



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

January 19, 2022

Mr. Ethan Taber, Reactor Manager  
Missouri University of Science  
and Technology  
Nuclear Reactor Facility  
250 West 13th Street  
Rolla, MO 65409-0450

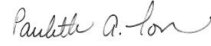
SUBJECT: BOARD OF CURATORS OF THE UNIVERSITY OF MISSOURI – ISSUANCE OF AMENDMENT NO. 23 TO RENEWED FACILITY OPERATING LICENSE NO. R-79 FOR THE MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY RESEARCH REACTOR TO CHANGE ADMINISTRATIVE CONTROLS IN THE TECHNICAL SPECIFICATIONS TO REFLECT REORGANIZATION OF THE DEPARTMENT OF NUCLEAR ENGINEERING AND RADIATION SCIENCE (EPID NO. L-2020-NFA-0014)

Dear Mr. Taber:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 23 to Renewed Facility Operating License No. R-79 for the Missouri University of Science and Technology Research Reactor. The amendment modifies technical specification (TS) 6.1, "Organization," in response to the application dated December 2, 2020 (Agencywide Documents Access and Management System Accession No. ML20337A162). Specifically, the amendment revises TS 6.1.1, "Structure," to include the new department name of the Department of Nuclear Engineering and Radiation Science and changes the title for the Level 1 person specified in TS 6.1.2, "Responsibility." The amendment also changes TS Figure 6.1, "Organizational Structure of the University of Missouri related to the Missouri S&T Nuclear Reactor Facility," to reflect the department name change from "Administrative Services" to "Finance and Operations." Additionally, the amendment makes minor format and punctuation changes in TS Figure 6.1.

A copy of the NRC staff's related safety evaluation is also enclosed. If you have any questions, please contact me at (301) 415-5656, or by e-mail at [Paulette.Torres@nrc.gov](mailto:Paulette.Torres@nrc.gov).

Sincerely,



Signed by Torres, Paulette  
on 01/19/22

Paulette A. Torres, 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. 50-123  
License No. R-79

Enclosures:

1. Amendment No. 23 to Renewed  
Facility Operating License No. R-79
2. Safety Evaluation

cc w/enclosures: See next page

cc:

Homeland Security Coordinator  
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SUBJECT: BOARD OF CURATORS OF THE UNIVERSITY OF MISSOURI – ISSUANCE OF AMENDMENT NO. 23 TO RENEWED FACILITY OPERATING LICENSE NO. R-79 FOR THE MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY RESEARCH REACTOR TO CHANGE ADMINISTRATIVE CONTROLS IN THE TECHNICAL SPECIFICATIONS TO REFLECT REORGANIZATION OF THE DEPARTMENT OF NUCLEAR ENGINEERING AND RADIATION SCIENCE (EPID NO. L-2020-NFA-0014)  
 DATED: JANUARY 19, 2022

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**NRR-058**

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BOARD OF CURATORS OF THE UNIVERSITY OF MISSOURI

DOCKET NO. 50-123

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY RESEARCH REACTOR

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 23  
License No. R-79

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment to Renewed Facility Operating License No. R-79 filed by the Board of Curators of the University of Missouri on December 2, 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 Commission's regulations;
  - 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 a notice of issuance 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 II.C.2 of Renewed Facility Operating License No. R-79 is hereby amended to read as follows:

2. Technical Specifications

- The technical specifications contained in Appendix A, as revised by Amendment No. 23, 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 its date of issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Joshua M. 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-79
2. Changes to Appendix A, "Technical Specifications"

Date of Issuance: January 18, 2022

ATTACHMENT TO LICENSE AMENDMENT NO. 23

RENEWED FACILITY OPERATING LICENSE NO. R-79

DOCKET NO. 50-123

Replace the following page of Renewed Facility Operating License No. R-79 with the attached revised page. The revised page is identified by amendment number and contains lines in the margin indicating the areas of change.

