



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

October 3, 2018

Dr. Ayman I. Hawari, Director
Nuclear Reactor Program
Department of Nuclear Engineering
North Carolina State University
Campus Box 7909
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SUBJECT: NORTH CAROLINA STATE UNIVERSITY – SUPPLEMENTAL INFORMATION
NEEDED FOR ACCEPTANCE OF REQUESTED LICENSING ACTION
REGARDING FUELED EXPERIMENTS FOR THE PULSTAR RESEARCH
REACTOR (EPID NO. L-2018-LLA-0247)

Dear Dr. Hawari:

By letter dated August 27, 2018 (Agencywide Documents Access and Management System Accession No. ML18241A135), North Carolina State University (NCSU) submitted a license amendment request (LAR) for the NCSU PULSTAR research reactor. NCSU requested the amendment to revise its license conditions (LCs) and technical specifications (TSs) to allow it to increase the quantity of uranium-235 (U-235) in fueled experiments; to allow it to perform fueled experiments with neptunium-237 or plutonium-239, in addition to U-235; and to allow it to perform vented fueled experiments. The amendment would also make other changes related to fueled experiments, including revising the TS definition of “fueled experiment,” and increasing license possession limits for fissile and fissionable materials to be used in fueled experiments. NCSU stated that the amendment would allow the LCs and TSs to accommodate its planned experimental needs.

The purpose of this letter is to provide the results of the U.S. Nuclear Regulatory Commission (NRC) staff’s acceptance review of this LAR. The NRC staff performed this acceptance review to determine if there is sufficient technical information in scope and depth to allow the NRC staff to complete its detailed technical review. The acceptance review is also intended to identify whether the application has any readily apparent information insufficiencies in its satisfaction of the regulatory requirements or the characterization of the licensing basis for the facility.

Consistent with Section 50.90, “Application for amendment of license, construction permit, or early site permit,” of Title 10 of the *Code of Federal Regulations* (10 CFR), whenever a holder of a license desires to amend the license, an application for an amendment must be filed with the Commission, as specified in 10 CFR 50.4, “Written communications,” fully describing the changes desired, and following as far as applicable, the form prescribed for original applications. Section 50.34, “Contents of applications; technical information,” of 10 CFR addresses the content of technical information required. This section stipulates that the submittal address the design and operating characteristics, unusual or novel design features, and principal safety considerations.

The NRC staff has reviewed NCSU's application, and concluded that the information delineated in the enclosure to this letter is necessary to enable the NRC staff to make an independent assessment regarding the acceptability of the proposed LAR in terms of meeting regulatory requirements, and protecting the public health and safety, and the environment. The NRC staff requests that NCSU either 1) supplement the application to address the information needs described in the enclosure by November 5, 2018, in order to make the application complete; or, 2) withdraw and resubmit the application at a later date.

The supplemental information will enable the NRC staff to begin its detailed technical review. If the information responsive to the NRC staff's information needs is not received by the above date, the application, if not withdrawn, will not be accepted for review pursuant to 10 CFR 2.101, "Filing of application," and the NRC staff will cease its review activities associated with the application.

If the application is subsequently accepted for review, NCSU will be advised of any further information needed to support the NRC staff's detailed technical review by separate correspondence.

The information needs and associated response time frame in this letter were discussed with your staff on October 1, 2018.

If you have any questions regarding this review, please contact me at 301-415-4067, or by electronic mail at Edward.Helvenston@nrc.gov.

