

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

LICENSE AUTHORITY FILE COPY

February 26, 1969

Do Not Remove

Docket No. 50-59

Texas A&M University
College of Engineering
College Station, Texas 77843

Attention: Dr. Earl Rudder
President

Gentlemen:

Amendment No. 8 to Facility License No. R-23 is enclosed. The amendment incorporates Technical Specifications into the license for operation of your Model AGN-201, Serial No. 106, nuclear reactor facility, including the performance of critical experiments dealing with core disassembly and critical loading, in accordance with the University's application dated May 15, 1968. The amendment also revises the license in its entirety to (1) consolidate the provisions of previously issued amendments and the order dated March 16, 1961, (2) restate the reporting requirements, and (3) expand the record keeping section.

A copy of the Notice of Issuance which is being filed with the Office of the Federal Register for publication and a copy of our related Safety Evaluation are also enclosed.

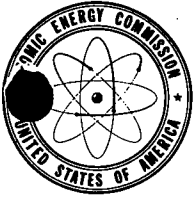
Sincerely,

A handwritten signature in cursive script, reading "Donald J. Skovholt", is written over the typed name.

Donald J. Skovholt
Assistant Director for Reactor Operations
Division of Reactor Licensing

Enclosures:

1. Amendment No. 8 to License No. R-23
2. Federal Register Notice
3. Safety Evaluation



UNITED STATES
ATOMIC ENERGY COMMISSION

WASHINGTON, D.C. 20545
TEXAS A&M UNIVERSITY

DOCKET NO. 50-59

AMENDED FACILITY LICENSE

License No. R-23
Amendment No. 8

The Atomic Energy Commission ("the Commission") has found that:

1. The application for license, as amended, complies with the requirements of the Atomic Energy Act of 1954, as amended (hereinafter, "the Act"), and the Commission's regulations set forth in Title 10, CFR, Chapter 1;
2. The reactor will be operated in conformity with the (a) application and (b) rules and regulations of the Commission;
3. There is reasonable assurance that the reactor can be operated at the designated location without endangering the health and safety of the public;
4. Texas A&M University is technically and financially qualified to operate the reactor and to assume financial responsibility for the payment of Commission charges for special nuclear material and to undertake and carry out the proposed activities in accordance with the Commission's regulations;
5. The issuance of this license, as amended, for possession, use and operation of the reactor and the receipt, possession and use of the special nuclear material in the manner proposed by Texas A&M University in its application will not be inimical to the common defense and security or to the health and safety of the public;
6. Texas A&M University is a nonprofit educational institution and will use the reactor for the conduct of educational activities and is therefore exempt from the financial protection requirement of subsection 170a of the Act. The University has executed an indemnity agreement pursuant to 10 CFR Part 140; and
7. Prior public notice of proposed issuance of this license amendment is not required since the operation of the reactor in accordance with the terms of the license, as amended, does not involve significant hazard considerations different from those previously evaluated.

Facility License No. R-23, as amended, is hereby amended in its entirety to read:

1. This license applies to the Model AGN-201, Serial No. 106, nuclear reactor (herein, "the reactor") which is owned by the Texas A&M University (hereinafter, "the licensee" or "the University") and located on its campus at College Station, Texas, and is described in the licensee's application for license dated June 13, 1957, and subsequent amendments thereto, including the amendment dated May 15, 1968 (herein referred to as "the application").
2. Subject to the conditions and requirements incorporated herein, the Commission hereby licenses the University:
 - A. Pursuant to Section 104c of the Act and Title 10, CFR, Chapter 1, Part 50, "Licensing of Production and Utilization Facilities", to possess, use and operate the reactor as a utilization facility at the designated location in College Station, Texas, in accordance with the procedures and limitations described in the application and in this license.
 - B. Pursuant to the Act and Title 10, CFR, Chapter 1, Part 70, "Special Nuclear Material", to receive, possess and use up to 700 grams of contained U-235 in connection with operation of the reactor.
 - C. Pursuant to the Act and Title 10, CFR, Chapter 1, Part 30, "Rules of General Applicability to Licensing of Byproduct Material", to possess, but not to separate, such byproduct material as may be produced by operation of the reactor.
3. This license shall be deemed to contain and be subject to the conditions specified in Part 20, Section 30.34 of Part 30, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70 of the Commission's regulations; is subject to all applicable provisions of the Act and rules, regulations and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

A. Maximum Power Level

The University may operate the reactor:

- (1) at steady-state power levels up to a maximum of 100 milliwatts (thermal), and
- (2) at up to 200 milliwatts (thermal) using short-term increases of power for the sole purpose of calibrating the safety channels.

B. Technical Specifications

The Technical Specifications contained in Appendix A to this license (hereinafter, "the Technical Specifications") are hereby incorporated in this license. The licensee shall operate the reactor in accordance with the Technical Specifications. No changes shall be made in the Technical Specifications unless authorized by the Commission as provided in 10 CFR Section 50.59.