Renewed Facility Operating License No. R-79

Remove

3

Insert

3

C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the Commission regulations in 10 CFR Parts 20, 30, 50, 51, 55, 70, and 73; is subject to all applicable provisions of the Act and to the rules, regulations and, orders of the Commission now, or hereafter, in effect; and is subject to the additional conditions specified or incorporated below:

1. Maximum Power Level

The licensee is authorized to operate the reactor at steady-state power levels up to a maximum of 200 kilowatts (thermal).

2. Technical Specifications

The technical specifications contained in Appendix A, as revised by Amendment No. 23, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the technical specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION  
**/RA/**

Eric J. Leeds, Director  
Office of Nuclear Reactor Regulation

Enclosure:  
Appendix A, "Technical Specifications"

Date of Issuance: March 30, 2009



ATTACHMENT TO LICENSE AMENDMENT NO. 23

RENEWED FACILITY OPERATING LICENSE NO. R-79

DOCKET NO. 50-123

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

Technical Specifications

Remove

Insert

24

24

26

26

- 1) The shim/safety rod drives have a maximum vertical travel of 24 in. and a withdrawal rate of approximately 6 in. per minute. The shim/safety rods are magnetically coupled to the drive mechanisms and drop into the core, by gravity, upon a scram signal.
- 2) The regulating rod drive has a maximum vertical travel of 24 in. and a withdrawal rate of approximately 24 in. per minute. The regulating rod is mechanically coupled to its rod drive and does not respond to a scram signal.
- 3) Lights are provided on the operator's console to indicate the upper limit, lower limit, and shim range for each shim/safety rod.

### **5.3.5 Startup Source**

A strong enough neutron source is available to satisfy the requirements of a count rate greater than 2 counts per second during a cold reactor startup.

## **5.4 Fissionable Material Storage**

The fuel storage pit, which is located below the floor of the reactor pool and at the end opposite from the core, is capable of storing the complete LEU fuel inventory. The neutron multiplication factor of the fully loaded storage pit shall not exceed 0.9 under any conditions.

# **6 Administrative Controls**

## **6.1 Organization**

### **6.1.1 Structure**

The Nuclear Reactor Facility is part of the Department of Nuclear Engineering and Radiation Science of the Missouri University of Science and Technology. The organizational structure is shown in Figure 6.1.

### **6.1.2 Responsibility**

The Chair of Nuclear Engineering and Radiation Science is the individual responsible for the reactor facility's licenses (Level 1).

The Director Nuclear Reactor (DNR) is the contact person for the NRC and has overall responsibility for management of the facility (Level 2). The DNR shall have a minimum of 6 years of nuclear experience. The DNR shall have a Bachelor's (or higher) degree in engineering or science. Equivalent education or experience may be substituted for a degree. The degree may fulfill 4 years of the 6 years of nuclear experience required.

The Reactor Manager (Level 3) shall be responsible for the day-to-day operations and for ensuring

