



March 28, 2002
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VIA OVERNIGHT DELIVERY SERVICE

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ATTN: Mr. Alexander Adams, Jr., Senior Project Manager
Non-Power Reactors & Decommissioning Projects Directorate
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

**Subject: Docket No. 50-89, Facility License R-38, and
Docket No. 50-163, Facility License R-67;
Submittal of General Atomics' TRIGA® Mark I and Mark F Annual
Reports for Calendar Year 2001 (3 Copies each)**

Dear Mr. Adams:

Enclosed are the annual reports required by the applicable Technical Specifications of General Atomics' (GA's) Mark I (License R-38) and Mark F (License R-67) TRIGA® research reactors. These reports cover operations for the calendar year 2001. The sections of these reports are numbered consistent with the items of information referred to in Section 7.6d of the Technical Specifications for the Mark I TRIGA® reactor and in 8.6d of the Technical Specifications for the Mark F TRIGA reactor.

Should you desire additional information concerning the above, please contact me at (858) 455-2823, or Mr. John Greenwood at (858) 455-4526.

Very truly yours,

Dr. Keith E. Asmussen, Director
Licensing, Safety and Nuclear Compliance

Enclosures: "TRIGA® Mark I Reactor / Annual Report / Calendar Year 2001," dated March 2002 (3 Copies), and
"TRIGA® Mark F Reactor / Annual Report / Calendar Year 2001," dated March 2002 (3 Copies)

A020

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of San Diego

ss.

On March 28, 2002, before me, Jennifer R. Lear, Notary Public

Date

Name and Title of Officer (e.g., "Jane Doe, Notary Public")

personally appeared Keith E. Asmussen

Name(s) of Signer(s)

☒ personally known to me

☐ proved to me on the basis of satisfactory evidence

to be the person~~s~~ whose name~~s~~ is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity~~(ies)~~, and that by his/~~her/their~~ signature~~s~~ on the instrument the person~~s~~, or the entity upon behalf of which the person~~s~~ acted, executed the instrument.



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WITNESS my hand and official seal.

Jennifer R. Lear
Signature of Notary Public

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Signer's Name: Keith E. Asmussen

☐ Individual

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☐ Other: _____

Signer Is Representing: Director, Licensing, Safety & Nuclear Compliance
of General Atomics

RIGHT THUMBPRINT
OF SIGNER

Top of thumb here

TRIGA[®] Mark I Reactor

ANNUAL REPORT

CALENDAR YEAR 2001

prepared to satisfy the requirements of
U.S. Nuclear Regulatory Commission
Facility License R-38
Docket No. 50-89

MARCH 2002

TRIGA REACTORS FACILITY
TRIGA Mark I Reactor
ANNUAL REPORT
Calendar Year 2001

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Introduction

This report documents operation of the General Atomics (GA) TRIGA® Mark I Non-Power Reactor for the period January 1, 2001 through December 31, 2001. The TRIGA Mark I Reactor, possessed by GA at its San Diego, California facilities, was not operated for the duration of the reporting period. The Reactor is possessed by GA under License No. R-38 (Amendment No. 36) granted by the U.S. Nuclear Regulatory Commission (Docket No. 50-89).

This report is being prepared and submitted to satisfy the requirements of Section 7.6(d) of the R-38 Technical Specifications, as amended. This report is presented in six parts, consistent with the information required by the applicable Technical Specifications.

1. Summary of Facility Activities

1.1 Decommissioning Activities

During Calendar Year 2001, the TRIGA Mark I Reactor Facility has been in Decommissioning status. The following represents a summary of activities during this reporting period:

1.1.1 TRIGA Mark I Reactor Facility Outside of Pool

The interior masonry walls of the TRIGA Mark I control room were mechanically decontaminated using needle guns to remove contaminated layers of paint.

1.1.2 Radiologically-Controlled Yard (Cooling Tower/Storage)

- o All asphalt, gunnite, and contaminated soil from the radiologically-controlled yard has been surveyed, removed, and packaged into Y-4 boxes for disposal as radioactive low-level waste.
- o All cooling lines and water make-up lines were excavated, removed, and surveyed and packaged for disposal as radioactive low-level waste.
- o Contaminated Hot Drain PVC pipes were excavated, removed, surveyed, and packaged into Y-4 boxes for disposal as radioactive low-level waste.
- o The demineralized water storage tank was excavated, removed, surveyed, and prepared for disposal as clean waste. The portion of the facility masonry wall, under which the demineralized water storage tank was situated, was surveyed, found to be clean, and backfilled with concrete to provide structural support.

1.2 Facility Status

- o All TRIGA Mark I fuel remains situated in the Fuel Storage Canal portion of the TRIGA Mark F Reactor pool, in Rm. 21/107.
- o The NRC inspected the facility on May 3, 2001; no findings were reported.

