



U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REGULATORY RESEARCH

April 1998
Division 1
Draft DG-1078

DRAFT REGULATORY GUIDE

Contact: C.L. Pittiglio (301)415-6702

DRAFT REGULATORY GUIDE DG-1078

STANDARD FORMAT AND CONTENT OF
LICENSE TERMINATION PLANS FOR NUCLEAR
POWER REACTORS

A. INTRODUCTION

On July 29, 1996, the Commission published amendments to its regulations in 10 CFR Parts 2, 50, and 51 (61 FR 39278) (Ref. 1), prescribing specific criteria for decommissioning nuclear power reactors to be effective August 28, 1996. This rule, by eliminating, revising, or extending operating reactor requirements commensurate with the importance to safety, specifies requirements for reactors that are permanently shut down and have no fuel in the reactor vessel. Reactors that are permanently shut down with no fuel in the vessel present a significantly reduced risk to the public.

Decommissioning activities for power reactors may be divided into three phases: (1) initial activities, (2) major decommissioning and storage activities, and (3) license termination activities. Draft Regulatory Guide DG-1067, "Decommissioning of Nuclear Power Reactors" (May 1997, Ref. 2), is being developed to describe methods and procedures that are acceptable to the NRC staff for implementing the rules that relate to the initial activities and the major phases of decommissioning.

For Phase 3, 10 CFR 50.82(a)(9) specifies that an application for license termination must be accompanied or preceded by a License Termination Plan (LTP), which is subject to review and approval

This regulatory guide is being issued in draft form to involve the public in the early stages of the development of a regulatory position in this area. It has not received complete staff review and does not represent an official NRC staff position.

Public comments are being solicited on the draft guide (including any implementation schedule) and its associated regulatory analysis or value/impact statement. Comments should be accompanied by appropriate supporting data. Written comments may be submitted to the Rules and Directives Branch, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Copies of comments received may be examined at the NRC Public Document Room, 2120 L Street NW., Washington, DC. Comments will be most helpful if received by **June 30, 1998.**

Requests for single copies of draft or active regulatory guides (which may be reproduced) or for placement on an automatic distribution list for single copies of future draft guides in specific divisions should be made in writing to the U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Reproduction and Distribution Services Section, or by fax to (301)415-5272.

9805080118 980430
PDR REGGD
01. XXX R PDR

Id P-11 Guides/Manual

by the NRC. According to 10 CFR 50.82(a)(9)(i), the licensee must submit an LTP at least two years before termination of the license. The LTP approval process is by license amendment. A public meeting must be held near the site; any hearing held in relation to the LTP would fall under either Subpart G or Subpart L of Part 2. If the fuel has been permanently removed from the Part 50 facility to an authorized facility, a hearing for the LTP would be in accordance with Subpart L. Conversely, if an LTP were submitted while the spent fuel was stored within the Part 50 facility, Subpart G of 10 CFR Part 2 would apply.

Even after the LTP has been approved, 10 CFR 50.59 continues to apply to allow the licensee to make certain changes that do not result in an unreviewed safety question or changes to the technical specifications, and the changes must meet the requirements of 10 CFR 50.82(a)(6).

On July 21, 1997, the Commission amended its regulations in 10 CFR Parts 20, 30, 40, 50, 51, 70, and 71 (62 FR 39058, Ref. 3), prescribing specific radiological criteria for license termination. These radiological criteria, which were effective August 21, 1997, apply to all sites except the sites that were "grandfathered" per 10 CFR 20.1401(b).

Under the new regulations, in the LTP a licensee could propose either:

- Release of the facility and site for unrestricted use or
- Release of the facility and site under restricted use conditions.

For the most part, the LTP will be a final site characterization, dose assessment, remediation, and survey plan. The LTP must be submitted as a supplement to the licensee's Final Safety Analysis Report (FSAR) or an equivalent document. A licensee might submit the LTP concurrently with the post-shutdown decommissioning activities report (PSDAR), although the NRC would not expect this.

This regulatory guide is being developed to provide guidance on developing LTPs for nuclear power reactor licensees who wish to terminate their licenses and release their sites.

Regulatory guides are issued to describe to the public methods acceptable to the NRC staff for implementing specific parts of the NRC's regulations, to explain techniques used by the staff in evaluating specific problems or postulated accidents, and to provide guidance to applicants. Regulatory guides are not substitutes for regulations, and compliance with regulatory guides is not required. Regulatory guides are issued in draft form for public comment to involve the public in developing the regulatory positions. Draft regulatory guides

have not received complete staff review; they therefore do not represent official NRC staff positions.

