

February 25, 2010

Dr. John G. Williams, Director
Nuclear Reactor Laboratory
University of Arizona
Tucson, AZ 85721-0020

SUBJECT: UNIVERSITY OF ARIZONA - REQUEST FOR ADDITIONAL INFORMATION
REGARDING DECOMMISSIONING OF THE UNIVERSITY OF ARIZONA
NUCLEAR REACTOR LABORATORY

Dear Dr. Williams:

The U.S. Nuclear Regulatory Commission (NRC) is continuing the review of the University of Arizona's letter dated May 21, 2009. By this letter, the University of Arizona Nuclear Reactor Laboratory submitted a Statement of Intent to obtain decommissioning funding according to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.75e(1)(iv); decommissioning plan; decommissioning environmental report; radiological characterization report; and activation analysis and component characterization, to the NRC for facility operating License R-52. During our review, questions have arisen for which we require additional information and clarification.

Please provide a response to the enclosed request for additional information within 30 days of the date of this letter. In accordance with 10 CFR 50.30(b), your response must be executed in a signed original under oath or affirmation. Please note that your timely response is needed in order to support completion of the review.

Should you have any questions regarding this review, please contact me at (301) 415-4103.

Sincerely,

/RA/

Linh N. Tran, Senior Project Manager
Research and Test Reactor Licensing Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-113

Enclosure: As stated
cc w/encl: Please see next page

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ACCESSION NO.: ML100550614 *Concurrence via e-mail NRR-088

OFFICE	PRLB/PM	PRLB/PM *	PRLB/LA	PRLB/BC	PRLB/PM
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DATE	2/23/2010	2/24/2010	2/24/2010	2/25/10	2/25/10

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REQUEST FOR ADDITIONAL INFORMATION

UNIVERSITY OF ARIZONA

NUCLEAR REACTOR LABORATORY

DECOMMISSIONING PLAN

DOCKET NO. 50-113

- References: (1) University of Arizona Nuclear Reactor Laboratory Decommissioning Plan; Decommissioning Environmental Report; Radiological Characterization Report; and Activation Analysis and Component Characterization; for Nuclear Regulatory Commission Facility Operating License R-52, dated May 2009. (Agencywide Documents Access and Management System Accession No. ML091490076)
- (2) NUREG-1757, Volumes 1 and 2, *Consolidated Decommissioning Guidance*, September 2006.
- (3) NUREG-1537, *Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors*, February 1996.

1. The Decommissioning Plan (DP) needs to be submitted with a license amendment request to incorporate approval of the DP with associated license conditions as discussed below and in questions 2, 3, 4, and 6.

A license condition is required to document approval of the DP. A sample is provided below:

Decommissioning

- a. The license is amended to approve the decommissioning plan described in the licensee's application dated Month Date, 2009, as supplemented on Month Date, 2009, and authorizes inclusion of the decommissioning plan as a supplement to the Safety Analysis Report pursuant to 10 CFR 50.82(b)(5).

2. Provide Method of Approving Changes to the DP

Background:

Section 2.4 of the DP, page 26, cites one of the functions of the Reactor Committee as: "Review and approval of all proposed changes to the facility, procedures and Technical Specifications, and Decommissioning Plan." Section 9.0 of the DP discusses the application of the Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 review process with respect to changes to the DP but does not provide sufficient specific

Enclosure

criteria for when prior U.S. Nuclear Regulatory Commission (NRC) approval would be required.

The NRC staff has additional guidance on changes to DPs in NUREG-1757, Vol. 1, Chapter 18 (the licensee should note that Volume 1 is generally applicable to materials licensees, but may provide helpful information for reactor licensees).

Information Required:

A license condition will be required to document the change control criteria.

A typical license condition used for DPs is included below:

The licensee may make changes to the decommissioning plan without prior approval provided the proposed changes do not:

- (i) Require Commission approval pursuant to 10 CFR 50.59;
- (ii) Use a statistical test other than the Sign test or Wilcoxon Rank Sum test for evaluation of the final status survey;
- (iii) Increase the radioactivity level, relative to the applicable derived concentration guideline level, at which an investigation occurs;
- (iv) Reduce the coverage requirements for scan measurements;
- (v) Decrease an area classification (i.e., impacted to unimpacted; Class 1 to Class 2; Class 2 to Class 3; or Class 1 to Class 3);
- (vi) Increase the Type I decision error;
- (vii) Increase the derived concentration guideline levels and related minimum detectable concentrations (for both scan and fixed measurement methods); and
- (viii) Result in significant environmental impacts not previously reviewed

3. Clarify additional characterization needed

Background:

Radiological characterization has not been performed on the reactor tank, storage pits, reactor internals, and underlying site soils. Section 2.2.2 of the DP, page 15, states: "Prior to commencement of D&D activities, a limited characterization and review of facility documents pertaining to the period from the end of the characterization until removal of the fuel will be conducted to validate that radiological conditions at the facility have not changed" ... and "...characterization of the reactor tank, internals and underlying soil sites should be conducted"..."

