License R-67
Docket 050-00163
Amendment 46

August 8, 2001

Dr. Keith E. Asmussen, Director
Licensing, Safety and Nuclear Compliance
General Atomics
P.O. Box 85608
San Diego, CA 92186-9784

SUBJECT: GENERAL ATOMICS MARK I AND MARK F TRIGA RESEARCH REACTORS - CORRECTED PAGE RE: SECURITY AMENDMENT (TAC NOS. MA9437 AND MA9438)

Dear Dr. Asmussen:

Please find enclosed a corrected page 2 of Amendment No. 46 to Facility License No. R-67 for the General Atomics TRIGA Mark F Research Reactor. A typographical error in the license number is corrected.

If you have any questions, please call me at 301-415-1127.

Sincerely,

/RA/

Alexander Adams, Jr., Senior Project Manager
Operational Experience and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-163

Enclosure: As stated

cc w/enclosure:
Please see next page

2. Accordingly, paragraph 2.C.5. of Facility License No. R-67 is hereby amended to read as follows:

   5. Physical Security Plans

      The licensee shall maintain and fully implement all provisions of the Commission approved physical protection and safeguards continency plans, including changes made pursuant to the authority of 10 CFR 50.54(p). These approved plans consist of documents withheld from public disclosure pursuant to 10 CFR 73.21 entitled:

      a) "Fixed Site and Transportation Plan for the Protection of Special Nuclear Material at the General Atomics TRIGA Reactors Facility" dated February 2001, submitted by letter dated March 5, 2001; and

      b) "Safeguards Contingency Response Plan for the General Atomics TRIGA Reactors Facility" dated February 2001, submitted by letter dated March 5, 2001.

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

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Ledyard B. Marsh, Chief
Events Assessment, Generic Communications and
Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Date of Issuance: July 20, 2001

July 20, 2001

Dr. Keith E. Asmussen, Director
Licensing, Safety and Nuclear Compliance
General Atomics
P.O. Box 85608
San Diego, CA 92186-9784

SUBJECT: GENERAL ATOMICS MARK I AND MARK F TRIGA RESEARCH REACTORS - AMENDMENT RE: SECURITY (TAC NOS. MA9437 AND MA9438)

Dear Dr. Asmussen:

The U.S. Nuclear Regulatory Commission (Commission) has issued the enclosed Amendment No. 37 to Amended Facility License No. R-38 for the General Atomics TRIGA Mark I Research Reactor and Amendment No. 46 to Facility License No. R-67 for the General Atomics TRIGA Mark F Research Reactor. The amendments consist of changes to the facility licenses in response to your application of June 29, 2000, as supplemented on November 21, 2000, and March 5 and May 22, 2001.

The amendment removes the requirement for a security plan from the Mark I TRIGA Research Reactor license and authorizes a new security plan for the Mark F TRIGA Research Reactor.

A copy of the safety evaluation supporting Amendment Nos. 37 and 46 is also enclosed.

Sincerely,

/RA/

Alexander Adams, Jr., Senior Project Manager
Events Assessment, Generic Communications and
Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos. 50-89 and 50-163

Enclosures:
1. Amendment Nos. 37 and 46
2. Safety Evaluation

cc w/enclosures:
Please see next page

2. Accordingly, paragraph 2.C.5. of Facility License No. R-38 is hereby amended to read as follows:

5. Physical Security Plans

The licensee shall maintain and fully implement all provisions of the Commission approved physical protection and safeguards continency plans, including changes made pursuant to the authority of 10 CFR 50.54(p). These approved plans consist of documents withheld from public disclosure pursuant to 10 CFR 73.21 entitled:

a) "Fixed Site and Transportation Plan for the Protection of Special Nuclear Material at the General Atomics TRIGA Reactors Facility" dated February 2001, submitted by letter dated March 5, 2001; and

b) "Safeguards Contingency Response Plan for the General Atomics TRIGA Reactors Facility" dated February 2001, submitted by letter dated March 5, 2001.

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

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Ledyard B. Marsh, Chief
Events Assessment, Generic Communications and
Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Date of Issuance: July 20, 2001

GENERAL ATOMICS

DOCKET NO. 50-163

AMENDMENT TO FACILITY LICENSE

Amendment No. 46
License No. R-67

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

   A. The application for an amendment to Facility License No. R-67 filed by General Atomics (the licensee) on June 29, 2000, as supplemented on November 21, 2000, and March 5 and May 22, 2001, conforms to the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the regulations of the Commission as stated in Chapter I of Title 10 of the *Code of Federal Regulations* (10 CFR);

   B. The facility will be possessed in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance that (i) the activities authorized by this amendment can be conducted without endangering the health and safety of the public and (ii) such activities will be conducted in compliance with the regulations of the Commission;

   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. This amendment is issued in accordance with the regulations of the Commission as stated in 10 CFR Part 51, and all applicable requirements have been satisfied; and

   F. Prior notice of this amendment was not required by 10 CFR 2.105 and publication of a notice for this amendment is not required by 10 CFR 2.106.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 37 TO

AMENDED FACILITY LICENSE NO. R-38

AND AMENDMENT NO. 46 TO

FACILITY LICENSE NO. R-67

GENERAL ATOMICS

DOCKET NOS. 50-89 AND 50-163

1.0 INTRODUCTION

By letter dated June 29, 2000, as supplemented on November 21, 2000, and March 5 and May 22, 2001, General Atomics (GA or the licensee) submitted a request for amendments to Amended Facility License No. R-38 for the GA TRIGA Mark I Research Reactor and Facility License No. R-67 for the GA TRIGA Mark F Research Reactor. The amendment for the Mark I reactor would remove the requirement from the license that the licensee maintain a physical security plan. The amendment for the Mark F reactor would authorize a new physical security plan to reflect enhancements made to physical security at the reactor.

