August 20, 2010

Dr. Robert D. Busch, Chief Reactor Supervisor
Chemical and Nuclear Engineering Department
University of New Mexico
209 Farris Engineering Department
Albuquerque, NM 87131-1341

SUBJECT: UNIVERSITY OF NEW MEXICO - REQUEST FOR ADDITIONAL INFORMATION REGARDING THE AGN-201M REACTOR APPLICATION FOR LICENSE RENEWAL (TAC NO. ME1590)

Dear Dr. Busch:

The U. S. Nuclear Regulatory Commission (NRC) has reviewed your application to renew Facility Operating License R-102 for the University of New Mexico AGN-201M Research Reactor, which you submitted on February 21, 2007 as supplemented by letters dated November 9, 2009, and February 17, 2010.

Our final review of your Technical Specifications has identified areas where we require additional information. Please provide either responses or a schedule to respond to the enclosed request for additional information within 30 days of the date of this letter. You must execute your response in a signed original under oath of affirmation according to Title 10 of the *Code of Federal Regulations* Section 50.30(b).

If you have any questions regarding this review, please contact me at (301) 415-1058 or Paul.Doyle@nrc.gov.

Sincerely,

/RA LTran for/

Paul V. Doyle Jr., Project Manager
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-252

Enclosure: As stated

cc: w/encl: See next page

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Reactor Newsletter
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OFFICE OF NUCLEAR REACTOR REGUALTION

REQUEST FOR ADDITIONAL INFORMATION

UNIVERSITY OF NEW MEXICO

AGN-201M REACTOR

DOCKET NO. 50-252

A. **Technical Specifications** – The U. S. Nuclear Regulatory Commission (NRC) staff has reviewed the revised Technical Specifications (TS) submitted by letter dated February 21, 2007. During our review, we have identified areas where we require additional information and/or clarification. Please provide responses to the following requests for additional information.

1. TS Section 1, Definitions, definition 1.1.1, *Certified Operator.* This definition has been removed from American Nuclear Society Institute/American National Standards (ANSI/ANS) 15.1 – 2007, and has been replaced with definitions for Reactor Operator and Senior Reactor Operator. Please update TS to the more current industry standard.

2. TS Section 1, Definitions, definition 1.1.10, *Explosive Material.* Two references in this definition, Dangerous Properties of Industrial Materials, by N.I. Sax, 3rd ed., (1968), and National Fire Protection Association in its publication 704-M, 1966, have subsequent editions. Is the facility still using the 1966 and 1968 editions of these publications? If not, please update your reference in this definition.

3. TS Section 1, Definitions, definition 1.1.11, *Fine Control Rod.* This definition is missing information, the fact that the fine rod does NOT withdraw automatically on a scram signal and the fact that it has a relatively small reactivity worth (¼ the value of the other rods). Please either add this information to the definition or explain why the definition as written is acceptable.

4. TS Section 1, Definitions, definition 1.1.20, *Reactor Operation.* ANSI/ANS 15.1-2007 suggests three operational states for the reactor: reactor operation, reactor shutdown and reactor secure. Normally a reactor that has been secured can be left unattended (e.g. reactor staff goes home for the night) and requires a startup checkout to return to operation whereas a reactor that is shutdown is not left unattended and may be restarted without performing startup checks. Your definition of reactor operation only refers to a reactor state of "Reactor Shutdown." However, there is no definition for reactor shutdown in your TS. To be consistent with your definitions, "Reactor Shutdown" should be changed to "Reactor Secured." If you choose to add a definition to the TS for Reactor Shutdown, the following is modification of the definition given in ANSI/ANS 15.1 and acceptable to the NRC staff:

The reactor is shut down if it is subcritical by at least one dollar in the reference core condition with the reactivity worth of all installed experiments included and the following conditions exist:

(a) 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;

(b) No experiments are being moved or serviced that have, on movement, a reactivity worth exceeding the maximum value allowed for a single experiment, or one dollar, whichever is smaller.

