

December 6, 2012

Dr. Yassin Hassan
Department Head- Acting, Nuclear Engineering
Texas A&M University
337 Zachry Engineering Center
College Station, TX 77843-3133

SUBJECT: TEXAS A & M UNIVERSITY – ADDITIONAL CLARIFICATION TO RESPONSES
TO NRC REQUEST FOR ADDITIONAL INFORMATION REGARDING THE
REVIEW OF THE TEXAS A & M UNIVERSITY AGN-201M RESEARCH
REACTOR LICENSE RENEWAL (TAC NO. ME1588)

Dear Dr. Hassan:

The U.S. Nuclear Regulatory Commission (NRC) is continuing its review of your application for the renewal of Facility Operating License No. R-23 for the Texas A & M University AGN-201M Reactor dated July 22, 1997, (a redacted version of the safety analysis report is available on the NRC's public Web site at www.nrc.gov under Agencywide Documents Access and Management System (ADAMS) Accession No. ML102790087). As part of our review, the NRC staff submitted requests for additional information (RAI) by letter dated July 25, 2011, (ADAMS Accession No. ML112000240).

The NRC staff has reviewed your responses and identified in the attached table those RAI responses needing additional clarification. Please provide your responses within 90 days of the date of this letter. In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.30(b), you must execute your response in a signed original document under oath or affirmation. Your response must be submitted in accordance with 10 CFR 50.4, "Written Communications." Information included in your response that is considered security, sensitive, or proprietary, that you seek to have withheld from the public, must be marked in accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding."

If you have any questions regarding this review, please contact Patrick Boyle at (301) 415-3936 or by electronic mail at Patrick.Boyle@nrc.gov.

Sincerely,

/JLising for RA/
Geoffrey Wertz, Project Manager
Research and Test Reactors Licensing Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-59
Enclosure:
As stated
cc w/encl: See next page

Texas A&M University

Docket No. 50-59

cc:

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College Station, TX 77840-3575

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Austin, TX 78711

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Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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Geoffrey Wertz, Project Manager
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ADAMS Accession No: ML12312A232 *via email

TEMPLATE # NRR-088

OFFICE	PRLB:NE	PRLB:PM*	PRLB:LA	PRLB:ABC	PRLB:PM
NAME	PBoyle	GWertz	GLappert	Plsaac	GWertz
DATE	11/8/12	11/7/12	11/14 /12	12/6/12	12/6/12

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OFFICE OF NUCLEAR REACTOR REGULATION
ADDITIONAL CLARIFICATION ON RESPONSES
FOR THE RENEWAL OF FACILITY OPERATING LICENSE
TEXAS A & M UNIVERSITY AGN-201M RESEARCH REACTOR

LICENSE NO. R-23

DOCKET NO. 50-59

The U.S. Nuclear Regulatory Commission (NRC) has reviewed your responses to our requests for additional information (RAIs) and has identified the following RAI responses that need additional clarification.

RAI No.	Original RAI Description	RAI Response Date	Additional Clarification Needed
06	Describe the design criteria for the console upgrade.	12/22/2011	Please describe the hardware components and software associated with "AGN computer" discussed in Chapter 7 of the Safety Analysis Report (SAR). Include a discussion of what verification and validation was used for the design and installation. Identify which reactor scram signals are generated by the "AGN computer" and which ones are hardwired directly to the scram circuit. Describe the design elements addressing the potential for a single failure disabling multiple scram inputs.
07	Limiting Condition of Operation for the skirt radiation monitor scram.	12/02/2011	Please explain why the Limiting Conditions for Operation (LCO) for a scram was proposed for section 3.4, "Radiation Monitoring, Control, and Shielding" instead of section 3.2 "Control and Safety Systems" which contains a listing of all of the other scram inputs
08	Channel #2 Period Scram design impact from the AGN computer	04/12/2012	Please explain how the "computer" calculates the period and how frequently this is compared to the trip set point. Explain the safety impact of using a computer for this function compared to the previously installed rate meter.

