NRC FORM 7 (8-2007) 10 CFR 110 — U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR NRC EXPORT/IMPORT LICENSE, AMENDMENT, OR RENEWAL

(See Instructions on Page 5)

APPROVED BY OMB: NO. 3150-0027 EXPIRES: 06/30/2009

PART A. FOR NRC USE ONLY	☑ PUBLIC OR ☐ NON-PUBLIC	DATE RECEIVED: 10-13-09
LICENSE NUMBER: XCOM2205	DOCKET NUMBER: 11005835	ADAMS ACCESSION NUMBER:

PART B. TO BE COMPLETED FOR ALL LICENSES, AMENDMENTS, RENEWALS OR NOTIFICATIONS

(If more space is needed to complete any of the items, use Pages 3-4 first, and then attach additional sheets, if necessary.)

1. NAME AND ADDRESS OF APPLICANT/LICENSEE

General Atomics
3550 General Atomics Court
San Diego, CA 92121

1a. NAME OF APPLICANT'S CONTACT: **Dr. Keith E. Asmussen**

1b. APPLICANT'S REFERENCE NUMBER: **IEL-4329**

1c. PHONE NUMBER: **(858) 455-2823**

1d. FAX NUMBER: **(858) 455-2822**

1e. E-MAIL ADDRESS: **keith.asmussen@ga.com**

2. TYPE OF ACTION REQUESTED *(Check One)*

☑ EXPORT (Parts B, C, E) ☐ NOTIFICATION OF EXPORT OF INCIDENTAL RADIOACTIVE MATERIAL (PART C, E) ☐ IMPORT (Parts B, D, E) ☐ COMBINED EXPORT/IMPORT (Parts B, C, D, E) ☐ AMENDMENT/RENEWAL Existing License Number: _____

3. CONTRACT NUMBER(S)	4. FIRST SHIPMENT DATE	5. LAST SHIPMENT DATE	6. PROPOSED EXPIRATION DATE
GA-ESI 206822	10/15/2009	09/15/2019	10/15/2019

PART C. TO BE COMPLETED FOR EXPORT ONLY OR COMBINED LICENSES, AMENDMENTS, OR RENEWALS

(If more space is needed to complete any of the items, use Pages 3-4 first, and then attach additional sheets, if necessary.)

7. NAME(S) / ADDRESS(ES) OF SUPPLIERS AND/OR OTHER PARTIES TO THE EXPORT

General Atomics-Electronic Systems, Inc. (GA-ESI)
4949 Greencraig Lane
San Diego, CA 92123

8. NAME(S) / ADDRESS(ES) OF INTERMEDIATE FOREIGN CONSIGNEE(S)

None

9. NAME(S) / ADDRESS(ES) OF ULTIMATE FOREIGN CONSIGNEE(S)

Atomic Energy Research Establishment
Bangladesh Atomic Energy Commission
Savar, Dhaka-1000
Bangladesh

7a. FUNCTION(S) PERFORMED/SERVICE(S) PROVIDED	8a. INTERMEDIATE USE(S)	9a. ULTIMATE END USE(S)
Manufacture and Ship	N/A	see page 3 of 3

10. DESCRIPTION OF RADIOACTIVE MATERIALS, SEALED SOURCES, NUCLEAR FACILITIES, EQUIPMENT, OR COMPONENTS; FOR NUCLEAR EQUIPMENT INCLUDE TOTAL DOLLAR VALUE OF EQUIPMENT FOR EXPORT	10a. MAX TOTAL VOLUME / ELEMENT WGT (KG), OR TOTAL ACTIVITY (TBq)	10b. MAX ENRICHMENT OR WGT %	10c. MAX ISOTOPE WGT (KG)
Supply of a TRIGA® research reactor instrumentation and control system. Please see attached description (3 pages) [redacted]	N/A	N/A	N/A

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11. FOREIGN OBLIGATIONS (BY COUNTRY AND BY PERCENTAGE OF MAXIMUM TOTAL VOLUME)

N/A NONE

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APPLICATION FOR NRC EXPORT/IMPORT LICENSE, AMENDMENT, OR RENEWAL (Continued)

LICENSE NUMBER	DOCKET NUMBER	ADAMS ACCESSION NUMBER	
XCOM1205	11005835		☑ PUBLIC OR ☐ NON-PUBLIC

PART D. TO BE COMPLETED FOR IMPORT ONLY, OR COMBINED LICENSES, AMENDMENTS, OR RENEWALS

(If more space is needed to complete any of the items, use Pages 3-4 first, and then attach additional sheets, if necessary.)

