



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

April 4, 2016

Dr. Ayman I. Hawari, Director  
Nuclear Reactor Program  
North Carolina State University  
Department of Nuclear Engineering  
Campus Box 7909  
Raleigh, NC 27695-7909

SUBJECT: NORTH CAROLINA STATE UNIVERSITY PULSTAR RESEARCH  
REACTOR - RENEWAL OF FACILITY OPERATING LICENSE NO. R-120,  
DOCKET NO. 50-297

Dear Dr. Hawari:

This letter is to remind you that the Facility Operating License No. R-120 for the PULSTAR research reactor at North Carolina State University (NCSU) is scheduled to expire on April 30, 2017, and to provide guidance for preparing your application for a renewal of the license. Title 10 of the *Code of Federal Regulations* (10 CFR), Section 2.109, "Effect of timely renewal application," allows continued operation under your current license until the U.S. Nuclear Regulatory Commission (NRC) acts upon an application for renewal, provided the application is received at least 30 days prior to the expiration date of your current license.

Your license renewal will involve the issuance of a new license. Therefore, renewal is not merely a routine administrative step, but involves reviews of all documentation related to the facility, on-site reviews, and publication in the *Federal Register* of a notice of your request that provides the opportunity for public participation, as well as a notice of the results of our review of your application.

Your renewal application should address the requirements in applicable sections of 10 CFR, and should demonstrate that the reactor can continue to be operated safely and without adverse impact on the environment or the public. The NRC staff recommends that the content and format of your renewal application follows the guidance provided in NUREG-1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Format and Content." NUREG-1537, Part 1, can be found in the NRC's Agencywide Documents Access and Management System (ADAMS), under Accession Number ML042430055.

In order for us to perform an adequate review, you are requested to include, as part of your application, all documentation in accordance with 10 CFR 50.33, "Contents of applications; general information," and 50.34, "Contents of applications; technical information," as follows:

1. Updated Safety Analysis Report (SAR)

A complete updated edition of your SAR is required to be submitted with your renewal application. The SAR should include information that describes the facility and all changes made during the license period; the design bases and limits on its operation; and a safety analysis of the structures, components and systems to ensure that they will be able to continue to perform their intended functions. Potential and reasonable accident scenarios and their consequences should be analyzed using the best current input data and computational techniques. Information should be compared, wherever possible, with facility operating experience.

Furthermore, the SAR should include, if applicable, updated information and analyses on demography, meteorology, geology, seismology, and other natural and man-made phenomena.

2. Financial Qualifications (10 CFR 50.33, "Contents of applications; general information," and 10 CFR 50.75, "Reporting and recordkeeping for decommissioning planning")

Financial Qualifications (10 CFR 50.33)

Pursuant to 10 CFR 50.33(f)(2), "...Applicants to renew or extend the term of an operating license for a nonpower reactor shall include the financial information that is required in an application for an initial license." To comply with this requirement, you are requested to provide the following information, appropriately certified:

- a. A statement from NCSU as to whether the North Carolina State University is owned, controlled, or dominated by an alien, a foreign corporation, or foreign government, and if so give details; and
- b. A statement that none of the provisions of 10 CFR 50.33(d) apply.

As required by paragraph (b) of 10 CFR 50.71, "Maintenance of records, making of reports," the NRC staff will analyze the financial statements for the current year to determine if the applicant is financially qualified to operate the reactor. To facilitate our review, you are requested to provide the most recently published annual financial statement for NCSU.

Pursuant to 10 CFR 50.33(f)(2), you are requested to provide the estimated annual operating costs for the first 5 year period after the projected license renewal, the underlying assumptions and bases of the estimate, and the source(s) of funding to cover these costs.