ENCLOSURE

RAI No.	Original RAI Description	RAI Response Date	Additional Clarification Needed
09	Channel #3 Linear Power Scram design impact from the console upgrade	04/12/2012	Describe how the "AGN computer" takes the signal from the picoammeter and generates a scram signal based on the output of the Channel #3 detector. How often is the signal compared to the set point and what processors are involved? What is the cumulative effect of the delay associated with each step between an increase (or decrease for low power trip) in the detector output and initiation of a scram signal including processor delays associated with the other processor demands on the "AGN computer"? Explain what digital filtering is used and how this affects the overall response time.
11	Reactor Control System does not show how the Interlock Relay function was incorporated into the upgrade.	12/22/2011	Your statement that "There was no Technical Specification (TS) requirement for this interlock feature" is not consistent with the current wording TS 3.2.e, 3.2.f and 3.2.g. Please explain how you are complying with the requirement to have "shield water level interlock," and "shield water temperature interlock" that will "prevent a reactor start up and scram the reactor"
13	Incorporation of the "watch-dog" scram into the appropriate LCO and Chapter 13 update	04/12/2012	The proposed wording for LCO 3.2.k contains the word "installed." It is not clear what is meant by the word "installed." Please provide a definition for the word "installed," to be included in section 1 or consider the use of a defined word such as "operable" or "operating" in the proposed LCO. Please provide a safety analysis of the design change that discusses the "AGN computer," its potential failure modes, and what features are relied upon to ensure operability (ability to perform its intended safety function).
14	Radiation protection program and as low as reasonably achievable (ALARA) considerations	08/25/2011	Some of the survey locations indicate a dose rate greater than 10 milli-Roentgen Equivalent Man/hour (mrem/hr). What actions are being implemented in these areas to ensure ALARA principles are considered? The RAI response indicates three phantom monitors are present at the facility. What are these phantom monitors and how are they used? The RAI response also indicated, "facility personnel "are supplied with dosimetry. Who is considered to be "facility personnel" and what type of dosimetry is used?

RAI No.	Original RAI Description	RAI Response Date	Additional Clarification Needed
15	Ar-41 production consideration	08/25/2011	The percentages of the 10 CFR Part 20 Appendix B Derived Air Concentration (DAC) and effluent release limits are provided in the RAI responses which are based on a dose rate. Based on the maximum allowed operations, what annual dose does this represent to the occupational workers and to members of the public?
17	Personnel monitoring during experiment handling	08/25/2011	Are students allowed in the reactor room when the reactor is operating? What type of dosimetry is required for the students? Explain how this is controlled (procedure, etc.).
20	Evaluation of MHA related to occupational dose limits	12/02/2011	Amendment 10 only considered one of the severe accidents (slow controlled excursion) 1% reactivity increase without the fuse melting. The original MHA also consider a 2% step reactivity increase (runaway) with fuse melt. Please discuss why the 2% step reactivity increase MHA scenario was not considered in your analysis related to dose limits.
21	Add TS definitions per ANSI/ANS-15.1-2007 guidance for: reactor secured, reactor shutdown, and shutdown margin.	12/02/2011	The proposed TS Section 1 definition for Reactor Shutdown (1.19) includes a reference condition of \$1.00. Please provide the relationship between \$1.00 and the %Δk/k or propose wording for the definition of shutdown that is expressed in %Δk/k consistent with other TSs.
24	The proposed TS 3.2 and Table 3.1 do not include Interlock Relay Scrams	12/02/2011	The previous console included interlocks for the Rod Drive Cable and Relay Chassis. Activation of these relays resulted in an automatic reactor scram. Please explain why these automatic scrams are no longer required including a discussion of the safety impact of replacing these automatic scram functions with operator action.

RAI No.	Original RAI Description	RAI Response Date	Additional Clarification Needed
25	TS 3.2.g states that a seismic displacement interlock switch shall be installed. This requires a set point.	12/02/2011	Per TS 4.2.h - The shield tank water level interlock, shield water temperature interlock and seismic displacement safety channel shall be tested by perturbing the sensing element to the appropriate set point. These tests shall be performed annually, but at intervals not to exceed 16 months. The reply indicates the switch cannot be calibrated because of its design. Please explain how Texas A&M is in compliance with TS 4.2.h if the set point cannot be verified. Additionally, please justify the use of this interlock. Please state how the fission barrier boundary integrity (core tank seal) is ensured via an appropriate TS LCO.
29	Maximum Hypothetical Accident assumptions include no escape of fission products from the core tank. Propose changes to 3.4.f for core tank seal integrity	12/02/2011	