12. NAME(S) / ADDRESS(ES) OF FOREIGN SUPPLIERS AND/OR OTHER PARTIES TO IMPORT	13. NAME(S) / ADDRESS(ES) OF INTERMEDIATE CONSIGNEE(S)	14. NAME(S) / ADDRESS(ES) OF ULTIMATE CONSIGNEE(S)

12a. NRC EXPORT LICENSE NUMBER(S) *(if applicable)*	13a. LICENSE NUMBER(S) / EXPIRATION DATE(S)	14a. LICENSE NUMBER(S) / EXPIRATION DATE(S)
	13b. INTERMEDIATE USE(S)	14b. ULTIMATE END USE(S)

15. DESCRIPTION OF RADIOACTIVE MATERIALS, SEALED SOURCES, NUCLEAR FACILITIES	15a. MAX TOTAL VOLUME / ELEMENT WGT (KG), OR TOTAL ACTIVITY (TBq)	15b. MAX ENRICHMENT OR WGT %	15c. MAX ISOTOPE WGT (KG)

16. FOREIGN OBLIGATIONS (BY COUNTRY AND BY PERCENTAGE OF MAXIMUM TOTAL VOLUME)

PART E. TO BE COMPLETED FOR ALL LICENSES, AMENDMENTS, OR RENEWALS

17. ADDITIONAL INFORMATION PROVIDED ON PAGES 3, 4, AND/OR ON SEPARATE SHEETS?	17a. COPIES OF RECIPIENTS' AUTHORIZATIONS PROVIDED?
☑ YES ☐ NO	☐ YES ☑ NO

18. CERTIFICATION: I, the applicant's authorized official, hereby certify that this application is prepared in conformity with Title10, Code of Federal Regulations, and that all information provided is correct to th e best of my knowledge.

18a. PRINT NAME AND TITLE OF AUTHORIZED OFFICIAL	18b. SIGNATURE -- AUTHORIZED OFFICIAL	18c. DATE
Keith E. Asmussen, Ph.D., Director Licensing, Safety and Nuclear Compliance	Keith E. Asmussen	09/03/2009

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ADDITIONAL INFORMATION *(Reference applicable block numbers from page 1 and/or page 2 for each entry)*

Block 9a from page 1: Nuclear instrumentation (i.e., instrumentation and control systems) to be used in the operation of the Bangladesh TRIGA® Mark II research reactor.

Block 17 of page 1: General Atomics previously possessed license XCOM 1105 which authorized the export of assorted spare and replacement parts and components to the Bangladesh TRIGA® Mark II research reactor. XCOM 1105 expired on December 31, 2007.

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GENERAL ATOMICS

X COM/1205
11005835

October 9, 2009
IEL-4329

Deputy Director
Office of International Programs
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Subject: Application for License to Export an Instrumentation and Control System to the Atomic Energy Research Establishment TRIGA® Research Reactor in Bangladesh

Dear Deputy Director:

General Atomics (GA) has a commitment to provide a nuclear instrumentation upgrade to the Atomic Energy Research Establishment TRIGA® research reactor located in Savar, Dhaka, Bangladesh. A completed NRC Form-7 and check in the amount of $4,100.00 are enclosed in support of this export license application.

In early September (~ September 3, 2009), and under separate cover, General Atomics Electronic Systems, Inc. (GA-ESI) forwarded their check #126221 in the amount of $4,100 to support this export license application. However, since the NRC Form-7 did not accompany the check, a new check has been prepared to accompany the enclosed NRC Form-7. General Atomics Electronic Systems, Inc. would like to request the return of check #126221.

If you have any questions about the above, please do not hesitate to contact me at (858) 455-2823 or keith.asmussen@ga.com.

