

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

June 15, 2021

Mr. John P. Foster, Director of Reactor Operations Nuclear Reactor Laboratory Massachusetts Institute of Technology 138 Albany Street, MS NW12-116B Cambridge, MA 02139

SUBJECT: MASSACHUSETTS INSTITUTE OF TECHNOLOGY – ISSUANCE OF AMENDMENT NO. 45 TO RENEWED FACILITY OPERATING LICENSE NO. R-37 FOR THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY REACTOR FACILITY RE: CHANGE TO SURVEILLANCE REQUIREMENT FREQUENCY WHEN THE REACTOR IS SHUT DOWN (EPID NO. L-2020-LLA-0149)

Dear Dr. Foster:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 45 to Renewed Facility Operating License No. R-37 for the Massachusetts Institute of Technology Reactor Facility. The amendment consists of change to the technical specification (TS) in response to your application, dated June 18, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20178A159), as supplemented by letter dated January 29, 2021 (ADAMS Accession No. ML21035A258). Specifically, the amendment changes TS definition 1.3.11 and TS surveillance requirements in TS 4.2 to allow deferral of select surveillances when the reactor is shut down.

A copy of the NRC staff's safety evaluation is also enclosed. If you have any questions, please contact me at (301) 415-3936, or by electronic mail at <u>Patrick.Boyle@nrc.gov</u>.

Sincerely,

Patrick Boyle, Project Manager Non-Power Production and Utilization Facility Licensing Branch Division of Advanced Reactors and Non-Power Production and Utilization Facilities Office of Nuclear Reactor Regulation

Docket No. 50-020 License No. R-37

Enclosures:

- 1. Amendment No. 45 to Renewed Facility Operating License No. R-37
- 2. Safety Evaluation

cc w/enclosure: See next page

Massachusetts Institute of Technology

CC:

City Manager City Hall Cambridge, MA 02139

Department of Environmental Protection One Winter Street Boston, MA 02108

Mr. Jack Priest, Director Radiation Control Program Department of Public Health 529 Main Street Schrafft Center, Suite 1M2A Charlestown, MA 02129

Ms. Samantha Phillips, Director Massachusetts Emergency Management Agency 400 Worcester Road Framingham, MA 01702-5399

Test, Research and Training Reactor Newsletter Attention: Ms. Amber Johnson Dept of Materials Science and Engineering University of Maryland 4418 Stadium Drive College Park, MD 20742-2115

Mr. Marshall B. Wade Reactor Superintendent Massachusetts Institute of Technology Nuclear Reactor Laboratory Research Reactor 138 Albany Street, MS NW12-116B Cambridge, MA 02139 SUBJECT: MASSACHUSETTS INSTITUTE OF TECHNOLOGY – ISSUANCE OF AMENDMENT NO. 45 TO RENEWED FACILITY OPERATING LICENSE NO. R-37 FOR THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY REACTOR FACILITY RE: CHANGE TO SURVEILLANCE REQUIREMENT FREQUENCY WHEN THE REACTOR IS SHUT DOWN (EPID NO. L-2020-LLA-0149) DATED: JUNE 15, 2021

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ADAMS Accession No.: ML21132A292

NRR-058

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

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DOCKET NO. 50-020

MASSACHUSETTS INSTITUTE OF TECHNOLOGY REACTOR FACILITY

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 45 License No. R-37

- 1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to Renewed Facility Operating License No. R-37, filed by the Massachusetts Institute of Technology dated June 18, 2020, as supplemented by letter dated January 29, 2021, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public;
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," of the Commission's regulations and all applicable requirements have been satisfied; and
 - F. Prior notice of this amendment was not required by 10 CFR 2.105, "Notice of proposed action," and publication of notice of this amendment is not required by 10 CFR 2.106, "Notice of issuance."

