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

May 26, 2020

Dr. J. David Robertson
Reactor Facility Director
University of Missouri-Columbia
Research Reactor Center
1513 Research Park Drive
Columbia, MO 65211

SUBJECT: UNIVERSITY OF MISSOURI-COLUMBIA - ISSUANCE OF AMENDMENT NO. 39 TO RENEWED FACILITY OPERATING LICENSE NO. R-103 TO AMEND TECHNICAL SPECIFICATIONS 1.26 AND 4.4 FOR THE UNIVERSITY OF MISSOURI – COLUMBIA RESEARCH REACTOR (EPID NO. L-2019-LLA-0280)

Dear Dr. Robertson:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 39 to Renewed Facility Operating License No. R-103 for the University of Missouri-Columbia Research Reactor (MURR). This amendment consists of changes to the renewed facility operating license and technical specifications (TSs), in response to the application dated December 12, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19350A574), as supplemented by letters dated March 10, and May 13, 2020 (ADAMS Accession Nos. ML20072H337 and ML20143A091, respectively). This amendment revises MURR TS 1.26, "Reactor Secured," and TS 4.4, "Reactor Containment Building."

A copy of the NRC staff's safety evaluation is also enclosed. If you have any questions please contact me at 301-415-0893, or by electronic mail at Geoffrey.Wertz@nrc.gov.

Sincerely,

/RA/

Geoffrey A. Wertz, 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. 50-186
License No. R-103

Enclosures:
1. Amendment No. 39 to Renewed Facility Operating License No. R-103
2. Safety Evaluation

cc: See next page

cc:

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Test, Research and Training
  Reactor Newsletter
Attention: Amber Johnson
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SUBJECT: UNIVERSITY OF MISSOURI-COLUMBIA - ISSUANCE OF AMENDMENT NO. 39 TO RENEWED FACILITY OPERATING LICENSE NO. R-103 TO AMEND TECHNICAL SPECIFICATIONS 1.26 AND 4.4 FOR THE UNIVERSITY OF MISSOURI – COLUMBIA RESEARCH REACTOR (EPID NO. L-2019-LLA-0280) DATED: MAY 26, 2020

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OFFICE	**NRR/DANU/UNPL/PM***	**NRR/DANU/UNPL/LA***	**OGC/NLO***	**NRR/DANU/UNPL/BC***	**NRR/DANU/UNPL/PM***
NAME	GWertz	NParker	MYoung	GCasto	GWertz
DATE	3/13/2020	3/12/2020	5/18/2020	5/26/2020	5/26/2020

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UNIVERSITY OF MISSOURI-COLUMBIA

DOCKET NO. 50-186

UNIVERSITY OF MISSOURI-COLUMBIA RESEARCH REACTOR

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 39
License No. R-103

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for an amendment to Renewed Facility Operating License No. R-103, submitted by the University of Missouri-Columbia (the licensee) on December 12, 2019, as supplemented on March 10, and May 13, 2020, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended, (the Act) and the Commission's rules and regulations 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 that (i) the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) such activities will be conducted in compliance with the regulations of the Commission 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. This amendment is issued in accordance with 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," of the Commission 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 a notice for this amendment is not required by 10 CFR 2.106, "Notice of issuance."

2. Accordingly, the license is amended by changes to the technical specifications as indicated in Attachment 2 to this license amendment, and paragraph 2.C.2 of Renewed Facility Operating License No. R-103 is hereby amended to read as follows:

   2. Technical Specifications

      The Technical Specifications contained in Appendix A, as revised by Amendment No. 39, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Greg A. Casto, 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 No. R-103
2. Changes to Appendix A, “Technical
   Specifications”

Date of Issuance: May 26, 2020

ATTACHMENT TO LICENSE AMENDMENT NO. 39

RENEWED FACILITY OPERATING LICENSE NO. R-103

DOCKET NO. 50-186

Replace the following page of the Renewed Facility Operating License No. R-103 with the revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Renewed Facility Operating License

Remove	Insert
4	4

2. Technical Specifications

The Technical Specifications contained in Appendix A, as revised by Amendment No. 39, are hereby incorporated in their entirety in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. Physical Security Plan

The licensee shall maintain and fully implement all provisions of the Commission-approved physical security plan, including changes made pursuant to the authority of 10 CFR 50.54(p). The approved physical security plan, entitled "Physical Security Plan for the University of Missouri Research Reactor," dated November 15, 2016, consists of documents withheld from public disclosure pursuant to 10 CFR 73.21.