2.0 BACKGROUND

Both nonpower reactors at GA are permanently shut down. Amendment No. 35 for the TRIGA Mark I, issued on October 29, 1997, and Amendment No. 43 for the TRIGA Mark F, issued on March 22, 1995, removed the authority from the licenses to operate the reactors and authorized possession only of the facilities. Amendment No. 36 for the TRIGA Mark I and Amendment No. 45 for the TRIGA Mark F, issued on August 12, 1999, approved the decommissioning plans for the reactors. Amendment No. 36 for the TRIGA Mark I reactor also removed the authority from the license to possess special nuclear material. All special nuclear material in the TRIGA Mark I reactor was transferred to the TRIGA Mark F reactor and is possessed under that license.

3.0 EVALUATION

3.1 Deletion of Requirement to Maintain a Physical Security Plan for the TRIGA Mark I Reactor

The licensee has proposed that paragraph 2.C.3, "Physical Security Plan," be deleted from the TRIGA Mark I reactor license. This license condition requires the licensee to maintain and fully implement all provisions of the Commission-approved physical security plan. The purpose of the physical security plan is to protect special nuclear material. All special nuclear material has been removed from the TRIGA Mark I reactor facility and has been transferred to the Mark F

reactor facility. The authority to possess special nuclear material has been removed from the TRIGA Mark I license. In addition, Technical Specification 5.0, "Reactor Fuel," states that no reactor fuel elements or control elements with fuel followers shall be located in, stored in, or moved into the reactor core structure or reactor facility. The reactor has undergone substantial dismantlement under the NRC-approved decommissioning plan. The reactor core structure has been removed from the reactor. The licensee is still required to protect the remaining byproduct material from unauthorized access or removal in accordance with Part 20 of Title 10 of the *Code of Federal Regulations* (10 CFR Part 20), Subpart I, "Storage and Control of Licensed Material." Because the licensee no longer possesses or is authorized to possess special nuclear material under the TRIGA Mark I license, the deletion of license paragraph 2.C.3 is acceptable to the staff.

3.2 New Physical Security Plan for the TRIGA Mark F Reactor

On June 29, 2000, GA submitted the "Safeguards Contingency Response Plan for the General Atomics TRIGA Reactors Facility" for NRC review and approval, and proposed changes to the "Fixed Site and Transportation Plan for the Protection of Special Nuclear Material at the General Atomics TRIGA Reactors Facility." The licensee implemented the changes to the Fixed Site and Transportation Plan for the Protection of Special Nuclear Material at the General Atomics TRIGA Reactors Facility (and additional changes made in response to questions from the staff) and added the Safeguards Contingency Response Plan for the General Atomics TRIGA Reactors Facility under 10 CFR 50.54(p) because the licensee determined that the changes did not decrease the effectiveness of the plan. However, because the changes represented a major revision to the security plan, the licensee requested that the plans also be approved by license amendment. The staff requested additional information, which the licensee provided on November 21, 2000. On March 5, 2001, the licensee submitted updated (February 2001) versions of the plans, incorporating the changes and the additional information provided in the licensee's response to the request for additional information. On May 22, 2001, the licensee provided additional information as discussed below as the result of a telephone conversation between GA and the NRC staff.

GA submitted the proposed amendment in response to specific changes in the long-term storage and physical protection of spent TRIGA fuel at the site. The amendments apply primarily to physical barriers, security practices, and administrative procedures to address the requirements of 10 CFR 73.60, 10 CFR 73.67, and additional measures deemed appropriate by the Commission.

As committed to by GA in the "Fixed Site and Transportation Plan for the Protection of Special Nuclear Material at the General Atomics TRIGA Reactors Facility," access controls, physical barriers, communications, and alarm monitoring capabilities have been enhanced to provide greater assurance that unauthorized access into the material access area (MAA) can be detected, assessed, and delayed until a proper and timely response can be accomplished.

The administrative access control commitments made by GA provide adequate assurance that attempts to introduce unauthorized materials into, or remove materials from, the MAA can be detected. GA's access control commitments include maintaining and updating access authorization lists, providing positive key and lock controls, and searching all personnel, packages, and vehicles in accordance with 10 CFR 73.60 and 10 CFR 73.67.

