November 16, 2017

Dr. Robert Dimeo, Director
NIST Center for Neutron Research
National Institute of Standards and Technology
U.S. Department of Commerce
100 Bureau Drive, Mail Stop 8561
Gaithersburg, MD 20899-8561

SUBJECT: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY - REQUEST FOR ADDITIONAL INFORMATION RE: LICENSE AMENDMENT REQUEST TO CHANGE TECHNICAL SPECIFICATIONS AT THE NATIONAL BUREAU OF STANDARDS TEST REACTOR (CAC NO. 000955)

Dear Dr. Dimeo:

By letters dated March 2, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML17068A163 and ML17068A164), as supplemented by letters dated March 29, 2017 (ADAMS Accession No. ML17097A243), and May 25, 2017 (ADAMS Accession No. ML17153A172), the National Institute of Standards and Technology Center for Neutron Research (NIST, the licensee) requested a revision to the Operating License for the National Bureau of Standards Test Reactor (NBSR). The proposed amendment would modify the NBSR technical specifications (TSs) to remove limitations in the current version of the TSs that prohibit use of a test procedure and would change the licensee's organizational chart. In addition, the proposed license amendment request (LAR) would allow transfer of instrumentation calibration and testing sources from a material license of NIST to the reactor license.

During its technical review of your amendment request, questions have arisen for which we require additional information and clarification. We request that you provide responses to the enclosed request for additional information within 30 days from the date of this letter.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.30(b), "Oath or affirmation," you must execute your response in a signed original document under oath or affirmation. Your response must be submitted in accordance with 10 CFR 50.4, "Written communications." Information included in your response that is considered sensitive, or proprietary, that you seek to have withheld from the public, must be marked in accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding." Any information related to security should be submitted in accordance with 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements." Following receipt of the additional information, we will continue our evaluation of your LAR.

If you need additional time to complete this request, or have any questions regarding this review, please contact me at (301) 415-1404, or by electronic mail at Xiaosong.Yin@nrc,gov.

Sincerely,

/RA/

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

Docket No. 50-184
License No. TR-5

Enclosure:
As stated

cc: See next page

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DATE: NOVEMBER 16, 2017

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ADAMS Accession No.: ML17318A695 **NRR-058**

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OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR ADDITIONAL INFORMATION

FOR THE LICENSE AMENDMENT REQUEST

TO CHANGE TECHNICAL SPECIFICATIONS AT THE

NATIONAL BUREAU OF STANDARDS TEST REACTOR

LICENSE NO. TR-5; DOCKET NO. 50-184

By letters dated March 2, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML17068A163 and ML17068A164), as supplemented by letters dated March 29, 2017 (ADAMS Accession No. ML17097A243), and May 25, 2017 (ADAMS Accession No. ML17153A172), the National Institute of Standards and Technology Center for Neutron Research (NIST, the licensee) requested a revision to the Operating License for the National Bureau of Standards Test Reactor (NBSR). The proposed amendment would modify the NBSR technical specifications (TSs) to remove limitations in the current version of the TSs that prohibit use of a test procedure and would change the licensee's organizational chart. In addition, the proposed license amendment request (LAR) would allow transfer of instrumentation calibration and testing sources from a material license of NIST to the reactor license.

During our technical review of your LAR, questions have arisen for which we require additional information and clarification. We request that you provide responses to the following within 30 days from the date of this letter.

1. TS 3.1.3, Core Configuration: The federal regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.36(c)(2)(i), require that limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility.

   The proposed change to TS 3.1.3 is to remove shim arm failure from the objective in the current TS 3.1.3. In addition, the basis for employing shim arm stops to prevent a broken shim arm from dropping from the reactor core was also proposed to be removed. In your May 25, 2017, letter, you provided an explanation of how a shim arm failure would be addressed under natural convection flow conditions if that occurs.

   Explain why the shim arm failure no longer needs to be controlled by this TS and why safe operation of the reactor is maintained without this TS or restore the objective and basis to controlling shim arm failure. Revise the proposed TS as needed.

2. TS 3.2.2, Reactor Safety Channels: The federal regulations in 10 CFR 50.36(c)(3), require surveillance relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

   The proposed change to TS 3.2.2 is to bypass the reactor outlet temperature channel when the reactor is operating under the TSs 2.2 and 3.3.1 conditions. With this bypass, it appears that the entire channel can be bypassed including the rundown function.

   Explain why it is safe to operate the reactor with the channel bypassed under the proposed conditions. Explain how the limiting conditions for operation will be met when the reactor is

operating under TSs 2.2(4) and 3.3.1 conditions but the entire reactor outlet temperature channel is bypassed.

3. TS 3.3.2, Emergency Core Cooling: The federal regulations in 10 CFR 50.36(c)(2)(i), require that limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility.

   The proposed change to TS 3.3.2 is to remove the requirement for emergency core cooling when the reactor is operating under TS 2.2(4) condition. In your application regarding to this change, it is stated that if desired, the emergency system may be initiated in a short time by using the appropriate procedure.

   Explain why it is safe to operate the reactor under TS 2.2(4) conditions without the emergency core cooling system operable. Why is this change necessary if your emergency cooling system is standing by to be initiated. Revise the proposed TS as needed.

4. TS 3.9.2.1, Fuel Handling: The federal regulations in 10 CFR 50.36(c)(2)(i), require that limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility.

   Your proposed changes to TS 3.9.2.1 would allow reactor operation with natural convection cooling without have fuel elements locked in the core grid structure. What precautions exist to prevent accidental starting of primary pumps and the establishment of primary flow when the reactor is in natural convection operation?