Financial Qualifications (10 CFR 50.75)

Pursuant to 10 CFR 50.33(k), the NRC requires that an application for an operating license for a utilization facility to provide information to demonstrate how reasonable assurance will be provided that funds will be available to decommission the facility. Under 10 CFR 50.75(d), each non-power reactor applicant for or holder of an operating license shall submit a decommissioning report that contains a cost estimate for

decommissioning the facility, an indication of the funding method(s) to be used to provide funding assurance for decommissioning, and a description of the means of adjusting the cost estimate and associated funding level periodically over the life of the facility. For the NRC staff's review, the following information is requested to be included in the application:

- a. A current cost estimate to decommission the NCSU PULSTAR research reactor (to meet the NRC's radiological release criteria for decommissioning the facility for unrestricted use), as well as the basis for the cost estimate. Also, please provide a summary of total decommissioning costs by labor, waste disposal, other items (such as energy, equipment, and supplies), and a 25 percent contingency factor;
- b. An indication of the funding method(s) to be used to provide funds for decommissioning; and
- c. A description of the means of adjusting the cost estimate and associated funding level periodically over the life of the facility. Also, please provide a detailed numerical example updating the cost estimate.

If NCSU intends to use a statement of intent (SOI) as the method to provide decommissioning funding assurance, as provided for by 10 CFR 50.75(e)(1)(iv), the NRC staff must find that the applicant "...is a Federal, State, or local government licensee..." To make this finding, the applicant must state that it is a State government organization and that the decommissioning funding obligations of the applicant are backed by the State government, and also provide corroborating documentation. Further, the applicant must provide documentation verifying that the signatory of the statement of intent is authorized to execute said document that binds the applicant. This document may be a governing body resolution, management directives, or other form that provides an equivalent level of assurance. If it is NCSU intent to use an SOI to provide financial assurance for decommissioning, the NRC staff requests the following information be included in the application:

- a. An updated SOI which includes the current (2017 dollars) cost estimate for decommissioning, a statement that funds for decommissioning will be obtained when necessary, and the signatory's "oath or affirmation" attesting to the information;
- b. Documentation that corroborates that the NCSU is a State or local government licensee under 10 CFR 50.75 (e)(1)(iv);
- c. A statement as to whether the decommissioning funding obligations for the NCSU PULSTAR research reactor are backed by the State of North Carolina government. The application must also present information that corroborates this statement. For example, the documentation may be a copy of or complete citation to a State statute that expressly provides that the obligations, or at least the decommissioning funding obligations, of the applicant are obligations backed or supported by the full faith and credit of the State of North Carolina, or an opinion of the applicant's General Counsel with citations to statutes, regulations, and/or case law that the obligations, or at least with respect to the decommissioning funding obligations, of the applicant are

obligations backed or supported by the full faith and credit of the State of North Carolina; and

- d. Documentation verifying that the signatory of the SOI is authorized to execute such a document that binds the applicant financially. For example, provide a copy of NCSU governing board or equivalent resolution that shows that the signatory of the SOI has been authorized by NCSU to bind it, at least with respect to funding the decommissioning of the NCSU PULSTAR research reactor, or provide a copy of an official North Carolina State University delegation of authority showing that the signatory of the SOI is authorized to bind the North Carolina State University financially, at least with respect to funding the decommissioning for North Carolina State University PULSTAR research reactor.

3. Environmental Report (10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions")

Your environmental report should include sufficient operational data, analyses, and discussions to provide a substantial basis for NRC to develop its environmental assessment.

4. Technical Specifications

The content and format of technical specifications (TS) should be developed considering the guidance in American Nuclear Standards Institute, Incorporated/American Nuclear Society 15.1-2007, "The Development of Technical Specification for Research Reactors," and NUREG-1537. In addition, please ensure that each technical specification is supported by an analysis in the SAR. Any changes to the current TS should be proposed, justified, and supported in the SAR at the time of the license renewal application so they can be evaluated during the review.

5. Operator Requalification Program (10 CFR 50.54, "Condition of Licenses," paragraph (i-1) and 10 CFR Part 55, "Operator's Licenses")

You have an approved operator requalification on file with the NRC. Accordingly, you need only reference the existing approved operator requalification plan. However, if you wish to modify your approved operator requalification plan, changes should be submitted for the NRC review in accordance with the regulations cited above.

6. Emergency Plan (10 CFR 50.54(q) and (r) and 10 CFR Part 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities")

You have an approved emergency plan on file with the NRC. Accordingly, you need only reference the existing approved emergency plan. However, if you wish to modify your approved emergency plan, changes should be submitted to the NRC in accordance with the regulations cited above.

