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

DCS IDF02

OCT 12 1990

Mr. Carlton E. Thorne, Director
Office of Nuclear Export Control
Bureau of Oceans and International
  Environmental and Sc'entific Affairs
U.S. Department of Sta
Washington, D.C. 20520

Dear Mr. Thorne:

Enclosed is an application from General Atomics for an export license (XR154), recently received by the Nuclear Regulatory Commission, for the export of a research reactor/utilization facility to Tirania, Albania. The facility, a TRIGA Mark I, has a design power level of 250 KW(t). The applicant is submitting a separate request for the initial core loading for this reactor.

Before taking action on this request, we would appreciate your views, in accordance with established procedures and from the overall perspective of the Executive Branch, as to whether the requested export meets the applicable criteria in the Atomic Energy Act of 1954, as amended by the Nuclear Non-Proliferation Act of 1978.

Sincerely,

Ronald D. Hauber

Ronald D. Hauber, Assistant Director
  for International Security, Exports and
  Materials Safety
International Programs
Office of Governmental and Public Affairs

Enclosure:
Appl. dtd. 10/9/90
(XR154 - Albania)

cc w/Enclosure:
T. Hart, DOE
R. DeLaBarre, DOS
N. Martin, DOE
M. Rosenthal, ACDA
L. Burdick, DOD
G. Kuzmycz, DOC

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GENERAL ATOMICS

XR154
11004355

October 9, 1990
IEL-1631

VIA FEDERAL EXPRESS

Mr. Ronald Hauber
Assistant Director for
International Security
Office of Governmental and Public Affairs
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Application for Research Reactor/Utilization Facility Export License; Albania

Dear Mr. Hauber:

This application is made under 10 CFR 110 for a license to export to Albania a TRIGA Mark I Research Reactor which the applicant manufactures. The export of the special nuclear material (SNM) in the form of reactor fuel elements will be the subject of a separate application.

The applicant is General Atomics (GA), a California corporation, with headquarters located at 3550 General Atomics Court, San Diego, California 92121-1194. General Atomics is engaged in the development, manufacture and marketing of reactors, and nuclear fuels and systems.

General Atomics conducts its business principally at San Diego, California. It is not owned, controlled or dominated by an alien, a foreign corporation, or foreign government within the meaning of the Atomic Energy Act of 1954, as amended, and of NRC's regulations. In making this application, General Atomics is not acting as an agent or representative of any other person.

The purchase and export of the subject research reactor will be a tri-lateral arrangement wherein the International Atomic Energy Agency as Executive Agency of the United Nations Development Program (UNDP) will purchase the reactor for Albania. More specifically, the construction of the Albanian research reactor is supported by the UNDP within the framework of the project "Strengthening of Agricultural, Industrial and Medical use of Isotopes by means of a Research Reactor." The reactor is to be built on the site of the Institute of Nuclear Physics (INP) in Tirana, Albania. INP is located in the northeastern part of Tirana, about 4 km from the city center.

The individual in Albania responsible for this project is:

Mr. Servet Dani, Director
Institute of Nuclear Physics
Tirana, Albania

3550 GENERAL ATOMICS COURT, SAN DIEGO, CA 92121-1194 P.O. BOX 85608, SAN DIEGO, CA 92138-5608 (619) 455-3000

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The main purpose of the Albanian research reactor utilization is to produce radioisotopes (e.g., Tc-99, I-131) to satisfy the local needs of the Tirana hospitals. Other short and medium life isotopes will be produced for use in medicine, agriculture, industry, geology, animal production and hydrology. In addition, the reactor will be used for research and training in nuclear science, including, for example:

- Neutron Activation Analysis (NAA) and
- Training in several fields (Nuclear Methods and Technology, Nuclear Physics, Health Physics, etc.)

The basic parameters of the reactor have been proposed by the IAEA to meet the requirements of the project and are given in Attachment 1.

The first shipment of reactor components to be made under the requested license is scheduled for about July 1, 1991. Final component shipment and the fuel shipment are tentatively scheduled for March 1993. Fuel loading and reactor checkout are scheduled for completion by September 1993.

The total value of all items to be exported under the requested license will be approximately $1,700,000 (exclusive of the TRIGA fuel element and fueled follower control rods).

The reactor to be exported is a TRIGA Mark I with a nominal steady-state power of 250 KW thermal. The TRIGA Mark I is a water-filled, pool-type reactor. The TRIGA Mark I reactor is described in more detail in Attachment 2.