- o The NRC inspected the facility on September 24 - 26, 2001. It was noted that the "Fixed Site Security Plan" was submitted without a "Safeguards Information" Stamp. This oversight was corrected. There is still one open item related to the burnup calculations with adjustments. Junaid Razvi will write a note to the NRC updating the information.
- o The NRC inspected the facility on December 6, 2001 as part of a fact-finding mission to determine security status of TRIGA Reactor Facility following the September 11, 2001 attacks.

1.3 Decommissioning Schedule

The tasks outstanding in the decommissioning schedule are: 1) the disposition of the activated portions of the concrete biological shield structure and soil/gravel behind the shield structure, and 2) the characterization and shipment of radioactive waste currently packaged and staged for disposal.

1.4 Radioactive Material Shipments

Listed below are the radioactive waste shipments, associated with the TRIGA Mark I Reactor decommissioning activities, made from General Atomics, San Diego, CA, to the U.S. Department of Energy Nevada Test Site (NTS), Mercury, NV, during the Calendar Year 2001 reporting period. Each Y-4 box mentioned below represents a radioactive low-level waste disposal volume of 123 ft³.

- o On January 24, 2001, 10 ea. Y-4 boxes were shipped to NTS for disposal as low-level radioactive waste.
- o On February 22, 2001, 13 ea. Y-4 boxes were shipped to NTS for disposal as low-level radioactive waste.

2. Maintenance Operations

All TRIGA Mark I maintenance activities, performed during the reporting period, generally fall into three categories: (i) routine preventive maintenance, (ii) routine calibration activities, and (iii) activities associated with replacement of older components and systems due to age. All maintenance activities are recorded in the TRIGA Reactors Decommissioning Logbook. Facility Maintenance Checklists are completed on a regular schedule, at weekly, quarterly, and annual frequencies. All maintenance operations performed on the TRIGA Mark I were minor in nature. There were no major maintenance operations performed during the reporting period.

3. 10CFR50.59 Facility Modifications and Special Experiments

There were no applications for Facility Modifications to the R-38 Facility, under the provisions of 10CFR50.59, submitted during the Calendar Year 2001 reporting period.

There were no new Special Experiments submitted for approval for the R-38 facility during the Calendar Year 2001 reporting period.

4. Radioactive Effluents Released to the Environs

During Calendar Year 2001, 0.00 millicuries of Argon-41 were discharged from the TRIGA Mark I Reactor facility stack to the atmosphere.

5. Environmental Surveys

During Calendar Year 2001, the Environmental Monitoring Program (EMP) for the TRIGA Reactors Facility remained essentially unchanged from the prior year. The applicable EMP includes the following monitoring equipment and actions:

- o Five (5) emergency air samplers, situated on the Facility roof and around the TRIGA Reactor Facility perimeter.
- o Ten (10) environmental air samplers, situated adjacent to, and near the GA site perimeter, in accordance with the GA Material License (SNM-696).
- o Daily liquid effluent monitoring from the GA Main Sewerage Outfall Pump House, for gross alpha and beta radioactivity concentrations.
- o Annual soil and water sampling at ten (10) stations on the GA site, including stations around the perimeter of the TRIGA Reactor Facility.
- o External radiation monitoring of the TRIGA Reactor Facility using five (5) passive area dosimeters, as well as radiation meter surveys conducted periodically.
- o A Continuous Air Monitor (CAM), situated in the Mark I Reactor Room (Rm. 21/102) to continuously sample room air for airborne radioactivity. CAM air filters are collected each week and analyzed for radioactivity.

6. Summary of Radiation Exposures and Radiological Surveys

The following data summarizes measured personnel occupational radiation exposures and radiological surveys of the TRIGA Reactor Facility during Calendar Year 2001. Personnel who are listed on the TRIGA Reactor Facility Work

Authorization (WA #3205) and specific Radiation Work Permits (RWPs) were monitored for radiation exposure; these individuals included 14 General Atomics employees and 3 sub-contractor employees.

6.1 General Atomics Staff Whole Body Exposures¹

Number of individuals monitored:	14
High Exposure:	0.110 Rem
Low Exposure:	0.000 Rem
Average Exposure:	0.0017 Rem

6.2 Non General Atomics Staff Whole Body Exposures²

Number of individuals monitored:	3
High Exposure:	0.180 Rem
Low Exposure:	0.000 Rem
Average Exposure:	0.060 Rem

6.3 Routine Wipe Surveys of Mark I Reactor Facility

High Wipe:	7.4 β dpm/100 cm ²
Low Wipe:	< 1.0 β dpm/100 cm ²
Average Wipe:	< 1.0 β dpm/100 cm ²

6.4 Routine Radiation Measurements of Mark I Reactor Facility

High Measurement:	0.2 mRem/hr @ 1 foot
Low Measurement:	<0.2 mRem/hr @ 1 foot
Average Level:	<0.2 mRem/hr @ 1 foot

¹ Includes reactor facility staff and facility support staff authorized to work at the TRIGA Reactor Facility. These personnel may also work routinely at other GA radiation facilities; therefore, this dose represents *cumulative* exposure at all GA facilities.