The information collections contained in this draft regulatory guide are covered by the requirements of 10 CFR Parts 50 and 51, which were approved by the Office of Management and Budget, approval numbers 3150-0011 and 3150-0021. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

B. CONTENT OF LICENSE TERMINATION PLAN

1. GENERAL INFORMATION

The licensee's name, address, license number, and docket number should agree with the most recent license. The LTP should address each of the criteria below from 10 CFR 50.82(a)(9) and the related radiological criteria from Subpart E of 10 CFR Part 20 for unrestricted and restricted release of the site. Include any supporting information necessary to address the criteria.

- Site characterization
- Identification of remaining site dismantlement activities
- Plans for site remediation
- Detailed plans for final radiation survey for release of the site
- Method for demonstrating compliance with the radiological criteria for license termination
- Description of the site's end use for any areas proposed for restricted release. Include documentation on public consultation, institutional controls, and financial assurance requirements for license termination for restricted release or alternative criteria
- Updated site-specific estimate of remaining decommissioning costs
- Supplement to the environmental report, pursuant to 10 CFR 51.53, that describes any new information or significant environmental changes associated with the licensee's proposed termination activities.

2. SITE CHARACTERIZATION

The purpose of providing information on site characterization is to ensure that final radiation surveys are conducted to cover all areas where contamination previously existed, remains, or has the potential to exist or remain.

The licensee can submit the entire site characterization package separately at any time prior to submittal of the LTP and reference it in the LTP, or the site characterization can be submitted as an integral part of the LTP. The site characterization should contain enough detail to allow the NRC to determine the extent and range of the radiological contamination of structures, systems, components, residues, soils, and surface or ground water. The site characterization should be sufficiently detailed to provide data for planning further decommissioning activities and should include decontamination techniques, projected schedules, costs, waste volumes, dose assessment, and health and safety considerations.

The LTP should describe historic events (including dates, types of occurrences, locations in and outside of the facility), such as radiological spills, disposals, or other radiological accidents or incidents, that resulted or could have resulted in contamination of structures, equipment, laydown areas, or soils (subfloor and outside area).

3. IDENTIFICATION OF REMAINING SITE DISMANTLEMENT ACTIVITIES

The LTP should contain a discussion of the remaining tasks associated with the decontamination and dismantlement, an estimation of the quantity of radioactive material to be released to unrestricted areas, and the proposed control mechanisms, person-rem estimates, and radioactive waste characterization. The LTP discussions should also identify any decommissioning tasks that require coordination with any other Federal or State regulatory agency.

In the LTP, the areas and equipment that need further remediation should be described in sufficient detail to allow the reviewer to estimate the radiological conditions that will be encountered during remediation. The details in this section should be sufficient for the NRC to identify any inspection or technical resources needed during the remaining dismantlement activities.

4. REMEDATION PLANS

The LTP should address any changes from the previously approved radiological control program that will be used for the control of radiological contamination associated with the remaining decommissioning and remediation activities.

The LTP should discuss in detail how facility areas and site areas will be remediated to meet the NRC criteria for license termination in Subpart E of 10 CFR Part 20 (Ref. 3) or the Site Decommissioning Management Plan (SDMP) Action Plan criteria (Ref. 4) if the site has been grandfathered. The relevant "grandfathering" is under the 1997 rule on residual criteria for license termination (Ref. 3).

5. FINAL RADIATION SURVEY PLAN

The LTP should describe the final survey plan for confirming that the plant and site will meet the restricted or unrestricted release criteria in Subpart E of 10 CFR Part 20 (Ref. 3) or the SDMP Action Plan criteria (Ref. 4) for license termination, as applicable. The following items, which are not meant to be all-inclusive, should be included in the final radiation survey plan.

- The methods proposed for surveying all equipment, systems, structures, and soils (diagrams, plot plans, and facility layout drawings should be used to facilitate presentation), as well as a method for ensuring that sufficient data are included for a meaningful statistical survey.
- A description of the methods to be used to establish background radiation levels (variances in background radiation can be expected between structures constructed of different materials) (Ref. 5).
- A description of the Quality Assurance (QA) Program to support both field survey work and laboratory analysis that addresses the QA organization; training and qualification requirements; survey instructions and procedures including water, air, and soil sampling procedures; document control; control of purchased items; inspections; control of survey equipment; handling, storage, and shipping of survey equipment and laboratory samples; nonconformance items; corrective action; QA records; and survey audits, including methods to be used for reviewing, analyzing, and auditing data (Ref. 6).

- Verification surveys used to support delineation of radiologically affected (contaminated) areas and unaffected (noncontaminated) areas.
- The major radiological contaminants.
- Methods used for addressing hard-to-detect radionuclides.
- Access control procedures.