2. Accordingly, the license is amended as described in Attachment 1 to this license amendment and by changes to the Technical Specifications as indicated in Attachment 2. Paragraph 2.C.(2) of Renewed Facility Operating License No. R-37 to read as follows:

2. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment 45, are hereby incorporated in the license. The Massachusetts Institute of Technology shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Joshua Borromeo, Chief Non-Power Production and Utilization Facility Licensing Branch Division of Advanced Reactors and Non-Power Production and Utilization Facilities Office of Nuclear Reactor Regulation

Attachments:

- 1. Changes to Renewed Facility Operating License R-37
- 2. Changes to Appendix A, "Technical Specifications"

Date of Issuance: June 15, 2021

ATTACHMENT TO LICENSE AMENDMENT NO. 45

RENEWED FACILITY OPERATING LICENSE NO. R-37

DOCKET NO. 50-020

Replace the following page of the Renewed Facility Operating License No. R-37 with the revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Renewed Facility Operating License

<u>Remove</u>

<u>Insert</u>

3

3

- 3. Pursuant to the Act and 10 CFR Part 30, to receive, possess, and use:
 - a. a 150-curie antimony-beryllium sealed neutron source in connection with operation of the facility;
 - b. such byproduct material as may be produced by operation of the facility, which, except for byproduct material produced in non-fueled experiments, shall not be separated; and
 - c. byproduct materials activated in reactors other than the MIT reactor (for use in the reactor hot cells) that are in solid form and have atomic numbers 3 through 83. The total inventory of this byproduct material shall not exceed 100,000 curies at any one time. This material may be irradiated in the reactor.
- C. This renewed license shall be deemed to contain and is subject to the conditions specified in Parts 20, "Standards for Protection against Radiation," 30, 50, 51, 55, "Operators' Licenses," 70, and 73, "Physical Protection of Plants and Materials," of the Commission's regulations; is subject to all applicable provisions of the Act and the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

Maximum Power Level

1. The licensee is authorized to operate the reactor at steady-state power levels not to exceed 6.0 megawatts (thermal).

Technical Specifications

2. The Technical Specifications contained in Appendix A, as revised through Amendment 45, are hereby incorporated in the license. The Massachusetts Institute of Technology shall operate the facility in accordance with the Technical Specifications.

Additional Conditions

3. The licensee shall fully implement and maintain in effect all provisions of the Commission-approved physical security plan, including amendments and changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The approved physical security plan consists of a Massachusetts Institute of Technology Nuclear Reactor Laboratory document, withheld from public disclosure pursuant to 10 CFR 73.21, entitled, "Physical Security Plan for the M.I.T. Research Reactor Facility," dated July 22, 2013, as revised.

ATTACHMENT 2 TO LICENSE AMENDMENT NO. 45

RENEWED FACILITY OPERATING LICENSE NO. R-37

DOCKET NO. 50-20

Replace the following pages of Appendix A, "Technical Specifications," with the revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Technical Specifications

<u>Remove</u>	Insert
1-4	1-4
4-4	4-4
4-7	4-7
4-8	4-8

1.3.11 Frequency

Each required surveillance test or other function shall be performed within the specified time interval with:

- a) A maximum allowable extension not to exceed 25% of the specified surveillance interval, unless otherwise stated in these Technical Specifications.
- b) A total maximum combined interval time for any three consecutive surveillance intervals not to exceed 3.25 times the specified surveillance interval.
- c) Where indicated in the surveillance Technical Specifications, scheduled surveillances that cannot be performed while the reactor is shut down may be deferred until the next planned period of reactor operation. Such surveillances shall be performed as soon as practicable when reactor operation resumes.

Surveillance tests required for experiments (Section 6) may be waived when an instrument, component, or system is not required to be operable, but any such instrument, component, or system shall be tested prior to being used as a required operable instrument, component, or system.

1.3.12 Immediate

Immediate means that the required action will be initiated without delay in an orderly manner by using written procedures when applicable.