Very truly yours,

Keith E. Asmussen

Keith E. Asmussen, Ph.D., Director
Licensing, Safety and Nuclear Compliance

Encl: NRC Form 7
General Atomics Electronic Systems, Inc. Check No. 126659
Product brochure

Received
10-13-09
RB

3550 GENERAL ATOMICS COURT, SAN DIEGO, CA 92121-1122 PO BOX 85608, SAN DIEGO, CA 92186-5608 (858) 455-3000

Attachment to GA-ESI's XCOM License Application IEL-4329

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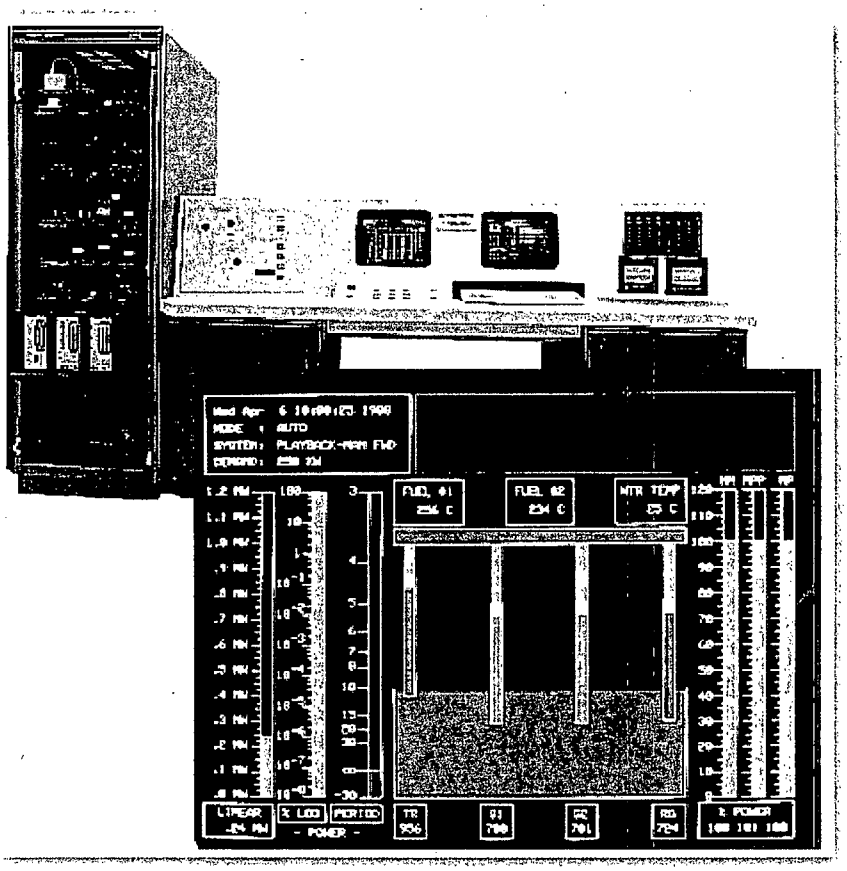
Rec'd 10-13-09 TJ

Instrumentation and Control Systems

All types of research reactors can be operated with this multipurpose control and instrumentation system. A state-of-the-art instrumentation and control system using microprocessor technology provides replacement of older, existing instrumentation and control systems that contain obsolete components. Increased flexibility, higher availability, and lower costs are only a few of the good reasons to convert to this system. Our features include:

- Eliminates most manual data logging.
- Provides automatic or manual reactor operation modes.
- Provides complete real-time operator display.
- Replays historical operating data on monitor or printer.
- Eliminates spare parts replacement problems.
- Meets all applicable NRC and IEE specifications



