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

July 22, 2021

Dr. Sean McDeavitt, Director
Nuclear Science Center
Texas A&M University
Texas Engineering Experiment Station
1095 Nuclear Science Road, MS 3575
College Station, Texas 77843

SUBJECT: TEXAS ENGINEERING EXPERIMENT STATION/TEXAS A&M UNIVERSITY SYSTEM – ISSUANCE OF AMENDMENT NO. 19 TO RENEWED FACILITY OPERATING LICENSE NO. R-83 FOR THE TEXAS ENGINEERING EXPERIMENT STATION/TEXAS A&M UNIVERSITY SYSTEM NUCLEAR SCIENCE CENTER RE: REMOVAL OF LICENSE CONDITION POSSESSION LIMIT EXPIRATION DATE (EPID NO. L-2021-NFA-0005)

Dear Dr. McDeavitt:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 19 to Renewed Facility Operating License No. R-83 for the Texas Engineering Experiment Station/Texas A&M University System. This amendment removes the expiration date from license conditions 2.B.2.d, 2.B.2.e, and 2.B.3.d that allow possession of the special nuclear material and byproduct material associated with the Aerojet General Nucleonics (AGN-201M) reactor and its plutonium-beryllium (Pu-Be) startup source. This amendment is in response to your application dated May 3, 2021 (Agencywide Documents Access and Management System Accession No. ML21123A292).

The amendment authorizes additional time to possess and store the AGN-201M reactor fuel, control rods, and Pu-Be start up source at the Nuclear Science Center until such time that the material can be subsequently transferred to the AGN-201M (R-23) license

A copy of the NRC staff's safety evaluation is also enclosed. If you have any questions, please contact me at (301) 415-3936, or by electronic mail at Patrick.Boyle@nrc.gov.

Sincerely,

/RA/

Patrick Boyle, 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. 50-128
License No. R-83

Enclosures:
1. Amendment No. 19 to Renewed Facility Operating License No. R-83
2. Safety Evaluation

cc w/enclosures: See next page

cc:

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

Governor's Budget and
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PO Box 12428
Austin, TX 78711-2428

Dr. Dimitris C. Lagoudas, Deputy Director
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Ashley Forbes, Director
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Test, Research and Training
Reactor Newsletter
Attention: Ms. Amber Johnson
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University of Maryland
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College Park, MD 20742-2115

Scott Miller, Reactor Operations Manager
Texas A&M University
Texas Engineering Experiment Station
1095 Nuclear Science Road, MS 3575
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State Energy Conservation Office
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P.O. Box 13528
Austin, TX 78711-3528

SUBJECT: TEXAS ENGINEERING EXPERIMENT STATION/TEXAS A&M UNIVERSITY SYSTEM – ISSUANCE OF AMENDMENT NO. 19 TO RENEWED FACILITY OPERATING LICENSE NO. R-83 FOR THE TEXAS ENGINEERING EXPERIMENT STATION/TEXAS A&M UNIVERSITY SYSTEM NUCLEAR SCIENCE CENTER RE: REMOVAL OF LICENSE CONDITION POSSESSION LIMIT EXPIRATION DATE (EPID NO. L-2021-NFA-0005) DATED: JULY 22, 2021

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ADAMS Accession No.: ML21146A192 **NRR-058**

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NAME	JBorromeo	PBoyle	
DATE	7/22/2021	7/22/2021	

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

TEXAS ENGINEERING EXPERIMENT STATION/TEXAS A&M UNIVERSITY SYSTEM

DOCKET NO. 50-128

TEXAS ENGINEERING EXPERIMENT STATION/TEXAS A&M UNIVERSITY SYSTEM

NUCLEAR SCIENCE CENTER

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 19
Renewed License No. R-83

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to Renewed Facility Operating License No R-83 filed by the Texas Engineering Experiment Station/Texas A&M University System dated May 3, 2021, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as 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 (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   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 notice for this amendment is not required by 10 CFR 2.106, "Notice of issuance."