C. Reports

In addition to reports otherwise required under this license and applicable regulations:

- (1) The licensee shall inform the Commission of any incident or condition relating to the operation of the reactor which prevented or could have prevented a nuclear system from performing its safety function as described in the Technical Specifications or in the Hazards Summary Report, as amended (hereinafter, "safety analysis report"). For each such occurrence, the licensee shall promptly notify by telephone or telegraph the Director of the appropriate Atomic Energy Commission Regional Compliance Office listed in Appendix D of 10 CFR 20 and shall submit within ten (10) days a report in writing to the Director, Division of Reactor Licensing (hereinafter, "the Director, DRL"), with a copy to the Regional Compliance Office.
- (2) The licensee shall report to the Director, DRL, in writing within thirty (30) days of its observed occurrence any substantial variance disclosed by operation of the reactor from performance specifications contained in the safety analysis report or the Technical Specifications.

- (3) The licensee shall report to the Commission in writing within thirty (30) days of its occurrence any significant change in transient or accident analysis as described in the safety analysis report.

D. Records

In addition to those otherwise required under this license and applicable regulations, the licensee shall keep the following records:

- (1) Reactor operating records, including power levels and periods of operation at each power level.
 - (2) Records of experiments installed including description, reactivity worths, locations, exposure time, total irradiation and any unusual events involved in their performance and in their handling.
 - (3) Records showing radioactivity released or discharged into the air or water beyond the effective control of the licensee as measured at or prior to the point of such release or discharge.
 - (4) Records of emergency shutdowns and inadvertent scrams, including reasons therefor.
 - (5) Records of maintenance operations involving substitution or replacement of reactor equipment or components.
 - (6) Records of tests and measurements performed pursuant to the Technical Specifications.
4. This license, as amended, is effective as of the date of issuance and shall expire at midnight, August 26, 1977, unless sooner terminated.

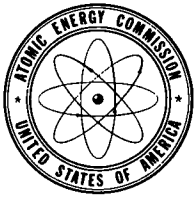
FOR THE ATOMIC ENERGY COMMISSION



Donald J. Skovholt
Assistant Director for Reactor Operations
Division of Reactor Licensing

Attachment:
Appendix A - Technical Specifications

Date of Issuance: February 26, 1969



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

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LICENSE AUTHORITY FILE COPY

February 4, 1972

Docket No. 50-59

Texas A&M University
ATTN: Mr. A. R. Luedecke
Executive Vice President
College Station, Texas 77843

Gentlemen:

In accordance with your application dated November 3, 1970, Amendment No. 9 to Facility License No. R-23 is enclosed. The amendment authorizes the University to operate its AGN-201 (Serial No. 106) nuclear reactor in the new Engineering Center Building at the previously approved licensed power level of 100 milliwatts (thermal). As required by Commission regulations, a notice (copy enclosed) has been filed with the Office of the Federal Register for publication.

Two copies of Amendment No. 9 to Indemnity Agreement No. E-12 are enclosed for your signature and return of one copy to this office.

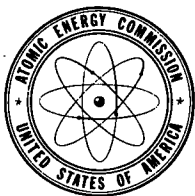
Sincerely,

A handwritten signature in cursive script, reading "Donald J. Skovholt", is written over the typed name.

Donald J. Skovholt
Assistant Director for
Reactor Operations
Division of Reactor Licensing

Enclosures:

1. Amendment No. 9 to
Facility License No. R-23
2. Federal Register Notice
3. Amendment to Indemnity
Agreement (2 copies)



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

TEXAS A&M UNIVERSITY

DOCKET NO. 50-59

FACILITY LICENSE AMENDMENT

License No. R-23
Amendment No. 9

The Atomic Energy Commission ("the Commission") has found that:

1. The application for license amendment dated November 3, 1970, complies with the requirements of the Atomic Energy Act of 1954, as amended ("the Act"), and the Commission's regulations set forth in 10 CFR Chapter I;
2. There is reasonable assurance that the reactor can be operated at the new location without endangering the health and safety of the public; and
3. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Facility License No. R-23 issued to the Texas A&M University is hereby amended to authorize the University to operate the reactor at the new location in accordance with the terms of the license.

Accordingly, paragraph 1 on page 2 of Facility License No. R-23 is amended (to add the application for relocation of the reactor) to read:

- "1. This license applies to the Model AGN-201, Serial No. 106, nuclear reactor (herein, 'the reactor') which is owned by the Texas A&M University (hereinafter, 'the licensee' or 'the University') and located on its campus at College Station, Texas, and is described in the licensee's application for license dated June 13, 1957, and subsequent amendments thereto, including the amendment dated May 15, 1968 and November 3, 1970, (herein referred to as 'the application')."

This license amendment is effective as of the date of issuance.

FOR THE ATOMIC ENERGY COMMISSION

A handwritten signature in dark ink, appearing to read "Donald J. Skovholt", is written over the typed name.