1.3.13 Inadmissible Sample Materials

Those materials defined by the MIT Reactor Safeguards Committee (MITRSC) as either not allowable within the MITR-II or restricted from the reactor containment building. Examples include unapproved amounts of combustible, corrosive, or explosive materials.

1.3.14 Independent Experiments

Experiments that are not connected by a mechanical, chemical, or electrical link.

1.3.15 Irradiation

Use of reactor experimental facilities where the primary purpose is the production of activated material such as samples for neutron activation analysis, or materials that exhibit

4.2 <u>Reactor Control and Safety Systems</u>

Applicability

This specification applies to the surveillance of reactor control and safety systems. The surveillance requirements in specifications #1, #6a, and #6b of this section can be deferred during periods of reactor shutdown until the next planned period of reactor operation, in which case they shall be performed as soon as practicable when reactor operation resumes.

Objective

To ensure the reliability of the reactor control and safety systems.

Specification

- <u>Reactivity Worth of Control Devices</u>: The integral and differential worths of the six shim blades and of the regulating rod shall be measured at least annually. Either calculations of the expected change or measurements shall be made upon changeout of an absorber and upon changes in core configuration that involve a new type of fuel or a change in the total number of non-fueled positions.
- 2. <u>Rod Withdrawal and Insertion Speed</u>: The withdrawal and insertion speed of each shim blade and the regulating rod shall be verified annually.
- 3. <u>Scram Times</u>: The scram time of each shim blade shall be verified annually or whenever any work has been done on either the shim blade, its electromagnet, or its associated drive. For purposes of this check, the scram time shall be measured from the full-out position to the 80% inserted position of the shim blade.
- Scram and Power Measuring Channels: The instruments or channels listed in Table 4.2-1 shall be tested at least quarterly and each time before startup of the

- 8. <u>Heat Balance</u>: The signal from the linear power channel shall be checked against a heat balance calculation at least monthly, for any month that the reactor is operated above 1 MW continuously for at least 48 hours.
- 9. <u>Control Device Inspection</u>: Control devices shall be inspected annually as follows:
 - a) Shim blade absorbers shall be checked visually.
 - b) Shim blade electromagnets shall be checked both visually and by measuring the resistance of the coils.
 - c) Shim blade and regulating rod drives shall be monitored for proper operation.
- 10. <u>Control System Interlocks</u>: A channel test of the following interlocks and scram shall be performed at least annually:
 - a) Withdraw Permit Interlock,
 - b) Subcritical Limit Shim Blades Interlock,
 - c) No Overflow Reflector Startup Interlock, and
 - d) Low Level D₂O Reflector Scram.

Basis

The MITR-II has observed the criteria given in Specification 4.2.1 for determination of control device reactivity worths and found it to be adequate. Measurements of the integral and differential worths are required annually. Because such measurements require operation of the reactor, they are deferrable until the reactor is operating. Measurements following changeouts of absorbers and change of core configuration are desirable. However, such measurements are very time consuming. Moreover, sufficient experience exists with such changes that their effect on integral and differential reactivity worths can be predicted with reasonable accuracy. Accordingly,

normal MITR-II practice is to do a complete set of measurements following replacement of all absorber sections rather than to do measurements as each is replaced. (Note: It requires several days to replace one absorber and the entire process is usually done over an interval of several months.) Estimates of the change of worth are used pending the measurement. Estimates, not measurements, are normally used for changes of core configuration.

The insertion and withdrawal speed of the control devices is fixed by the motor and drive design as discussed in Section 4.2.2 of the SAR. These speeds are verified annually.

Scram time is as defined by Specifications 1.3.37 and 3.2.1. It is verified at least annually and whenever maintenance has been performed that could affect it.

The instruments and channels listed in Table 4.2-1 correspond to those in Table 3.2.3-1, "Required Safety Channels" with the exception that surveillance of the building overpressure and gasket deflated scrams is addressed elsewhere (Specification 4.4).

