



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

June 8, 2021

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

**SUBJECT: THE CURATORS OF THE UNIVERSITY OF MISSOURI – ISSUANCE OF
AMENDMENT NO. 40 TO RENEWED FACILITY OPERATING LICENSE
NO. R-103 FOR THE UNIVERSITY OF MISSOURI – COLUMBIA RESEARCH
REACTOR RE: CHANGES TO TECHNICAL SPECIFICATIONS 6.2 AND 6.4
(EPID NO. L-2021-NFA-0002)**

Dear Dr. Robertson:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 40 to Renewed Facility Operating License No. R-103 for the University of Missouri – Columbia Research Reactor (MURR). The amendment consists of changes to the renewed facility operating license and technical specifications (TSs), in response to the application dated March 16, 2021 (Agencywide Documents Access and Management System Accession No. ML21075A292). The amendment revises MURR TS 6.2, "Review and Audit," to require that the biennial audit of the Emergency Plan include the Emergency Plan implementing procedures, and TS 6.4, "Procedures," to remove the required annual procedure review by the Reactor Manager and the Reactor Health Physics Manager.

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,

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. 40 to Renewed
Facility Operating License No. R-103
2. Safety Evaluation

cc: See next page

cc:

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Attention: Amber Johnson
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SUBJECT: THE CURATORS OF THE UNIVERSITY OF MISSOURI – ISSUANCE OF
AMENDMENT NO. 40 TO RENEWED FACILITY OPERATING LICENSE
NO. R-103 FOR THE UNIVERSITY OF MISSOURI – COLUMBIA RESEARCH
REACTOR RE: CHANGES TO TECHNICAL SPECIFICATIONS 6.2 AND 6.4
(EPID NO. L-2021-NFA-0002) DATED: JUNE 8, 2021

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ADAMS Accession No.: ML21098A199**NRR-058**

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DATE	4/9/2021	4/9/2021	5/18/2021	6/8/2021	6/8/2021

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UNITED STATES
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WASHINGTON, D.C. 20555-0001

THE CURATORS OF THE UNIVERSITY OF MISSOURI

DOCKET NO. 50-186

UNIVERSITY OF MISSOURI – COLUMBIA RESEARCH REACTOR

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 40
License No. R-103

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to Renewed Facility Operating License No. R-103, by the Curators of the University of Missouri (the licensee) dated March 16, 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 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 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. 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 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 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-103 is hereby amended to read as follows:

2. Technical Specifications

The Technical Specifications contained in Appendix A, as revised by Amendment No. 40, 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

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 No. R-103
2. Changes to Appendix A, "Technical
Specifications"

Date of Issuance: June 8, 2021

ATTACHMENT TO LICENSE AMENDMENT NO. 40

RENEWED FACILITY OPERATING LICENSE NO. R-103

DOCKET NO. 50-186

Replace the following page of 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

4

Insert

4

2. Technical Specifications

The Technical Specifications contained in Appendix A, as revised by Amendment No. 40, 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. 40

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

A-69

A-70

Insert

A-69

A-70

6.2 Review and Audit - Continued

- iii. Corrective Action items associated with reactor safety, at least annually; and
 - iv. Emergency Plan and implementing procedures, at least every two (2) years.
- (2) Audit findings which affect reactor safety shall be immediately reported to the Reactor Facility Director. A written report of the findings shall be submitted to the Reactor Facility Director, the RAC and its subcommittees within three (3) months after the audit has been completed.

6.3 Radiation Safety

- a. The Reactor Health Physics Manager shall be responsible for the implementation of the Radiation Protection Program. The requirements of the Radiation Protection Program are established in 10 CFR 20. The program should use the guidelines of American National Standard "Radiation Protection at Research Reactor Facilities," ANSI/ANS-15.11-1993 (R2004).

6.4 Procedures

- a. Written procedures shall be in effect for operation of the reactor, including the following:
 - (1) Startup, operation, and shutdown of the reactor;
 - (2) Fuel loading, unloading and movement within the reactor;
 - (3) Maintenance of major components of systems that could have an effect on reactor safety;
 - (4) Surveillance checks, calibrations and inspections that may affect reactor safety;
 - (5) Administrative controls for operations and maintenance and for the conduct of irradiations and experiments that could affect reactor safety or core reactivity; and
 - (6) Implementation of the Emergency and Physical Security Plans.
- b. Written procedures shall be in effect for radiological control, and the preparation for shipping and the shipping of byproduct material produced under the facility operating license.