This license is effective as of the date of issuance and shall expire at midnight, 20 years from the date of issuance.

For the Nuclear Regulatory Commission

/RA/

William M. Dean, Director
Office of Nuclear Reactor Regulation

Attachment:
Appendix A, Technical Specifications

Date of Issuance: January 4, 2017

ATTACHMENT TO LICENSE AMENDMENT NO. 39

RENEWED FACILITY OPERATING LICENSE NO. R-103

DOCKET NO. 50-186

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 to indicate the areas of change.

Technical Specifications

Remove	Insert
A-4	A-4
A-47	A-47

1 **DEFINITIONS** - Continued

1.23 **Reactor in Operation -** The reactor shall be considered in operation unless it is either shutdown or secured.

1.24 **Reactor Safety System -** The reactor safety system is that combination of sensing devices, electronic circuits and equipment, signal conditioning equipment, and electro-mechanical devices that serves to either effect a reactor scram, or activates the engineered safety features.

1.25 **Reactor Scram -** A reactor scram is the insertion of all four (4) shim blades (rods) by gravitational force as a result of removing the holding current from the shim rod drive mechanism electromagnets.

1.26 **Reactor Secured -** The reactor shall be considered secured when:

a. There is insufficient fuel in the reactor core to attain criticality with optimum available conditions of moderation and reflection with all four (4) shim blades (rods) removed,

OR

b. Whenever all of the following conditions are met:

(1) All four shim blades (rods) are fully inserted;

(2) One of the two following conditions exists:

i. The Master Control Switch is in the “OFF” position with the key locked in the key box or in custody of a licensed operator,

OR

ii. The dummy load test connectors are installed on the shim rod drive mechanisms and a licensed operator is present in the reactor control room;

(3) No work is in progress involving the transfer of fuel in or out of the reactor core;

(4) No work is in progress involving the shim blades (rods) or shim rod drive mechanisms unless the shim rod drive mechanisms are physically decoupled from the shim blades (rods), with the exception of installing or removing the dummy load test connectors; and

(5) The reactor pressure vessel cover is secured in position and no work is in progress on the reactor core assembly support structure.

4.4 Reactor Containment Building

Applicability:
This specification applies to the surveillance requirements on the containment system.

Objective:
The objective of this specification is to reasonably assure proper operation of the containment system.

Specification:

a. The reactor containment building leakage rate shall be measured biennially, plus or minus four (4) months. The test shall be performed by the make-up flow, pressure decay, or reference volume techniques. No repairs or modifications shall be performed just prior to the test.

b. The reactor containment building leakage rate shall be measured following any modification or repair that could affect the leak-tightness of the building.

c. The containment actuation (reactor isolation) system, including each of its radiation monitors, shall be tested for operability at monthly intervals.

d. When required by Specification 3.4.b, containment integrity shall be verified to exist within a shift.

Bases:

a. Annual measurement of the containment building leakage rate has proven adequate to ensure that the leakage rate of the structure will remain within the design limits outlined in Specification 5.5.c. No repairs or modifications will be performed prior to the test so that the results demonstrate the historic integrity of the containment structure.

b. Measurement of the containment building leakage rate following any modification or repair that could affect the leak-tightness of the building ensures that the leakage rate of the structure will remain within the design limits outlined in Specification 5.5.c.

c. The reliability of the containment actuation (reactor isolation) system has proven that monthly verification of its proper operation is sufficient to assure operability.

d. Specification 4.4.d assures that containment integrity is verified to exist to limit the leakage of contained potentially radioactive air in the event of any reactor accident to ensure exposures are maintained below the limits of 10 CFR 20.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 39 TO