2. Accordingly, the license is amended by revised license conditions 2.B.2.d, 2.B.2.e, and 2.B.3.d to read as follows:

   2. Pursuant to the Act and 10 CFR Part 70, the following activities are included:

      d. To receive, possess, but not use up to 0.7 kilograms of contained Uranium-235 as <20% enriched ^{235}U Fuel – AGN -201M, and any special nuclear materials produced by the operation of the AGN-201M reactor.

      e. To receive, possess, but not use up to 0.020 kilograms of ^{239}Pu as a ^{239}PuBe AGN-201M Neutron Start Up Source in connection with storage of the AGN-201M reactor.

   3. Pursuant to the Act and 10 CFR Part 30, the following activities are included:

      d. to receive, possess, but not use, byproduct materials including contaminated or activated Fuel - AGN-201M and AGN-201M Neutron Start Up Source.

3. Accordingly, the license is amended by changes to the technical specifications as indicated in the attachment to this license amendment, and paragraph 2.C.2 of Renewed Facility Operating License No. R-83 is hereby amended to read as follows:

   Technical Specifications

   The Technical Specifications contained in Appendix A, as revised by license Amendment No. 19, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

4. 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

/RA/

Joshua 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

Attachment:
Changes to Renewed Facility
Operating License No. R-83

Date of Issuance: July 22, 2021

ATTACHMENT TO LICENSE AMENDMENT NO. 19

RENEWED FACILITY OPERATING LICENSE NO. R-83

DOCKET NO. 50-128

Replace the following page of the Renewed Facility Operating License No. R-83 with the revised pages. The revised pages are identified by amendment number and contains marginal lines indicating the areas of change.

Renewed Facility Operating License

Remove	Insert
3	3
4	4

Attachment

c. to receive, possess, and use, but not separate, in connection with the operation of the facility, such special nuclear material as may be produced by the operation of the facility.

d. To receive, possess, but not use up to 0.7 kilograms of contained Uranium-235 <20% enriched ^{235}U Fuel – AGN-201M, and any special nuclear materials produced by the operation of the AGN-201M reactor.

e. To receive, possess, but not use up to 0.020 kilograms of ^{239}Pu as a $^{239}PuBe$ AGN-201M Neutron Start Up Source in connection with storage of the AGN-201M reactor.

3. Pursuant to the Act and 10 CFR Part 30, the following activities are included:

a. to receive, possess, and use, in connection with the operation of the facility, a sealed antimony-beryllium neutron startup source,

b. to receive, possess, and use, in connection with the operation of the facility, a sealed 2.5-curie americium-beryllium neutron source; and,

c. to receive, possess, and use, in connection with operation of the facility, such byproduct material as may be produced by operation of the reactor, which cannot be separated except for byproduct material produced in reactor experiments.

d. to receive, possess, but not use, byproduct materials including contaminated or activated Fuel - AGN-201M and AGN-201M Neutron Start Up Source.

4. Pursuant to the Act and 10 CFR Part 40, “Domestic Licensing of Source Material,” to receive, possess, and use in connection with operation of the facility, not more than 6.8 kilograms of source material.

C. This license shall be deemed to contain, and is subject to the conditions specified 10 CFR Parts 20, 30, 40, 50, 51, 55, 70, and 73 of the Commission’s regulations; is subject to all 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 a steady-state power level up to a maximum of 1000 kilowatts (thermal) and to pulse the reactor in accordance with the limitations in the Technical Specifications..

2. Technical Specifications

The Technical Specifications contained in Appendix A, as revised by license Amendment No. 19, are hereby incorporated in their entirety in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. Physical Security Plan

The licensee shall maintain and fully implement all provisions of the Commission-approved physical security plan, including changes made pursuant to the authority of 10 CFR 50.54(p). The approved physical security plan, entitled "Texas A&M Engineering Experiment Station, Nuclear Science Center, Physical Security Plan for the Protection of Special Nuclear Material, Facility Operating License R-83, Docket Number 50-128, March 2015," consists of documents withheld from public disclosure pursuant to 10 CFR 73.21.