Some of the calibration procedures for the wide-range neutron flux monitors that calculate period and neutron flux level require operation of the reactor. These are therefore deferrable until the reactor is operating.

The thermal power indication is calibrated at least annually and the signal from the linear power channel is compared against a heat balance at least monthly for any month that the reactor is operated above 1 MW. These actions are done under conditions of thermal equilibrium which, because of the MITR-II's heat capacity (especially that of the graphite reflector), occurs after 48 hours of steady-state operation.



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

SAFETY EVALU ATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 45

RENEWED FACILITY OPERATING LICENSE NO. R-37

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

MASSACHUSETTS INSTITUTE OF TECHNOLOGY REACTOR

DOCKET NO. 50-020

1.0 INTRODUCTION

By letter dated June 18, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20178A159), as supplemented by letter dated January 29, 2021 (ADAMS Accession No. ML21035A258), Massachusetts Institute of Technology (MIT, the licensee) applied for an amendment to Renewed Facility License No. R-37 for the MIT reactor (MITR). The license amendment request (LAR) proposed changes to technical specifications (TSs) 1.3.11 and 4.2 to allow deferral of select TS surveillances when the reactor is shut down.

2.0 REGULATORY EVALUATION

The U.S. Nuclear Regulatory Commission (NRC) staff evaluated the proposed changes based on the following regulations and guidance:

- Title 10 of the Code of Federal Regulations (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," Section 50.36, "Technical specifications," requires TSs to be included in utilization facility licenses, which includes research reactor licenses. 10 CFR 50.36(c)(3), "Surveillance requirements," requires that TSs include requirements to test, calibrate, or inspect to ensure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits (SLs), and that the limiting conditions for operation (LCOs) will be met.
- Section 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory
 actions eligible for categorical exclusion or otherwise not requiring environmental review," of
 10 CFR, identifies licensing, regulatory, and administrative actions eligible for categorical
 exclusion from the requirement to prepare an environmental assessment or environmental
 impact statement.
- NUREG-1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors: Format and Content," Appendix 14.1, "Format and Content of Technical Specifications for Non-Power Reactors" (ADAMS Accession No. ML042430055), provides guidance to applicants and licensees on preparing research

reactor license applications and TSs. Appendix 14.1 of NUREG-1537, Part 1, Section 4 "Surveillance Requirements" states that a surveillance may be deferred while the reactor is shut down provided the surveillance is not required for safety while the reactor is shut down.

- NUREG-1537, Part 2, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors: Standard Review Plan and Acceptance Criteria," Chapter 14, "Technical Specifications," (ADAMS Accession No. ML042430048), provides guidance for reviewing and evaluating the TSs submitted to the NRC by applicants for research reactor licenses and accepts the guidance in American National Standards Institute/American Nuclear Society (ANSI/ANS)-15.1-1990, "The Development of Technical Specifications for Research Reactors."
- American National Standards Institute/American Nuclear Society (ANSI/ANS)-15.1-2007, "The Development of Technical Specifications for Research Reactors," Section 4, "Surveillance Requirements," provides guidance used by the NRC staff, applicants, and licensees, for TS surveillance requirements. The 2007 version is a revision of the ANSI/ANS-15.1-1990 standard cited in NUREG-1537. Both versions of ANSI/ANS-15.1 state in section 4 "Surveillance requirements," that a TS surveillance should indicate whether it can be deferred while the reactor is shut down, and, if deferred, the TS surveillance should be performed prior to reactor operations. The NRC staff used the ANSI/ANS-15.1-1990 version, which is referenced in NUREG-1537 and uses terminology similar to that proposed in the LAR.