6. COMPLIANCE WITH THE RADIOLOGICAL CRITERIA FOR LICENSE TERMINATION

If a licensee requests unrestricted release of the site per Subpart E of 10 CFR Part 20, and the site has not been grandfathered per 10 CFR 20.1401(b) (see Ref. 3, Statement of Considerations, Section F.2), the LTP should demonstrate that the residual radioactivity that is distinguishable from background radiation does not exceed 25 mrem (0.25 mSv) per year to an average member of the critical group over a 1000-year period, including from drinking water. The LTP should also demonstrate that residual radioactivity has been reduced to levels that are as low as reasonably achievable (10 CFR 20.1402). The LTP should describe in detail the methods and assumptions used to demonstrate compliance with the 25-mrem per year criterion.

If a licensee requests unrestricted release of the site under the "grandfathering" provisions per 10 CFR 20.1401(b), the LTP should describe in detail the methods and assumptions that will demonstrate compliance with the SDMP Action Plan criteria (Ref. 4).

If a licensee requests license termination under the restricted release criteria per Subpart E of 10 CFR Part 20 (Ref. 3), the LTP should describe in detail the methods and assumptions that will be used to demonstrate that the licensee will provide reasonable assurance that the dose from residual radioactivity, distinguishable from background, will not exceed 25 mrem per year to a member of the critical group over a 1000-year period with the restrictions in place (10 CFR 20.1403(b)). The LTP should also describe in detail how the requirements of 10 CFR 20.1403(e)(1) or (2) will be met when the restrictions fail.

If a licensee requests license termination under the alternative radiological criteria in 10 CFR 20.1404, the LTP should describe in detail the methods and assumptions used to demonstrate that public health and safety would continue to be protected. Specifically, the LTP should demonstrate that the dose from all man-made sources combined, other than medical, would be unlikely to exceed the 100 mrem annual value set forth in 10 CFR 20.1301(a)(1) and 10 CFR 20.1404(a)(1)); that the licensee has employed, to the extent practicable, restrictions on site use to minimize exposures at the site; and that doses have

been reduced to ALARA levels, taking into consideration any detriments such as traffic accidents that might result from decontamination or waste disposal.

7. SITE END USE FOR RESTRICTED RELEASE

If a licensee requests license termination under the restricted release criteria or alternative criteria per Subpart E of 10 CFR Part 20 (Ref. 3), the LTP should discuss site end use, the institutional controls to be put in place, and the maintenance required for the controls (including financial assurance for any necessary control and maintenance of the site) until the residual radioactivity meets unrestricted release criteria.

If a licensee requests license termination under the restricted release criteria of 10 CFR 20.1403 or the alternative criteria under 10 CFR 20.1404, the LTP should document how the public consultation requirements of 10 CFR 20.1403(d) or 10 CFR 20.1404(a)(4) were met.

8. UPDATE THE SITE-SPECIFIC DECOMMISSIONING COSTS

The license termination plan must:

- Provide an estimate of the remaining decommissioning costs and
- Compare the estimated costs with the present funds set aside for decommissioning. If there is a deficit in present funding, the LTP must indicate the means for ensuring adequate funds to complete the decommissioning.

Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors" (Ref. 7), provides detailed guidance on methods for estimating decommissioning costs, as well as on financial assurance mechanisms that are acceptable to the NRC staff. If the LTP indicates that assurance of funding is to be provided by a surety method, insurance, or other guarantee, the financial assurance instrument must remain in effect until the NRC has terminated the license. The decommissioning cost estimate should include an evaluation of the following cost elements, which are not meant to be all-inclusive.

- Cost assumptions used, including a contingency factor
- Major decommissioning activities and tasks

- Unit cost factors
- Estimated costs of decontamination and removal of equipment and structures
- Estimated costs of waste disposal, including applicable disposal site surcharges
- Estimated final survey costs
- Estimated total costs

The cost estimate should focus on the remaining work, detailed activity by activity, for each activity associated with the decommissioning, including the costs of labor, materials, equipment, energy, and services. No credit for the salvage value of equipment should be taken.

9. SUPPLEMENT TO THE ENVIRONMENTAL REPORT

The licensee must submit a supplement to the Environmental Report describing any new information or significant environmental change associated with the site-specific termination activities. The supplement to the Environmental Report should:

- Describe in detail the impact of the site-specific termination activity,
- Compare the impact with previously analyzed termination activities, and
- Analyze the environmental impact of the site-specific activity.

C. FORMAT OF THE LICENSE TERMINATION PLAN

GRAPHIC PRESENTATIONS

Graphic presentations such as drawings, maps, diagrams, sketches, and tables should be employed if the information may be presented more adequately or conveniently by such means. Due concern should be taken to ensure that all information so presented is legible, that symbols are defined, and that scales are not reduced to the extent that visual aids are necessary to interpret pertinent items of information. These graphic presentations should appear in the section where they are primarily discussed.

References may appear either as footnotes to the page on which they are cited or at the end of each chapter.

PHYSICAL SPECIFICATIONS

Paper Size

Text pages: 8-1/2 x 11 inches.