Based on these statements, it appears that the licensee intends to perform additional characterization of the site following the end of reactor operations. However, this is not explicitly stated in the DP.

Information Required:

The licensee should provide a detailed radiological characterization plan, or commitment by license condition to submit a complete radiological characterization report for NRC to review prior to performing decommissioning activities at the University of Arizona Research Reactor (UARR). The licensee should refer to the applicable guidance documents (NUREG-1575, Sections 2.4 and 5.3; and NUREG-1757, Volume 2, Section 4.2) to determine the information that should be supplied by the licensee to allow NRC staff to verify that the licensee has adequately characterized the radiological condition of the site.

4. Provide a Detailed Final Status Survey Plan

Background:

The DP does not contain a proposed Final Status Survey (FSS) Plan with adequate detail, as recommended by NUREG-1537, Part I, Appendix 17.1, section 4. Section 4.1 of the DP, page 41, states: "The FSS will be developed following the guidance provided in NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)"..."

Based on the above it appears that the intent of the licensee is to submit a FSS Plan to the NRC for review and approval at a later date. However, this is not explicitly stated in the DP.

Information Required:

The licensee should provide a complete, detailed plan or an appropriate commitment, by license condition, to submit a complete, detailed plan for NRC review and approval prior to conduct of the surveys. The licensee should refer to the applicable guidance documents (NUREG-1537, Part I, Appendix 17.1, Section 4; and NUREG-1757, Volume 2, Chapter 4) to determine the information that should be supplied by the licensee to allow the NRC staff to determine that the FSS design or design process is adequate to demonstrate compliance with the radiological criteria for license termination.

5. The DP included insufficient information on the qualifications and experience of senior staff as detailed below:

Background:

Section 2.4 of Appendix 17.1 in NUREG-1537, states that qualification and experience for key positions should be described.

Information Required:

Please provide the minimum qualifications for the Nuclear Reactor Lab (NRL) Director. Include specifics on education, licenses held and experience.

Please provide the minimum qualifications for the University Project Manager. Include specifics on education, project and task experience and specific University of Arizona (UA) experience.

Please provide details on the Reactor Supervisor's area of responsibility.

Please provide the minimum qualifications for the Reactor Supervisor. Include specifics on education, reactor experience and UA experience.

Please provide the minimum qualifications for the Radiation Control Office staff. Include specifics on education and experience.

6. Release Criteria

Background:

Section 2.2.3 of the DP discusses release criteria for the remaining equipment and surfaces. Currently the licensee proposes to us the NRC screening values but discusses the possibility of using alternative site-specific release criteria developed using a dose modeling software code such as the RESRAD family of codes.

Information Required:

A license condition is needed to require NRC review and approval if the licensee decides to use alternative site-specific release criteria.

7. Provide evaluation of hot particles

Background:

A number of reactor facilities have discovered hot particles in various locations during decommissioning. Origins of hot particles have included particles of failed fuel and particles of activated materials. The DP does not discuss the possibility of hot particles at the NRL facility.

Information Required:

UA should evaluate the possibility of hot particles at the NRL facility. The DP should either justify that significant hot particles do not exist at the facility or demonstrate that characterization and final status surveys will detect such hot particles if they do exist.

8. Technical Specifications

Background:

The DP should describe the applicable decommissioning technical specifications (TS) to include the safety precautions necessary during the decommissioning phase (refer to NUREG-1537, Part I, Appendix 17.1, Section 5).

Section 5.0, page 48, states that: "After the reactor ceases operation, most of the technical specifications will no longer be applicable. Additionally, other technical specifications that apply to non-operating conditions will be amended at the time of reactor shutdown and fuel removal. If additional changes to the technical specifications are necessary prior to D&D operations, the University will request that changes be approved by the NRC through a license amendment." Based on this statement, the NRC staff concludes that the licensee intends to submit the decommissioning technical specifications to the NRC for review and approval prior to the start of decommissioning work.

Information Required:

The DP should include the commitment by the licensee to include the information described in NUREG-1537, Part I, Appendix 17.1, Section 5, in the revisions to the TS. The revised TS should include the four sections described in Section 5 of Appendix 17.1: 1) a section imposing limiting decommissioning conditions at the facility that is comparable to the limiting conditions for operation for required equipment and conditions; 2) a section providing for surveillance of the required equipment and conditions for decommissioning; 3) a section describing the residual facility and site to which the DP applies, and; 4) an administrative section that outlines the management structure, provides for review and audit functions, provides for development and use of the necessary procedures, and contains reporting and record-retention requirements.

9. Decommissioning Contractor

Background:

The specific qualifications and experience of the Decommissioning Contractor (DC) are not specified in the DP as recommended in section 2.6 of Appendix 17.1 of NUREG-1537.