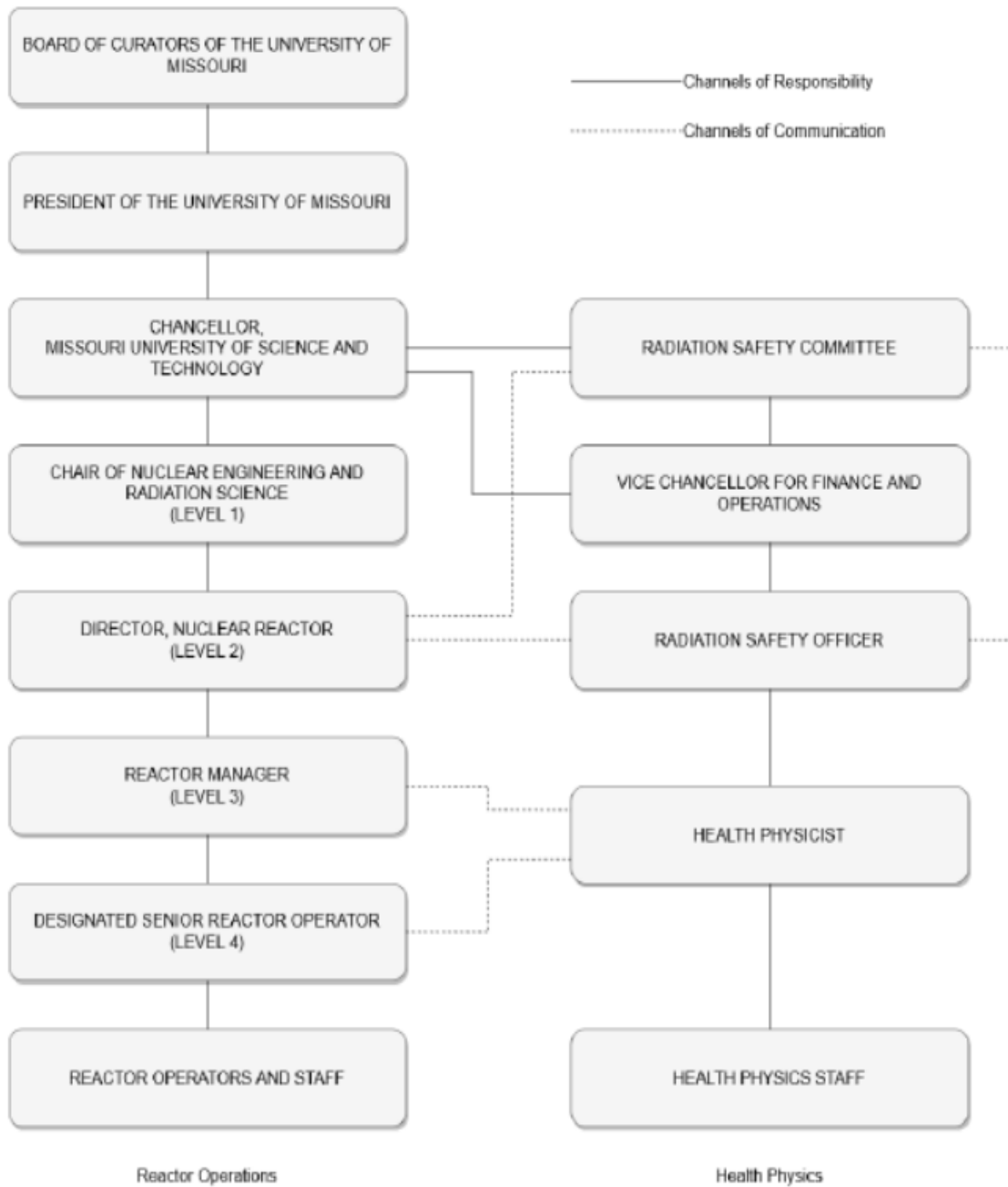


Figure 6.1 Organizational structure of the University of Missouri related to the Missouri S&T Nuclear Reactor Facility



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 23

RENEWED FACILITY OPERATING LICENSE NO. R-79

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY RESEARCH REACTOR

DOCKET NO. 50-123

1.0 INTRODUCTION

By letter dated December 2, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20337A162), the licensee for the Missouri University of Science and Technology Research Reactor (MSTR) applied for an amendment to Renewed Facility Operating License No. R-79 for the MSTR.

The licensee indicated that the MSTR had been part of the Department of Mining and Nuclear Engineering at the Missouri University of Science and Technology. However, recently, a reorganization of the department merged the mining component into another department and made the nuclear engineering faculty and resources a new standalone department called the Department of Nuclear Engineering and Radiation Science, which includes the MSTR facility. Accordingly, the requested amendment would revise the MSTR technical specifications (TSs) to reflect this departmental reorganization, department name changes, format changes, and editorial corrections.