RENEWED FACILITY OPERATING LICENSE NO. R-103

UNIVERSITY OF MISSOURI-COLUMBIA

UNIVERSITY OF MISSOURI-COLUMBIA RESEARCH REACTOR

DOCKET NO. 50-186

1.0 INTRODUCTION

By letter dated December 12, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19350A574), as supplemented by letters dated March 10, and May 13, 2020 (ADAMS Accession Nos. ML20072H337 and ML20143A091, respectively), the University of Missouri-Columbia (the licensee) submitted a license amendment request (LAR) to amend its Appendix A of Renewed Facility Operating License No. R-103, "Technical Specifications for the University of Missouri Research Reactor [MURR]." Specifically, the licensee proposes to:

1. revise Technical Specification (TS) 1.26, "Reactor Secured," section b.(4), to provide an exception to the definition of reactor secured such that the reactor can be considered secured if the shim rod drive mechanisms (SRDMs) are physically decoupled from the shim blades (rods); and

2. revise TS 4.4, "Reactor Containment Building," Specification a, to change the periodicity of the reactor containment building leakage rate measurement from annually to biennially.

2.0 REGULATORY EVALUATION

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the licensee's LAR and evaluated the proposed TS changes based on the regulations and guidance in:

- Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," Section 50.36, "Technical specifications," which provides the requirements for TSs to be included in facility operating licenses, including research reactor licenses. The regulation, 10 CFR 50.36(c)(3), "Surveillance requirements," includes requirements to test, calibrate, or inspect 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.

- 10 CFR Part 20, "Standards for Protection against Radiation," Section 20.1201, "Occupational Dose Limits for Adults," and Section 1301, "Dose Limits for Individual Members of the Public," provide dose limits for occupational workers and members of the public.

- 10 CFR 51.22, “Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review,” which 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,” Chapter 14, Appendix 14.1, “Format and Content of Technical Specifications for Non-Power Reactors;” Section 1.3, “Definitions;” and Section 4.4.1, “Containment,” (ADAMS Accession No. ML042430055), which provides guidance to licensees preparing research reactor applications and TSs.

- 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 Specification,” (ADAMS Accession No. ML042430048), which provides guidance to the NRC staff for performing reviews of proposed TSs.

- American National Standards Institute/American Nuclear Society (ANSI/ANS)-15.1-2007 (Reaffirmed [R] 2013), “The Development of Technical Specifications for Research Reactors,” Section 1.3, “Definitions,” “Reactor Secured,” and Section 4.4.1, “Containment,” which provides guidance, used by the NRC staff, including definitions, parameters and operating characteristics of a research reactor that should be included in the TSs. The 2007 version is a revision of the ANSI/ANS-15.1-1990 (R1999) standard that was cited in NUREG-1537, issued in 1996. Sections 1.3 and 4.4.1 of ANSI/ANS-15.1-2007 (R2013) are identical to the 1990 (R1999) version. Because the two versions are identical, the NRC staff find its acceptable to use the version of ANSI/ANS-15.1-2007 (R2013) cited by the licensee in its application.

3.0 TECHNICAL EVALUATION

The proposed TS changes are denoted using ~~strikeout~~ to indicate deletion and **bold** to indicate addition.

3.1 TS 1.26, “Reactor Secured”

The current TS 1.26 b.(4) states that the reactor shall be considered secured when:

> (4) No work is in progress involving the shim blades (rods) or shim rod drive mechanisms with the exception of installing or removing the dummy load test connectors; and

The proposed TS 1.26 b.(4) states:

> (4) No work is in progress involving the shim blades (rods) or shim rod drive mechanisms **unless the shim rod drive mechanisms are physically decoupled from the shim blades (rods),** with the exception of installing or removing the dummy load test connectors; and

In its LAR, the licensee states that it currently uninstalls (i.e., removes the SRDMs from the upper housing located above the reactor core) and relocates the SRDMs to the Instrumentation Support Shop (ISS) to perform corrective and preventative maintenance. The current definition of TS 1.26.b.(4) does not allow the reactor to be considered "secured" if work is being performed on the shim control blades or SRDMs, even if they have been removed from their position in the reactor upper housing and relocated to the ISS, because the licensee cannot satisfy the requirement in TS 3.4, "Reactor Containment Building," Specification b.(1), which states, "Reactor containment integrity shall be maintained at all times except when: (1) The reactor is secured."