7. Physical Security Plan (10 CFR 73.67, "Licensee fixed site and in-transit requirements for the physical protection of special nuclear material of moderate and low strategic significance")

You have an approved physical security plan on file with the NRC. Accordingly, you need only reference the existing approved security plan. However, if you wish to modify your physical security plan, changes should be submitted to the NRC in accordance with the regulations cited in 10 CFR 50.54(p).

8. Filing of Application

The requirements for submitting your renewal application and all other formal documentation relating to your license with respect to addressee, notarization, signatory and number of copies are given in 10 CFR 50.4, "Written communications," and 10 CFR 50.30, "Filing of applications for licenses; oath or affirmation."

The NRC staff request that the application for renewal be submitted to the NRC Document Control Desk no less than 30 days prior to the license expiration date, and earlier if possible, to allow the NRC staff adequate time to perform an acceptance review of the application.

9. Staff Visits

As a part of our review of your facility, members of the NRC licensing staff may visit your facility. These visits will be coordinated with you following receipt of your application for renewal.

The NRC staff plans to use the "Interim Staff Guidance (ISG) on Streamlined Review Process for License Renewal for Research Reactors" (ADAMS Accession No. ML092240244), to complete its review of your license renewal application. As discussed in the ISG, our review of your facility license renewal application will be based on the facility's power level. Since the PULSTAR research reactor's maximum power level is 1.0 megawatt thermal (MW(t)), but the facility has indicated they will request a power increase to 2.0 MW(t), the NRC staff is planning to use the full review process. Detail and schedule for the review are discussed in detail in the enclosed document, "Reviewing License Renewal Application in Accordance With the Interim Staff Guidance Process and Schedule."

A. Hawari

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If you have any questions, please contact me at (301) 415-3724, or by e-mail at [Duane.Hardesty@nrc.gov](mailto:Duane.Hardesty@nrc.gov).

Sincerely,

*/RA/*

Duane A. Hardesty, Senior Project Manager  
Research and Test Reactors Licensing Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-297  
License No. R-120

Enclosure:  
Reviewing License Renewal Application

cc: See next page

North Carolina State University

Docket No. 50-297

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If you have any questions, please contact me at (301) 415-3724, or by e-mail at [Duane.Hardesty@nrc.gov](mailto:Duane.Hardesty@nrc.gov).

Sincerely,

*/RA/*

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Office of Nuclear Reactor Regulation

Docket No. 50-297  
License No. R-120

Enclosure:  
Reviewing License Renewal Application

cc: See next page

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## **Reviewing License Renewal Application in Accordance with the Interim Staff Guidance Process and Schedule**

### Introduction

The “Interim Staff Guidance [ISG] on the Streamlined Review Process for License Renewal for Research Reactors” (Agencywide Documents Access and Management System (ADAMS) Accession No. ML092240244), was developed to streamline the research and test reactor license renewal review process and to develop guidance for the U.S. Nuclear Regulatory Commission (NRC) staff for reviewing license renewal applications. Figure 1 provides an outline of the streamlined review process. Although the NRC’s review process has changed, the licensee/applicant is still required to submit its application in accordance with the applicable regulations contained in Title 10 of the *Code of Federal Regulations* Parts 50, 51, 55, and 73, and the recommendation provided in NUREG-1537, Part 1, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Format and Content.”

### Background

In SECY-08-0161, “Review of Research and Test Reactor License Renewal Applications [LRA],” dated October 24, 2008 (ADAMS Accession No. ML082550140), the NRC staff provided the Commission with information about the staff’s plans to improve the review of license renewal applications for research and test reactors. The Commission issued the staff requirements memorandum (SRM) for SECY-08-0161 on March 26, 2009 (ADAMS Accession No. ML090850159). The SRM directed the staff to streamline the renewal process for such reactors, using some combination of the options presented in SECY-08-0161. The SRM also directs the staff to implement a graded approach whose scope is commensurate with the risk posed by each facility. The graded approach incorporates elements of the alternative safety review approach discussed in Enclosure 1 of SECY-08-0161. In the alternative safety review approach, the staff should consider the results of past NRC staff reviews when determining the scope of the review. A basic requirement, as contained in the SRM, is that licensees must be in compliance with applicable regulatory requirements.