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

For the Nuclear Regulatory Commission

/RA/

William M. Dean, Director
Office of Nuclear Reactor Regulation

Attachment:
Appendix A, Technical Specifications

Date of Issuance: October 1, 2015

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 19 TO

RENEWED FACILITY OPERATING LICENSE NO. R-83

TEXAS ENGINEERING EXPERIMENT STATION/TEXAS A&M UNIVERSITY SYSTEM

NUCLEAR SCIENCE CENTER REACTOR

DOCKET NO. 50-128

1.0 INTRODUCTION

By letter dated May 3, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21123A292), the Texas Engineering Experiment Station/Texas A&M University System (TEES/TAMUS, the licensee), submitted a license amendment request (LAR) under the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," to the U.S. Nuclear Regulatory Commission (NRC) to amend the TEES Nuclear Science Center (NSC), Training, Research, and Isotope Production, General Atomics (TRIGA) Reactor (the facility) renewed Facility Operating License No. R-83. TAMUS requested deletion of the possession time limits in license conditions 2.B.2.d, 2.B.2.e, and 2.B.3.d, which allow possession of the special nuclear material (SNM) and byproduct material from the Aerojet General Nucleonics (AGN-201M) reactor and its plutonium-beryllium (Pu-Be) startup source. The expiration dates of the license conditions became part of the license when License Amendment No. 18 (ADAMS Accession No. ML16109A153), issued on August 31, 2016.

2.0 EVALUATION

License Amendment No. 18 to Renewed Facility Operating License No. R-83 authorized TEES/TAMUS to receive and temporarily store but not use, the SNM and byproduct material associated with the AGN-201M reactor from Facility Operating License No. R-23. The licensee requested the amendment to allow temporary storage of the materials at the TRIGA facility due to the need to move the AGN-201M to another location. Following the granting of License Amendment No. 18, the AGN-201M fuel (which is defined in TRIGA technical specification (TS) 1.3 as fuel discs, fueled control rod ends, and a core thermal fuse) and Pu-Be source (aka neutron startup source) were transferred to License No. R-83 and stored in the fuel storage room at the NSC.

License Conditions 2.B.2.d, 2.B.2.e, and 2.B.3.d each include the statement "for up to 5 years from the date of issuance of License Amendment No. 18." The 5-year possession time limit was consistent with TAMUS' construction plans at the time License Amendment No. 18 was issued, however, delays in the construction project have resulted in the need to remove the time restriction on possession of the AGN-201M materials identified in the above-listed License

Conditions. TEES/TAMUS requested removal of the expiration statement from the affected license conditions because it wants to store the AGN-201M materials at its TRIGA facility until TAMUS receives NRC permission to install the AGN-201M at a newly constructed location and TAMUS still plans to possess and use the materials in connection with its AGN-201M reactor license (No. R-23) and requested more flexibility in implementing the construction schedule. The TSs, as revised by License Amendment No. 18, specify the storage location of the AGN-201M fuel and startup source at the NSC. The licensee stated in the LAR that no changes to the TSs are necessary or requested.

In its letter dated May 3, 2021, the licensee indicated that the expiration date in the license conditions was not part of the safety analysis to store the material at the TEES. In addition, the safety evaluation (SE) related to License Amendment No. 18, which added license conditions that included material possession expiration dates regarding the AGN-201M fuel and startup source, did not rely on the time limitation in order to make a safety finding or conclusion (ADAMS Accession No. ML16109A153).

The NRC staff reviewed the licensee's May 3, 2021, LAR and determined that the possession and storage period of materials associated with the AGN-201M reactor need not be subject to an expiration date. In the SE related to License Amendment No. 18, the NRC staff reviewed the storage location and associated safety analysis, and concluded that the temporary storage location for the AGN-201M reactor fuel and startup source provides adequate assurance of safety and security. The NRC staff conclusion was made based on conditions assumed in the analyses being maintained consistent with requirements in fuel storage TSs and did not depend on the storage period being time limited. The conclusion was also based on the licensee's physical security plan requirements and the presence of a NSC fuel storage room radiation monitor, which can detect an inadvertent criticality consistent with the requirements of 10 CFR 70.24, "Criticality accident requirements," paragraph (a)(2). As a result, the NRC staff finds that the criticality analysis, radiological safety, and security matters reviewed in the prior SE support the proposed deletion of the time limitation in the three license conditions. In addition, the fission products in the AGN-201M fuel and small amount of plutonium in the startup source will continue to during storage.