Intrusion detection and assessment capabilities provide sufficient coverage of the MAA to ensure that attempts to gain unauthorized access can be detected and assessed. Testing and maintenance commitments provide an adequate level of assurance that the intrusion detection system will be capable of performing its intended function when called upon. Alarm annunciation and communication commitments are sufficient to ensure that a timely response by GA personnel and outside support agencies can be accomplished.

The "Safeguards Contingency Response Plan for the General Atomics TRIGA Reactors Facility" follows the outline in Appendix C to 10 CFR Part 73. Administrative commitments establish adequate liaison with outside support agencies to ensure that they are promptly notified and that a coordinated response will be available, if needed.

As stated in a letter dated May 22, 2001, GA will ensure that suitable alternate communication capabilities are maintained if primary communications with outside support and response agencies are lost. Compensatory measures implemented as a result of a loss of communications with outside support and response agencies will ensure that the requirements of 10 CFR 73.67(a), "General performance objectives," continue to be satisfied despite the loss.

Based on its review of the information submitted by the licensee, the staff concludes that the proposed plans satisfy the requirements of 10 CFR 73.60, 10 CFR 73.67, and additional measures as deemed appropriate by the Commission for the long-term storage of spent TRIGA fuel and are consistent with the permanently shutdown status of the TRIGA Mark F and TRIGA Mark I reactors on the GA site.

4.0 ENVIRONMENTAL CONSIDERATION

These amendments involve changes relating solely to safeguards matters (i.e., protection against sabotage or loss or diversion of special nuclear material) or issuance of an approval of a safeguards plan. The staff has determined that the amendments or approval do not involve any significant construction impacts. The amendments or approval are confined to (i) organizational and procedural matters, (ii) modifications to systems used for security and/or materials accountability, (iii) administrative changes, and (iv) review and approval of transportation routes pursuant to 10 CFR 73.37. Accordingly, these amendments meet 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 these amendments.

5.0 CONCLUSION

On the basis of the considerations discussed above, the staff has concluded that (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously evaluated, create the possibility of a new or different kind of accident from any accident previously evaluated, or involve a significant reduction in a margin of safety, the amendments do not involve a significant hazards consideration; (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed activities; and (3) such activities will be conducted in compliance with the Commission's

regulations and the issuance of these amendments will not be inimical to the common defense and security or the health and safety of the public.

Principal Contributors: A. Adams, Jr., REXB/DRIP/NRR
D. Gordon, IOLB/DIPM/NRR

Date: July 20, 2001

LICENSE AUTHORITY FILE COPY
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UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

GENERAL Atomics

Am 41 1-9-89

DOCKET NO. 50-163

NAME CHANGED TO:

License No. R-67
Amendment No. 41

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

A. 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;

1.B. The reactor has been constructed in conformity with Construction Permit No. CPRR-59 and will be decommissioned in conformity with the application, as amended, and in conformity with the Act and the rules and regulations of the Commission;

1.C. There is reasonable assurance that the reactor can be decommissioned at the designated location without endangering the health and safety of the public;

1.D. General Atomics is technically and financially qualified to decommission the reactor;

1.E. The decommissioning of the reactor in the manner proposed in the application will not be inimical to the common defense and security or to the health and safety of the public;

Amdt. #45, 8-12-99

F. GENERAL ATOMICS has submitted proof of financial protection which satisfies the requirements of Commission regulations currently in effect. GENERAL ATOMICS has executed an indemnity agreement pursuant to 10 CFR Part 140.

Am 41 1-9-89

Facility License No. R-67, as amended, is hereby amended in its entirety to read as follows:

2. A. This license applies to the TRIGA Mark F tank-type nuclear reactor (herein "the reactor") which is owned by General Atomics (formerly General Dynamics Corporation) and located at its John Jay Hopkins Laboratory for Pure and Applied Science, Torrey Pines Mesa, in San Diego, California, and described in the application dated March 1, 1960, and amendments thereto, including the amendment dated December 22, 1966, and supplements thereto dated July 25, 1967, November 27, 1967, and August 9, 1968, and amendment dated September 7, 1994, and supplement thereto dated December 20, 1994, and January 27, 1995 (hereinafter referred to as "the application"), and authorized for construction by Construction Permit No. CPRR-59

Amdt. 43, 3-22-95 effective 4-21-95

8. Subject to the conditions and requirements incorporated herein, the Commission hereby licenses General Atomics:

   1. Pursuant to Section 104c of the Act and Title 10 CFR Chapter 1, Part 50, "Licensing of Production and Utilization Facilities," to possess, but not operate the reactor in accordance with the procedures and limitations described in the application and in this license.

   2. Pursuant to the Act and Title 10 CFR Chapter 1, Part 70, "Domestic Licensing of Special Nuclear Material," to receive and possess up to 30 kilograms of contained uranium-235 and 1 gram of plutonium in connection with the reactor.

   3. Pursuant to the Act and Title 10 CFR Chapter 1, Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," to possess but not to separate such byproduct material as may have been produced by past operation of the reactor.