² Includes non-GA sub-contractor personnel who were granted periodic access to the TRIGA Reactor Facility for the performance of work. These personnel may also work routinely at other GA radiation facilities; therefore, this dose represents *cumulative* exposure at all GA facilities

TRIGA[®] Mark F Reactor

ANNUAL REPORT

CALENDAR YEAR 2001

prepared to satisfy the requirements of
U.S. Nuclear Regulatory Commission
Facility License R-67
Docket No. 50-163

MARCH 2002

**TRIGA REACTORS FACILITY
TRIGA Mark F Reactor
ANNUAL REPORT
Calendar Year 2001**

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Introduction

This report documents operation of the General Atomics (GA) TRIGA® Mark F Nonpower Reactor for the period January 1, 2001 through December 31, 2001. The TRIGA Mark F Reactor, possessed by GA at its San Diego, California facilities, was not operated for the duration of the reporting period. The Reactor is possessed by GA under License No. R-67 (Amendment No. 45) granted by the U.S. Nuclear Regulatory Commission (Docket No. 50-163).

This report is being prepared and submitted to satisfy the requirements of Section 8.6(d) of the R-67 Technical Specifications, as amended. This report is presented in six parts, consistent with the information required by the applicable Technical Specifications.

TRIGA® is a registered trademark of General Atomics

1. Summary of Facility Activities

1.1 Decommissioning Activities

During Calendar Year 2001, the TRIGA Mark F Reactor Facility has been in Decommissioning status. The following represents a summary of activities during this reporting period:

1.1.1 TRIGA Mark F Reactor Facility Components Outside of Pool

- o The two Radioactive Materials Shielded Storage Caves were dismantled. The component lead bricks were surveyed and dispositioned as appropriate. The contaminated lead bricks were loaded into B-12 boxes shipped to Alaron Corp. in Wampum, PA., for decontamination/recycling services.
- o The TRIGA Mark F water purification system was dismantled and replaced with a simpler, self contained ion exchange resin bed design. The old system was surveyed, packaged, and dispositioned.
- o A major portion of the unused sections of the TRIGA Mark F control room console was dismantled leaving only a small portion for necessary maintenance-related instrumentation.

The only items remaining above the TRIGA Mark F pool in Rm. 21/107 are the tools and hardware necessary for the maintenance of the facility and the future shipment of fuel.

1.1.2 TRIGA Mark F Reactor Components in Pool

- o The reactor shroud assembly (including empty core support hardware) was removed and packaged for shipment.

The only items remaining in the TRIGA Mark F Reactor pool are the fuel handling tools and dummy fuel elements and their associated storage racks. Some of the dummy fuel elements are necessary for the continuing qualification of Senior Reactor Operators (SRO). In addition, both the TRIGA Mark F and TRIGA Mark I fuel elements are stored in the Fuel Storage Canal portion of the TRIGA Mark F Reactor pool.

1.2 Facility Status

- o The Senior Reactor Operators (SROs) have all maintained their licensing requirements to keep their licenses current.
- o All TRIGA Mark F and TRIGA Mark I fuel remains in the Fuel Storage Canal.
- o The NRC inspected the facility on May 3, 2001; no findings were reported.
- o The NRC inspected the facility on September 24 - 26, 2001. It was noted that the "Fixed Site Security Plan" was submitted without a "Safeguards Information" Stamp. This oversight was corrected. There is still one open item related to the burnup calculations with adjustments. Junaid Razvi will write a note to the NRC updating the information.
- o The NRC inspected the facility on December 6, 2001 as part of a fact-finding mission to determine security status of the TRIGA Reactor Facility following the September 11, 2001 attacks.

1.3 Decommissioning Schedule

The only items remaining on the decommissioning schedule up to the point where fuel needs to be shipped are:

- 1) Miscellaneous dummy fuel elements and their associated storage racks unnecessary for the continuing qualification of SROs, and
- 2) the characterization and shipment of radioactive waste currently packaged and staged for disposal.

Any further decommissioning tasks may jeopardize fuel storage and will therefore be conducted after the fuel is shipped.