3.0 TECHNICAL EVALUATION

By letter dated June 18, 2020 (ADAMS Accession No. ML 20178A159), the licensee indicated that, due to the Coronavirus Disease 2019 (COVID-19) public health emergency, operation of the MITR was prohibited. As a result of the extended shutdown, the licensee indicated that some of the TS-required surveillances could not be performed without reactor operation, and proposed an additional TS definition TS 1.3.11, item c., to allow deferment of those surveillances requiring reactor operation. By letter dated January 29, 2021 (ADAMS Accession No. ML21035A258), the licensee modified the proposed change to TS 1.3.11.c and proposed a change to the Applicability statement in TS 4.2 to allow the deferral of TS 4.2.1, TS 4.2.6.a, and TS 4.2.6.b. The licensee also proposed to modify the Bases of TS 4.2, to be consistent with the proposed TS changes.

The proposed TS changes set forth below are denoted using **bold** to indicate addition.

3.1 <u>TS 1.3.11 "Frequency"</u>

TS Section 1.3, "Definitions," defines the terms used in the TSs. TS 1.3.11, "Frequency," states, "Each required surveillance test or other function shall be performed within the specified time interval with:"

Proposed TS 1.3.11.c, states:

c) Where indicated in the surveillance Technical Specifications, scheduled surveillances that cannot be performed while the reactor is shut down may be deferred until the next planned period of reactor operation. Such surveillances shall be performed as soon as practicable when reactor operation resumes. In its letter dated January 29, 2021, the licensee stated that the current MIT TS surveillance requirements do not allow deferral of any surveillances requiring reactor operation and which cannot be performed because the reactor is shutdown. The licensee proposed to add a new TS 1.3.11.c, to allow the deferral of those surveillances that require reactor operation.

In its letter dated June 18, 2020, the licensee indicated that the proposed new TS is consistent with the following guidance in NUREG-1537, Part 1, Appendix 14.1, Section 4, "Surveillance Requirements:" The licensee stated that Appendix 14.1, Section 4: allows deferral of surveillances that are not required for safety while the reactor is shut down, but requires performance of the surveillances before reactor startup, and requires the safety analysis report to clearly state the justification for deferral.

Additionally, the licensee quoted the following guidance from ANSI/ANS-15.1-2007, Section 4: "For each surveillance requirement (SR), it should be specified if the surveillance activity can or cannot be deferred during reactor shutdown. It should also be specified for those that can be deferred, which must be performed prior to reactor operations."

The NRC staff reviewed the proposed TS 1.3.11.c, and finds that it is consistent with the guidance in NUREG-1537, Part 1 and ANSI/ANS-15.1-1990, which indicates that the TSs should specify if surveillances can be deferred during reactor shut down, and, if deferred, the surveillances shall be performed as soon as practicable when reactor operation resumes. Further, the NRC staff finds that the requirement that the deferred surveillance be performed as soon as practicable limits reactor operation to the power level necessary to complete the surveillance and prevents operation for other purposes until the completion of each deferred surveillance. Based on the information provided above, the NRC staff finds the proposed TS 1.3.11.c acceptable.

3.2 TS 4.2 "Reactor Control and Safety System"

The objective of TS 4.2 is to ensure the reliability of the reactor control and safety systems. The applicability of TS 4.2 identifies the relevant surveillances.

The proposed TS 4.2, Applicability, states:

This specification applies to the surveillance of reactor control and safety systems. The surveillance requirements in specifications #1, #6a, and #6b of this section can be deferred during periods of reactor shutdown until the next planned period of reactor operation, in which case they shall be performed as soon as practicable when reactor operation resumes.

3.2.1 <u>TS 4.2.1 "Reactivity Worth of Control Devices"</u>

The proposed changes to TS 4.2.1 allow deferral of measuring the reactivity worth of the control devices (shim blades and regulating rod). The proposed changes are evaluated below.

TS 4.2.1, states:

<u>Reactivity Worth of Control Devices</u>: The integral and differential worths of the six shim blades and of the regulating rod shall be measured at least annually. Either calculations of the expected change or measurements shall be made upon changeout of an absorber

and upon changes in core configuration that involve a new type of fuel or a change in the total number of non-fueled positions.