Amdt #43, 3-22-95 Effective 4-21-95

C. 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:

1. ~~Maximum Power Level~~

~~GA Technologies may operate the reactor at power levels not in excess of 1500 kilowatts (thermal) and, in the pulsing mode, with reactivity insertions not to exceed 5.60$.~~

Amdt 43 3-22-95 Amdt. # 37, Effective 4-21-87 3-19-87

2.C.1.(a) The licensee may (i) make changes in the facility or procedures as described in the Hazards Summary Report and (ii) conduct tests or experiments not described in the Hazards Summary Report without prior Commission approval, unless the proposed changes, tests, or experiments involve a change in the technical specifications incorporated in the license or an unreviewed safety question.

(b) A proposed change, test, or experiment shall be deemed to involve an unreviewed safety question if (i) the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the Hazards Summary Report may be increased, or (ii) a possibility for an accident or malfunction of a different type than evaluated previously in the Hazards Summary Report may be created, or (iii) if the margin of safety as defined for any technical specification is reduced.

Amdt. 43, 3-22-95 Effective 4-21-95

(c) The licensee shall maintain records of changes in the facility and of changes in procedures made pursuant to this license condition, to the extent that these changes constitute changes in the facility as described in the Hazards Summary Report or to the extent that they constitute changes in procedures as described in the Hazards Summary Report. The licensee shall also maintain records of tests and experiments performed according to paragraph (a) of this license condition. These records must include a written safety evaluation which provides the basis for the determination that the changes, tests, or experiments do not involve an unreviewed safety question.

(1) The licensee shall submit annually, in accordance with 10 CFR 50.4, a report containing a brief description of any changes, tests, and experiments, including a summary of the safety evaluation of each.

(11) The licensee shall maintain the records of changes in the facility until the date of termination of the license and shall maintain the records of changes in procedures and records of tests and experiments for five years.

(d) If the licensee desires to (i) make a change in the technical specifications, or (ii) make a change in the facility or procedures described in the Hazards Summary Report, or (iii) conduct tests or experiments not described in the Hazards Summary Report which involve an unreviewed safety question or a change in technical specifications, it shall submit an application for amendment of its license pursuant to 10 CFR 50.90.

Amdt. #43 3-22-95 Effective 4-21-95

2.C. (2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 45, are hereby incorporated in the license. The licensee shall decommission the facility in accordance with the Technical Specifications.

Amdt. #45, 8-12-99

3. Records

In addition to those otherwise required under this license and applicable regulations, GENERAL ATOMICS shall keep the following records: Am 41 + 8-99

(a) Reactor operating records, including power levels and periods of operation at each power level.

(b) Records showing radioactivity released or discharged into the air or water beyond the effective control of GENERAL ATOMICS as measured at or prior to the point of such release or discharge. Am 41 + 8-99

(c) Records of emergency shutdowns and inadvertent scrams, including reasons therefor.

(d) Records of maintenance operations involving substitution or replacement of reactor equipment or components.

(e) Records of experiments installed including description, reactivity worths, locations, exposure time, total irradiation and any unusual events involved in their handling.

(f) Records of tests and measurements required by the Technical Specifications.

4. Reports

In addition to reports otherwise required by applicable regulations:

(a) GENERAL ATOMICS 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 safety analysis report. For each such occurrence, GENERAL ATOMICS 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 Part 20 and shall submit within ten (10) days a report in writing to the Director, Division of Reactor Licensing (hereinafter, "Director, DRL"), with a copy to the Regional Compliance Office. Am 41 + 8-99

Deleted per Amdt. #45, dated 8-12-99

Deleted per Amdt. #45, 8-12-99

(b) ~~GENERAL ATOMICS~~ report to the Director, DRL, in writing within thirty (30) days of its occurrence any substantial variance disclosed by operation of the reactor from performance specifications contained in the safety analysis report or in the Technical Specifications.

Am 41 1-9-89

(c) ~~GENERAL ATOMICS~~ shall report to the Director, DRL, in writing within thirty (30) days of its occurrence any significant change in the transient or accident analysis as described in the safety analysis report.

Am 41 1-9-89

5. Physical Security Plans

The licensee shall maintain and fully implement all provisions of the Commission approved physical protection and safeguards continency plans, including changes made pursuant to the authority of 10 CFR 50.54(p). These approved plans consist of documents withheld from public disclosure pursuant to 10 CFR 73.21 entitled:

a) "Fixed Site and Transportation Plan for the Protection of Special Nuclear Material at the General Atomics TRIGA Reactors Facility" dated February 2001, submitted by letter dated March 5, 2001; and

b) "Safeguards Contingency Response Plan for the General Atomics TRIGA Reactors Facility" dated February 2001, submitted by letter dated March 5, 2001.

Amdt. #46, 7-20-2001

D. This license is effective as of the date of issuance and shall expire at midnight, July 1, 2000.

Amended 2-2 5-14-70

FOR THE ATOMIC ENERGY COMMISSION

Frank C Kelly Acting

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

Attachment:
Appendix A - Technical Specifications

Date of Issuance: September 27, 1968

GENERAL ATOMICS

TRIGA Reactors Facility

TECHNICAL SPECIFICATIONS

TRIGA MARK F REACTOR

Facility License No. R-67

AUGUST 12, 1999

AMENDMENT NO. 45

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APPENDIX A

License No. R-67

TECHNICAL SPECIFICATIONS
for
THE TORREY PINES TRIGA MARK F REACTOR

1.0 DEFINITIONS

1.1 Facility

Facility means the building housing the disassembled reactor plus systems, components, etc. associated with possession and decommissioning of the reactor, including fuel storage.