6.4 Procedures - Continued

- c. The Reactor Manager shall approve the procedures for normal operations of the reactor and the Emergency Plan implementing procedures. The Reactor Health Physics Manager shall approve the radiological control procedures and the procedures for the preparation for shipping and the shipping of byproduct material.
- d. Deviations from procedures required by this Specification may be enacted by a Senior Reactor Operator or member of Reactor Health Physics, as applicable. Such deviations shall be documented, reviewed pursuant to 10 CFR 50.59, and reported within 24 hours or the next working day to the Reactor Manager or Reactor Health Physics Manager or designated alternate.

6.5 Experiment Review and Approval

- a. Approved experiments shall be carried out in accordance with established and approved procedures. Procedures related to experiment review and approval shall include the following:
 - (1) All new experiments or class of experiments shall be reviewed by the RAC and approved in writing by the Reactor Manager.
 - (2) Substantive changes to previously approved experiments shall be made only after review by the RAC and approved in writing by the Reactor Manager.

6.6 Reportable Events and Required Actions

- a. Safety Limit Violation - In the event of a safety limit violation, the following actions shall be taken:
 - (1) The reactor shall be shut down and reactor operation shall not be resumed until authorized by the NRC pursuant to 10 CFR 50.36(c)(1);
 - (2) The safety limit violation shall be promptly reported to the Reactor Manager and Reactor Facility Director, or designated alternates;
 - (3) The safety limit violation shall be promptly reported to the NRC. Prompt reporting of the violation shall be made by MU, by telephone and subsequently confirmed in writing or email, to the NRC Operations Center no later than the following working day;
 - (4) A detailed follow-up report shall be prepared. The report shall include the following:



UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 40 TO

RENEWED FACILITY OPERATING LICENSE NO. R-103

THE CURATORS OF THE UNIVERSITY OF MISSOURI

UNIVERSITY OF MISSOURI – COLUMBIA RESEARCH REACTOR

DOCKET NO. 50-186

1.0 INTRODUCTION

By letter dated March 16, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21075A292), the Curators of the University of Missouri (MURR, 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." Specifically, the licensee proposes to:

1. revise technical specification (TS) 6.2, "Review and Audit," Section e.(1)iv, to require that the biennial audit of the Emergency Plan include the Emergency Plan implementing procedures; and
2. revise TS 6.4, "Procedures," Section c, to remove the requirement that an annual procedure review be completed by the Reactor Manager and the Reactor Health Physics Manager.

2.0 REGULATORY EVALUATION

The U.S. Nuclear Regulatory Commission (NRC) staff evaluated the proposed TS 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)(5), "Administrative controls," includes the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner.

- 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 6.2.4, "Audit Function;" and Section 6.4, "Procedures," (ADAMS Accession No. ML042430055), provides guidance to licensees for 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), provides guidance to the NRC staff for performing reviews of proposed TSs. NUREG-1537 accepts the guidance in American National Standards Institute/ American Nuclear Society (ANSI/ANS)-15.1-1990, "The Development of Technical Specifications for Research Reactors."
- ANSI/ANS-15.1-2007 (Reaffirmed [R] 2013), Section 6.2.4, "Audit function," and Section 6.4, "Procedures," 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 standard that was cited in NUREG-1537, issued in 1996. Because the relevant sections of 6.2.4 and 6.4 of ANSI/ANS-15.1-2007 (R2013) are identical to the 1990 version, the NRC staff used ANSI/ANS-15.1-2007 (R2013) to review this amendment application.

3.0 TECHNICAL EVALUATION

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

3.1 TS 6.2, "Review and Audit"

TS 6.2, "Review and Audit," section e(1), requires that audits of specific functions be conducted, including the Emergency Plan.

The current TS 6.2 e.(1)iv. requires an audit of:

- iv. Emergency Plan, at least every two (2) years.

The proposed TS 6.2 e.(1)iv. would require an audit of:

- iv. Emergency Plan **and implementing procedures**, at least every two (2) years.

In the LAR, the licensee proposed that the required biennial audit of the Emergency Plan include the Emergency Plan implementing procedures. The licensee states that adding the

Emergency Plan implementing procedures to this TS will help to ensure a consistent audit review periodicity for both the Emergency Plan and its implementing procedures. The licensee also stated that a list of all Emergency Plan implementing procedures is contained in Appendix B of the MURR Emergency Plan. The licensee referenced ANSI/ANS-15.1-2007 (R2013), Section 6.2.4, "Audit function," which states that the facility emergency plan and implementing procedures shall be audited at least once every other calendar year.

