



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 4

TO FACILITY LICENSE NO. R-102

DOCKET NO. 50-252

UNIVERSITY OF NEW MEXICO

1.0 INTRODUCTION

By letter of December 20, 1994, and as supplemented on August 24, 1995, the University of New Mexico (the licensee), requested revisions to the Technical Specifications (TSs) for the Argonaut research reactor to (1) update certain provisions of the TSs, (2) change the reactor safety systems, and (3) indicate changes in the organization of the reactor facility staff as well as in the administrative organization of the University of New Mexico.

2.0 EVALUATION

Technical Specification 1.1.6-Coarse Control Rod

The change in the TS 1.1.6 on the definition of "Coarse Control Rod" involves (1) a wording change which clarifies the meaning of the TS and (2) a correction in the range of times for control rod insertion from 20 to 25 seconds to 80 to 100 seconds. The first change is solely editorial and, therefore, is acceptable. With regard to the second change in this definition, the licensee explained that the 20 to 25 second time is incorrect and that the 80 to 100 second time is the correct value. The most recent safety evaluation report<sup>1</sup>, indicates that the travel length for this rod is 24 centimeters (cm) and the rod can be inserted at low speed (~1/4 cm/second). Based on this documentation, the proposed change is consistent with the latest safety evaluation on this issue and, therefore, the change is acceptable.

Technical Specification 1.1.9-Experimental Facilities

The change to TS 1.1.9, the definition of "Experimental Facilities," replaces the word "from" with the word "outside", is an editorial change that does not change the meaning of the TS, and therefore, is acceptable.

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<sup>1</sup>U.S. Nuclear Regulatory Commission, "Safety Evaluation Report related to the renewal of the operating license for the University of New Mexico Research Reactor Docket No. 50-252," NUREG-1224, March 1987, section 4.4.2 "Coarse Control Rod," pages 4-4 through 4-5

#### Technical Specification 1.1.22.b-Reactor Secured

The change to TS 1.1.22.b, the definition of "Reactor Secured," replaces the word "licensed" with the word "certified." This change makes the definition of "Reactor Secured" consistent with the definition of "Certified Operator" as "an individual authorized by the Nuclear Regulatory Commission (NRC) to carry out the duties and responsibilities associated with operation of the reactor." Therefore, this change is acceptable.

#### Technical Specification 1.1.26-Safety Control Rod

The change to TS 1.1.26, the definition of "Safety Control Rod," replaces "45 to 50 seconds full insertion time" with "35 to 50 seconds full insertion time." This expansion of the range of insertion times is consistent with the latest safety evaluation,<sup>2</sup> provides appropriate insertion time specification, and, therefore, is acceptable.

#### Technical Specification 2.1-Safety Limits

The change to TS 2.1, basis for the safety limit on maximum core temperature updates the basis by adding reference to and results from the 1986 safety analysis report.<sup>3</sup> Therefore, the change updates the basis to the safety limit and is acceptable.

#### Technical Specification 2.2-Limiting Safety System Settings

The change to the basis for TS 2.2 "Limiting Safety System Settings" is to conform this TS to the changes to the reactor protection system in TS 3.2.d.4, discussed below. Based on the discussion below, this change is acceptable.

#### Technical Specification 3.1-Reactor Core Parameters

The change in title for TS 3.1 from "Reactivity Limits" to "Reactor Core Parameters," is editorial and does not change the meaning of the TS, and therefore, is acceptable.

#### Technical Specification 3.2.b-Rod Scram Time Surveillance

The change to TS 3.2.b to eliminate a phrase "as inferred from strip chart data taken at high recording speed" allows determination of the scram time from computer recorded data or other methods. This eliminates unneeded detail from the specification and allows the licensee additional surveillance flexibility to verify control rod scram withdrawal times for the safety rods and the coarse control rods. Therefore, this change is acceptable.

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<sup>2</sup>Ibid, section 4.4.1 "Safety Rods," page 4-4.

<sup>3</sup>Safety Analysis Report for the University of New Mexico AGN-201M Reactor Facility, May 1986.

Technical Specification 3.2.d.4-Low Power Interlock, Technical Specification 3.2.e-Nuclear Safety Channel Instrumentation, Table 3.1-Nuclear Instrumentation, and Technical Specification 4.2.g-Associated Surveillance

The licensee proposes to add TS 3.2.d.4 to require that the safety and coarse control rods shall be interlocked such that "At any operating power below  $50 \times 10^{-6}$  watts, none of the rods can be moved to a more reactive position." This provides a low power scram interlock to replace low power scram setpoints removed under TS 3.2.e, Table 3.1.