1.2 Facility Secured

Facility secured shall mean that condition where no decommissioning activities or handling of fuel are in progress at the facility.

1.3 Facility Operation

Facility operation shall mean any condition wherein the facility is not secured.

1.4 Decommissioning Activities

Decommissioning activities shall mean those activities required to remove the facility safely from service and reduce residual radioactivity to a level that permits the release of the facility to unrestricted use and termination of the license. These activities will involve the handling, surveying, packaging, and dispositioning of radioactive materials in the facility.

1.5 Decommissioning Status

Decommissioning status means that the facility license has been amended to withdraw authorization to operate the reactor and authorizes possession only of the reactor, and that the fuel has been removed from the reactor and is maintained in a safe and secure manner in an approved location in the facility.

1.6 Operable

A system or device shall be considered operable when it is capable of performing its intended functions in a normal manner.

1.7 Operating

Operating means a component or system is performing its intended function.

1.8 Abnormal Occurrence

An abnormal occurrence is:

(a) Any unanticipated or uncontrolled change in subcritical multiplication during fuel storage or handling,

(b) An observed inadequacy in the implementation of either administrative or procedural controls, such that the inadequacy caused or could have caused the existence or the development of a condition which resulted or could have resulted in a facility condition outside the requirements of the Technical Specifications, and

(c) Release of fission products from a fuel element or fuel follower control rod during fuel storage or handling.

1.9 Measured Value

The measured value is the magnitude of that variable as it appears on the output of a measuring channel.

1.10 Measuring Channel

A measuring channel is the combination of sensor, interconnecting cables or lines, amplifiers, and output device which is connected for the purpose of measuring the value of a variable.

1.11 Channel Calibration

A channel calibration consists of comparing a measured value from the measuring channel with a corresponding known value of the parameter so that the measuring channel output can be adjusted to respond, with acceptable accuracy, to known values of the measured variable.

2.0 SITE

A minimum radius of 120 feet from the appropriate center of the TRIGA Reactor Facility building shall define the exclusion area.

3.0 REACTOR BUILDING

Until such time as all fuel is removed from the facility and all decommissioning activities have been completed, the following ventilation requirements shall apply.

3.1 The reactor shall be housed in a closed room built to restrict leakage. The minimum free volume in the reactor room shall be 11,700 cubic feet.

3.2 Controls for the ventilating system shall be located in the facility.

3.3 All air or other gas exhausted from the reactor room shall be released to the environment at a minimum of 20 feet above ground level.

3.4 The reactor room ventilation system shall be separate from the rest of the building ventilation.

3.5 During decommissioning activities and while fuel remains in the facility, air ventilation systems shall be operating to ensure the reactor room is maintained at a negative pressure with respect to the surrounding areas and the exhaust pathway to the environment is controlled and monitored.

4.0 REACTOR POOL

4.1 The stored reactor fuel shall be cooled by natural convective water flow.

4.2 Until such time as all fuel has been removed from the pool and the pool is drained as a part of decommissioning, the minimum level of the pool water shall be 12 inches below the reference mark near the top of the pool. The reference mark is located on the west wall of the north-south canal at a level 18 1/2 inches below floor grade level.

4.3 Until such time as all fuel has been removed from the pool and the pool is drained as a part of decommissioning, the pool water shall be sampled for conductivity at least weekly. The conductivity of the coolant shall not exceed 5 micro-mhos per centimeter averaged over any one calendar month.

4.4 Until such time as all fuel has been removed from the pool, on a quarterly basis the pool water shall be sampled and analyzed for the presence of fission products at a level indicating potential fuel leakage.

5.0 STORED FUEL DESCRIPTION

5.1 No reactor fuel elements or control elements with fuel followers shall be stored in the reactor portion (round area) of the pool. Reactor fuel elements and control elements with fuel followers shall only be stored in the Fuel Storage Area of the Mark F reactor pool.

5.2 Standard fuel elements have the characteristics listed below:

5.2.1 Standard low-enrichment fuel

(a) Maximum uranium content in unirradiated fuel	9.0 wt%
(b) Maximum uranium enrichment in unirradiated fuel	<20%
(c) Hydrogen to zirconium ratio (in the ZrH_n)	0.9 to 1.54 H atoms to 1.0 Zr atom (low hydride) 1.55 to 1.8 H atoms to 1.0 Zr atom (high hydride)
(d) Cladding material and minimum thickness	0.020 inch 304 or 304L stainless steel, Incoloy 800, Hastelloy X, or 0.030 inch aluminum or Zircaloy