The NRC staff reviewed the proposed change using the guidance provided in NUREG-1537, Part 1, Chapter 14, Appendix 14.1, Section 6.2.4, which states, in part, that the emergency plan should be specified for auditing. Section 6.2.4 of ANSI/ANS-15.1-2007 (R2013) is consistent with the guidance accepted in NUREG-1537 and specifies that the facility emergency plan and implementing procedures shall be audited at least once every other calendar year. The NRC staff finds that the proposed change is consistent with the guidance in NUREG-1537 and ANSI/ANS-15.1-2007 (R2013) because the emergency plan and implementing procedures are specified for auditing with the recommended periodicity. Therefore, the NRC staff concludes that the proposed change to TS 6.2 e.(1)iv. is acceptable.

3.2 TS 6.4, "Procedures"

The current TS 6.4.c. states:

- c. The Reactor Manager shall approve and annually review the procedures for normal operations of the reactor and the Emergency Plan implementing procedures. The Reactor Health Physics Manager shall approve and annually review the radiological control procedures and the procedures for the preparation for shipping and the shipping of byproduct material.

The proposed TS 6.4.c. states:

- c. The Reactor Manager shall approve ~~and annually review~~ the procedures for normal operations of the reactor and the Emergency Plan implementing procedures. The Reactor Health Physics Manager shall approve ~~and annually review~~ the radiological control procedures and the procedures for the preparation for shipping and the shipping of byproduct material.

In the LAR, the licensee proposed removing the requirement that the Reactor Manager annually review the normal reactor operating and Emergency Plan implementing procedures and that the Reactor Health Physics Manager annually review the radiological control and shipping-related procedures. The licensee stated that the removal of the annual procedure review will reduce the administrative burden of reviewing the facility's well-developed, time-tested procedures. The licensee indicated that MURR staff could not identify any instance where the annual procedure review resulted in a substantive change to the procedures. The licensee explained that changes stemming from the annual reviews are grammatical, editorial, and/or formatting changes that do not alter the technical direction that guide operator or technician tasks, and substantive changes to procedures are initiated by modifications to the facility and equipment, component replacements, or facility corrective actions.

The licensee stated that MURR administrative procedure AP-RR-015, "Work Control Procedure," and AP-RO-115, "Modification Records," ensure maintenance, operating, and other procedures are updated prior to completing and closing a Work Package or Modification Record, and AP-RR-001, "Corrective Action Program," ensures that procedures are revised

prior to closing a corrective action program report where the corrective action included a procedure revision. The licensee also stated that administrative procedure AP-DC-100, "Controlled Document Process," prescribes the process for initiating other changes, preparing drafts, reviewing, and approving facility controlled documents, and that all procedures listed in TS 6.4.a and 6.4.b are facility controlled documents. The licensee stated that review in accordance with the administrative procedures is sufficient to assure the continued effectiveness of facility procedures.

The licensee noted that NUREG-1537, Part 1, Chapter 14, Appendix 14.1, Section 6.4, and ANSI/ANS-15.1-2007 (R2013), Section 6.4, do not specify periodic reviews of procedures by the Reactor Manager and Reactor Health Physics Manager.

The NRC staff reviewed the proposed changes using the guidance provided in NUREG-1537, Part 1, Chapter 14, Appendix 14.1, Section 6.4, and ANSI/ANS-15.1-2007 (R2013). The guidance in ANSI/ANS-15.1-2007 (R2013), Section 6.4, lists activities that should have a written procedure prepared, reviewed, and approved, and discusses how the procedures, and changes to the procedures, should be reviewed by the review group and approved. The NRC staff finds that the guidance does not include any provision specifying periodic (e.g., annual) reviews of procedures. Therefore, the NRC staff finds the proposed changes to remove the annual procedure review requirements from TS 6.4 are consistent with the guidance provided in NUREG-1537 and ANSI/ANS-15.1-2007 (R2013). The NRC staff finds that the licensee is required by TS 6.4.a and b, "Procedures," to follow procedures, including those that require the review of procedures (e.g. prior to completing a Work Package and other revisions). In addition, the Reactor Manager and Reactor Health Physics manager are required by TS 6.4.c to approve procedures, including revisions. Because the proposed TS changes are consistent with NRC guidance and the TSs retain the requirement that the managers approve procedures, the NRC staff concludes that the proposed changes to TS 6.4.c. are acceptable.

4.0 ENVIRONMENTAL CONSIDERATION

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.

The NRC staff determined that proposed changes to TS 6.2, which would require a biennial audit of the Emergency Plan implementing procedures, and TS 6.4, which would remove the required annual procedure reviews by the Reactor Manager and the Reactor Health Physics Manager, change recordkeeping, reporting, or administrative procedures or requirements. Accordingly, the proposed TS changes meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(10)(ii), and no environmental impact statement or environmental assessment need 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.

Principal Contributors: G. Wertz, NRR
MK. Gavello, NRR

Date: June 8, 2021