The initial reactor core will consist of 64 stainless steel clad standard TRIGA fuel elements and three standard fueled follower control rods. The total amount of special nuclear material involved in the initial core is about 2,500 grams of U-235 contained in about 12,600 grams of uranium enriched to a maximum of 19.9%. As mentioned above, these fuel elements and control rods will be the subject of a separate application.

Items to be exported under the requested license will consist of instrumentation systems and components, reactor mechanical components, reactor cooling system components, fuel handling equipment, experimental/irradiation facilities, a complement of spares and replacement components, installation services, and such equipment and tools needed to service the reactor. Certain other items will be exported for temporary use. Such items, include specialized tools, instruments and associated start-up monitoring equipment. These certain items exported for temporary use will be returned to General Atomics upon completion of the reactor checkout.

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We request the license have a validity period through July 1994 to accommodate possible schedule slippage during the construction and start-up of the reactor.

If you should have any questions regarding this application or require additional information, please don't hesitate to contact me at (619) 455-2823.

Very truly yours,

Keith E. Asmussen

Keith E. Asmussen, Manager
Licensing, Safety and
Nuclear Compliance

KEA:shs

Enclosures:

Attachment 1 - "Basic Technical Data of the Albanian Reactor"
Attachment 2 - "Description of TRIGA Mark I Reactor"

STATE OF CALIFORNIA)
)ss
COUNTY OF SAN DIEGO)

OFFICIAL SEAL
LINDA L. ANDERSEN
NOTARY PUBLIC - CALIFORNIA
SAN DIEGO COUNTY
My Comm. Expires Oct. 15, 1993

On this the 9th day of October, 1990, before me, the undersigned, a Notary Public in and for said State, personally appeared Keith E. Asmussen, Manager, licensing, Safety and Nuclear Compliance, personally known to me or proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument, and acknowledged that he executed it.

WITNESS my hand and official seal.

Linda L. Andersen
Notary's Signature

ATTACHMENT 1 to General Atomics' Application for Export of Research Reactor to Albania, dated October 9, 1990

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Basic Technical Data of the Albanian Reactor

Technical Data

Reactor type	Tank
Thermal power (kw)	250
Maximum thermal neutron flux ($n \cdot cm^{-2} s^{-1}$)	$\geq 5 \times 10^{12}$
Moderator material	H_2O (plus Zr-H for TRIGA-type)
Coolant material	H_2O
Natural convection cooling	yes
Forced cooling	no
Reflector material	Graphite + H_2O
Control-rods material	BORAL or B_4C
Control-rods number	4

Experimental Facilities

Horizontal channel number	0
Core irradiation facilities number	1
Thermal neutron flux in core irradiation facility	$\geq 5 \times 10^{12}$
Reflector irradiation facilities number	8
Reflector pneumatic irradiation fac.n.	2
Thermal neutron flux in reflector irradiation facilities	$\geq 1 \times 10^{12}$

ATTACHMENT 2 to General Atomics' Application for Export of Research Reactor to Albania, dated October 9, 1990