The proposed change to TS 1.26.b.(4) would add an exception to the condition of reactor secured in TS 1.26.b.(4) that would allow the reactor to be considered "secured" if the SRDMs are decoupled from their associated shim control blades. Thus, the licensee would be able to satisfy TS 3.4.b.(1) and would not have to maintain reactor containment integrity while the SRDMs physically decoupled from the shim control blades.

In its LAR, the licensee states that the TS 1.26 definition of "reactor secured" helps to ensure that the reactor core and its support equipment are in a condition where inadvertently attaining criticality is not possible. TS 1.26 requires either insufficient fuel in the reactor core to attain criticality with optimum available conditions of moderation and reflection and with all four (4) shim blades removed (as stated in TS 1.26.a), or the four (4) shim blades are fully inserted and the SRDMs are in a condition to preclude the withdrawal of any of the four (4) shim blades, and other conditions not related to shim blades and SRDMs (as stated in TS 1.26.b). Further, the licensee states that the only component that can physically move the shim control blade is the SRDM using an energized electromagnet to couple the shim control blade to the SRDM. If the SRDM is electrically disconnected (de-energized) so that no electrical current can flow through the SRDM electromagnet, the SRDM can no longer change the position of the shim control blade (withdraw) because it is physically decoupled from the control blade. Even if the SRDM remains installed in its normal location in the offset mechanism upper housing above the reactor, de-energizing the electromagnet will disable the SRDM from shim control blade movement. Further, the licensee states that if the SRDM is removed or uninstalled from its position above the reactor core in the offset mechanism upper housing, there is no mechanical means to move the shim control blade under any circumstance.

In its LAR, the licensee also states that the proposed change to TS 1.26 is consistent with the definition of "reactor secured" in the guidance in ANSI/ANS-15.1-2007 (R2013), Section 1.3 which states:

> (c) No work is in progress involving core fuel, core structure, installed control rods, or control rod drives unless they are physically decoupled from the control rods;

The NRC staff reviewed the proposed TS change that would allow the reactor to be considered "secured" if the SRDMs are decoupled from the shim control blades. The NRC staff finds this proposed TS change is consistent with the guidance provided in NUREG-1537, Part 1, Chapter 14, Appendix 14.1, Section 1.3, which endorses ANSI/ANS-15.1-1990 (R1999), Section 1.3, "reactor secured." Although the license quoted the most recent version of ANSI/ANS-15.1-2007 (R2013), the definition of "reactor secured" remains unchanged.

The NRC "Safety Evaluation Report, Renewal of the Facility Operating License for the University of Missouri-Columbia Research Reactor," (License Renewal SER), dated January 4, 2017 (ADAMS Accession No. ML16124A887) documents the NRC staff's evaluation of the licensee's facility for continued operation. In order verify that the shim control blades cannot move if they are decoupled from the SRDMs, the NRC staff reviewed the design as stated in its recent License Renewal SER. The License Renewal SER Section 7.3, "Reactor Control System," states that when "power is not available to the control rod drive mechanisms [SRDM] or to the control rod magnets … it is impossible to withdraw the [shim] control [blades] rods." Because the design of the shim blades allows the blades to be withdrawn only when the electromagnet connecting the SRDM is energized, the NRC staff finds that when the SRDMs are physically decoupled (electromagnet de-energized), the SRDM can no longer change the position of its shim control blade. Therefore, the NRC staff finds that the design of the facility prevents inadvertent movement of the shim blades when the SRDM is uninstalled or removed from its position above the reactor core, in the offset mechanism upper housing, and this design feature provides assurance that the reactor will remain secured when the SRDMs are decoupled and removed for maintenance.

Conclusion

Based on the information above, the NRC staff finds that the proposed TS change is consistent with the guidance provided in NUREG-1537 and ANSI/ANS-15.1-2007 (R2013). Also, the NRC staff finds that the design of the shim blades does not allow for the SRDM to change the position of its shim control blade when physically decoupled. On this basis, the NRC staff finds the proposed change to TS 1.26 b.(4) acceptable.