Donald J. Skovholt
Assistant Director for
Reactor Operations
Division of Reactor Licensing

Date of Issuance: February 4, 1972

UNITED STATES ATOMIC ENERGY COMMISSION

TEXAS A&M UNIVERSITY

DOCKET NO. 50-59

NOTICE OF ISSUANCE OF FACILITY LICENSE AMENDMENT

No request for a hearing or petition to intervene having been filed following publication of the notice of proposed action in the Federal Register on February 20, 1971 (36 F. R. 3278), the Atomic Energy Commission ("the Commission") has issued Amendment No. 9 to Facility License No. R-23 to the Texas A&M University as proposed in that notice. The amendment authorizes the University to operate its AGN-201 nuclear reactor in the new location in the Engineering Center Building on its campus at College Station, Texas, at its previously licensed power level of 100 milliwatts (thermal) in accordance with the University's application dated November 3, 1970.

The facility has been inspected by Commission representatives who have concluded that relocation and reconstruction of the facility has been completed in accordance with the provisions of Construction Permit No. CPRR-112 and the application.

The Commission has found that the application, as amended, for the amendment to the facility license complies with the requirements of the Atomic Energy Act of 1954 ("the Act"), as amended, and the Commission's regulations published in 10 CFR Chapter I. The Commission has made the findings required by the Act and the Commission's regulations, which are

set forth in the license amendment, and has concluded that the issuance of the license amendment will not be inimical to the common defense and security or to the health and safety of the public.

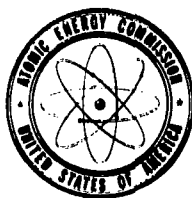
A copy of the license amendment is available for inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C., or may be obtained upon request sent to the U. S. Atomic Energy Commission, Washington, D. C. 20545, Attention: Director, Division of Reactor Licensing.

Dated at Bethesda, Maryland, this 4th day of February 1972.

FOR THE ATOMIC ENERGY COMMISSION



Donald J. Skovholt
Assistant Director for
Reactor Operations
Division of Reactor Licensing



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

January 18, 1973

Docket No. 50-59

LICENSE AUTHORITY FILE COPY

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Texas A&M University
ATTN: Mr. A. R. Luedecke
Executive Vice President
College Station, Texas 77843

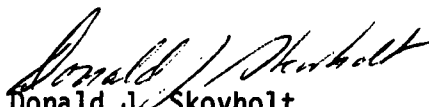
Gentlemen:

In accordance with your application dated September 27, 1972, Amendment No. 10 to Facility License No. R-23 is enclosed. This amendment authorizes operation of your AGN-201 reactor at power levels up to 5 watts (thermal) and redesignates the reactor as Model AGN-201M. Prior to operation of the reactor at 5 watts, the modifications shall have been completed as described in your application dated September 27, 1972, and evaluated by us in our Safety Evaluation dated December 13, 1972.

Your proposed changes to the Technical Specifications for operation at 5 watts have been reviewed pursuant to Section 50.59 of 10 CFR Part 50. We have determined that there is reasonable assurance that the health and safety of the public will not be endangered by operation of the reactor in the manner proposed. Consequently, the Technical Specifications of Facility License No. R-23 are hereby changed as set forth in the enclosed Change No. 2.

As required by Commission regulations, the enclosed Notice of Issuance of Facility License Amendment has been filed with the Office of the Federal Register for publication.

Sincerely,


Donald J. Skovholt
Assistant Director
for Operating Reactors
Directorate of Licensing

Enclosures and cc:
See next page

January 18, 1973

Enclosures:

1. Amendment No. 10
2. Change No. 2
3. Federal Register Notice

cc w/enclosures:

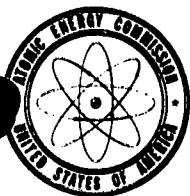
Honorable Preston Smith
Governor of Texas
Austin, Texas 78711

J. E. Pevy, M. D.
Commissioner of Health
State Department of Health
1100 West 49th Street
Austin, Texas 78785

Mr. J. B. Roberts, Chairman
Industrial Accident Board
State Finance Building
Austin, Texas 78701

Mr. Martin C. Wukasch, Director
Division of Occupational Health
and Radiation Control
Texas State Department of Health
Austin, Texas 78756

Mr. D. A. Anderson
Mayor, City of College Station
College Station, Texas 77843



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

TEXAS A&M UNIVERSITY

Amend w/ change No 2

DOCKET NO. 50-59

AMENDMENT TO FACILITY LICENSE

Amendment No. 10
License No. R-23

The Atomic Energy Commission ("the Commission") has found that:

1. The application for license amendment dated September 27, 1972, complies with the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations set forth in 10 CFR Chapter I;
2. There is reasonable assurance (i) that the activities authorized by this operating license, as amended, can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the rules and regulations of the Commission, and
3. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Accordingly, Facility License No. R-23, as amended, issued to the Texas A&M University, is hereby further amended as indicated below to authorize operation of the reactor at 5 watts:

1. Change the second paragraph numbered as 1 to read:

"1. This license applies to the Model AGN-201M, Serial No. 106, nuclear reactor (herein, 'the reactor') which is owned by the Texas A&M University (hereinafter, 'the licensee' or 'the University') and located on its campus at College Station, Texas, and is described in the licensee's application for license dated June 13, 1957, and subsequent amendments thereto, including the amendments dated May 15, 1968, November 3, 1970, and September 27, 1972 (herein referred to as 'the application')."