Information Required:

Please specify the qualifications and experience requirements that will be used to evaluate the DC and what are the minimum expectations. Include specifics on: Task Experience, QA Program and Personnel Experience.

10. Training Program

Background:

The Training Program section of the DP, Section 2.5, lacks some of the information recommended by NUREG-1537, Part I, Appendix 17.1, Section 2.5. The items not described include:

- The required frequency for refresher training
- A statement that contractors will receive training on the DP and the site

Information Required:

The licensee should provide additional information in Section 2.5 of the DP, and the licensee's training program modified accordingly.

11. Waste Disposal

Background:

The DP states: "Based on the site characterization and reactor activation analysis, Class B and C LLRW are not expected at the UARR."

Information Required:

What if any contingencies, does the licensee have if Class B or C waste is identified at the NRL during decommissioning? Where would the licensee plan on shipping such waste?

12. Radiation Protection

Background:

The DP refers to the D&D project Radiation Protection (RP) Program, a RP and ALARA Plan to be prepared by the DC, and a project Health Physics Program. It is unclear how these "new" programs are related to the existing RP program.

Information Required:

Please describe if and how the current RP Program is utilized and/or incorporated into the decommissioning RP programs.

13. Soil / Groundwater Contamination

Background:

Both the DP and the Environmental Report state that there have not been any non-routine events such as accidents, spills, unplanned releases.

Information Required:

Please confirm that there is no record of any unexplained loss of pool inventory.

14. Provide Instrument Scan MDCs

Background:

Section 3.6, page 7, of the UA NRL Characterization Report listed the minimum detectable concentrations (MDCs) for static (direct) surface measurements. Scan measurements will be made as part of the decommissioning project. Therefore scan MDCs need to be performed for the survey instruments used to conduct scan measurements.

Since scan survey measurements appear to be needed for site characterization, the licensee should provide the minimum detectable concentrations for radiological measurement instrumentation.

Information Required:

The licensee should provide a description and justification for survey measurements and instrumentation, including sensitivities for NRC to review prior to performing decommissioning activities at the UARR. The licensee should refer to the applicable guidance documents (NUREG-1575, Sections 6.4 and 6.5; NUREG-1757, Volume 2, Section 4.2) to provide the information that should be supplied by the licensee to allow NRC staff to verify that the licensee has adequately developed scan minimum detectable concentrations for instrumentation used to perform radiological scan surveys.

15. Calculate DCGLs for Activated Concrete or Volumetrically Contaminated Bulk Materials

Background:

There are NRC license termination screening values associated with surface and soil concentrations presented in the UARR DP, Section 2.2.2, page 19. However, Derived Concentration Guideline Levels (DCGLs) need to be determined for activated concrete or volumetrically contaminated bulk materials which will be encountered during the decommissioning process.

Section 2.2.3, page 19, of the DP states that "Residual concrete and steel from the reactor tank will also be sampled to ensure that residual radioactivity meets the following NRC screening values for soils".

Information Required:

The licensee should provide a description and calculation of the DCGLs for activated concrete or volumetrically contaminated bulk materials for NRC to review prior to performing decommissioning activities at the UARR. The licensee should refer to the applicable guidance documents (NUREG-1575, Sections 4.3 and NUREG-1757, Volume 2, Section 4.2) to provide the information that should be supplied by the licensee to allow NRC staff to verify that the licensee has adequately developed DCGLs for activated concrete or volumetrically contaminated bulk materials.

16. Incomplete List of Radionuclides of Concern

Background:

The UA NRL Characterization Report, Section 3.1, page 4, has identified the radionuclides of concern as tritium and beta/gamma emitting isotopes. No specific beta/gamma radionuclides were identified other than tritium. The UA Activation Analysis and Component Characterization Report provided results for several radionuclides that are not included in the radionuclide screening levels in the UARR DP.

The DP included the following screening levels for surfaces:

H-3
C-14
Mn-54
Fe-55
Co-60
Ni-63
Tc-99
Cs-137

The DP included the following screening levels for soils:

Co-60
H-3
C-14
Fe-55
Ni-63
Cs-137
Eu-152
Eu-154

The UA Activation Analysis and Component Characterization Report included the following radionuclides not included above:

Ca-45
Cr-51
Fe-59
Co-58
Ni-59
Zn-65
Nb-94

Information Required:

The licensee should identify the radionuclides of concern by isotope and include radionuclides associated with activation of concrete, volumetrically contaminated materials, and buried or embedded piping, if applicable. NUREG-1757, Volume 1, and NUREG-1757, Volume 2, Sections 4,5 and Section 1.2 discusses information the licensee is expected to provide regarding the existing radiological characterization of the site. Specifically, the licensee should identify all radionuclides of concern potentially present at the site. Ensure that any new radionuclides identified by characterization activities following reactor shutdown are included.

University of Arizona

Docket No. 50-113

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