



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 9, 2001

Wesley C. Patrick, President
Center for Nuclear Waste
Regulatory Analyses
6220 Culebra Road
PO Drawer 28510
San Antonio, TX 78228-0510

Subject: Task Order No. 12 Entitled, "Analysis of the Impact of Interactive Dose Effects on Partial Site Release", Under Contract NRC-02-97-001

Dear Dr. Patrick:

In accordance with the task order procedures of the subject contract, this letter definitizes Task Order No. 12. This effort shall be performed in accordance with the enclosed Statement of Work, and the Contractor's technical proposal dated January 30, 2001. Task Order No. 12 shall be in effect from February 9, 2001 through June 8, 2001 with a cost ceiling of \$68,098. The amount of \$61,119 represents the total estimated reimbursable costs, the amount of \$2,089 represents the cost of facility capital, and the amount of \$4,890 represents the fixed fee for this task order.

The amount obligated on this task order document is \$60,000. Of this amount \$55,556 represents the estimated cost (including facilities capital) and \$4,444 represents the fixed fee. It is estimated that this funding will cover performance through May 18, 2001.

Accounting Data for Task Order No. 12 is as follows:

B&R No.: 15015303120
JC No.: J5156
BOC: 252A
Appn. No.: 31X0200
Obligated: \$60,000

Technical Matters:

Edna Knox-Davin
Project Officer
(301) 415-6577

TEMPLATE-ADM 001

ADM02

Contractual Matters:

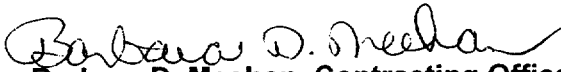
**Barbara Meehan
Contract Specialist
(301) 415-6730**

The issuance of Task Order No. 12 does not change any terms and conditions of the subject contract.

Please indicate your acceptance of Task Order No. 12 by having an official authorized to bind your organization, execute three (3) copies of this document in the space provided and return two (2) copies to the U.S. Nuclear Regulatory Commission, Attn: Mrs. Barbara Meehan, ADM/DCPM/CMB2, Mail Stop T-712, Washington, DC 20555. You should retain the third copy for your records.

If you have any questions regarding this matter, please call me on (301) 415-6730.

Sincerely,


Barbara D. Meehan, Contracting Officer
Contract Management Branch No. 2
Division of Contracts and
Property Management
Office of Administration

Enclosure: As stated

Accepted:



Name

R.B. Kalmbach, Director of Contracts

Title

February 28, 2001

Date

**OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
DIVISION OF WASTE MANAGEMENT**

TITLE: ANALYSIS OF THE IMPACT OF INTERACTIVE DOSE EFFECTS ON PARTIAL
SITE RELEASE

Task Order No.: 12

Contractor: CNWRA **Site:** San Antonio, TX **Contract Number:** NRC-02-97-001

JOB CODE: J5156

STATUS: NON-FEE RECOVERABLE

**TECHNICAL ASSISTANCE
PROJECT MANAGER:**

Edna Knox-Davin, 415-6577

TECHNICAL PROJECT MANAGER:

James Shepherd, 415-6712

DWM TASK MONITOR:

Christopher McKenney, 415-6663

PRINCIPAL INVESTIGATOR(S):

John Russell, (301) 881-0289

PERIOD OF PERFORMANCE:

5 Months

1.0 Background

In the Statements of Consideration for the License Termination Rule (10 CFR 20, Subpart E) published in the July 21, 1997, Federal Register, it is noted that "NRC intends to develop comprehensive guidance on how licensees should address previously released portions of licensed sites in demonstrating compliance with the dose criteria." (pg 39080, column 3). The consideration of previously released portions of the site at the time of license termination was not directly addressed in the first version of the NMSS Decommissioning Standard Review Plan (NUREG-1727, September 2000).

On April 26, 2000, the Commission approved a rulemaking plan (SECY-00-023, ML003674188) to add a new section to 10 CFR Part 50, separate from the current decommissioning and license termination rules, that identifies a regulatory process that a licensee would use to reduce the size of its site before approval of a license termination plan (LTP) ("partial site release"). The suggested rule is narrowly focused on power reactor licensees of both operating plants and those in decommissioning who request partial releases for unrestricted use.