2.0 REGULATORY EVALUATION

The U.S. Nuclear Regulatory Commission (NRC, the Commission) staff reviewed the license amendment request (LAR) and evaluated the proposed changes to TS 6.1.1, TS 6.1.2, and TS Figure 6.1 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," which provides the requirements for TSs to be included in facility operating licenses, including for research reactor. Section 50.36(c)(5), "Administrative controls," requires that TSs include provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner.
- Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," 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, which identifies licensing, regulatory, and administrative actions eligible for categorical exclusion from the requirement to prepare an environmental assessment or an 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,” Section 6.1.1, “Structure” (ADAMS Accession No. ML042430055), which provides guidance to applicants and licensees on preparing research reactor license applications and TSs regarding organizational structure.
- 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), which provides guidance to the NRC staff for reviewing LARs.
- American National Standards Institute/American Nuclear Society (ANSI/ANS)-15.1-2007, “The Development of Technical Specifications for Research Reactors,” Section 6.1, “Organization,” and Section 6.1.1, “Structure,” which provide guidance on administrative controls that should be included in the TSs for research reactors. The 2007 version is a revision of ANSI/ANS-15.1-1990 that is cited in NUREG-1537, Parts 1 and 2, but provisions in Sections 6.1 and 6.1.1 of the 2007 version of the standard do not substantively differ from those in the 1990 version cited in NUREG-1537.

### 3.0 TECHNICAL EVALUATION

The MSTR is a pool-type research reactor licensed to operate at a steady-state power level of up to 200 kilowatts thermal. The reactor core is cooled by natural circulation of light water and uses aluminum-clad plate-type fuel enriched to less than 20 percent isotopic enrichment of uranium 235. The MSTR uses three shim/safety rods to provide reactivity control during reactor startup and shutdown and in the event of a reactor scram. The licensee uses the reactor primarily for research and training.

The LAR proposed a change to TS 6.1.1, “Structure,” to include the new department name of the Department of Nuclear Engineering and Radiation Science and a change to the title for the Level 1 person specified in TS 6.1.2, “Responsibility.” The LAR also proposed changes to TS Figure 6.1, “Organizational Structure of the University of Missouri related to the Missouri S&T Nuclear Reactor Facility,” to indicate that the department formerly named “Administrative Services,” is now named “Finance and Operations,” with the “Vice Chancellor for Finance and Operations,” as the organizational lead. Additionally, the LAR proposed changes to TS 6.1, “Organization,” to correct minor spelling and punctuation changes in TS Figure 6.1. According to the licensee, the changes are necessary to reflect reorganization of the university and the new department and position titles and to correct typographical errors. The licensee stated that the proposed changes will not result in any changes to the operations of the facility.

The current TS Figure 6.1 states:

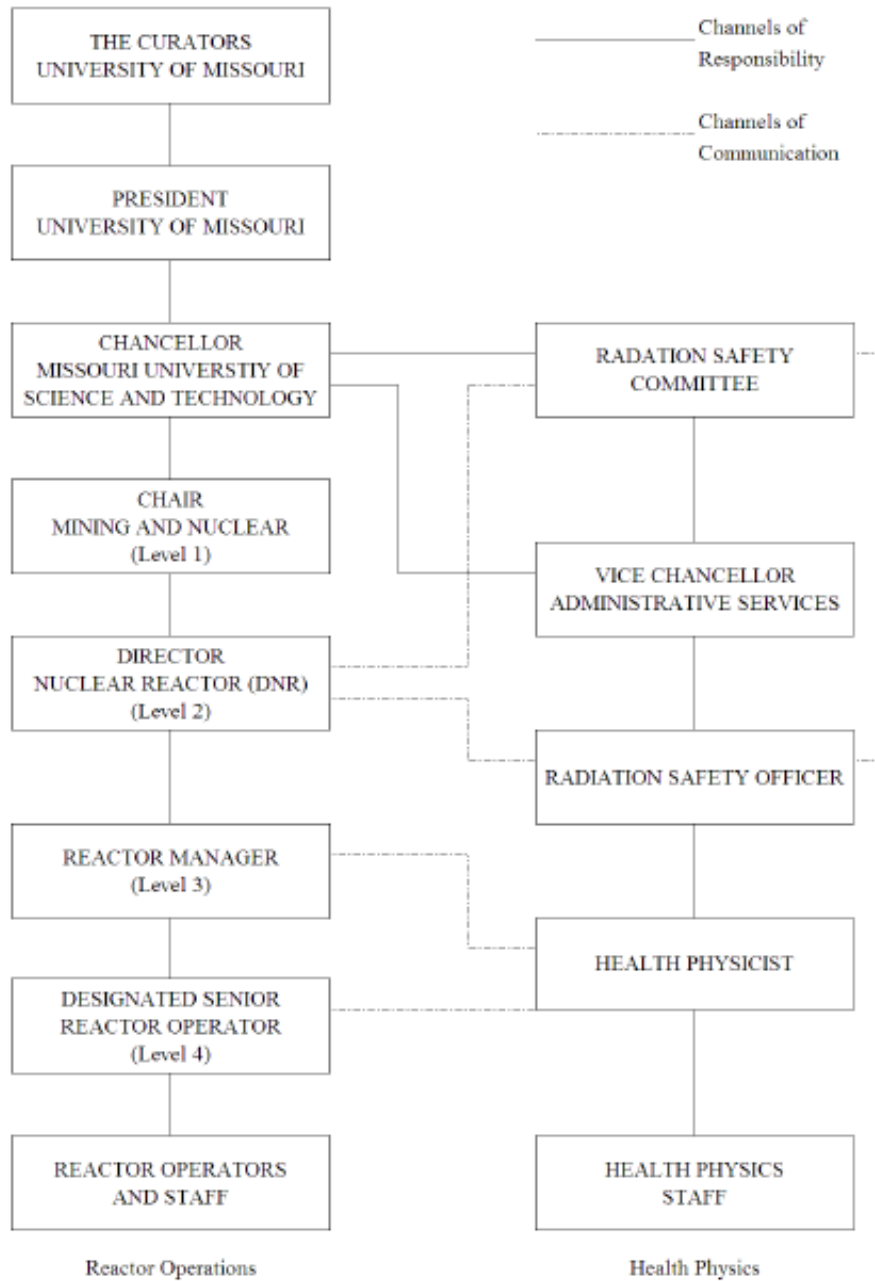


Figure 6.1 Organizational structure of the University of Missouri related to the Missouri S&T Nuclear Reactor Facility

The proposed TS Figure 6.1 would state:

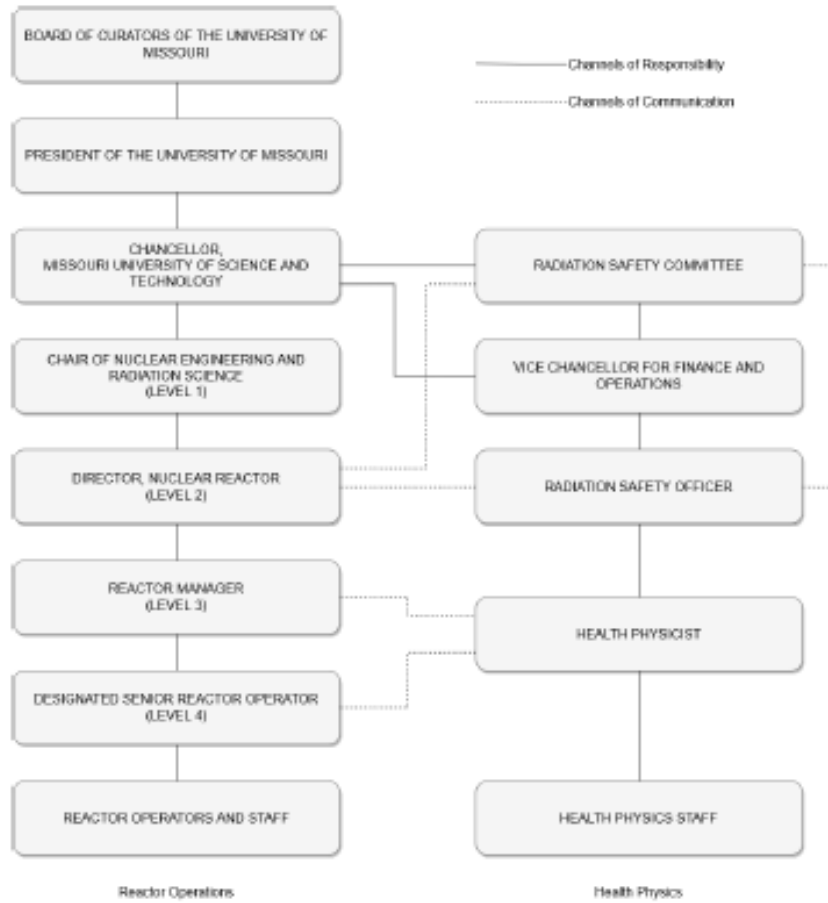


Figure 6.1 Organizational structure of the University of Missouri related to the Missouri S&T Nuclear Reactor Facility

