

February 16, 2016

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

SUBJECT: TEXAS A&M UNIVERSITY - REQUEST FOR ADDITIONAL INFORMATION  
REGARDING LICENSE AMENDMENT REQUEST RELATED TO INTERIM  
STORAGE OF THE SPECIAL NUCLEAR MATERIAL AND THE DISASSEMBLED  
AEROJET GENERAL NUCLEONICS MODEL 201-MODIFIED REACTOR ON THE  
TEXAS A&M ENGINEERING EXPERIMENT STATION NUCLEAR SCIENCE  
CENTER SITE

Dear Dr. Hassan:

The U.S. Nuclear Regulatory Commission (NRC) is reviewing your application to amend Facility Operating License No. R-23, dated November 11, 2015, available on the NRC's public Web site at [www.nrc.gov](http://www.nrc.gov) under Agencywide Documents Access and Management System (ADAMS) Accession No. ML15315A027, for the Texas A&M University Aerojet General Nucleonics Model 201-Modified (AGN-201M) reactor.

During our review, questions have arisen for which additional information is needed. The enclosed request for additional information (RAI) identifies the information needed to continue our review. We request that you provide responses to the enclosed RAI within 30 days from the date of this letter. A timely and complete response to these questions is required to support the expedited review requested by Dr. Banks, of Texas A&M University, in a letter dated October 26, 2015 (ADAMS Accession No. ML15301A242).

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.30(b), "Oath or affirmation," 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 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." Any information related to security should be submitted in accordance with 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements." Following receipt of the additional information, we will continue our evaluation of your amendment request.

Y. Hassan

- 2 -

If you have any questions, or need additional time to respond to this request, please contact me at (301) 415-3936, or by electronic mail at [Patrick.Boyle@nrc.gov](mailto:Patrick.Boyle@nrc.gov).

Sincerely,

***/RA/***

Patrick G. Boyle, 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: See next page

Y. Hassan

- 2 -

If you have any questions, or need additional time to respond to this request, please contact me at (301) 415-3936, or by electronic mail at [Patrick.Boyle@nrc.gov](mailto:Patrick.Boyle@nrc.gov).

Sincerely,

**/RA/**

Patrick G. Boyle, 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: See next page

**DISTRIBUTION:**

PUBLIC	PRLB R/F	RidsNrrDprPrta Resource	AAdams, NRR
RidsNrrDprPrtb Resource	PBoyle, NRR	DHardesty, NRR	GMorlang, NRR
RidsNrrDpr Resource	AMendiola, NRR	EHelvenston, NRR	
NParker, NRR			

**ADAMS Accession No.: ML16032A022** \*concurrence via e-mail

**NRR-088**

OFFICE	NRR/DPR/PM	NRR/DPR/PM	NRR/DPR/LA*	NRR/DPR/BC	NRR/DPR/PM*
NAME	EHelvenston	PBoyle	NParker	AAdams	PBoyle
DATE	2/8/2016	2/8/2016	2/8/2016	2/11/2016	2/16/2016

**OFFICIAL RECORD COPY**

Texas A&M University

Docket No. 50-59

cc:

Mayor, City of College Station  
P.O. Box Drawer 9960  
College Station, TX 77840-3575

Governor's Budget  
and Policy Office  
PO BOX 12428  
Austin, TX 78711-2428

Jeremy Osborn  
AGN-201M Reactor Supervisor  
Texas A&M University  
Nuclear Engineering Department  
3133 TAMU  
College Station, TX 77843-3133

Dr. Sean McDeavitt, Director  
Nuclear Science Center  
Texas A&M Engineering Experiment Station  
3575 TAMU  
College Station, TX 77843-3575

Jerry Newhouse, Assistant Director  
Nuclear Science Center  
Texas A&M Engineering Experiment Station  
3575 TAMU  
College Station, TX 77843-3575

Radiation Program Officer  
Bureau of Radiation Control  
Dept. Of State Health Services  
Division for Regulatory Services  
1100 West 49<sup>th</sup> Street, MC 2828  
Austin, TX 78756-3189

Technical Advisor  
Office of Permitting, Remediation &  
Registration  
Texas Commission on Environmental  
Quality  
P.O. Box 13087, MS 122  
Austin, TX 78711-3087

Test, Research and Training  
Reactor Newsletter  
P.O. Box 118300  
University of Florida  
Gainesville, FL 32611-8300

Radiological Safety Officer  
Texas A&M University  
Environmental Health and Safety  
1111 Research Parkway  
College Station, TX 77843-4472