In the LAR, the licensee stated that the surveillance related to TS 4.2.1 can only be performed while the reactor is operating because the surveillance involves measuring the neutron production rate doubling times (i.e., the time it takes the reactor power level to increase by a factor of two). The licensee also explained the following. The reactivity worth of the control devices (shim blades and regulating rod) changes while the reactor is operating due to the depletion of absorber isotopes by the absorption of neutrons within the control device. Because reactivity worth of the control devices changes very little while the reactor is shutdown as the neutron absorption is significantly reduced, the last measured reactivity worth can be used to accurately estimate the reactivity worth prior to operation for the period that the reactor has been shut down.

The NRC staff reviewed the licensee's proposed TS change to allow the deferral of the surveillance requirements for the reactivity worth of control devices, and finds that the licensee correctly concluded that the measurement of the reactivity worth of the control devices requires the presence of neutron flux, which only occurs during reactor operation. The NRC staff finds surveillances are not needed to maintain the guality of the control devices during shutdown because there is no significant change in reactivity worth and the neutron absorbing material in the shim blades and regulating rod will not be depleted from neutrons (and neutron absorption) associated with reactor operations. The NRC staff also finds that the proposed change to perform the surveillance as soon as practicable when reactor operations resumes is consistent with the guidance provided in NUREG-1537, Part 1, Appendix 14.1, which allows deferral of surveillances not needed for reactor safety during shutdown, and ANSI/ANS-15.1-1990, which indicates surveillances deferred during shutdown should be completed "as soon as practicable." Further, the NRC staff finds that the TS 1.3.11.c requirement to perform the deferred surveillance as soon as practicable ensures that the surveillances are to be conducted when the reactor reaches the thermal power level necessary to complete the rod worth measurement/calculation. In addition, it ensures that the reactor will not be operated for other purposes until the completion of the surveillances needed to determine the reactivity of the control devices as required by TS 3.2.2, "Reactivity Insertion Rates and Automatic Control." Based on the information provided above, the NRC staff finds the proposed change to defer the TS 4.2.1 surveillance requirement is acceptable.

3.2.2 <u>TS 4.2.6.a and b</u>

The proposed changes to TS 4.2.6 allow deferral of calibration and trip point verification of instruments that measure the reactor period and neutron flux levels. The proposed changes are evaluated in each section below.

TS 4.2.6 states, in part:

The following instruments shall be calibrated and trip points verified when initially installed, any time a significant change in indication is noted, and at least annually:

a) Period

- b) Neutron Flux Level
- ...

In the LAR, the licensee stated that the surveillance procedure used to verify that the calibration and trip setpoints for TS 4.2.6.a and TS 4.2.6.b can only be performed while the reactor is operating and generating sufficient neutron flux. The licensee also stated that its neutron performance verification procedures require the reactor to be operating at power in order to compare the operating neutron flux to an equilibrium thermal power using calorimetric calculations. Additionally, verification of acceptable performance of the neutron detectors requires the reactor operating at low power for determination of the detector discriminator setpoint, and at high power levels for testing of the fission chamber plateaus. Further, the licensee indicated that the nuclear instruments measuring reactor period and neutron flux level do not exhibit drastic performance changes or trip setpoint movement during the period when the reactor is shutdown, and any significant change or malfunction would be apparent in required pre-startup channel tests.