The licensee proposed several changes to TS Figure 6.1 to reflect the new names in the organizational structure:

- Change the name of the licensee from “The Curators University of Missouri” to “Board of Curators of the University of Missouri” to be consistent with the name of the licensee in Section I.A. of Renewed Facility Operating License No. R-79 and as specified in the definition of “licensee” in TS 1.2, “Definitions.”
- Change the name of the Level 1 administrator from “Chair Mining and Nuclear” to “Chair of Nuclear Engineering and Radiation Science.”
- Delete “Vice Chancellor Administration Services” and replace it with “Vice Chancellor for Finance and Operations.”
- Delete “(DNR)” from the Level 2 administrator’s title of “Director Nuclear Reactor.”

The NRC staff evaluated the proposed changes using the guidance in ANSI/ANS-15.1-2007, Section 6.1, which states that the functions, assignments, and responsibilities shall be specified in the TSs. The NRC staff finds that the proposed updated organizational names do not alter the responsibilities and structure of the operating organization. The NRC staff also finds that the proposed changes to TS Figure 6.1 are to the positions or titles of officers or organizational

units of the licensee and are consistent with ANSI/ANS-15.1-2007, Section 6, in that the TSs continue to specify the required licensee organizational structure and management responsible for reactor facility operations. Therefore, the NRC staff concludes that changing the above organizational names in TS Figure 6.1 is acceptable.

The licensee proposed to amend TS 6.1.1, "Structure," and TS 6.1.2, "Responsibility," to be consistent with the proposed changes to TS Figure 6.1.

The current TS 6.1.1 states:

The Nuclear Reactor Facility is part of the Department of Mining and Nuclear Engineering of the Missouri University of Science and Technology. The organizational structure is shown in Figure 6.1.

The proposed TS 6.1.1 would state:

The Nuclear Reactor Facility is part of the Department of Nuclear Engineering and Radiation Science of the Missouri University of Science and Technology. The organizational structure is shown in Figure 6.1.

The current TS 6.1.2 states, in part:

The Chair of Mining and Nuclear Engineering is the individual responsible for the reactor facility's licenses (Level 1).

The proposed TS 6.1.2 would state, in part:

The Chair of Nuclear Engineering and Radiation Science is the individual responsible for the reactor facility's licenses (Level 1).

The NRC staff reviewed the proposed changes and found that they are consistent with the changes to TS Figure 6.1. Therefore, the NRC staff concludes that the changes to TSs 6.1.1 and 6.1.2 are acceptable on the same basis as the changes to TS Figure 6.1 to reflect the changes that resulted from the reorganization.

The NRC staff reviewed the licensee's proposed changes to TSs in the LAR. The NRC staff finds that the proposed changes reflect organizational changes and are consistent with the guidance in NUREG-1537, Part 1, Appendix 14.1 and ANSI/ANS-15.1-2007, Section 6. The NRC staff also finds that the proposed changes will continue to provide organization and management controls that assure operation of the facility in a safe manner as required by 10 CFR 50.36(c)(5) because of the MSTR TSs provisions relating to organization and management. Therefore, based on its review, the NRC staff concludes that the proposed changes to the TSs are acceptable.

#### 4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes recordkeeping, reporting, or administrative procedures or requirements; changes the name, position, or title of an officer of the licensee; or changes the format of the license or otherwise makes editorial, corrective, or other minor revisions. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(10).



Pursuant to 10 CFR 51.22(b), 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: W. Kennedy, NRR  
P. Torres, NRR

Date: January 19, 2022