5.2.2 Standard Fuel Lifetime Improvement Program (FLIP) fuel

(a) Maximum uranium content in	9.0 wt%

unirradiated fuel

(b) Nominal uranium enrichment in unirradiated fuel	70%
(c) Hydrogen-to-zirconium ratio (in the ZrH_n)	1.5 to 1.65 H atoms to 1.0 Zr atom
(d) Natural erbium content (homogeneous distribution)	1.0 to 1.8 wt%
(e) Cladding material and minimum thickness	0.020 inch 304 or 304L stainless steel, Incoloy 800, or Hastelloy-X

5.2.3 Standard low-enrichment fuel with high wt% uranium

(a) Maximum uranium content in unirradiated fuel	30 wt%
(b) Maximum uranium enrichment in unirradiated fuel	<20%
(c) Hydrogen-to-zirconium ratio (in the ZrH_n)	1.5 to 1.65 H atoms to 1.0 Zr atom
(d) Natural erbium content (homogeneous distribution)	0.4 to 1.8 wt%[1]
(e) Cladding material and minimum thickness	0.020 inch 304 or 304L stainless steel, Incoloy 800, or Hastelloy-X

[1]Scaled according to maximum U-235 content such that a core containing only these elements would require a critical loading of ≥50 fuel elements.

5.3 Special fuel elements are uranium zirconium hydride fuel elements, which are not standard fuel elements, have the characteristics listed below.

5.3.1 Special fuel elements with high-enrichment uranium.

(a) Maximum uranium content in unirradiated fuel	12.0 wt%
(b) Maximum uranium enrichment in unirradiated fuel	95%
(c) Cladding material and minimum thickness	0.020 inch 304 or 304L stainless steel, Incoloy 800, or Hastelloy-X or 0.030 inch Zircaloy

(d) Construction shall be such that calculated clad temperature shall not exceed 500°C at the planned operating level

5.3.2 Special fuel elements with high wt% uranium

(a) Maximum uranium content in unirradiated fuel	>30.0 to 45.0 wt%
(b) Maximum uranium enrichment in unirradiated fuel	<20%
(c) Cladding material and minimum thickness	0.020 inch 304 or 304L stainless steel, Incoloy 800 or Hastelloy-X or 0.030 inch Zircaloy for 1.5 inch nominal diameter, or 0.015 inch to 0.020 inch stainless steel, Incoloy 800 or Hastelloy-X for 0.5 inch nominal diameter

(d) Construction shall be such that the calculated clad temperature does not exceed 500°C at planned operating level.

(e) Special fuel elements with 0.5 inch nominal diameter are enclosed in a 0.020 inch metal shroud. The shroud, constructed from one of the above listed cladding materials, has a nominal diameter of 1.5 inches.

5.3.4 Any burnable poison used is an integral part of the as-manufactured fuel element. A burnable poison is defined as a material used for the specific purpose of compensating for fuel burn-up and/or other long-term reactivity adjustments.

6.0 CONTROL AND SAFETY SYSTEMS

6.1 Control Systems

The poison section of the control rods which may remain in the facility contains borated graphite or stainless steel, B_4C powder or boron or its compounds in solid form, cadmium, or the rare earth poisons in solid form, clad with the materials authorized for fuel element cladding. The control rods may contain flux traps and may be equipped with fuel or non-fuel followers.

6.2 Safety Systems

Until such time as decommissioning activities are completed in the facility, radiation monitoring systems shall be operating as follows:

(a) An area radiation monitoring system capable of activating the evacuation alarm.

(b) When the facility is not secured, a continuous monitoring system for airborne activity having a readout and audible alarm which can be heard in the facility.

These systems shall be calibrated annually and their set points verified monthly. For periods of time for maintenance or repair to the above systems, or during periods of other forced outages, the intent of this specification shall be satisfied if the installed system(s) is replaced with appropriate alternative or portable radiation monitors.

Following maintenance or modification of the radiation monitoring systems, the affected system shall be verified to be operable before returning it to routine operation.