January 18, 1973

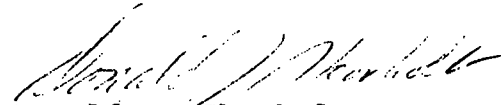
2. Change subparagraph 3.A (Maximum Power Level) in its entirety to read:

"3.A. Maximum Power Level

The University is authorized to operate the reactor at steady-state power levels up to a maximum of 5 watts (thermal)."

This amendment is effective as of its date of issuance.

FOR THE ATOMIC ENERGY COMMISSION



Donald J. Skovholt
Assistant Director
for Operating Reactors
Directorate of Licensing

Date of Issuance: January 18, 1973

UNITED STATES ATOMIC ENERGY COMMISSION

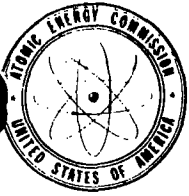
DOCKET NO. 50-59

TEXAS A&M UNIVERSITY

NOTICE OF ISSUANCE OF FACILITY LICENSE AMENDMENT

No request for a hearing or petition for leave to intervene having been filed following publication of the notice of proposed action in the Federal Register on December 15, 1972 (37 F. R. 26749), the Atomic Energy Commission ("the Commission") has issued Amendment No. 10 to Facility License No. R-23 to the Texas A&M University as proposed in that notice. The amendment authorizes the University to operate its modified AGN-201 nuclear reactor located on its campus in College Station, Texas, at increased power levels of up to 5 watts (thermal) (from 100 milliwatts) and redesignates the reactor as Model AGN-201M, in accordance with the University's application dated September 27, 1972.

The Commission has found that the application for the amendment to the facility license complies with the requirements of the Atomic Energy Act of 1954, as amended ("the Act"), and the Commission's regulations published in 10 CFR Chapter I. The Commission has made the findings required by the Act and the Commission's regulations, which are set forth in the license amendment, and has concluded that the issuance of the license amendment will not be inimical to the common defense and security or to the health and safety of the public.



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

M. Jinks (4)
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NOV 13 1973

Docket No. 50-59

Texas A&M University
ATTN: General A. R. Luedecke
Executive Vice President
College Station, Texas 77843

Gentlemen:

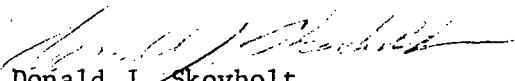
We have completed our review of your application dated September 20, 1973, for an amendment to Facility Operating License No. R-23 to include the receipt, possession, and use of a 16-gram plutonium-beryllium startup source for your AGN-201M research reactor facility. From our review, we have concluded that the application complies with the applicable Commission rules and regulations and that the issuance of the amendment for the source will not be inimical to the common defense and security or to the health and safety of the public.

Plutonium-beryllium is being used as a startup source for a number of operating facilities. The reactivity effect of source withdrawal on the Texas A&M AGN-201 core is shown to be about 25% less for the same source positions when using Pu-Be than was experienced using Ra-Be as the source material. The gamma radiation level measured at the access port, with Pu-Be, during shutdown was about 0.35 mr/hr. Consequently, we also have concluded that the use of Pu-Be as the startup source material in lieu of Ra-Be does not involve a significant hazards consideration.

Accordingly, Amendment No. 11 to Facility License No. R-23 is enclosed authorizing the use of a Pu-Be neutron source in connection with reactor operation.

Since this action does not involve a significant hazards consideration and the reactor is not of the type described in 50.21(b) or 50.22 of 10 CFR Part 50, or a testing facility, no public notice relating thereto is required to be published in the Federal Register.

Sincerely,


Donald J. Skovholt
Assistant Director for
Operating Reactors
Directorate of Licensing

Enclosure:
Amendment No. 11 to R-23

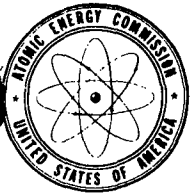
cc: See next page

NOV 13 1973

cc w/enclosure and 9/20/73 Application:
Mr. Walter Tibbits, Acting Director
Division of Planning Coordination
Office of the Governor
P. O. Box 12428
Capitol Station
Austin, Texas 78711

cc w/enclosure:
Mr. Martin C. Wukasch, Director
Division of Occupational Health
and Radiation Control
Texas State Department of Health
Austin, Texas 78756

Honorable D. A. Anderson
Mayor, City of College Station
College Station, Texas 77843



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

TEXAS A&M UNIVERSITY

DOCKET NO. 50-59

AMENDMENT TO FACILITY LICENSE

Amendment No. 11
License No. R-23

The Atomic Energy Commission ("the Commission") has found that:

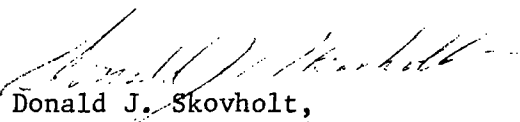
1. The application for license amendment dated September 20, 1973, complies with the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's rules and regulations set forth in 10 CFR Chapter I;
2. There is reasonable assurance (i) that the activities authorized by this operating license, as amended, can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the rules and regulations of the Commission;
3. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public, and does not involve a significant hazards consideration; and
4. Public notice of issuance of this license is not required since the action does not involve a significant hazards consideration and the reactor is not of the type described in 50.21(b) or 50.22 of 10 CFR Part 50, or a testing facility.