If you add a definition for Reactor Shutdown, the definition of Reactor Operation should be modified so that operation is when the reactor is not shutdown or secured.

5. TS Section 1, Definitions, definition 1.1.22, *Reactor Secured.* This definition does not take into consideration reactivity effects due to experiment insertion or removal, and work on either the core or the control or the safety rods. Please update this definition to take into consideration the reactivity effects of experiments, work on the reactor core or control or safety rods or explain why this is not necessary for your reactor.

6. TS Section 1, Definitions, definition 1.1.30, *Shutdown Margin.* This definition does not take into consideration reactivity effects due to operation of the fine control rod. Please either add the reactivity effect of the fine rod failing in its most reactive state to this definition or explain why non-scramming rods do not need to be considered in the definition of shutdown margin.

7. TS, Section 3, LIMITING CONDITIONS FOR OPERATION (LCO), Specifications 3.1.a and 3.1.d. These TS appear to limit experiment worth to 0.4% Δk/k by limited excess reactivity. However, ANSI/ANS 15.1 recommends limits on individual experiment worth and total experiment worth by limiting the sum of the absolute value of the worths of individual experiments. Your proposed TS do not limit total experiment worth (e.g. placing an experiment into the reactor with a worth of +0.3% Δk/k and an experiment with a worth of -0.3% Δk/k does not change the excess reactivity of the reactor. This could be repeated. But then if only the experiments with positive reactivity upon removal are taken out of the reactor the limit on excess reactivity is violated.). Please propose a limit on the sum of the absolute reactivity values of experiments or justify not needing a limit.

   In addition, these TS refer to all control and safety rods. From Definition 1.1.5, it appears that safety rods are control rods. Please verify that the calculation of excess reactivity involves all four control rods or explain why this is not necessary. Please revise the TS as needed.

8. TS Section 3, LCO, Specification 3.1.b. This specification does not take into consideration reactivity effects due to operation of the fine control rod. Please either add the reactivity effect of the fine rod failing in its most reactive state to this definition or explain as to why this reactivity is not applicable at your reactor.

9. TS Section 3, LCO, Specifications 3.2.c. and 3.2.e. Please verify that this specification applies to the fine control rod. If not, explain why this limitation is not needed for the fine control rod.

10. TS Section 3, LCO, Specification 3.2.e. Your TS requires nuclear safety instrumentation to be operable if the control rods are not in their fully withdrawn position. Normally, this instrumentation needs to be operable if the reactor is in operation (e.g. this would require instrumentation to be operable when removing experiments from the reactor that could impact reactivity even if the control rods are fully withdrawn). Please explain the basis for your proposed TS or modify it to require instrumentation when the reactor is in operation.

11. TS Section 3, LCO, Specification 3.3.a. The wording of the TS allows experiments that violate the reactivity limitations to not be subject to the TS. Please correct.

12. TS Section 3, LCO, Specifications 3.3.a. and 3.3.c. Your TS allow the conduct of fueled experiments. Because of the number of isotopes produced in fueled experiments, please provide an example calculation showing how you meet the occupational (please justify the evacuation time used in the calculations) and unrestricted dose requirements (for the maximum exposed individual and at the nearest residence) if a fueled experiment were to fail.

13. TS Section 3, LCO, Specification 3.3.c. TS 3.3.c.(1) limits dose to a 2-hour period starting at the time of release. However, the EPZ is the Nuclear Engineering Laboratory Building (operations boundary). Based on this, dose limits in the unrestricted area should be based on continual occupancy. Please address. There is no TS limit on the doses from failure of experiments that are not doubly encapsulated. Please explain or correct.

14. TS Section 3, LCO, Specification 3.4.b. The definition of restricted area from Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20 is: "*Restricted area* means an area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area." Please explain why the reactor room is not considered a restricted area when the reactor is secure.