1.4 Radioactive Material Shipments

Listed below are the radioactive waste shipments, associated with the TRIGA Mark F Reactor decommissioning activities, made from General Atomics, San Diego, CA, to the U.S. Department of Energy Nevada Test Site (NTS), Mercury, NV, and to Alaron Corp. during the Calendar Year 2001 reporting period. Each Y-4 box mentioned below represents a radioactive waste disposal volume of 123 ft³. Each B-12 box mentioned below represents a radioactive waste disposal volume of 61.5 ft³.

- o On June 19, 2001 two ea. contaminated lead casks were shipped to Alaron Corp for decontamination/recycle and/or waste disposal.
- o On June 19, 2001 three ea. B-12 boxes of contaminated lead bricks were shipped to Alaron Corp for decontamination/recycle and/or waste disposal.
- o On August 22, 2001 twenty-one ea. Y-4 boxes were shipped to NTS for disposal as low-level radioactive waste.
- o On August 25, 2001 fifteen ea. Y-4 boxes were shipped to NTS for disposal as low-level radioactive waste.

2. Maintenance Operations

All TRIGA Mark F maintenance activities, performed during the reporting period, generally fall into three categories: (i) routine preventive maintenance, (ii) routine calibration activities, and (iii) activities associated with replacement of older components and systems due to age. All maintenance activities are recorded in the TRIGA Reactors Decommissioning Logbook. Facility Maintenance Checklists are completed on a regular schedule, at weekly, quarterly, and annual frequencies. All maintenance operations performed on the TRIGA Mark F were minor in nature. There were no major maintenance operations performed during the reporting period.

3. 10CFR50.59 Facility Modifications and Special Experiments

There were no applications for Facility Modification under the provisions of 10CFR50.59 submitted for the R-67 facility during the Calendar Year 2001 reporting period.

There were no Special Experiments submitted for the R-67 facility during the Calendar Year 2001 reporting period.

4. Radioactive Effluents Released to the Environs

During Calendar Year 2001, 0.00 millicuries of Argon-41 were discharged from the TRIGA Mark F Reactor Facility stack to the atmosphere.

5. Environmental Surveys

During Calendar Year 2001, the Environmental Monitoring Program (EMP) for the TRIGA Reactors Facility remained essentially unchanged from the prior year. The applicable EMP includes the following monitoring equipment and actions:

- o Five (5) emergency air samplers, situated on the Facility roof and around the TRIGA Reactor Facility perimeter.
- o Ten (10) environmental air samplers, situated adjacent to, and near the GA site perimeter, in accordance with the GA Special Nuclear Material License (SNM-696).
- o Daily liquid effluent monitoring from the GA Main Sewerage Outfall Pump House, for gross alpha and beta radioactivity concentrations.
- o Annual soil and water sampling at ten (10) stations on the GA site, including stations around the perimeter of the TRIGA Reactors Facility.
- o External radiation monitoring of the TRIGA Reactor Facility using five (5) passive area dosimeters, as well as radiation meter surveys conducted periodically.
- o A Continuous Air Monitor (CAM), situated in the Mark F Reactor Room (Rm. 21/107), to continuously sample room air for airborne radioactivity. CAM air filters are collected each week and analyzed for radioactivity.

6. Summary of Radiation Exposures and Radiological Surveys

The following data summarizes measured personnel occupational radiation exposures and radiological surveys of the TRIGA Reactors Facility during Calendar Year 2001. Personnel who are listed on the TRIGA Reactors Facility Work Authorization (WA #3205) and specific Radiological Work Permits (RWPs) were monitored for radiation exposure; these individuals included 14 General Atomics employees and 3 sub-contractor employees.

6.1 General Atomics Staff Whole Body Exposures¹

Number of individuals monitored:	14
High Exposure:	0.110 Rem
Low Exposure:	0.000 Rem
Average Exposure:	0.0017 Rem

¹ Includes reactor facility staff and facility support staff authorized to work at the TRIGA Reactor Facility. These personnel may also work routinely at other GA radiation facilities; therefore, this dose represents *cumulative* exposure at all GA facilities.

6.2 Non General Atomics Staff Whole Body Exposures²

Number of individuals monitored:	3
High Exposure:	0.180 Rem
Low Exposure:	0.000 Rem
Average Exposure:	0.060 Rem

6.3 Routine Wipe Surveys of Mark F Reactor Facility

High Wipe:	92.7 β dpm/100 cm ²
Low Wipe:	< 1.0 β dpm/100 cm ²
Average Wipe:	2.0 β dpm/100 cm ²

6.4 Routine Radiation Measurements of Mark F Reactor Facility

High Measurement:	220.0 mRem/hr @ 1 foot
Low Measurement:	<0.2 mRem/hr @ 1 foot
Average Level:	<0.2 mRem/hr @ 1 foot

² Includes non-GA personnel who were granted periodic access to the facility for the performance of work. These personnel may also work routinely at other GA radiation facilities; therefore, this dose represents *cumulative* exposure at all GA facilities.