Here's How Our System Works

Xcom/205
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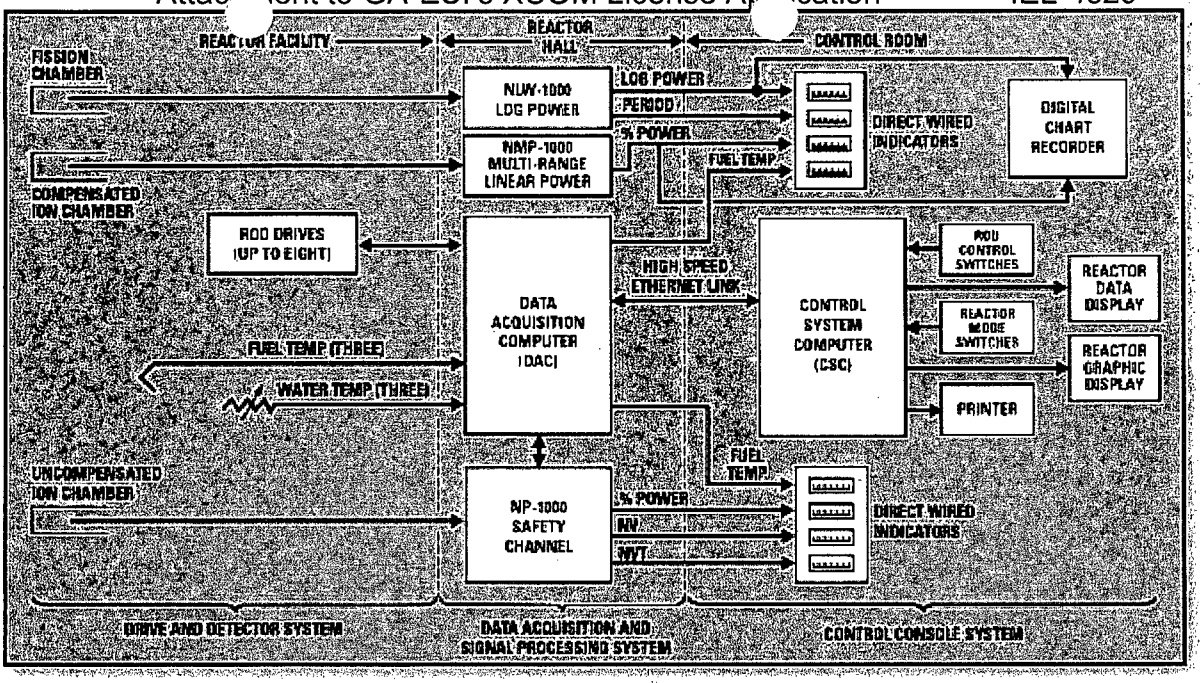
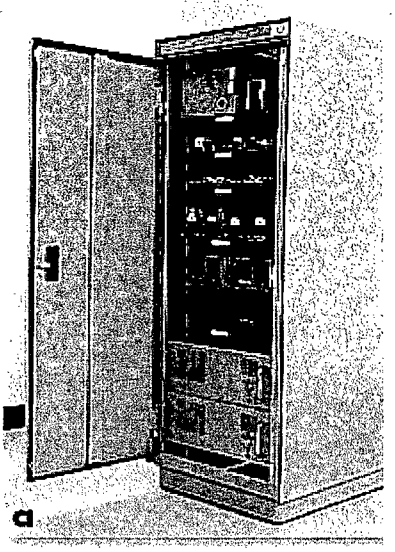


Simplified Research Reactor Control System Block Diagram

The complete system consists of three major subsystems-the Control Rod Drive and Detector System, the Data Acquisition and Signal Processing System, and the Control Console System. The Data Acquisition and Signal Processing System and Control Console System each have independent computers (DAC and CSC) for monitoring and control purposes. The Data Acquisition and Signal Processing System includes the NLW-1000 and NMP-1000 nuclear channels as well as the related reactor safety scram and shutdown circuits. All these systems are mounted in an auxiliary instrumentation cabinet, which is located in the reactor hall usually near the reactor. Thus, even if the Control Console System is disconnected, the Data Acquisition and Signal Processing System can control or shutdown the reactor in a safe manner.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Information on all aspects of reactor operation is displayed on the Control Console System. The two color graphics monitors can display real-time operations data in concise, accurate, and easily understood formats. Bar graph indicators and visual and audible annunciators are also provided. Information displayed on the two monitors can be recorded on hard copy using the graphics printer in the Control Console System. The DAC collects data during reactor operations and stores it in a historical database. Reactor operations can then be replayed in real-time or slow motion. This record is a powerful tool that can be used for operations review and maintenance troubleshooting.

Reactor control rod position commands are transmitted via a high-speed Ethernet link from the Control Console System to the Data Acquisition and Signal Processing System and in turn to the rod drive mechanisms. This reduces the complexity, vulnerability, and cost of data transfer. The Data Acquisition and Signal Processing System computer controls rod positions us integral software during automatic mode operation.

