

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
FOR LICENSE RENEWAL APPLICATION FOR
FACILITY OPERATING LICENSE NO. R-120 FOR
THE NORTH CAROLINA STATE UNIVERSITY
PULSTAR RESEARCH REACTOR (EPID NO. L-2017-RNW-0026)

SUBMITTAL 2

NORTH CAROLINA STATE UNIVERSITY
LICENSE NO. R-120; DOCKET NO. 50-297

FEBRUARY 14TH, 2019

2. Environmental Report (ADAMS Accession No: ML17088A836)

The NCSU LRA letter (ADAMS Accession No: ML17088A819) requested a power level increase of its Facility Operating License from 1.0 megawatt (MWt) to 2.6 MWt. Included in the LRA environmental report (ER), Section 4, "Environmental Effects of Facility Operation," was the following statement: "Operation of the reactor at 2 MW will not cause a significant increase in radiation levels or effluent." The NRC staff is not clear if the ER was performed at the proposed 2.0 MWt or 2.6 MWt power levels.

The regulations in 10 CFR 51.45(c) contain the requirements for an applicant's ER, and states that an ER "...should contain sufficient data to aid the Commission in its development of an independent analysis."

Provide an updated ER with an environmental impact analysis that describes the operational changes associated with the proposed power level increase including effluents, doses, cooling demand, makeup water usage, and waste generation, including batch discharges to the sanitary sewer for operation at the proposed power level of 2.6 MWt, or justify why no changes are needed.

Note: The updated ER should properly bound the impacts commensurate with the proposed power level increase, including reference to a documented analysis methodology that identifies assumptions and accounts for any margins for instrument inaccuracies and measurement uncertainty in determining maximum power for the analysis.

RESPONSE

Per communication with NRC regarding the reduction in the peak cladding temperature limit and the addition of an oxidation limit, the *Safety Analysis for Assessing 2 MW Power Upgrade for the NCSU PULSTAR Reactor* report was revised resulting in a Limiting Safety System Setting of 2.0 MWt for the power level. Therefore, the 2.0 MWt used as the basis in the Environmental Report is correct and an update is not necessary.

3. Safety Analysis Report (ADAMS Accession No: ML17201Q129)

The NCSU LRA requested a power level increase from 1.0 MWt to 2.6 MWt. Included in LRA SAR, Section 11, "Radiation Protection Program and Waste Management," were radiation dose calculations that appear to assume operation at 2.0 MWt. The NRC staff is not clear if the dose calculations were performed at 2.0 MWt rather than the proposed 2.6 MWt power level.

The regulations in 10 CFR Part 20 require that doses to workers and members of the public be limited. LRA SAR Section 11 provided various dose calculations that would be necessary to make this determination (i.e., the concentrations of and the doses to workers/members of the public from any radiological effluents).

Provide clarification that the dose calculations provided in LRA SAR Section 11 comply with the limits in 10 CFR Part 20 for the proposed power level increase of 2.6 MWt or justify why no changes are needed.

RESPONSE

Per communication with NRC regarding the reduction in the peak cladding temperature limit and the addition of an oxidation limit, the *Safety Analysis for Assessing 2 MW Power Upgrade for the NCSU PULSTAR Reactor* report was revised resulting in a Limiting Safety System Setting of 2.0 MWt for the power level. Therefore, the 2.0 MWt used as the basis in Section 11 of the LRA SAR is correct.

6. Supporting Information

The regulations in 10 CFR 50.9, "Completeness and accuracy of information," require that information provided to the Commission by a licensee shall be complete and accurate in all material respects.

The NRC staff, in its review of the NCSU LRA, finds that the following supporting information is necessary to continue its review:

- a. North Carolina State University PULSTAR Reactor, "Safety Analysis for Assessing 2 MW Power Upgrade for the NCSU PULSTAR Reactor," March 2017.

Provide the following information or justify why the supporting information cannot or will not be provided.

RESPONSE

The document requested in 6(a) *Safety Analysis for Assessing 2 MW Power Upgrade for the NCSU PULSTAR Reactor* has been revised to reflect the cladding temperature limit of 1200 °C (2200 °F) along with a 17% cladding oxidation limit that was set based on discussion with the NRC via teleconference and followed up by an email on August 1, 2018.

The supporting information requested in (a) is included as Attachment 1 of this submittal.