OFFICE OF NUCLEAR REACTOR REGULATION  
REQUEST FOR ADDITIONAL INFORMATION  
RELATED TO LICENSE AMENDMENT REQUEST FOR  
TEXAS A&M UNIVERSITY  
AEROJET GENERAL NUCLEONICS MODEL 201-MODIFIED REACTOR  
LICENSE NO. R-23; DOCKET NO. 50-59

The U.S. Nuclear Regulatory Commission (NRC) has begun its review of your application for the amendment of Facility Operating License No. R-23, dated November 11, 2015, available on the NRC's public Web site at [www.nrc.gov](http://www.nrc.gov) under Agencywide Documents Access and Management System (ADAMS) Accession No. ML15315A027, for the Texas A&M University (TAMU) Aerojet General Nucleonics Model 201-Modified (AGN-201M) reactor. During our review, the following questions have arisen for which additional information is needed. Provide responses to these questions within 30 days from the date of this letter.

The following questions pertain exclusively to the license amendment request (LAR), dated November 11, 2015, to modify Facility Operating License No. R-23 for the TAMU AGN-201M reactor; this LAR is referred to in the questions as the "AGN-201M LAR." However, the following questions also make references to the LAR, dated October 14, 2015, to modify Facility Operating License No. R-83 for the Texas A&M Engineering Experiment Station (TEES) Nuclear Science Center (NSC) Training Research Isotope Production General Atomics (TRIGA) reactor to allow storage of the AGN-201M special nuclear material (SNM) at the NSC (ADAMS Accession No. ML15287A148); this LAR is referred to in the questions as the "TRIGA LAR."

According to Title 10 of the *Code of Federal Regulations*, Section 50.90, "Application for amendment of license, construction permit, or early site permit," whenever the holder of a license desires to amend the license, the application must fully describe the changes desired, following as far as applicable, the form prescribed for original applications. NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," provides guidance for license requests for non-power reactors.

1. The current AGN-201M reactor Facility Operating License No. R-23, Section 2.B(2), permits TAMU "Pursuant to the Act and 10 CFR Part 70, "Special Nuclear Material," to receive, possess, and use up to 700 grams of contained uranium 235, enriched to less than 20 percent in uranium dioxide (UO<sub>2</sub>) embedded in radiation stabilized polyethylene, and up to 16 grams of plutonium 239 in the form of a sealed Pu-Be neutron source, both in connection with operation of the reactor." The current AGN-201M reactor Facility Operating License No. R-23, Section 2.B(3), permits TAMU "Pursuant to the Act and 10 CFR Parts 30 and 70 to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the reactor." The AGN-201M LAR does not propose to change these license conditions. The TRIGA LAR proposes to add Section B.5. to Facility Operating License No. R-83, which would permit TEES to receive and possess the

Enclosure

AGN-201M SNM under Facility Operating License No. R-83. For clarity of licensing, if the AGN-201M SNM would be possessed under, and governed by, Facility Operating License No. R-83, it should not continue to also be possessed under, and governed by, Facility Operating License No. R-23.

- a) Clarify whether the AGN-201M SNM would be governed by Facility Operating License No. R-23, or Facility Operating License No. R-83, once the AGN-201M SNM is in storage at the NSC.
  - b) Confirm that Facility Operating License No. R-23, license condition 2.B.(2), "Pursuant to the Act and 10 CFR Part 70 [...] both in connection with operation of the reactor," should be deleted from license R-23, once the SNM has been relocated to the NSC and transferred to the R-83 license; provide revised wording for this license condition; or, justify why this license condition should remain in place as currently written.
  - c) Propose revised wording for Facility Operating License No. R-23, license condition 2.B.(3), "Pursuant to the Act and 10 CFR Parts 30 and 70 [...] as may be produced by the operation of the reactor," to indicate that SNM produced by operation of the AGN-201M reactor would no longer be possessed under Facility Operating License No. R-23 pursuant to 10 CFR Part 70 once the SNM has been relocated to the NSC and transferred to the R-83 license; or, justify why this license condition should remain in place as currently written.
2. Current Facility Operating License No. R-23, Section 2.B.(1), permits TAMU to possess, use, and operate the AGN-201M reactor on the TAMU campus. Current Facility Operating License No. R-23, Section 2.B.(3), permits TAMU to possess, but not separate, byproduct material produced during operation of the reactor, such as contaminated or activated AGN-201M reactor components. The AGN LAR, paragraph 4, states that the AGN-201M reactor will remain governed by Facility Operating License No. R-23 while in temporary storage. However, the TRIGA LAR proposes to add Section B.6. to Facility Operating License No. R-83 which would permit TEES to receive and possess byproduct materials such as contaminated or activated AGN-201M reactor components under Facility Operating License No. R-83. For clarity of licensing, if the AGN-201M reactor components would continue to be governed by Facility Operating License No. R-23, they should not also become governed by Facility Operating License No. R-83.
- a) Clarify whether the AGN-201M reactor components would be governed by Facility Operating License No. R-23, or Facility Operating License No. R-83, once the AGN-201M reactor components are in storage at the NSC.
  - b) Proposed TS 5.3.a states "The reactor room may house the reactor assembly and accessories required for its operation and maintenance." Proposed TS 5.3.b states "The reactor control room may house the reactor control console." Proposed TS 5.3.f states "The disassembled reactor and associated reactor components may be stored within the Restricted Area at the Nuclear Science Center, at areas approved by the site Radiation Protection Staff."