The scram setpoints that the licensee proposes to remove from TS 3.2.e, Table 3.1, are (1) a low power scram at  $1 \times 10^{-13}$  amperes on safety channel No. 2, (2) a short reactor period scram on a less than or equal to 5 second period on safety channel No. 2, and (3) a low power scram at 5 percent of the operating range on safety channel No. 3. Also, the licensee proposes changes to TS 4.2.g to eliminate the surveillance requirement for these deleted period and low power scrams. These changes are to allow for low power die away experiments without getting a low level trip on either of the two safety channels.

The licensee indicated that there are two original bases for the low power scram setpoints on safety channel Nos. 2 and 3 (items (1) and (3) above). First, these scrams were to ensure that there was a neutron source in the reactor for startup and that the channels were operational. This function will be performed by the pre-start check and the listing of initial neutron levels as the safety rods are inserted. The second bases was to avoid adding reactivity at low power levels where the neutron population might be too sparse and the fundamental mode not well established. This function is to be handled through the low power interlock which denies the movement of any rod in a manner that would add reactivity to the reactor which does not satisfy the bases for the original system configuration. These changes are consistent with other non-power reactor requirements and operations and, therefore, are acceptable.

In addition to proposing the removal of the low power scram setpoints for channels 2 and 3 in Table 3.1, the short period trip from channel 2 (item (2) above) is also proposed to be deleted under this current license amendment. The licensee stated that the basis for deletion of the short period trip is that if the reactor is on a period of 5 seconds or less from whatever change in the system, it would take less than 35 seconds to increase from 1 milliwatt to 6 watts, which is the high level trip setting. For very short periods, this time would be on the order of seconds and the trip response would be overshadowed by the high level trips on channels 2 and 3. This analysis showed that the period trip is unnecessary and redundant to the high level trips of the two safety channels, and therefore, this change is acceptable.

The 1987 NRC staff review of the accident analysis<sup>4</sup> determined that these trips were not specifically needed in the accident analysis to ensure public health and safety. Further, the staff concludes that the licensee's analysis has shown that system redundancy and protection is provided by the proposed reactor operations, controls and safety systems. Therefore, since the proposed changes do not impact a previously analyzed accident analysis and the changes continue to provide a reactor protection system consistent with regulatory standards for research reactors, the proposed changes are acceptable.

Based on removal of the scrams from the TSs as described in the above, the deletion of the associated surveillance requirements (TS 4.2.g) for these removed scrams is consistent, and also, acceptable.

#### Technical Specification 3.2.g-Shield Water Level Interlock

TS 3.2.g proposed a change to the shield water level interlock from 17.8 centimeters (cm) below the highest point on the reactor shield tank manhole opening to 18 cm. This change provides a more practical measurement sensitivity for the licensee's instrumentation (i.e., within 1 cm rather than 0.1 cm), does not significantly change the effective shield water conditions, and, therefore, is acceptable.

#### Technical Specification 3.2.h-Shield Water Temperature Interlock

The proposed editorial change to eliminate the words to "be set to" before the word "prevent" so that the specification is more definitive that the shield water temperature interlock will prevent startup and cause reactor scram. The proposed change does not clarify the meaning of the TS, and therefore, is acceptable.

#### Technical Specification 3.2.i-Seismic Displacement Interlock

The proposed editorial change to add the word "to" clarifies the function of the seismic displacement interlock "to scram the reactor during a seismic displacement." The proposed change clarifies the meaning of the TS, and therefore, is acceptable.

#### Technical Specification 3.3.c-Radioactive Limits for Control of Experiments

The proposed change to TS 3.3.c and basis removes previous 10 CFR Part 20 dose limitations and replaces them, the current 10 CFR Part 20 limits. This change makes the specification consistent with current regulatory limits and is, therefore, acceptable.

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<sup>4</sup>U.S. Nuclear Regulatory Commission, "Safety Evaluation Report related to the renewal of the operating license for the University of New Mexico Research Reactor Docket No. 50-252," NUREG-1224, section 14 "Accident Analysis," pages 14-1 through 14-2.

Technical Specification 3.4.d-Access Control to Top of Operating Reactor

TS 3.4.d on control of access to the top of the reactor, a high radiation area, is revised to require that the access stairs be locked and the key be placed under the control of a Reactor Supervisor. This replaces the previous control of an alarm that would alert the individual using the stair and the reactor operator. This change and associated change to the bases for this specification acceptably implement the regulations in 10 CFR Part 20.