Accordingly, Facility Operating License No. R-23, as amended, issued to the Texas A&M University, is hereby further amended to revise paragraph 2.B in its entirety to read as follows:

"2.B. Pursuant to the Act and 10 CFR Part 70, "Special Nuclear Material," to receive, possess, and use up to 700 grams of contained U-235 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."

This amendment is effective as of its date of issuance.

FOR THE ATOMIC ENERGY COMMISSION


Donald J. Skovholt,
Assistant Director for
Operating Reactors
Directorate of Licensing

Date of Issuance: NOV 13 1973



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

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May 24, 1979

Posted

Docket No. 50-59

Dr. R. R. Berg
Office of University Research
Texas A&M University
College Station, Texas 77843

*Correction to
Am-12 to
R-23*

Dear Dr. Berg:

On April 25, 1979 the Commission issued Amendment No. 12 to Facility Operating License No. R-23 for the AGN-201M nuclear research/training reactor to renew your operating license and incorporate Technical Specifications consistent with the requirements of Section 50.36 of 10 CFR Part 50.

The Technical Specifications Appendix A which were transmitted with the amendment contain a number of incorrect pages. Please replace those pages with the enclosed corrected pages 1, 2, 3, 11, 12, 14, and 15.

We regret any inconvenience this administrative error may have caused you.

Sincerely,

Robert W. Reid

Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors

Enclosures:
TS pages 1, 2, 3, 11,
12, 14, & 15

cc w/enclosures:
See next page

Texas A&M University

-2-

cc w/enclosures:

Mayor of the City of College Station
College Station, Texas 77843

Director, Governor's Budget
and Planning Office
Executive Office Building
411 West 13th Street
Austin, Texas 78701

1.0

DEFINITIONS

The terms Safety Limit (SL), Limiting Safety System Setting (LSSS), and Limiting Conditions for Operation (LCO) are as defined in 50.36 of 10 CFR Part 50.

1.1

Channel Calibration - A channel calibration is an adjustment of the channel such that its output responds, within acceptable range and accuracy, to known values of the parameter which the channel measures. Calibration shall encompass the entire channel, including equipment, actuation, alarm, or trip.

1.2

Channel Check - A channel check is a qualitative verification of acceptable performance by observation of channel behavior. This verification may include comparison of the channel with other independent channels or methods measuring the same variable.

1.3

Channel Test - A channel test is the introduction of a signal into the channel to verify that it is operable.

1.4

Experiment -

a. An experiment is any of the following:

- (1) An activity utilizing the reactor system or its components or the neutrons or radiation generated therein;
- (2) An evaluation or test of a reactor system operational, surveillance, or maintenance technique;
- (3) An experimental or testing activity which is conducted within the reactor; or
- (4) The material content of any of the foregoing, including structural components, encapsulation or confining boundaries, and contained fluids or solids.

b. Secured Experiment - Any experiment, or component of an experiment is deemed to be secured, or in a secured position, if it is held in a stationary position relative to the reactor by mechanical means. The restraint shall exert sufficient force on the experiment to overcome the expected effects of hydraulic, pneumatic, bouyant, or other forces which are normal to the operating environment of the experiment or which might arise as a result of credible malfunctions.

c. Unsecured Experiment - Any experiment, or component of an experiment is deemed to be unsecured whenever it is not secured as defined in 1.4.b. above. Moving parts of experiments are deemed to be unsecured when they are in motion.

- d. Movable Experiment - A movable experiment is one which may be inserted, removed, or manipulated while the reactor is critical.
 - e. Removable Experiment - A removable experiment is any experiment, experimental facility, or component of an experiment, other than a permanently attached appurtenance to the reactor system, which can reasonably be anticipated to be moved one or more times during the life of the reactor.
- 1.5 Experimental Facilities - Experimental facilities are those portions of the reactor assembly that are used for the introduction of experiments into or adjacent to the reactor core region or allow beams of radiation to exit from the reactor shielding. Experimental facilities shall include the thermal column, glory hole, and access ports.
- 1.6 Explosive Material - Explosive material is any solid or liquid which is categorized as a Severe, Dangerous, or Very Dangerous Explosion Hazard in "Dangerous Properties of Industrial Materials" By N. I. Sax, Third Ed. (1968), or is given an Identification of Reactivity (Stability) index of 2, 3, or 4 by the National Fire Protection Association in its publication 704-M, 1966, "Identification System for Fire Hazards of Materials," also enumerated in the "Handbook for Laboratory Safety" 2nd Ed. (1971) published by The Chemical Rubber Company.
- 1.7 Measuring Channel - A measuring channel is the combination of sensor, lines, amplifiers, and output devices which are connected for the purpose of measuring or responding to the value of a process variable.
- 1.8 Operable - Operable means a component or system is capable of performing its intended function in its normal manner.
- 1.9 Operating - Operating means a component or system is performing its intended function in its normal manner.
- 1.10 Potential Reactivity Worth - The potential reactivity worth of an experiment is the maximum absolute value of the reactivity change that would occur as a result of intended or anticipated changes or credible malfunctions that alter experiment position or configuration.
- Evaluations of potential reactivity worth of experiments also shall include effects of possible trajectories of the experiment in motion relative to the reactor, its orientation along each trajectory, and circumstances which can cause internal changes such as creating or filling of void spaces or motion of mechanical components. For removable experiments, the potential reactivity worth is equal to or greater than the static reactivity worth.
- 1.11 Reactor Component - A reactor component is any apparatus; device, or material that is a normal part of the reactor assembly.
- 1.12 Reactor Operation - Reactor operation is any condition wherein the reactor is not shut down.