- i. Provide the storage locations (*i.e.*, specific rooms, buildings, or parts of the Restricted Area) of the AGN-201M reactor components at the NSC.
  - ii. Propose revised TSs 5.3.a, 5.3.b, and 5.3.f that would require that the AGN-201M reactor components be located at either their current locations at the Zachry Engineering Center, or at their precise storage locations at the NSC; or, justify why no change is needed.
  - iii. For contaminated or activated AGN-201M reactor components (*i.e.*, reactor components containing byproduct material), describe how radiation protection concerns associated with the reactor components will be addressed while those reactor components are in storage at the NSC.
  - iv. Describe how theft or diversion of contaminated or activated AGN-201M reactor components (*i.e.*, reactor components containing byproduct material) will be prevented while those reactor components are in storage at the NSC.
3. The current revisions of the AGN-201M Emergency Plan (EP) and Physical Security Plan (PSP) are applicable for the AGN-201M reactor and SNM's current possession under Facility Operating License R-23 and location in the Zachry Engineering Center.
  - a) As the current AGN-201M EP describes the AGN-201M reactor's current location in the Zachry Engineering Center, changes to the AGN-201M EP may be needed in consideration of the proposed relocation of the AGN-201M reactor components to the NSC. Discuss whether changes are needed to the AGN-201M EP, considering the specific storage locations for the AGN-201M reactor components at the NSC.
  - b) As the current AGN-201M PSP describes the AGN-201M reactor's current location in the Zachry Engineering Center, it would not apply for the AGN-201M reactor's proposed location at the NSC. The regulations in 10 CFR Part 37, "Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material," state, in part, that PSPs are required for the possession of certain quantities of byproduct material specified in 10 CFR Part 37, Appendix A, "Category 1 and Category 2 Radioactive Materials." The regulations in 10 CFR 50.34(c), "Physical security plan," state, in part, that nonpower reactors that are subject to 10 CFR 73.60, "Additional requirements for physical protection at nonpower reactors," are required to have a PSP; 10 CFR 73.60 is applicable only to nonpower reactor licensees that possess certain quantities of SNM. Based on these regulations, a PSP may not be required for the AGN-201M. State that Facility Operating License No. R-23, license condition 2.C.(3), "The licensee shall fully implement [...] with revisions through September 24, 1984," and license condition 2.D, "The licensee shall maintain [...] dated September 13, 1974," which require the AGN-201M to have a PSP, should be deleted from license R-23, once the AGN-201M SNM has been relocated to the NSC and transferred to the R-83 license, and justify the removal of these license conditions; propose and justify revised wording for these license conditions; or, state that these license conditions should remain in place as currently written, and discuss whether changes are needed to the AGN-201M PSP.

4. The NRC staff reviewed the current TSs for the TAMU AGN-201M reactor and noted that it is not clear how some of these TSs will be met after the reactor has been disassembled and moved to the NSC.
  - a) Current TSs 3.2.a through 3.2.h denote requirements for control and safety systems for the AGN-201M reactor. Following disassembly of the AGN-201M reactor, these systems may not be operable. Explain how current TSs 3.2.a through 3.2.h will be met for the disassembled reactor, or propose revisions to current TSs 3.2.a through 3.2.h to indicate that TSs 3.2.a through 3.2.h would not apply once the reactor has been disassembled and moved to the NSC.
  - b) Current TSs 5.1.a through 5.1.e denote design features of the AGN-201M reactor. Following disassembly of the AGN-201M reactor, the reactor will not be assembled as described in the TSs. Explain how current TSs 5.1.a through 5.1.e will be met for the disassembled reactor, or propose revisions to current TSs 5.1.a through 5.1.e to indicate that TSs 5.1.a through 5.1.e would not apply once the reactor has been disassembled and moved to the NSC.