(a) Photo of typical cabinet which contains the Data Acquisition and Processing System which includes the DAC, the NLW-1000, the NMP-1000 and NP-1000 channels. Closeup views are shown in the photos of (b) the NP-1000 channel, the NMP-1000 microprocessor, and (d) the NLW-1000 amplifier.

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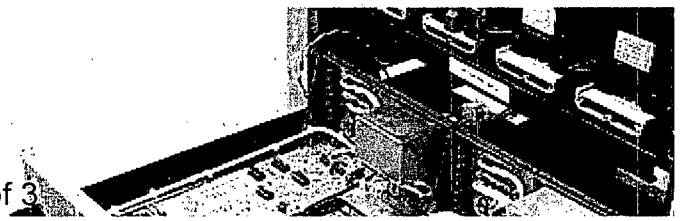
The NLW-1000, NMP-1000 and NP-1000 channels provide power indication. The NLW-1000 can replace existing source and intermediate range channels and provide wide range log power and period. The NMP-1000 provides multi-range linear power. The NP-1000 analog channel was developed specifically as a



research reactor safety channel. It monitors percent power. For pulsing reactors, the NP-1000 is also wired to output nv and n data, which can be graphically displayed or recorded on hard copy.

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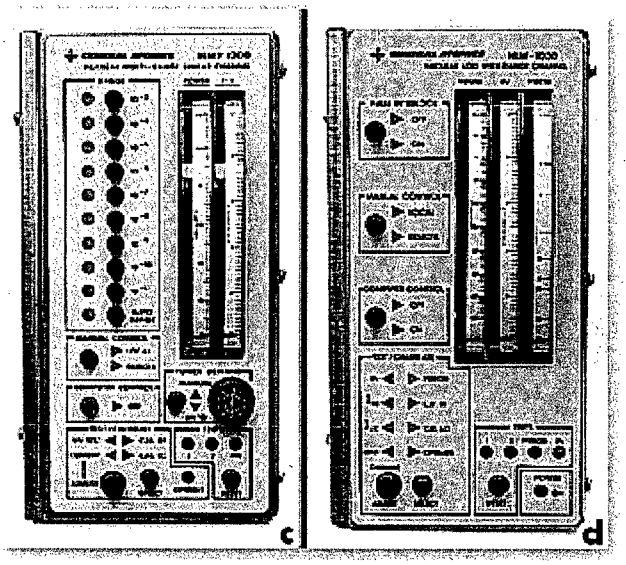
Safety Features

The two independent, redundant percent power safety channels are provided to ensure safe operation of the reactor (the NMF 1000 and NP-1000). Both channels are designed to meet all applicable specifications and both channels also have automatic startup on-line self-diagnostic/testing and calibration verification with data display and documentation printout. Both channels a have isolated outputs for display and safety scram circuit inputs. Redundancy and diverse designs ensure against reactor instrumentation and control system common mode failure. Backup bar graph displays and safety/scram circuits are also hardv to NMP-1000 and NP-1000 outputs.



NP-1000 Analog Safety Channel

The NP-1000 is an advanced design analog neutron monitorir safety channel. The design is very versatile and diverse applications are easily accommodated. This has led to the sal additional NP-1000 units to expand the capability of standard Research Reactor Instrumentation and Control Systems. One interesting application employs twelve NP-1000 units organize for safety monitoring of four reactor parameters using two-out three logic circuitry. The system meets IEEE 269 physical separation requirements in a 19-inch, rack-mounted array usir new plug-in physical separation connectors. NP-1000 channe feature current mode analog circuitry for percent power and p power monitoring using signals generated by a self-powered, core detector or an ionization chamber. They include a built-in pulse integrator circuit and circuits for pre-operational testing a calibration. NP-1000 channels may also be used to monitor temperature and other parameters using appropriate transduc signals. Safety trip circuits connect to computer analysis syste and/or hard-wired scram systems. The integrity of NP signals assured by use of isolation devices. Input signals from as low as 10-9 to 10-3 Amp are accommodated. Gain adjustments are manual and range selection either manual or computer controlled. The unit can be configured in a compact NEMA-12 enclosu that can be mounted horizontally or vertically.

Data Display and Storage

Two color monitors provide real-time information one shows reactor operations graphics and the other displays important oper parameters. Hard copies of the two displays can be made using the graphics printer.

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TRIGA INTERNATIONAL Fuel Sales

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