- 1.13 Reactor Safety System - The reactor safety system is that combination of safety channels and associated circuitry which forms the automatic protective system for the reactor or provides information which requires manual protective action be initiated.
- 1.14 Reactor Shutdown - The reactor shall be considered shutdown whenever
- a. either: 1. All safety and control rods are fully withdrawn from the core, or
 2. The core fuse melts resulting in separation of the core,
- and:
- b. The reactor console key switch is in the "off" position and the key is removed from the console and under the control of a licensed operator.
- 1.15 Safety Channel - A safety channel is a measuring channel in the reactor safety system.
- 1.16 Static Reactivity Worth - The static reactivity worth of an experiment is the absolute value of the reactivity change which is measurable by calibrated control or regulating rod comparison methods between two defined terminal positions or configurations of the experiment. For removable experiments, the terminal positions are fully removed from the reactor and fully inserted or installed in the normal functioning or intended position.

watt, and that the total gamma, thermal neutron, and fast neutron dose rate in the accelerator room is less than 15 mrem/hr at reactor power levels less than or equal to 5.0 watts and the thermal column filled with water.

The facility shielding in conjunction with radiation monitoring, control, and restricted areas is designed to limit radiation doses to facility personnel and to the public to a level below 10 CFR 20 limits under operating conditions, and to a level below criterion 19, Appendix A, 10 CFR 50 recommendations under accident conditions.

4.0 SURVEILLANCE REQUIREMENTS

Actions specified in this section are not required to be performed if during the specified surveillance period the reactor has not been brought critical or is maintained in a shutdown condition extending beyond the specified surveillance period. However, the surveillance requirements must be fulfilled prior to subsequent startup of the reactor.

4.1 - Reactivity Limits

Applicability

This specification applies to the surveillance requirements for reactivity limits.

Objective

To assure that reactivity limits for Specification 3.1 are not exceeded.

Specification

- a. Safety and control rod reactivity worths shall be measured annually, but at intervals not to exceed 16 months.
- b. Total excess reactivity and shutdown margin shall be determined annually, but at intervals not to exceed 16 months.
- c. The reactivity worth of an experiment shall be estimated or measured, as appropriate, before or during the first startup subsequent to the experiment's insertion.

Bases

The control and safety rods reactivity worths are measured annually to assure that no degradation or unexpected changes have occurred which could adversely affect reactor shutdown margin or total excess reactivity. The shutdown margin and total excess reactivity are determined to assure that the reactor can always be safely shut down with one rod not functioning and that the maximum possible reactivity insertion will not result in reactor periods shorter than those that can be adequately terminated by either operator or automatic action. Based on experience with AGN reactors, significant changes in reactivity or rod worth are not expected within a 16-month period.

4.2 Control and Safety Systems

Applicability

This specification applies to the surveillance requirements of the reactor control and safety systems.

Objective

To assure that the reactor control and safety systems are operable as required by Specification 3.2.

Specification

- a. Safety and control rod scram times and average reactivity insertion rates shall be measured annually, but at intervals not to exceed 16 months. .
- b. Safety and control rods and drives shall be inspected for deterioration at intervals not to exceed 2 years.
- c. A channel test of the following safety channels shall be performed prior to the first reactor startup of the day or prior to each reactor operation extending more than one day:

Nuclear Safety #1, #2, and #3

- d. A channel test of the seismic displacement interlock shall be performed semiannually.
- e. A channel check of the following safety channels shall be performed daily whenever the reactor is in operation:

Nuclear Safety #1, #2, and #3

- f. Prior to each day's reactor operation or prior to each reactor operation extending more than one day, safety rod #1 shall be inserted and scrambled to verify operability of the manual scram system.
- g. The period, count rate, and power level measuring channels shall be calibrated and set points verified annually, but at intervals not to exceed 16 months.
- 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.