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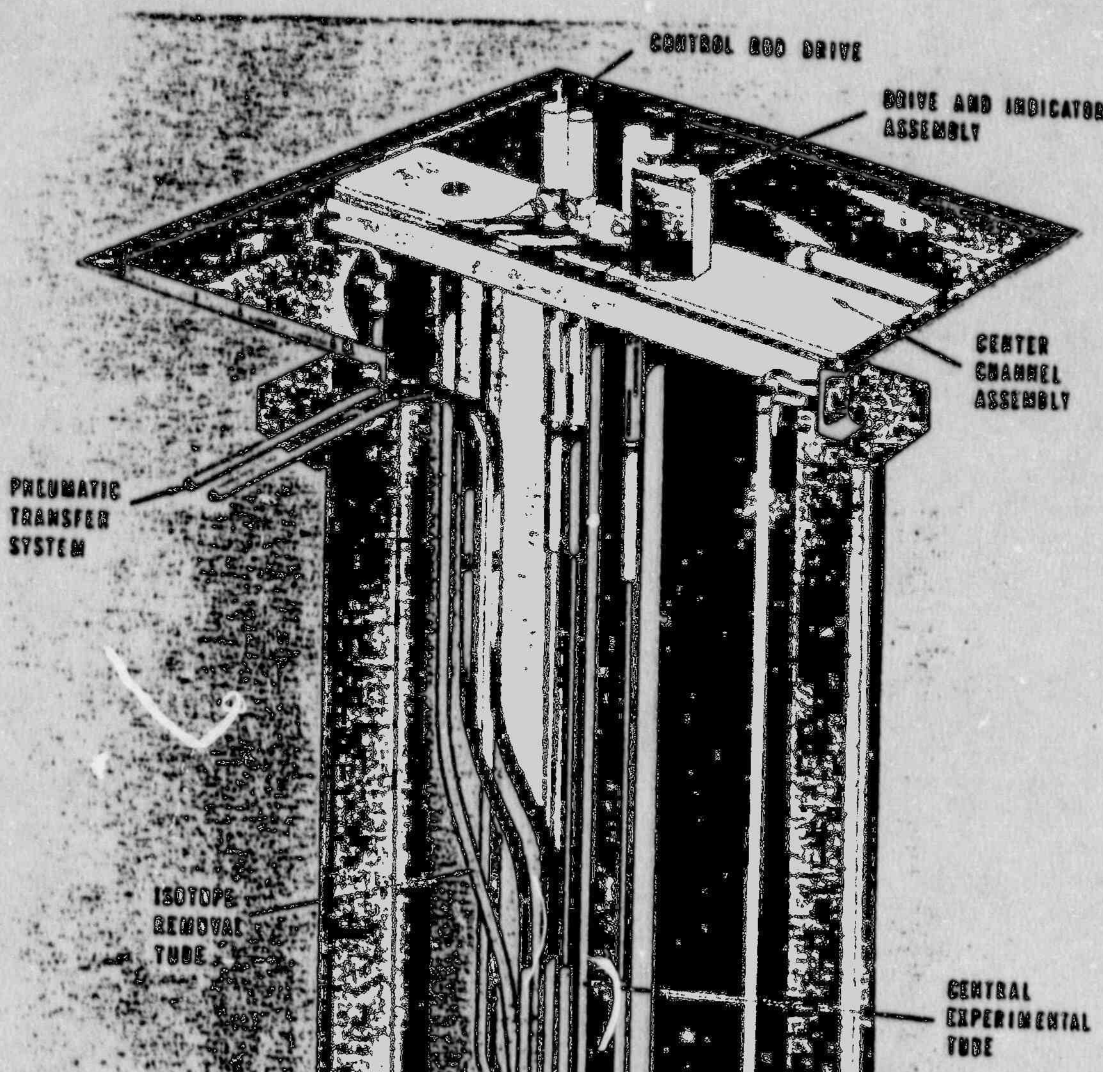
DESCRIPTION OF TRIGA MARK I REACTOR

GENERAL DESCRIPTION

The TRIGA Mark I reactor was designed to implement effectively the various fields of basic nuclear research and education. It incorporates facilities for advanced neutron and gamma radiation studies as well as for isotope production, sample activation, and student training. The TRIGA Mark I reactor is installed below ground (see Fig. 2-1). Its built-in safety permits installation at a minimum of expense in either an existing or a new building.

The reactor and experimental facilities are located in an aluminum tank which is surrounded by reinforced concrete (see Fig. 2-1). The reactor core and reflector assembly is located at the bottom of the 6.5-ft (2-m)-diam aluminum tank 24.5 ft (7.5 m) deep. Approximately 20 ft (6 m) of water above the core provides vertical shielding. The core is shielded radially by concrete around the tank and the earth.

TRIGA reactors use solid fuel elements, developed by General Atomic, in which the zirconium-hydride moderator is homogeneously combined with the enriched uranium. The unique feature of these fuel-moderator elements is the prompt negative temperature coefficient of reactivity, which gives the TRIGA reactor its built-in safety by automatically limiting the reactor power to a safe level in the event of a power excursion. The reactor core consists of a lattice of cylindrical fuel-moderator elements and graphite (dummy) elements. The fuel elements have graphite end sections that form the top and bottom reflector. A 12-in.-thick graphite radial reflector surrounds the core and is supported on an aluminum stand at the bottom of the tank. Water occupies about 1/3 of the core volume.



MI-1B

Fig. 2-1. Cutaway view of below-ground TRIGA Mark 1 reactor

The experimental and irradiation facilities of the TRIGA Mark I reactor are extensive and versatile. Physical access and observation of the core are possible at all times through the vertical water shield (see Fig. 2-2).

A rotary specimen rack in a well in the top of the graphite reflector provides for the large-scale production of radioisotopes and for the activation and irradiation of small specimens. (See Fig. 2-3.) All 40 positions in this rack are exposed to neutron fluxes of comparable intensity. The TRIGA reactor is equipped with a central thimble for conducting experiments or irradiating small samples in the core at the point of maximum flux. Experimental tubes can easily be installed in the core region to provide additional facilities for high-level irradiation or in-core experiments. A high-speed pneumatic transfer system permits the use of extremely short-lived radioisotopes. The in-core terminus of this system is located in the outer ring of fuel element positions, a region of high neutron flux.