3.2 TS 4.4, "Reactor Containment Building"

The current TS 4.4.a. states:

a. The reactor containment building leakage rate shall be measured annually, plus or minus four (4) months. The test shall be performed by the make-up flow, pressure decay, or reference volume techniques. No repairs or modifications shall be performed just prior to the test.

The proposed TS 4.4.a. states:

a. The reactor containment building leakage rate shall be measured ~~annually~~ **biennially**, plus or minus four (4) months. The test shall be performed by the make-up flow, pressure decay, or reference volume techniques. No repairs or modifications shall be performed just prior to the test.

In its LAR, the licensee proposes to change the periodicity of the reactor containment building leakage rate measurement from annually to biennially in TS 4.4.a. Further, the licensee indicated that measuring the reactor containment building leakage rate biennially is sufficient to reasonably assure proper operation of the containment system, thereby assuring that reactor containment integrity is maintained, as required by TS 3.4, so that the health and safety of the public is assured.

The licensee also referenced the following guidance provided in ANSI/ANS-15.1-2007 (R2013), Section 4.4.1, "Containment," item (2), which states: "Integrated leak rate test: Annually to biennially." In its LAR, the licensee states that the proposed increase in testing periodicity will reduce the adverse effects on reactor instrumentation, reactor equipment and the reactor containment building due to the high pressure and humidity that are necessary to increase containment pressure to perform the test. The licensee also indicates that the undue stress on the containment building from the leakage testing could increase containment building leakage. The licensee states that since calendar year (CY) 1978, MURR has used the make-up flow technique at 1.0 pound per square inch gauge (psig) to measure the reactor containment building leakage rate. During the performance of this test, steam is introduced into the containment building to raise the relative humidity above 90 percent in order to reduce the evaporation rate of reactor pool water, which affects the accuracy of the test. Although steam is secured prior to starting the measurements, the relative humidity in the containment building remains greater than 80 percent for the duration of the test, which totals approximately 10 hours. In addition, the 1.0 psig air pressure is maintained for 6-8 hours during the test. Therefore, all electric motors, relays, switches, meters, radiation detectors, and other electronic instrumentation and control equipment, as well as computers that are left in the containment building, must withstand the high humidity and pressure condition for several hours. The high humidity level creates a sticky film on surfaces including electrical contact faces. The high-pressure condition forces moisture into detector and motor enclosures, and it may take several hours or days for the humidity level inside those enclosures to return to normal levels. There are a few select nuclear instrumentation drawers that are removed prior to conducting the test due to their sensitivity to higher-than-normal humidity; however, it would be impractical and impossible to remove all of the electrical equipment that could be affected during the test from the containment building. The licensee suspects that the high humidity and pressure condition may have contributed to equipment failures that occurred after the leakage rate test in years 2006, 2013, 2018, and 2019. Most of these equipment failures eventually caused unscheduled shutdowns of the reactor.

To support its position that the increase in testing periodicity will not adversely affect the containment integrity, the licensee provides historical data for the containment building leak rate surveillance tests conducted from CY 2007 through CY 2019. The reactor containment building leakage rates ranged from 9.5 to 12.2 standard cubic feet per minute (scfm), which were all well below the limit of 16.3 scfm required by TS 5.5.c. No containment failures have occurred during this period.

Further, the license performs post-measurement analysis following each reactor containment building leakage test to identify any upward trends in the leakage rate compared to the previous (prior year) measurement and evaluates the slope of any increase in leakage rate. The leakage data is then extrapolated based on that slope to ensure the subsequent year's leakage rate will fall well below the Specification 5.5.c limit.

In addition to measuring reactor containment building leakage rate, the licensee states that it conducts preventive maintenance procedure BCI-QI, “Containment Doors Gasket Inspection,” on a quarterly basis to help identify any potential sealing surface defects prior to the sealing surface degrading to a point of significantly affecting containment building leakage rate.