Specification

- a. All portable radiation survey instruments assigned to the reactor facility shall be calibrated under the supervision of the Radiological Safety Officer annually, but at intervals not to exceed 16 months.
- b. Prior to each day's reactor operation or prior to each reactor operation extending more than one day, the reactor room high radiation area alarm shall be verified to be operable. (See Article 3.4.e).
- c. A radiation survey of the reactor room, reactor control room, and accelerator room shall be performed under the supervision of the Radiological Safety Officer annually, but at intervals not to exceed 16 months, to determine the location of radiation and high radiation areas corresponding to reactor operating power levels.

Bases

The periodic calibration of radiation monitoring equipment and the surveillance of the reactor room high radiation area alarm will assure that the radiation monitoring and control systems are operable during reactor operation. (See Article 3.4.e).

The periodic radiation surveys will verify the location of radiation and high radiation areas and will assist reactor facility personnel in properly labeling and controlling each location in accordance with 10 CFR 20.

5.0 DESIGN FEATURES

5.1 Reactor

- a. The reactor core, including control and safety rods, contains approximately 660 grams of U-235 in the form of <20% enriched UO_2 dispersed in approximately 11 kilograms of polyethylene. The lower section of the core is supported by an aluminum rod hanging from a fuse link. The fuse melts at a fuse temperature of about 120°C causing the lower core section to fall away from the upper section reducing reactivity by at least 5% $\Delta k/k$. Sufficient clearance between core and reflector is provided to insure free fall of the bottom half of the core during the most severe transient.
- b. The core is surrounded by a 20 cm thick high density (1.75 gm/cm^3) graphite reflector followed by a 10 cm thick lead gamma shield. The core and part of the graphite reflector are sealed in a fluid-tight aluminum core tank designed to contain any fission gases that might leak from the core.
- c. The core, reflector, and lead shielding are enclosed in and supported by a fluid-tight steel reactor tank. An upper or "thermal column tank" may serve as a shield tank when filled with water or a thermal column when filled with graphite.

- d. The 6½ foot diameter, fluid-tight shield tank is filled with water constituting a 55 cm thick fast neutron shield. The fast neutron shield is formed by filling the tank with approximately 1000 gallons of water. The complete reactor shield shall limit doses to operating personnel in unrestricted areas to levels less than permitted by 10 CFR 20 under operating conditions.
- e. Two safety rods and one control rod (identical in size) contain less than 20 grams of U-235 each in the same form as the core material. These rods are lifted into the core by electromagnets, driven by reversible DC motors through lead screw assemblies. Deenergizing the magnets causes a spring-driven, gravity-assisted scram. The fourth rod or fine control rod (approximately one-half the diameter of the other rods) is driven directly by a lead screw. This rod may contain fueled or unfueled polyethylene.

5.2 Fuel Storage

Fuel, including fueled experiments and fuel devices not in the reactor, shall be stored in locked rooms in the nuclear engineering department laboratories. The storage array shall be such that K_{eff} is no greater than 0.8 for all conditions of moderation and reflection.

5.3 Reactor Room, Reactor Control Room, Accelerator Room

- a. The reactor room houses the reactor assembly and accessories required for its operation and maintenance.
- b. The reactor control room houses the reactor control console.
- c. The accelerator room is directly above the reactor room and a hole in the accelerator room floor provides access to the thermal column.
- d. The reactor room, reactor control room, and accelerator room are separate rooms in the Zachry Engineering Center, constructed with adequate shielding and other radiation protective features to limit doses in restricted and unrestricted areas to levels no greater than permitted by 10 CFR 20, under normal operating conditions, and to a level below criterion 19, Appendix A, 10 CFR 50 recommendations under accident conditions.
- e. The access doors to the reactor room, reactor control room, and accelerator room shall contain locks.

6.0 ADMINISTRATIVE CONTROLS

6.1 Organization

The administrative organization for control of the reactor facility and its operation shall be as set forth in Figure 1 attached hereto. The authorities and responsibilities set forth below are designed to comply with the intent and requirements for administrative controls of the reactor facility as set forth by the Nuclear Regulatory Commission.



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

DO NOT REMOVE

April 25, 1979

Docket No. 50-59

Dr. R. R. Berg
Office of University Research
Texas A&M University
College Station, Texas 77843

Dear Dr. Berg:

The Commission has issued the enclosed Amendment No. 12 to Facility Operating License No. R-23 for the AGN-201M nuclear research/training reactor in response to your application dated May 31, 1977 and as supplemented September 29, 1978, December 11, 1978, and December 18, 1978, and March 23, 1979.

The amendment renews the facility operating license until August 26, 1997, and incorporates in the license the enclosed revised Technical Specifications that are consistent with the requirements of Section 50.36 of 10 CFR Part 50. These Technical Specifications, which have been discussed with and agreed to by your staff, provide a more concise and definitive statement of the limits of reactor operating parameters and surveillance measures required to assure these limits are not exceeded. The amendment also restates the license in its entirety, utilizing the current license format, and deletes those items that are now included in the Technical Specifications. The amendment also adds a paragraph to the license which identifies the currently approved physical security plan and incorporates the plan as a condition of the license.

The document comprising the approved physical security plan for the AGN-201M research reactor and our evaluation findings are in the Commission's files. Pursuant to 10 CFR Part 2.790(d), this information is withheld from public disclosure.