The NRC staff reviewed the licensee's proposed TS change to allow deferral of the surveillance requirements to calibrate, and verify trip points of, the instruments associated with the "Period" and "Neutron Flux Level," and finds that the licensee correctly concluded that reactor operation is necessary to perform the calibration and trip point verification of the instruments that provide "period" and "neutron flux level" scrams at setpoints required by TS 3.2.3, Table 3.2.3-1. The NRC staff also finds that calibration of the instruments necessitates that the reactor operates (i.e., it is not in shutdown as defined by TS 1.3.29) to obtain sufficient neutron flux to compare with the thermal power indication necessary for calibration. Additionally, the NRC staff finds that the surveillances are not necessary to maintain the quality of instruments that do not provide a safety function while the reactor is shut down and finds that reactor operation is necessary to determine detector discriminator values and voltage plateaus. Further, the NRC staff finds that the nuclear instrument performance is not expected to degrade significantly while the reactor is shut down because of minimal demands on the electronics and any such degradation would be identifiable during pre-startup channel tests conducted upon resumption of reactor operations. Finally, the NRC staff finds that performance of the surveillance as soon as practicable limits operation to the power level necessary to complete the surveillance and prevents reactor operation for other purposes until the completion of the deferred surveillances. Based on the information provided above, the NRC staff finds the proposed change to defer the surveillances required by TS 4.2.6.a and 4.2.6.b are acceptable.

3.3 Proposed Changes to TS Bases

The regulation at 10 CFR 50.36(a)(1) states that a summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the TSs. Consistent with 10 CFR 50.36(a)(1), the licensee submitted changes to TS 4.2 Bases as part of the LAR, that provide the reasons for the proposed TS.

Conclusion

The NRC staff reviewed the licensee's proposed TS changes to allow the deferral of the surveillance requirements for the trip setpoints and calibration of the reactor period and reactor neutron flux level. The NRC staff finds that the licensee correctly concluded that verification of proper operation requires the measurement of neutron fluxes that are only available during reactor operation, and insufficient when the reactor is shutdown. Further, the NRC staff finds that deferral of these surveillances when the reactor is shutdown meets the guidance provided in NUREG 1537, Part 1, Appendix 14.1, and ANSI/ANS-15.1-1990. The NRC staff also finds that including the requirement to perform the surveillance as soon as practicable when reactor operations resumes, continues to ensure the necessary quality of the reactivity control devices as required by 10 CFR 50.36(c)(3).

4.0 ENVIRONMENTAL CONSIDERATION

The proposed amendment would change surveillance requirements, including definitions related to those requirements. Pursuant to 10 CFR 51.22(b), no environmental assessment or environmental impact statement is required for any action within the category of actions listed in 10 CFR 51.22(c), for which the Commission declared to be a categorical exclusion by finding that the action does not individually or cumulatively have a significant effect on the human environment. The proposed change that would be authorized by the amendment is evaluated below.

The regulation in 10 CFR 51.22(c)(9), states, in part, that issuance of an amendment that changes a surveillance requirement meets the definition of a categorical exclusion, provided that, the proposed change satisfies each of 10 CFR 51.22(c)(9) criteria listed below:

(i) The amendment or exemption involves no significant hazards consideration; [10 CFR 51.22(c)(9)(i)]

Pursuant to 10 CFR 50.92, "Issuance of amendment" paragraph (c), the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility, in accordance with the proposed amendment, would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated [10 CFR 50.92(c)(1)]; or

The proposed license amendment would allow the licensee to defer surveillances (TS 4.2.1, TS 4.2.6.a, and TS 4.2.6.b) while the reactor is shut down because the surveillances are not needed to maintain the quality of an instrument safety function while the reactor is shut down and reactor operation is needed to perform the required calibration, setpoint verifications, and rod worth measurements. In the License Renewal safety evaluation report (ADAMS Accession No. ML102320082), Section 13.1, "Maximum Hypothetical Accident," the NRC staff evaluated the maximum hypothetical accident (MHA) that bounds all accidents at the facility and concluded that calculated doses would remain below the limits in 10 CFR 20.1201, "Occupational dose limits for adults," and 10 CFR 20.1301, "Dose limits for individual members of the public." The proposed changes do not alter any of the assumptions or limits used in postulating or evaluating the MHA because the MHA is not based on surveillance requirements. The instruments are not expected to degrade during the period while the surveillances can only be performed while the reactor is

operating because the neutron flux necessary to perform the calibration and trip setpoint verification does not occur when the reactor is shut down. In addition, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated because no changes are being proposed to reactor design or hardware, or to structures, systems, and components that are relied upon for accident detection, mitigation, or response. Further, the proposed amendment does not change the licensed power level of the reactor, fission product inventory, and or change any potential release paths from the facility. Therefore, the proposed amendment does not involve a significant increase in the probability or consequence of an accident previously evaluated.