15. TS Section 3, LCO, Specification 3.1.c. This LCO requires the reactor to be subcritical upon withdrawal of certain control rods. Section 4, SURVEILLANCE REQUIREMENTS, does not contain a corresponding surveillance to ensure this requirement is met. Please either add a surveillance to section 4 of the TSs or explain why a surveillance is not required.

16. TS Section 3, LCO, Specification 3.2.d. This LCO discusses the rod interlocks required for AGN reactor operation. TS Section 4, SURVEILLANCE REQUIREMENTS, does not contain a corresponding surveillance to ensure this requirement is met. Please either add a surveillance to section 4 of the TSs or explain why a surveillance is not required.

17. TS Section 3, LCO, Specification 3.2.j. This LCO discusses the requirement that the AGN reactor scram on a loss of power. TS Section 4, SURVEILLANCE REQUIREMENTS, does not contain a corresponding surveillance to ensure this requirement is met. Please either add a surveillance to section 4 of the TSs or explain why a surveillance is not required.

18. TS Section 3, LCO, Specifications 3.3.a, 3.3.b and 3.3.c. These three LCOs are all missing corresponding surveillances. Please add corresponding surveillances for all three LCOs or explain why surveillances are not required.

19. TS Section 3, LCO, Specification 3.4.d. This specification requires the gate to the top of the reactor to be locked any time the reactor is in operation. This would preclude anyone from ever going to the top of the reactor during operation. Is this the intent of this LCO? If not, please modify.

20. TS Section 3, LCO, Specifications 3.4.d and 3.4.e. Neither of these LCOs have a corresponding surveillance requirement in Section 4. Please add surveillance requirements for both of these LCOs similar to specification 4.2.c.

21. TS Section 4, SURVEILLANCE REQUIREMENTS, Specification 4.0. This specification allows for the deferral of surveillances if the reactor is not in operation. However, the reason why deferral is acceptable is not clear for some of the surveillances. For TS 4.3, explain why periodic inspections of the shield tank to verify integrity is not needed if the reactor is not operated. For TSs 4.4.a. and 4.4.c, explain why radiation instrument calibrations and surveys are not needed if the reactor is not operated.

22. TS Section 4, SURVEILLANCE REQUIREMENTS, Specification 4.2.i. The first part of this specification, referring to the melting of the fuse, should be added to specification 3.2, as a LCO. The rest of this specification should be modified for proper wording as a surveillance requirement for the added LCO. Or please provide a justification if you believe that the specification is acceptable as written.

23. TS Section 4, SURVEILLANCE REQUIREMENTS, Specification 4.3. The TS allows operation with a known leaking shield tank. Please explain why operation in this condition is not a radiation safety issue. The TS limit of leakage sufficient

to leave a puddle on the floor is subjective. If leakage is acceptable, please quantify the amount of leakage that can occur before correction. Should the limit on leakage be an LCO? Please address.

24. TS Section 4, SURVEILLANCE REQUIREMENTS, Specification 4.4.a. The specification requires an annual check of the remote area monitor at the top of the reactor. There is no corresponding LCO for this radiation monitor. Please add an LCO, or explain why an LCO is not required.

25. TS Section 4, SURVEILLANCE REQUIREMENTS, Specification 4.4.b. The specification requires a daily check of the reactor access high radiation alarm. There is no corresponding LCO. Please add a LCO, or explain why an LCO is not required.

26. TS Section 4, SURVEILLANCE REQUIREMENTS, Specification 4.4.c. The specification requires a radiation survey annually. The regulations in 10 CFR 20.1501 require surveys be made as may be necessary. This may require surveys to be performed more often than annually. Please revise the specification to be consistent with the regulations.

27. TS Section 5, DESIGN FEATURES. Regulation 10 CFR 50.36(a)(1) states "Each applicant for a license authorizing operation of a production or utilization facility shall include in his application proposed technical specifications in accordance with the requirements of this section. A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the technical specifications." Please rewrite Section 5 to convert the statements to specifications and add applicability, objective and bases for each of these specifications.