Sincerely,

/RA/

Edward Helvenston, Project Manager
Research and Test Reactors Licensing Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

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

Enclosure:
As stated

cc: See next page

North Carolina State University

Docket No. 50-297

cc:

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SUBJECT: NORTH CAROLINA STATE UNIVERSITY – SUPPLEMENTAL INFORMATION
NEEDED FOR ACCEPTANCE OF REQUESTED LICENSING ACTION
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REACTOR DATE: OCTOBER 3, 2018

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ADAMS Accession No. ML18263A235***concurrent via email**

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NAME	EHelvenston	NParker	AAdams	EHelvenston
DATE	9/26/2018	9/25/2018	10/3/2018	10/3/2018

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SUPPLEMENTAL INFORMATION NEEDS

LICENSE AMENDMENT REQUEST REGARDING FUELED EXPERIMENTS FOR

THE PULSTAR RESEARCH REACTOR

NORTH CAROLINA STATE UNIVERSITY

DOCKET NO. 50-297

LICENSE NO. R-120

By letter dated August 27, 2018 (Agencywide Documents Access and Management System ADAMS Accession No. ML18241A135), North Carolina State University (NCSU) submitted a license amendment request (LAR) related to fueled experiments at the NCSU PULSTAR research reactor.

The U.S. Nuclear Regulatory Commission (NRC) staff has determined that the following information is necessary to make the application complete and acceptable for docketing:

1. Atmospheric Dispersion Calculation Methodology

The analyses in the application include atmospheric dispersion calculations that appear to differ significantly from those used in the 2017 safety analysis report (SAR) (ADAMS Accession No. ML17201Q129), submitted in support of NCSU's request for renewal of the PULSTAR reactor license, which the NRC staff is currently reviewing separately. The application should be supplemented to include a discussion of the differences in the calculations in the fueled experiment amendment request versus the 2017 SAR, and the rationale for the use of a different methodology.

2. Vented Fueled Experiments

The application does not appear to include sufficient discussion of the vented fueled experiments that are proposed as part of the amendment request. The application should be supplemented to describe the location and configuration of components such as the experiment holder, filters, holdup tanks, radiation and flow monitors, isolation valves, and connections between these components, with respect to existing reactor components such as beam tubes and beam tube exhaust. The NRC staff recommends that diagrams of the proposed vented experiment system be provided, if possible. Additionally, the application should be supplemented to discuss how, as stated in the LAR, the "[r]elease of particulate, powder, liquid, and solid material is prevented by design of the [vented experiments]."

3. Filter Efficiencies

The analyses of doses from failures of encapsulated fueled experiments, and routine releases from vented fueled experiments, appear to credit particulate and charcoal filters (as part of the facility confinement system or in the vented experiment system) for removal of radioactive material from air, but the current or proposed technical specifications (TSs) do not appear to include limiting conditions for operation (LCOs) requiring specific minimum efficiencies for these filters. The application should be supplemented to include proposed LCO TSs requiring applicable minimum filter efficiencies.

Enclosure

4. Surveillance Requirements Related to Vented Fueled Experiments

The proposed TSs do not appear to include any surveillance requirement TSs for proposed LCO TS 3.8.d.iv related to vented fueled experiments. The application should be supplemented to include proposed surveillance TSs for LCO TS-required vented fueled experiment equipment (such as filters or radiation monitors) and parameters (such as exhaust flow rates).

5. Possession Limit Changes

The application does not appear to specify the form or enrichment of uranium-235, neptunium-237, or plutonium-239 for which a possession allowance is being requested. The application also does not appear to specify whether any current license conditions (LCs) related to radioactive material possession (e.g., current LC 2.B.(2), which, in part, allows NCSU to possess “up to 2 grams of contained uranium-235 of any enrichment in the form of foils” should be replaced by the new possession limit conditions. The application should be supplemented to provide these details of the requested possession limit changes.

6. Description of Technical Specification Changes

The application does not appear to contain a sufficient description of, or justification for, all of the proposed changes to TS 3.8. The application should be supplemented to provide a complete description of all of the proposed changes to TS 3.8 compared to the current NRC-approved TS 3.8 (i.e., each deletion or modification of a portion of current TS 3.8, including minor numbering, formatting, or editorial changes, as well as each addition to current TS 3.8). In addition, the application should be supplemented to include a detailed discussion and/or analysis, as applicable, justifying each change.

7. Proposed Technical Specification Change Pages

The application does not appear to include proposed TS change pages that are marked-up to indicate the areas of change (compared to the current NRC-approved TSs of record), to support the LAR. The NRC staff recommends that the application be supplemented to include marked-up proposed TS change pages.