The NRC staff also reviewed the TSs, as revised by License Amendment No. 18, and concludes that they continue to ensure adequate protection, radiological monitoring (under the Radiation Safety Program required by TS 6.3), and secure storage for continued possession of the AGN-201 reactor fuel and startup source at the NSC. TS 5.6, "Fuel Storage," requires that "Fuel-AGN-201M" (defined by TS as cylindrical discs , fueled control rod ends, and a core thermal fuse) "be stored in a geometrical array for which the k-effective (k_{eff}) is less than 0.8 for all conditions of moderation and reflection." TS 5.6.3 prohibits additional SNM from being in the fuel storage room while the AGN-201M reactor fuel and startup source are being stored in that room. Additionally, the NRC staff finds that the AGN-201M reactor fuel and startup source (which includes SNM and associated byproduct material) can be safely stored as specified in License Amendment No. 18 until they are installed in a newly-licensed AGN-201M location. The NRC staff further finds that the TRIGA license conditions, physical security plan requirements, and TSs contain provisions to ensure that the AGN-201M reactor fuel can be safely and securely stored at the TRIGA facility and that there is no safety reason to limit the storage period. Therefore, the NRC staff concludes that the proposed changes that remove the 5-year possession time limit in license conditions 2.B.2.d, 2.B.2.e, and 2.B.3.d are acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

The regulation, 10 CFR 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," paragraph (a) states that licensing actions may be found eligible for a categorical exclusion if the action does not individually or cumulatively have a significant effect on the human environment. The NRC staff has determined that the amendment involves changes in the use of a facility component in that it allows an extension of the time period to store components (the AGN-201M reactor fuel, (consisting of fuel plates, a core thermal fuse, and control rod ends) and neutron startup source) within the restricted area, as defined in 10 CFR Part 20, "Standards for Protection against Radiation." The fuel storage room where the items are stored are within the site boundary, which the NSC SAR (ADAMS Accession No. ML102920025), defines as the restricted area boundary consistent with 10 CFR Part 20. The issuance of this amendment meets the requirements for categorical exclusion under 10 CFR 51.22(c)(9), provided that:

(i) The amendment or exemption involves no significant hazards consideration; [10 CFR 51.22(c)(9)(i)]

The regulations in 10 CFR 50.92, "Issuance of amendment," state that the NRC may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility, in accordance with the amendment, would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or [10 CFR 50.92(c)(1)]

The proposed license amendment extends the time that the AGN-201M fuel and neutron startup source can be stored, but not used, at the TRIGA/NSC facility by removing the 5-year time limit in license conditions. The amendment does not alter the reactor design, reactor operating procedures or TS requirements that prevent or mitigate accidents. Because the material is not being used in or near the TRIGA core, it is does not impact the probability or consequence any previously analyzed accident with respect to TRIGA reactor operation.

The proposed amendment does not change the probability or consequences of storage accidents postulated at the facility. American National Standards Institute/American Nuclear Society (ANSI/ANS)-15.1-1990, "The Development of Technical Specifications for Research Reactors," includes standards for the content of TSs and specifies limits on fissionable material (e.g., reactor fuel) storage. The ANSI/ANS-15.1-1990 specifies that the nuclear material be stored in a geometric array where k_{eff} is not greater than 0.90 for all conditions of moderation and reflection. TS 5.6, Specification 1, continues to require that fuel be stored in a geometrical array that limits the k_{eff} value to 0.8, which is stricter than the 0.9 k_{eff} value in NUREG-1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Format and Content," guidance and the ANSI/ANS-15.1-1990 standard. The restrictions on k_{eff} values help ensure that a criticality accident does not occur while the material is in storage. The lower the k_{eff} value is, the less likely a criticality will occur. The continued decay of the radioactive materials during storage further reduces the consequences of an accident release since less radioactive material is available to be released during an accident.