The intent of the current license termination rule in 10 CFR 50.82 is to ensure that the entire site, as defined in the original license, will be included in the LTP to ensure that the full area meets the requirements of 10 CFR Part 20, Subpart E, at the time the license is terminated. Because 10 CFR 50.82 applies to the decommissioning of an entire site as originally licensed (or as modified to include additional land), it is also necessary to ensure that any partial site releases also comply with Subpart E.

As a result of the suggested rulemaking, licensees will need to:

- Demonstrate that a partial site release meets the radiological criteria of Subpart E, at Section 20.1402 for unrestricted release at the time the release is performed; and
- Account for any dose from released portions of the site in determining the dose levels for the entire original site for comparison against the radiological criteria of Subpart E at the time of license termination.

During preparation of the rulemaking plan, a concern was raised that combined dose effects could occur between parts of a site as they are released before license termination, or between parts of a site previously released and the remainder of the site as it exists when the license is terminated. Currently there is no established guidance for evaluating these effects to provide assurance that combined doses would not exceed the limits of 10 CFR Part 20, Subpart E, Section 20.1402 (25 mrem/yr reduced to as low as reasonably achievable [ALARA]). In the staff requirements memorandum associated with the rulemaking plan, the Commission stated that "because the nature and scope of the proposed evaluation of [combined] effects is unclear, the staff should, as it finalizes the rulemaking plan, more clearly define the possible role of [combined] effects. In addition, the staff should ensure that this effort is coordinated, as necessary, with NMSS' development of the standard review plan for license termination."

A number of combined dose effect scenarios have been envisioned. An example described in the rulemaking plan considers a partial site release that results in a 15 mrem/yr dose due to direct radiation from residual radioactivity, which would likely be acceptable. However, if a subsequent partial release, or the remainder of the site as it existed at the time of license termination, resulted in a 15 mrem/yr dose due to direct radiation or due to eating crops grown on the land, the combined dose could conceivably exceed the radiological limit of 25 mrem/yr imposed by Section 20.1402. Because the two property releases would take place at different times, a method is required to provide assurance that the combined doses do not exceed the limits of Section 20.1402.

Scenarios involving the potential transport of radionuclides across proposed partial release boundaries, such as those involving groundwater pathways, need also to be considered. Preliminarily, however, it seems that such releases would not be allowed as partial site releases due to their complexity and due to the potential for adverse dose impacts to areas surrounding the proposed release.

Additionally, the Commission raised the following questions in the staff requirements memorandum associated with the rulemaking plan:

- Would the dose contribution from the released portion of the site need to be calculated (or recalculated at license termination), particularly in cases where residual radioactivity has significantly decayed, thereby reducing the potential public dose?
- What would happen in cases where subsequent owners of the released portion of the site engage in activities (licensed or unlicensed) that result in a higher dose

contribution from this portion of the site--would this dose "count against" the Part 20 allowable dose limit for unrestricted use?

- Would the contribution from the groundwater pathway need to be recalculated if years have elapsed between the partial site release and license termination?

Also to be considered is that a partial site release for unrestricted use that contains residual radioactivity that is distinguishable from background may have to meet a standard lower than the radiological criteria of 10 CFR Part 20 Subpart E (25 mrem/yr and ALARA). This is because the combined dose from the partial site release and the dose from the reactor facility must meet the EPA's fuel cycle dose limit of 25 mrem/yr. This limitation does not exist when a reactor license is terminated. In addition, licensees may need to revise their demonstration of compliance with the public dose limits to include the dose, if any, from a partial site release

2.0 Objective

The objective of this task order is to provide technical assistance to the NMSS staff in:

1. Identifying scenarios and determining the extent to which combined dose effects could occur between parts of a site as they are released before license termination, and between parts of a site previously released and the remainder of the site as it exists when the license is terminated.
2. Identifying needed changes to the guidance currently provided in the NMSS Decommissioning Standard Review Plan in order to address partial site releases and provide licensees with acceptable methods for demonstrating compliance with the dose criteria of 10 CFR Part 20, Subpart E, where combined dose effects could occur.
3. Incorporating the guidance identified in Objective #2 above into a staff position, which will be later incorporated into Revision 1 of NUREG-1727.