The NRC staff reviewed the proposed TS change using the guidance in provided in NUREG-1537, Part 1, Chapter 14, Section 14.1, Section 4.4.1, “Containment,” which endorses the guidance in ANSI/ANS-15.1-1990 (R1999), Section 4.4.1, “Containment,” item (2), which states that the integrated leak rate test can be performed “annually to biennially.” As stated in Section 2 of this safety evaluation, the most recent version of ANSI/ANS-15.1-2007 (R2013), Section 4.4.1, “Containment,” item (2), remains unchanged.

The NRC staff also reviewed the licensee's past reactor containment building leak rate data described above and finds that the licensee's past measured leakage rates are consistently well below the TS 5.5 c. limit of 16.3 scfm. Additionally, the NRC staff finds that the leakage rate data from CY 2007 to CY 2019 indicates a decreasing leakage trend which indicates an improvement in the integrity of the reactor containment building. Further, the NRC staff finds that the licensee performs routine preventive maintenance procedure BCI-QI, "Containment Doors Gasket Inspection," on containment door seals to ensure proper sealing function is maintained throughout the period between reactor containment building leakage tests.

Conclusion

Based on the information described above, the NRC staff finds that the proposed biennial measurement of the reactor containment building leakage rate is consistent with the guidance provided in NUREG-1537 and ANSI/ANS-15.1-2007 (R2013) and is sufficient to ensure reactor integrity is maintained. Also, the NRC staff finds that the licensee's past performance of the reactor containment building leakage test demonstrated the licensee's capability to effectively manage containment integrity well below the TS limit for the past 13 years, and that containment leak rates are not likely to be exceeded during the extended surveillance interval. Therefore, the NRC staff finds the proposed change to TS 4.4.a acceptable.

4.0 ENVIRONMENTAL CONSIDERATION

The proposed amendment would change requirements with respect to installation or use of a facility component. 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 has declared to be a categorical exclusion by finding that the action does not individually or cumulatively have a significant effect on the human environment. Each of the proposed TS changes that would be authorized by the amendment are evaluated below.

The regulation in 10 CFR 51.22(c)(9), states, in part, that issuance of an amendment that changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined by 10 CFR Part 20, "Standards for Protection against Radiation," 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(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 amendment, would not:

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

The proposed change to TS 1.26.b.(4) would allow the reactor to be considered "secured" and allow work to be conducted on SRDMs if the SRDMs are physically decoupled from the shim control blades. The decoupled shim control blade will remain in the fully inserted position in the core and provide the most negative reactivity to maintain the reactor core in a sub-critical (shutdown) condition. The proposed change to TS 4.4.a would increase the periodicity of the reactor containment building leakage rate test from annually to biennially, but would not affect the reactor containment building integrity due to the successful results of leak rate testing done for the past 13 years, the licensee's procedure that requires preventive maintenance to be performed quarterly on containment door gaskets, and the reduction in stress on the building associated with the increased surveillance interval.

In License Renewal SER, Section 13.1, "Maximum Hypothetical Accident—Failed Fueled Experiment," the NRC staff evaluated the postulated maximum hypothetical accident (MHA) that bounds all accidents at the facility and assumes that the release of fission products from a failed fuel experiment to the unrestricted environment results in radiological consequences and concluded that calculated doses would remain below the limits in 10 CFR 20.1201 for occupational workers, and 20.1301 for individual members of the public. The proposed change does not alter any of the assumptions or limits used in postulating or evaluating the MHA. Further, 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 (SSCs) that are relied upon for accident detection, mitigation, or response. In addition, 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. Further, TS 3.4, "Reactor Containment Building," continues to impose requirements to ensure that the integrity of the reactor containment building is maintained when the potential for a radiological release exists. Licensee leak test results demonstrate that the integrity of the reactor containment building has been maintained well below the requirement of TS 5.5 c. of 16.3 scfm during the past 13 CYs. Therefore, the NRC staff concludes that there is no significant increase in the probability or consequences of an accident previously evaluated.