Technical Specification 4.2-Control and Safety Systems

The licensee proposed that the subsections of this TS be renumbered. No change was proposed to the content of the TS other than those noted below for TS 4.2.f or above for TS 4.2.g. Therefore, this change is acceptable.

Technical Specification 4.2.f-Surveillance of the Seismic Interlock

The seismic displacement interlock surveillance is changed from a semiannual to an annual frequency to make this surveillance requirement consistent with the time for surveillance of the other safety channels. This proposed change is consistent with this surveillance requirement for other similar reactors (Texas A&M AGN, Docket No. 50-59). Based on the above, the proposed change is acceptable.

Technical Specification 4.3-Visual Inspection for Water Leakage

This surveillance requirement is changed from annually to prior to each startup. This change is conservative in that the surveillance will be conducted prior to operation of the reactor. This change provides additional assurance that radiation shielding for reactor operations will be in place, and therefore, is acceptable.

Technical Specification 5.1.e-Design Description of the Fine Control Rod

A TS 5.1.e editorial change was proposed. The change was to replace "fueled or unfueled" to "with or without fuel," for the design description of the fine control rod. This change does not affect the meaning or content of the TS, and therefore, is acceptable.

Technical Specification 5.2-Fuel Storage

TS 5.2 was proposed for revision to provide clarification to allow that the fuel storage location need not be secured when it is in use. This change does not affect the intent of the TS, and therefore, is acceptable.

Technical Specification 6.1-Organization

The proposed editorial change to eliminate the words "attached hereto" after the words "Figure 1" does not affect the intent of the TS, and therefore, is acceptable.

Technical Specification 6.1.1-President

The proposed editorial change to eliminate the words "The President is" does not affect the intent of the TS, and therefore, is acceptable.

Technical Specification 6.1.2-Dean, School of Engineering, Technical Specification 6.1.3-Reactor Administrator, Technical Specification 6.1.4-Radiation Control Committee, Technical Specification 6.1.5-Radiation Safety Officer, Technical Specification 6.1.6-Reactor Safety Advisory Committee, and Technical Specification 6.3-Training

Several specifications have been revised to change the title of the Reactor Safeguards Advisory Committee to the Reactor Safety Advisory Committee, the title of the Committee on Radiological Controls to the Radiation Control Committee, the title of the Radiological Safety Officer to the Radiation Safety Officer and the title of the College of Engineering to the School of Engineering. These simple title changes are acceptable as they do not affect function or makeup of the organizations or individuals.

Also, TS changes to indicate a change in the University of New Mexico organization were proposed. The changes specified that the Reactor Administrator would no longer be the Chairman of the Nuclear Engineering Department, and that the Chairman of the Chemical and Nuclear Engineering Department is responsible for selection of the Reactor Administrator. These changes are consistent with the guidance in the American National Standards Institute/American Nuclear Society Standard 15.1-1990, "Development of Technical Specifications for Research Reactors." Therefore, these changes are acceptable.

Technical Specification 6.1.9-Reactor Supervisors

The proposed editorial change makes the TS consistent with the provisions of the proposed change to TS 6.1.13.a.4 as discussed below, does not affect the intent of the TS, and therefore, is acceptable.

Technical Specification 6.1.13.a.4-Reactor Supervisor On Call

The change to this TS replaces the requirement for an on call senior licensed operator with a reactor supervisor. This change does not change the intent or practical application of this TS, continues to meet the regulatory requirements for shift manning for research reactors, and therefore is acceptable.

Technical Specification 6.2-Staff Qualifications

The proposed change adds reactor supervisors to the requirement to satisfy American National Standards Institute Standard 15.4 qualification requirements. This change clarifies the applicability of the requirement for Reactor Supervisors, and therefore, is acceptable.

Technical Specification 6.4.4-Authority

The proposed change corrects a TS section reference from 6.1.5 to 6.1.6, and therefore, is acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment changes the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and changes inspection and surveillance requirements, as well as recordkeeping, reporting, or administrative procedures or requirements. The staff has determined that this amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and there is no significant increase in individual or cumulative occupational radiation exposure. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), and (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 this amendment.

4.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously evaluated, or create the possibility of a new or different kind of accident from any accident previously evaluated, and does not involve a significant reduction in a margin of safety, the amendment does not involve a significant hazards consideration; (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed changes; and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or the health and safety of the public.

Principal Contributor: Marvin M. Mendonca

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