(2) Create the possibility of a new of different kind of accident from any accident previously evaluated [10 CFR 50.92(c)(2)]; or

The proposed license amendment would allow deferral of surveillances, while the reactor is shut down. The proposed changes do not create a new or different kind of accident from any accident previously evaluated because there are no changes to any equipment that is relied upon for accident detection, mitigation, or response to an accident. In addition, the changes would not introduce any new accident scenarios, transient precursors, failure mechanisms, or limiting single failures, and there would be no adverse effect or challenges to any systems important to safety as a result of the proposed amendment. The proposed changes do not authorize any changes in the hardware, design, function, or operation of any equipment important to safety, or in the authorized reactor power level. Further, the proposed changes do not alter or decrease the functional capability of any equipment used for defense in depth or create any new radiological accident release pathways. Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) Involve a significant reduction in a margin of safety [10 CFR 50.92(c)(3)]

The proposed license amendment would allow deferral surveillances, while the reactor is shut down. The proposed changes do not authorize any changes in the design, function, or operation of any equipment important to safety, or in the authorized reactor power level. The proposed changes do not alter how SLs, limiting safety system settings, or LCO are determined and do not adversely affect existing facility safety margins or the reliability of equipment assumed to mitigate accidents in the facility. Additionally, the proposed changes do not alter or decrease the functional capability of any equipment used for defense in depth. Therefore, the proposed amendment does not involve a significant reduction in the margin of safety.

(ii) There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite; and [10 CFR 51.22(c)(9)(ii)].

The proposed license amendment would allow deferral of surveillances while the reactor is shut down. The proposed changes do not change the types of effluents that may be released offsite or cause any significant increase in the amount of radioactive material that could be released offsite because the existing requirements for monitoring and release of radioactive effluents are unchanged. TS 3.7, "Radiation Monitoring Systems, Effluents, Hot Cells, and Byproduct Material," continues to require "[a]t least one environmental monitor at the site and one within one quarter mile of the site shall be used to verify compliance with environmental dose limits." Annual releases from the facility must be controlled such that radiation dose (to a member of the public) will not exceed the dose limits in 10 CFR 20.1101, (10 millirem) and 10 CFR 20.1301, (100 millirem). The proposed amendment does not alter TS 4.7, "Radiation Monitoring Systems and Effluents," which requires periodic channel checks, tests, and calibrations of the radiation monitors. In addition, the reactor power level, the amount of radioactive material used, and the design of equipment important to safety are not changed. Therefore, there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

(iii) There is no significant increase individual or cumulative occupational radiation exposure. [10 CFR 51.22(c)(9)(iii)]

The proposed license amendment would allow the deferral of TS 4.2.1, 4.2.6.a, and 4.2.6.4 surveillances while the reactor is shut down and does not otherwise change the surveillance requirements. The proposed changes do not alter any technical or safety requirements for radiation monitoring at the facility or affect occupational radiation exposure. The reactor power level, the amount of radioactive material used, and the design of equipment important to the safety of the reactor are not changed. In addition, TS 7.3 "Radiation Safety," requires that the licensee Radiation Protection Program be designed to achieve the requirements of 10 CFR 20, including maintaining exposures as low as is reasonably achievable. Therefore, there is no significant increase in individual or cumulative occupational radiation exposure.

Based on the discussion above, the NRC staff concludes that the amendment meets the eligibility criteria for categorical exclusions set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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