7.0 FUEL STORAGE

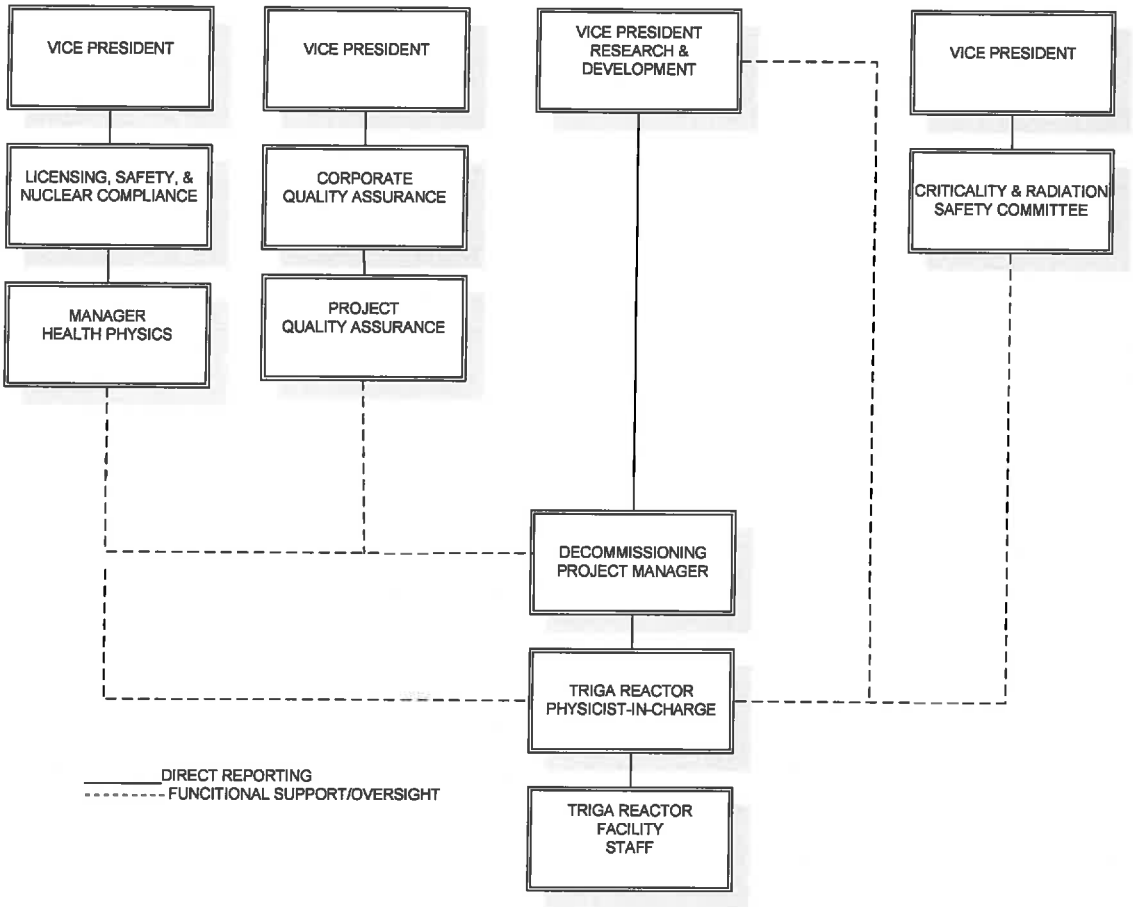
7.1 All fuel elements or control elements with fuel followers shall be stored in a safe geometry (k_{eff} less than 0.8 under all conditions of moderation).

7.2 Irradiated fuel elements and control elements with fuel followers shall be stored in an array which will permit sufficient natural convection cooling by water or air such that the temperature of the fuel element will not exceed design values.

8.0 ADMINISTRATIVE REQUIREMENTS

8.1 Organization

The facility shall be under the supervision of the Physicist-in-Charge or his designated alternate, both of whom shall be licensed senior operators of the facility. The minimum qualification for the Physicist-in-Charge shall include a Bachelor's degree or equivalent academic education and three years experience in activities related to reactor operations. He shall be responsible to a Vice President whose duties include responsibility for research and development, or his designated alternate, for safe possession of the reactor and its associated equipment and for limiting exposure of personnel and dispersal of radioactive material. The reactor shall be related to the Corporate structure as shown in the following chart:



8.2 Criticality and Radiation Safety Committee

a. There shall be a Criticality and Radiation Safety Committee (CRSC). The CRSC or a subcommittee thereof shall review activities of the facility to assure criticality and radiation safety. This Committee shall be composed of at least four members selected by the Cognizant Vice President, or a designee, considering their experience and education with regard to the various aspects of nuclear physics, chemistry, radiological health and statistics, as well as appropriate experience in other disciplines such as metallurgy and engineering. Subcommittees shall be appointed by the Chairman of the CRSC. The subcommittee assigned the responsibility for reviewing facility operations shall not have thereon person(s) who are directly involved with the facility.

b. The Criticality and Radiation Safety Committee shall be in accordance with a written charter including provisions for:

1. Holding meetings or audits at least annually; special meetings may be called by subcommittees of the CRSC or by the Chairman of the CRSC at times when such meetings are deemed appropriate.

2. Having a quorum when a majority of the members attend.

3. Preparing minutes or audit findings of the CRSC meetings by the Chairman or his designee. Evidence of approval of the participating members of the CRSC shall be obtained before

distribution.

c. The Criticality and Radiation Safety Committee, or subcommittee, shall review and approve safety standards associated with possession of the Facility. The CRSC or a subcommittee thereof shall audit the Facility annually, but at intervals not to exceed fifteen (15) months,

d. The responsibilities of the Committee or designated subcommittee thereof include, but are not limited to, the following:

1. Review and approval of all proposed changes to the facility, procedures, and Technical Specifications;

2. Determination of whether a proposed change, test, or experiment would constitute an unreviewed safety question or a change in the Technical Specifications;

3. Review of Facility records;

4. Review of abnormal performance of plant equipment and other anomalies; and

5. Review of unusual or abnormal occurrences and incidents which are Reportable Occurrences under 10 CFR Part 20 and 10 CFR Part 50.