Drawings and graphics: 8-1/2 x 11 inches; however, a larger size is acceptable provided the finished copy, when folded, does not exceed 8-1/2 x 11 inches.

Paper Stock and Ink

Use suitable quality in substance, paper color, and ink density for handling and reproduction by microfilming or image-copying equipment.

Page Margins

A margin of no less than 1 inch should be maintained on the top, bottom, and binding side of all pages submitted.

Printing

Composition: Text pages should be single-spaced.

Typeface and Style: Should be suitable for microfilming or image-copying equipment, including computer scanning.

Reproduction: May be mechanically or photographically reproduced. All pages of text should be printed on both sides and the image printed head to head.

Binding: Pages should be punched for standard three-hole loose-leaf binders.

Page Numbering

Pages should be numbered with the digits corresponding to the chapter followed by a hyphen and a sequential number, e.g., the third page of Section 4 should be numbered 4-3. Do not number the entire report sequentially.

Table of Contents

A table of contents and an index of key items should be included.

PROCEDURES FOR UPDATING OR REVISING PAGES

Data and text should be updated or revised by replacing pages. The changed or revised portion on each page should be highlighted by a "change-indicator" mark consisting of a bold vertical line drawn in the margin opposite the binding margin. The line should be the same length as the portion actually changed.

All pages submitted to update, revise, or add pages to the report should show the date of change and change or amendment number. A guide page listing the pages to be inserted and the pages to be removed should accompany the revised pages. When major changes or additions are made, a revised table of contents should be provided.

REFERENCES

1. U.S. Nuclear Regulatory Commission, "Decommissioning of Nuclear Power Reactors" (10 CFR Parts 2, 50, and 51), *Federal Register*, Vol. 61, pp. 39278-39304 (61 FR 39278), July 29, 1996.
2. U.S. Nuclear Regulatory Commission, "Decommissioning of Nuclear Power Reactors," Draft Regulatory Guide DG-1067, June 1997.¹
3. U.S. Nuclear Regulatory Commission, "Radiological Criteria for License Termination" (10 CFR Parts 20, 30, 40, 50, 51, 70, and 72), *Federal Register*, Vol. 62, pp. 39058-39092 (62 FR 39058), July 21, 1997.
4. U.S. Nuclear Regulatory Commission, "Action Plan To Ensure Timely Cleanup of Site Decommissioning Management Sites," *Federal Register*, Vol. 57, p. 13389 (57 FR 13389), April 18, 1992.
5. A.M. Huffert, R.A. Meck, and K.M. Miller, "Background as a Residual Radioactivity Criterion for Decommissioning," U.S. Nuclear Regulatory Commission, Draft NUREG-1501, August 1994.²
6. M.C. Daily et al., "Working Draft Regulatory Guide on Release Criteria for Decommissioning: NRC Staff's Draft for Comment," U.S. Nuclear Regulatory Commission, NUREG-1500, August 1994.²
7. U.S. Nuclear Regulatory Commission, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors," Regulatory Guide 1.159, August 1990.¹

¹Single copies of regulatory guides, both active and draft, may be obtained free of charge by writing the Office of the Chief Information Officer, Attn: Printing, Graphics and Distribution Branch, USNRC, Washington, DC 20555-0001, or by fax at (301)415-5272. Active guides may also be purchased from the National Technical Information Service on a standing order basis. Details on this service may be obtained by writing NTIS, 5285 Port Royal Road, Springfield, VA 22161. Copies of active and draft guides are available for inspection or copying for a fee from the NRC Public Document Room at 2120 L Street NW., Washington, DC; the PDR's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202)634-3273; fax (202)634-3343.

²Copies are available at current rates from the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20402-9328 (telephone (202)512-2249); or from the National Technical Information Service by writing NTIS at 5285 Port Royal Road, Springfield, VA 22161. Copies are available for inspection or copying for a fee from the NRC Public Document Room at 2120 L Street NW., Washington, DC; the PDR's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202)634-3273; fax (202)634-3343.

REGULATORY ANALYSIS

A separate regulatory analysis was not prepared for this guide. The regulatory analysis prepared for the amendments to Parts 2, 50, and 51, "Decommissioning of Nuclear Power Reactors," which was issued on July 29, 1996 (61 FR 39278), provides the regulatory basis for this guide and examines the costs and benefits of the rule as implemented by the guide. A copy of this regulatory analysis is available for inspection or copying for a fee in the the NRC Public Document Room, 2120 L Street NW., Washington, DC; the PDR's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202)634-3273; fax (202)634-3343.

**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, DC 20555-0001

FIRST CLASS MAIL
POSTAGE AND FEES PAID
USNRC
PERMIT NO. G-67

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300

120555064215 2 1SA15B1S1
US NRC-OIRM
INFORMATION & RECORDS MGMT
DOCUMENT CONTROL DESK
1WFM-P117
WASHINGTON DC 20555