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

Proposed TS 1.26 b.(4) would allow the reactor to be considered "secured" when SRDMs are decoupled from the shim control blades, which is accomplished by de-energizing the associated electromagnet between the two components, and allow work to be performed on the decoupled SRDMs. De-energized components are readily verified by loss of electrical power, and the inability to change position reduces the probability of an inadvertent reactivity accident when work is performed. The proposed change to TS 4.4.a, would increase the periodicity of the reactor containment building leakage rate test from annually to biennially, but would maintain reactor containment building integrity due to the results of leak rate testing done for the past 13 years, the licensee's procedure that requires preventive maintenance to be performed quarterly on containment door gaskets, and the reduced stress on the building associated with the increased surveillance interval. The reactor containment building leakage rate test is performed when the potential for a radiological release is not possible because the reactor is shutdown, and sensitive equipment has been removed from the reactor containment to prevent damage from high humidity effects.

The TS 1.26.b.(4) and TS 4.4.a changes do not create a new or different kind of accident from any accident previously evaluated because there are no changes to

SSCs that are 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 reactor safety-related systems as a result of the proposed amendment. Therefore, the 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)]

Proposed TS 1.26.b.(4) would allow the reactor to be considered secured when SRDMs are decoupled from the shim control blades. Decoupling the SRDMs from the shim control blades eliminates the possibility that a shim control blade could inadvertently be withdrawn from the reactor because the SRDM provides the only motive force for shim control blade withdrawal movement. The proposed change to TS 4.4.a, would increase the periodicity of the reactor containment building leakage rate test from annually to biennially. As stated above, TS 3.4 continues to impose requirements to ensure that the integrity of the reactor containment building is maintained at all times when the potential for a radiological release exists. Further, the results of licensee testing during the past 13 years demonstrate that the integrity of the reactor containment building has been maintained well below the 16.3 scfm limit in TS 5.5.c.

The proposed changes do not authorize any changes in SSCs design, function, operation, or in authorized reactor power levels. The proposed amendment does not alter how safety limits, limiting safety system settings, or limiting conditions for operation are determined and does not adversely affect existing facility safety margins or the reliability of equipment assumed to mitigate accidents in the facility. The proposed changes do not affect the capability of the SRDMs to safely shut down the reactor and to maintain it in a safe shutdown condition. Additionally, the proposed changes do not alter or decrease the functional capability of any SSCs used for defense in depth. Therefore, the proposed amendment does not involve a significant reduction in the margin of safety.

Based on the above, the NRC staff concludes that the proposed amendment involves no significant hazards consideration.

(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 change to TS 1.26 b.(4) would allow work to be done on SRDMs and the reactor to be considered "secured" if the SRDMs are physically decoupled from the shim control blades, which prevents inadvertent movement of the shim control blades. The proposed change to TS 4.4.a, would increase the periodicity of the reactor containment building leakage rate test from annually to biennially, but would not adversely affect containment building integrity or change any release limits. TS 3.7, "Radiation Monitoring Systems and Airborne Effluents," continues to require that annual releases from the facility do not result in a radiation dose (to a member of the public) in excess of the annual dose limits in 10 CFR 20.1101, "Radiation protection programs," (10 millirem) and 10 CFR 20.1301, "Dose limits for individual members of the public," (100 millirem). The reactor power level, the amount of radioactive material used, and the design of reactor SSCs are not changed. Therefore, the NRC staff finds that there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite because the proposed change does not affect the offsite radiological material released from the facility.

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

The proposed change to TS 1.26 b.(4) would allow the reactor to be considered secured and for maintenance work to be performed on the SRDMs when the SRDMs are physically decoupled from the shim control blades, which prevents inadvertent movement of the shim control blades. The proposed change to TS 4.4.a, would increase the periodicity of the reactor containment building leakage rate test from annually to biennially, but would not adversely affect containment building integrity. Proposed TS 1.26 b.(4) and TS 4.4.a do not change existing requirements for individual or cumulative occupational radiation exposure. Additionally, the licensee's radiation safety program has effectively controlled radioactive material exposure as required in TS 6.3, "Radiation Safety," to prevent exposures that exceed the dose limits of 10 CFR Part 20 and the release limits in Table 2 of Appendix B to Part 20. Further, facility radiation protection program requirements, including the TS requirement to keep doses as low as reasonably achievable, remain unchanged. Therefore, there is no significant increase in individual or cumulative radiation exposure.

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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