8.3 Written Procedures

Written instructions shall be in effect for the following items. The instructions shall be adequate to assure the safe possession of the reactor but shall not preclude the use of independent judgment and action should the situation require such:

a. Testing and calibration of instrumentation, controls, radiation monitors and radiation protection systems necessary to meet the requirements of the Technical Specifications.

b. Emergency and abnormal conditions including provisions for evacuation, reentry, recovery, and medical support.

c. Fuel element or control element with fuel follower handling.

d. Maintenance of systems necessary for assuring the integrity of the fuel and for maintaining the reactor in accordance with the license.

e. Actions to be taken to correct specific and foreseen potential malfunctions of systems or components, including responses to alarms and abnormal changes.

f. Decommissioning activities (consistent with an approved Decommissioning Plan).

Changes which alter the original intent of the above procedures shall be made only with the approval of the Criticality and Radiation Safety Committee (CRSC). Temporary changes to the procedures that do not change their original intent and do not constitute an unreviewed safety question (as defined in 10 CFR 50.59) may be made by the Physicist-in-Charge. All such temporary changes shall be documented and subsequently reviewed and approved by the CRSC.

8.4 Action to be Taken In the Event of an Abnormal Occurrence

In the event of an abnormal occurrence, as defined in Section 1.8 of the Specifications, the following action shall be taken:

a. The Physicist-in-Charge or designated alternate shall be notified and corrective action taken with respect to the operation involved.

b. The Physicist-in-Charge or other person notified under Section 8 shall notify the Chairman of the CRSC and the Vice President, or his designated alternate, identified in Section 8.1.

c. A report shall be made to the CRSC which shall include an analysis of the cause of the occurrence, efficacy of corrective action, and recommendations for measures to prevent or reduce the probability of recurrence.

d. A report shall be made to the NRC in accordance with Section 8.6 of these Specifications.

8.5 Facility Records

In addition to the requirements of applicable regulations, and in no way substituting therefore, records and logs shall be prepared of at least the following items and retained for a period of at least five (5) years:

a. Normal reactor operation and facility status;

b. Principal maintenance activities;

c. Abnormal or reportable occurrences;

d. Equipment and component surveillance activities required by the Technical Specifications;

e. Gaseous and liquid radioactive effluents released to the environs;

f. Off-site environmental monitoring surveys;

g. Fuel inventories and transfers;

h. Facility radiation and contamination surveys;

i. Experiments performed with the reactor or in support of decommissioning;

j. Radiation exposures for all personnel;

k. Updated, corrected, and as-built drawings of the facility (these shall be retained for the lifetime of the facility);

l. Decommissioning/dismantlement activities.

8.6 Reporting Requirements

In addition to the requirements of applicable regulations, and in no way substituting therefore, reports shall be made to the NRC as follows:

a. A report within 24 hours by telephone or facsimile to the NRC Operations Center:

1. Any accidental release of radioactivity above permissible limits in unrestricted areas, whether or not the release resulted in property damage, personal injury, or exposure;

2. Any abnormal occurrences as defined in Section 1.8 of these Specifications.

b. A report within 10 days in writing to the Document Control Desk, USNRC, Washington, DC 20555:

1. Any accidental release of radioactivity above permissible limits in unrestricted areas, whether or not the release resulted in property damage, personal injury, or exposure; the written report (and, to the extent possible, the preliminary telephone or facsimile report) shall describe, analyze and evaluate safety implications, and outline the corrective measures taken or planned to prevent reoccurrence of the event.

2. Any abnormal occurrence as defined in Section 1.8 of these Specifications.

c. A report within 30 days in writing to the Document Control Desk, USNRC, Washington, DC 20555:

1. Any significant variation of measured values from a corresponding predicted or previously measured value of safety-connected operating characteristics occurring for the reactor or fuel;

2. Any significant changes in the transient or accident analyses as described in all Safety Analysis Reports; and

3. Any significant changes in facility organization or personnel for which minimum qualifications are specified in these specifications.

d. Commencing in 2000, a routine report in writing to the Document Control Desk, U.S. Nuclear Regulatory Commission by April 15 of each year, providing the following information:

1. A brief narrative summary of: (1) actions taken for decommissioning of the facility, (2) current status of the facility and fuel, (3) any changes to the decommissioning schedule, and (4) a summary of radioactive material shipments.

2. Discussion of the major maintenance operations performed during the period, including the effects, if any, on the safe possession of the reactor, and the reasons for any corrective maintenance required.

3. A summary of each change, if such changes have been made, to the facility, or procedures, tests, and experiments carried out under the conditions of Section 50.59 of CFR Part 50.

4. A summary of the nature and amount of radioactive effluents released or discharged to the environs beyond the effective control of the licensee as measured at or prior to the point of such release or discharge.

5. A description of any environmental surveys performed outside the facility.

6. A summary of radiation exposures received by facility

personnel and visitors, including the dates and time of significant exposure, and a brief summary of the results of radiation and contamination surveys performed within the facility.

9.0 FACILITY OPERATIONS

The following activities shall be conducted in the facility:

a) Maintenance, monitoring, control of radioactive material, protection of personnel and security activities as defined in approved procedures (see Section 8.3).

b) Decommissioning in accordance with the facility license and consistent with an approved Decommissioning Plan.

c) Fuel storage, handling, packaging, and removal in accordance with approved procedures.