The NRC staff developed the ISG to assist in the review of license renewal applications. The streamlined review process (Figure 1), is a graded approach based on licensed power level. Under the streamlined review process, the facilities are divided into two tiers. Facilities with licensed power level of 2 megawatts thermal (MW(t)) and greater would undergo a full review using NUREG-1537, “Guidance for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors.” Facilities with a licensed power level less than 2 MW(t) would undergo a focused review that centers on the most safety significant aspects of the renewal application and will rely on past NRC reviews for certain safety findings. Specifically, for reactors with licensed power levels less than 2 MW(t), the review will focus on the sections of the safety analysis report (SAR) that are most significant to safety under a focused license renewal approach.

### Streamlined Review Process

*Facilities with licensed power equal or greater than 2 MW(t) or Facilities requesting a power level increase (FULL review):*

The NRC will perform the license renewal application review in accordance with the guidance provided in NUREG-1537, Part 2, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Standard Review Plan and Acceptance Criteria."

*Facilities with licensed power less than 2 MW(t) (FOCUSED review):*

The NRC staff will perform a focused review that centers on the most safety significant aspects of the renewal application and will rely on past NRC reviews for certain safety findings. Specifically, for reactors with licensed power levels less than 2 MW(t), the review will center on the sections of the SAR that are most significant to safety. Specifically, the focus will be on reactor design and operation, accident analysis, technical specifications (TS), radiation protection, waste management programs, financial requirements, environmental assessment, and changes to facility after submitting application.

The review will start with a familiarization site visit to the facility. The NRC team would comprise of, but not limited to, the NRC license renewal project manager, the NRC environmental assessment reviewer, the NRC financial reviewer, and the NRC's contractors. The purpose of this one-day visit is to observe the site configuration and to conduct general discussions regarding license renewal application with the licensee.

After the first site visit, the NRC staff and its contractors will conduct a comprehensive review of the license renewal application in accordance with the guidance provided in the ISG. The NRC staff will determine the application's conformance to the regulatory requirements and consistency with NRC guidance and if needed, perform independent calculations to verify the applicant's statements in the SAR and proposed TS. The NRC staff will identify the portions of the application needing further clarification to complete its review.

Prior to providing the formal request for additional information (RAI) to the licensee, the NRC staff and its contractor will hold a conference call, or if necessary, a site visit with the licensee to discuss the draft RAIs. This will provide an opportunity for the licensee to provide clarification regarding the draft RAIs. Once the licensee receives the formal RAIs, the NRC staff and its contractor will hold another conference call, if necessary, to clarify any questions that the licensee may have regarding the formal RAIs, and ensure that the RAIs are understood by the licensee.

Prior to submitting its final responses to the RAIs, the staff and its contractor will hold a conference call or if necessary, a site visit, with the licensee to discuss its draft responses to the RAIs to ensure that the responses will enable the completion of the review of the LRA. The staff will also be requesting that the licensee submit a draft proposed TS incorporating all the applicable responses to the RAIs.

The NRC staff and its contractors will review and evaluate the licensee's responses to the final RAI to determine adequacy and acceptability for the supporting safety conclusions based on the guidance provided in the ISG.

During its final phase of reviewing the LRA, the staff may have further need for additional clarifications. The staff will hold conference calls with the licensee, as necessary, to obtain the additional information necessary to complete its review of the LRA.

The staff will inform the licensee of the projected date for the issuance of the facility renewal license to permit adequate time for the licensee to prepare proper documentation and training once the facility renewal license is issued.

#### Streamlined Review Schedule

*Facilities with licensed power equal or greater than 2 MW(t) or Facilities requesting a power level increase (FULL review):*

It is estimated that a full review of the LRA will be completed within 20 months, provided that the licensee provides adequate and timely responses to the NRC's RAI.

*Facilities with licensed power less than 2 MW(t) (FOCUSED review):*

It is estimated that a focused review of the LRA will be completed within 16 months, provided that the licensee provides adequate and timely responses to the NRC's RAI.

Figure -1 Research and Test Reactor License Renewal Streamlined Review Process