3.0 Minimum Required Technical and Other Special Qualifications

The CNWRA investigators proposed for this project shall have the following qualifications:

- a. Health physics or hydrogeological background with abilities to conduct dose assessment calculations,
- b. Knowledge and experience using NRC's probabilistic RESRAD and DandD codes,
- c. Modeling expertise specifically in running multimedia environmental pathway models and analyzing their results with regard to parameter and conceptual model sensitivity and uncertainty.
- d. Familiarity with international and domestic guidance on decommissioning of sites from regulatory control, including the license termination rule (10 CFR 20, Subpart E), the fuel cycle rule (40 CFR 190), pertinent guidance such as NUREG-1549, NUREG-1727, and draft NUREG-1700, "Standard Review Plan for Evaluating Nuclear Power Reactor License

Termination Plans."

4.0 Level of Effort

The estimated level of effort for this task is 0.3 staff years.

5.0 Completion Date

This task will be completed 16 weeks after award.

6.0 Scope of Work

6.1 Identification of Scenarios

The contractor will develop, using a risk-informed process, credible scenarios that would result in combined effects between portions of a licensee's site released prior to license termination and the remaining portions of the site released at the time of license termination. While the initiating event to create this contract was reactor-related, the scenario development should consider other facility types, such as fuel fabrication facilities, rare earth metal processors, universities, etc. Scenarios with the following attributes should be excluded from consideration:

- Low probability of occurrence;
- Low probability of the scenario resulting in doses exceeding the 0.25 mSv/a (25 mrem/yr) dose limit;
- Are based on a dose calculation to maximum exposed individuals rather than average members of the critical group; and
- Are a subset of another scenario and do not involve unique combinations of exposure pathways and human behavior that could result in higher doses than the general scenario.

The scenarios should be developed at least to the level of conceptual models.

6.2 Identification of Needed Changes or Additions to NUREG-1727

The contractor will review the information in Chapter 5 and Appendix C of NUREG-1727 to determine if changes need to be made to incorporate any findings of additional reasonable scenarios that need to be considered in partial release cases. Attention should be focused on scenario development and source term identification.

6.3 Suggested Text for Staff Guidance

The contractor will develop sections of text to address the necessary changes or additions noted in objective 2. While these sections of text will be later included in the next revision of NUREG-1727 in 1 or more years, the suggested text needs to be packaged as stand alone sections to be used in developing a staff position or addendum to NUREG-1727 for use until the document is updated. These sections of text will include both the general guidance and one or two short examples using the guidance to consider partial site release.

7.0 Meetings and Travel

Two meetings (2 persons/1 day) at the NRC headquarters may be needed as part of this task. All domestic travel related to this task order requires prior approval of the NRC Technical Project Manager.

8.0 Deliverables/Schedule

Identification of Scenarios	2 weeks after award
Identification of Needed Changes or Additions to NUREG-1727	4 weeks after award
Suggested Text for Staff Guidance	16 weeks after award

9.0 NRC-Furnished Materials

NRC will provide CNWRA with the following information:

- NUREG-1727, "NMSS Decommissioning Standard Review Plan," NRC/NMSS, September 2000.
- SECY-00-023, "Rulemaking Plan to Standardize the Process for Allowing a Licensee to Release Part of its Reactor Facility or Site for Unrestricted Use Before Receiving Approval of its License Termination Plan," February 2, 2000.
- Memorandum from John A. Zwolinski to John T. Greeves dated October 17, 2000, "Request for Assistance Regarding the Impact of Interactive Dose Effects on Partial Site Releases."

10.0 Technical Direction

James Shepherd is the Technical Project Manager for this task. Action specified within this task is considered within the scope of the current agreement with the NRC. No changes to cost or delivery of specified services and products are authorized.