28. TS Section 5, DESIGN FEATURES, Specification 5.2. The exact location of fuel storage by room need not be given in the TS. The location can be given in a controlled document such as the security procedures. Please address.

29. TS Section 5, DESIGN FEATURES, Specification 5.3.b. Please add the room number(s) of the area under the jurisdiction of the reactor license so that the licensed area is clearly defined.

30. TS Section 6, ADMINISTRATIVE CONTROLS, Specification 6.1.1. The specification refers to a Radiation Control Committee, which has responsibility for "control of all University of New Mexico (UNM) activities involving sources of ionizing radiation." Please add this committee to the organizational chart, or explain why this committee does not belong on the chart.

31. TS Section 6, ADMINISTRATIVE CONTROLS, Specification 6.1.2. The organizational chart shows the position of the Dean of the school of engineering. However, the Dean does not seem to have any responsibility for the operation of the reactor. Please either add text to this section delineating the responsibilities

of the Dean of the school of engineering with respect to the reactor, or remove this position.

32. TS Section 6, ADMINISTRATIVE CONTROLS, Specification 6.1.3. The specification states that the position of Reactor Administrator is selected by the Chair of the Nuclear Engineering Department. Please add this position to the organizational chart or explain why it is not needed.

33. TS Section 6, ADMINISTRATIVE CONTROLS. The reporting relationships delineated in the organizational chart do not match the reporting relationships delineated in the text of this section. Please modify the organization chart and the text of this section to agree on reporting relationships.

34. TS Section 6, ADMINISTRATIVE CONTROLS, Specification 6.1.8. The regulations in 10 CFR 50.54 (m)(1) require the presence of a senior reactor operator for refueling. Please revise your TS or explain why a senior reactor operator is not needed.

35. TS Section 6, ADMINISTRATIVE CONTROLS, Specification 6.3. The specification refers to ANSI standard ANS 15.4-1977. This standard has been updated several times since 1977. Please modify this specification to update the reference or show why later versions of this standard are not applicable at your facility.

36. TS Section 6, ADMINISTRATIVE CONTROLS, Specification 6.4.1. The specification is missing information. Please modify the specification to specify who has responsibility for appointing members to this committee. Also, please either add a requirement stating that the majority of a quorum cannot consist of reactor staff members or state why this limitation should not be a requirement for your facility.

37. TS Section 6, ADMINISTRATIVE CONTROLS, Specification 6.4.2. The specification covers the changing of procedures, equipment and experiments, but does not cover the creation of new procedures and experiments, and the addition of new equipment. Please add text to cover the addition of new experiments, procedures and equipment or state why these reviews should not be a requirement for your facility.

38. TS Section 6, ADMINISTRATIVE CONTROLS, Specification 6.4.3. ANSI/ANS 15.1-2007, contains recommendations about reporting deficiencies uncovered by audits to management and about submission of audit written reports. Please revise your TS to agree with ANSI/ANS 15.1-2007 or explain why your current wording is acceptable.

39. TS Section 6, ADMINISTRATIVE CONTROLS, Specification 6.6, last paragraph. The paragraph refers to a ‘safety question’. The term is no longer defined in 10 CFR 50.59. Please modify the paragraph to refer to a 10 CFR 50.59 review.

40. TS Section 6, ADMINISTRATIVE CONTROLS, Specification 6.9. Instances in the TSs where written reports are sent to the Director, Office of Nuclear Reactor Regulation can be replaced with Document Control Desk. References to communicating by telegraph can be removed from the TS.

41. TS Section 6, ADMINISTRATIVE CONTROLS, Specification 6.10.2. The regulations in 10 CFR 50.36 Sections c.1(i)(A), c.1(i)(B) and c.2 list requirements to retain reports related to the violation of Safety Limits, Limiting Safety System Settings and LCO respectively for the life of the facility license. Please add these requirements to this section of the TS.