Because the proposed license amendment does not alter TS 5.6 k_{eff} limits; it does not involve a significant increase in the probability or consequences of a storage accident previously evaluated.

Therefore, the NRC staff concludes that the proposed changes do not significantly increase the probability or consequences of an accident previously evaluated.

(2) *Create the possibility of a new or different kind of accident from any accident previously evaluated; or* [10 CFR 50.92(c)(2)]

The proposed changes extend the time to store AGN-201M SNM (fuel and neutron startup source) and byproduct material contained therein in a previously approved location. The amendment does not allow their use in the TRIGA reactor and does not authorize any change in reactor design, hardware or operations. TS 5.6.1 limits the geometry within the storage location and TS 5.6.3 prohibits storage of other SNM while the AGN-201M fuel and startup source are in the fuel storage room. As a result, the amendment does not change requirements on storage conditions or configurations that prevent the occurrence of a criticality accident. Therefore, the facility conditions for which the postulated operating reactor or fuel storage accidents have been evaluated remain valid and no new accident scenarios, failure mechanisms, or single failures are introduced by storage of this material at the facility.

For these reasons, the presence of AGN-201M fuel and Pu-Be neutron startup source in the fuel storage location does not create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) *Involve a significant reduction in a margin of safety.* [10 CFR 50.92(c)(3)]

The margin of safety related to operation of the TRIGA reactor is based on fuel temperatures while the reactor is operating and maintaining sufficient cooling. Since the AGN-201M SNM and byproduct material is not used for the operation of the TRIGA reactor or related equipment, the margin of safety for the TRIGA reactor is unaffected. Because the proposed changes do not alter the 0.8 k_{eff} limit currently applicable to storage of AGN-201M fuel, the proposed changes to do not involve a reduction in a margin of safety.

Therefore, the NRC staff concludes that this amendment involves no significant hazards.

(ii) *There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite; and* [10 CFR 51.22(c)(9)(ii)]

The AGN-201M fuel and startup source, will continue to be stored, but not used at the NSC facility. The AGN-201M fuel matrix is designed to retain fission products produced during operation of the reactor. The existing fission product inventory (source term) in the fuel is extremely low since the reactor has not operated for several years. During the additional storage period, the AGN-201M fission product inventory will continue to decrease due to radioactive decay of the fission products. The startup source is a sealed source designed for minimal leakage. Because no additional radioactive materials will be produced, the potential for release is very small and the quantities available for release are very limited. In addition, the amendment does not alter any equipment associated with operation of the TRIGA reactor. For these reasons, the NRC staff finds that there is no significant change in

the types or significant increase in the amounts of any effluents that may be released offsite due to storage of the AGN-201M fuel and Pu-Be neutron startup source at the NSC facility.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure. [10 CFR 51.22(c)(9)(iii)]

The proposed amendment would allow TAMUS/TEES to continue to possess and store the AGN-201M fuel and a startup source in a room with radiological control features and that is separate from the normal building access areas. No additional shielding is needed to mitigate the radiation levels of the AGN-201M fuel or the startup source as the existing radiation levels are extremely low. During the additional storage period, the radiation levels emitted by the stored materials will continue to decrease because of radiological decay of the fission products within the fuel. Additional radiological decay of the Pu-Be source is minimal, because of the long half-life (24,100 years) of the plutonium isotope used in the Pu-Be source. Furthermore, the amendment will not change the radiation protection program at the NSC for limiting individual or cumulative occupational radiation doses. Therefore, the NRC staff finds that there is no significant increase in individual or cumulative occupational radiation exposure.

Based on the above, the NRC staff determined that the amendment involves no significant hazards. The staff also determined that amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). 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.

4.0 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 Contributor: P. Boyle, NRR

Date: July 22, 2021