*Pasted
Am-12 to
R-23*

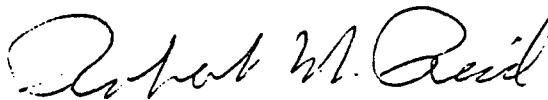
*Issued with
new License & T/S*

Dr. R. R. Berg

-2-

Copies of the Safety Evaluation/Environmental Impact Appraisal and the Notice of Issuance/Negative Declaration are also enclosed.

Sincerely,



Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors

Enclosures:

1. Amendment No. 12
2. Safety Evaluation/Environmental
Impact Appraisal
3. Notice of Issuance/Negative
Declaration

cc w/enclosures: See next page

Texas A&M University

cc w/enclosure(s):
Mayor of the City of College Station
College Station, Texas 77843

cc w/enclosure(s) and incoming dtd:
5/31/77, 9/29/78, 12/11/78, 12/18/78 & 3/23/79.
Director, Governor's Budget
and Planning Office
Executive Office Building
411 West 13th Street
Austin, Texas 78701



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

DO NOT REMOVE

Posted
Amat. 13
to R-23

November 5, 1985

Docket No.: 50-59

Dr. H. H. Richardson, Interim Director
Texas Engineering Research Center
301 Engineering Research Center
Texas A&M University
College Station, Texas 77843-3577

Dear Dr. Richardson:

SUBJECT: REVISED PHYSICAL SECURITY PLAN FOR TEXAS A&M AGN REACTOR

By letter dated September 2, 1985, you submitted a request to amend your license to reflect a revision to the Texas A&M University physical security plan for your AGN-201 reactor, License No. R-23. Accordingly, we are herewith issuing Amendment No. 13 to Operating Facility License No. R-23, which identifies your currently approved physical security plan.

Changes which would not decrease the effectiveness of your approved physical security plan may be made without prior approval by the Commission pursuant to the authority of 10 CFR 50.54(p). A report containing a description of each change shall be furnished to the Regional Administrator, U. S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 1000, Arlington, Texas 76011, with a copy to the Director, Office of Nuclear Reactor Regulation, Attn: Document Control Desk, Washington, D. C. 20555 within two months after the change is made. Records of changes made without Commission approval shall be maintained for a period of two years from the date of the change. Changes which do require prior NRC approval should be submitted in the manner required by 10 CFR 50.90 to the Director, Office of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555 and identified as a license amendment request.

Based on the fact that this license amendment applies to the physical security plan and incorporates into the license the latest requirements of your updated physical security plan, we have concluded that:

- (1) There is reasonable assurance that the health and safety of the public will not be endangered by this action; and
- (2) 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 to the health and safety of the public.
- (3) This amendment does not: (1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) Involve a significant reduction in a margin of safety. Therefore, this amendment involves no significant hazards consideration.

Dr. H. H. Richardson

- 2 -

This amendment relates solely to safeguards matters and, since no construction activities are involved, does not involve any significant construction impacts. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(12). 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.

The NRC-approved physical security plan supersedes all previously submitted security commitments under your 10 CFR Part 50 license. The documents comprising the currently approved physical security plan for the Texas A&M University AGN-201 reactor and our evaluation findings have been placed in the Commission's files. Pursuant to 10 CFR 2.790 this information is being withheld from public disclosure.

Sincerely,

Cecil O. Thomas

Cecil O. Thomas, Chief
Standardization and Special
Projects Branch
Division of Licensing

Enclosure:
Amendment No. 13

cc w/enclosure:
See next page

Texas A&M University

Docket Nos. 50-59/128

cc: Mayor of the City of College Station
College Station, Texas 77843-3575

Governor's Budget and
Planning Office
Post Office Box 13561
Austin, Texas 78711

Dr. Donald Feltz
Nuclear Science Center
F.E. Box 89
Texas A&M University
College Station, Texas 77843-3575

Bureau of Radiation Control
State of Texas
1100 West 49th Street
Austin, Texas 78756

TEXAS A&M UNIVERSITY

DOCKET NO. 50-59

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 13
License No. R-23

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Texas A&M University (the licensee) dated September 2, 1985, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the amended license, provisions of the Atomic Energy Act of 1954, as amended, 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;
 - 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 of the Commission's regulations and all applicable requirements have been satisfied; and
 - F. Publication of notice of this amendment is not required since it does not involve a license of the type described in 10 CFR Section 2.106(a)(2).

2. Accordingly, Facility Operating License No. R-23 is hereby amended by adding paragraph 2.C.3, to read as follows:

(3) Physical Security Plan

The licensee shall fully implement and maintain in effect all provisions of the Commission-approved physical security plan, including all amendments and revisions made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p), which are part of the license. This plan, which contains information withheld from public disclosure under 10 CFR 2.790, is entitled "Texas A&M University AGN-201M Reactor Facility Security Plan," with revisions through September 24, 1984.

3. The license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Cecil O. Thomas, Chief
Standardization and Special
Projects Branch
Division of Licensing

Date of Issuance: November 5, 1985