dpm

Current Date minus Source Date ( $t$ ): \_\_\_\_\_ years or days

Current Check Source Activity:  $A = A_0 \times \exp[-0.693t/T_{1/2}]$

= \_\_\_\_\_ x  $\exp[-0.693 \times \text{_____} / \text{_____}]$  = \_\_\_\_\_  $\mu$ Ci  
or dpm

Meter Reading with check Source ( $M$ ): \_\_\_\_\_  $\mu$ Ci (x  
 $2.2 \times 10^6$  = cpm) \_\_\_\_\_ cpm

Efficiency ( $E$ ):  $M/A = \text{_____} / \text{_____} = \text{_____}$  (x 100 =  
\_\_\_\_\_ %)

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\*\*\*\*\*

Background ( $B$ ): \_\_\_\_\_  $\mu$ Ci (x  $2.2 \times 10^6$  = cpm) Date:  
\_\_\_\_\_ cpm Location:  
\_\_\_\_\_

Background ( $B$ ): \_\_\_\_\_  $\mu$ Ci (x  $2.2 \times 10^6$  = cpm) Date:  
\_\_\_\_\_ cpm Location:  
\_\_\_\_\_

Background ( $B$ ): \_\_\_\_\_  $\mu$ Ci (x  $2.2 \times 10^6$  = cpm) Date:  
\_\_\_\_\_

\_\_\_\_\_ cpm  
\_\_\_\_\_

Location:

**SAMPLE INSTRUMENTATION WORKSHEET, continued**

Inspector: \_\_\_\_\_  
Date: \_\_\_\_\_

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| Release Criteria for Building Surfaces for Isotope of Interest (**X**):  
| \_\_\_\_\_ dpm/100 cm<sup>2</sup>  
| (See Appendix B, License Termination Screening Values.)

Instrument Reading That Equals Maximum Release Criteria: {(**X**/100)  
x **S** x **E**} + **B**  
= { (\_\_\_\_\_/100) x \_\_\_\_\_ x \_\_\_\_\_ } + \_\_\_\_\_  
= \_\_\_\_\_ cpm

| Release Criteria for Surface Soil for Isotope of Interest (**X**)  
| (See Appendix B, License Termination Screening Values)

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**Meter Source Checks**

Check Source: Isotope: \_\_\_\_\_ Serial No. : \_\_\_\_\_  
\_\_\_\_\_ NRC Tag No.: \_\_\_\_\_  
\_\_\_\_\_

<u>Location</u>	<u>Date</u>	<u>Time</u>	<u>Meter Reading</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

APPENDIX B

Guidance on Release Criteria

The guidance for determining whether sites are suitable for unrestricted use consists of the following documents:

1. Supplemental Information on the Implementation of the Final Rule on Radiological Criteria for License Termination, Federal Register, Vol. 63, No. 222, November 18, 1998; and
2. Supplemental Information on the Implementation of the Final Rule on Radiological Criteria for License Termination, Federal Register, Vol. 64, No. 234, December 7, 1999.
3. NRC's "Radiological Criteria for License Termination; Final Rule," (10 CFR Part 20, et al., July 21, 1997).

APPENDIX C

Example Site Status Report

Docket no. \_\_\_\_\_ License no.  
\_\_\_\_\_

Licensee Name: \_\_\_\_\_

Site Name: \_\_\_\_\_

Site Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip:  
\_\_\_\_\_

Regional Contact: \_\_\_\_\_ Phone:  
\_\_\_\_\_

Status Summary:

APPENDIX D

INPUT FOR QUARTERLY INFORMATION STATUS REPORT (QISR)

STATUS OF SITES IDENTIFIED BY ORNL

	Total	Sites Eliminated	Sites Pending	Sites Contaminated
> 300				
5-300				
Total				

In addition, the quarterly status reports should list, by name, the sites counted under "Sites Eliminated," "Sites Pending," and "Sites Contaminated." Each of these lists should also delineate those sites with scores >300, and those with scores from 5 - 300.

STATUS OF LICENSES WITH SEALED SOURCES NOT ACCOUNTED FOR

	Total	Sites Eliminated	Sites Pending
> 300			
5-300			
Total			

In addition, the quarterly status reports should list, by name, the sites counted under "Sites Eliminated," and "Sites Pending." Each of these lists should also delineate those sites with scores >300, and those with scores from 5 - 300.