The power level of the TRIGA reactor is normally controlled with three control rods: a regulating rod, a shim rod, and a safety rod. Insofar as control for the sake of safety is concerned, transient tests at General Atomic have proved conclusively that the large prompt negative temperature coefficient of the fuel-moderator material provides a high degree of self-regulation without the assistance of external control devices.

The water cooling and purification systems maintain low water conductivity, remove impurities, maintain the optical clarity of the water, and provide a means of dissipating the reactor heat. They consist of a water surface skimmer, pump, filter, demineralizer, heat exchange unit, associated piping and valving, and miscellaneous instrumentation.

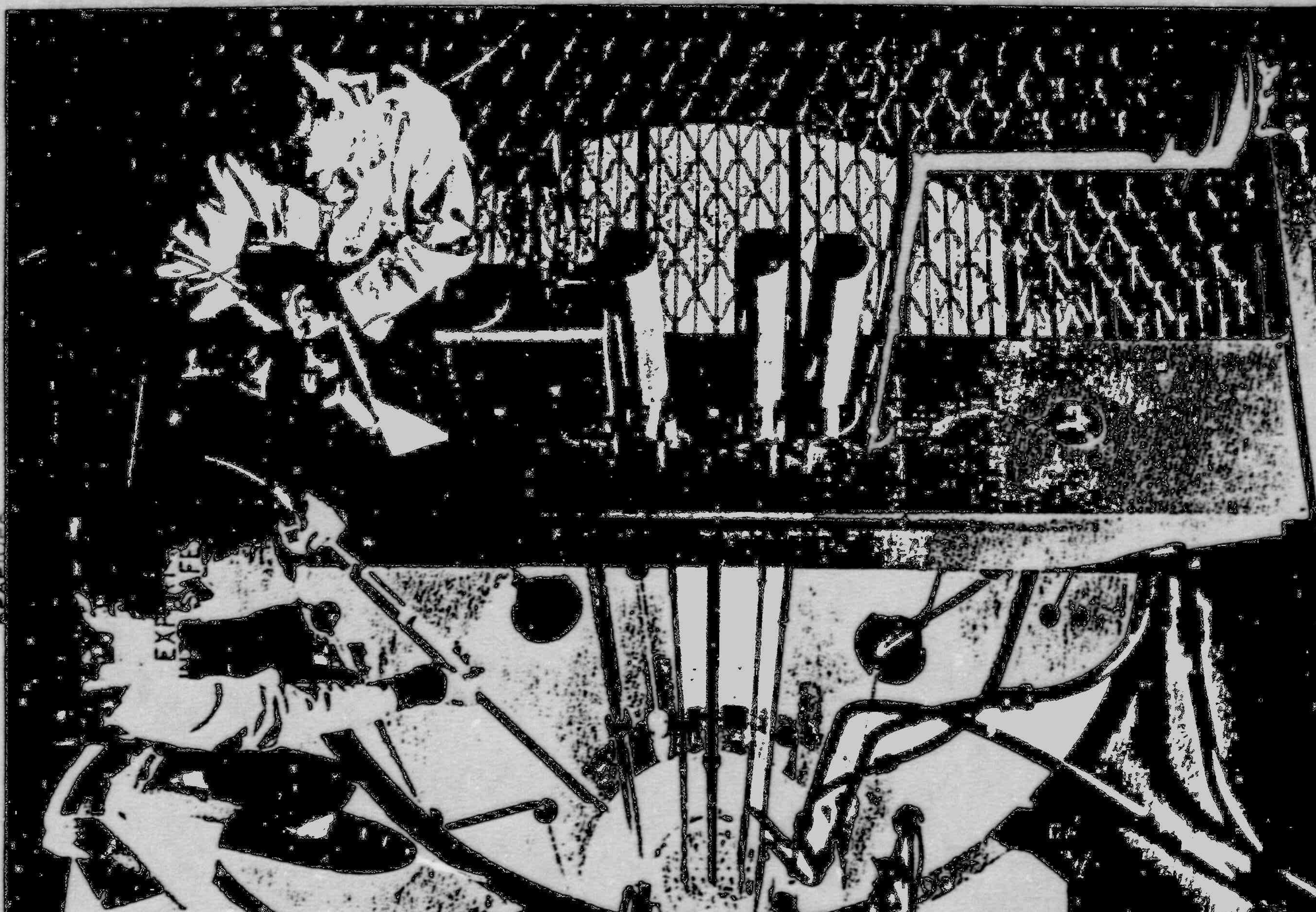


Fig. 2-2. TRIGA core visible through the cooling and shielding water

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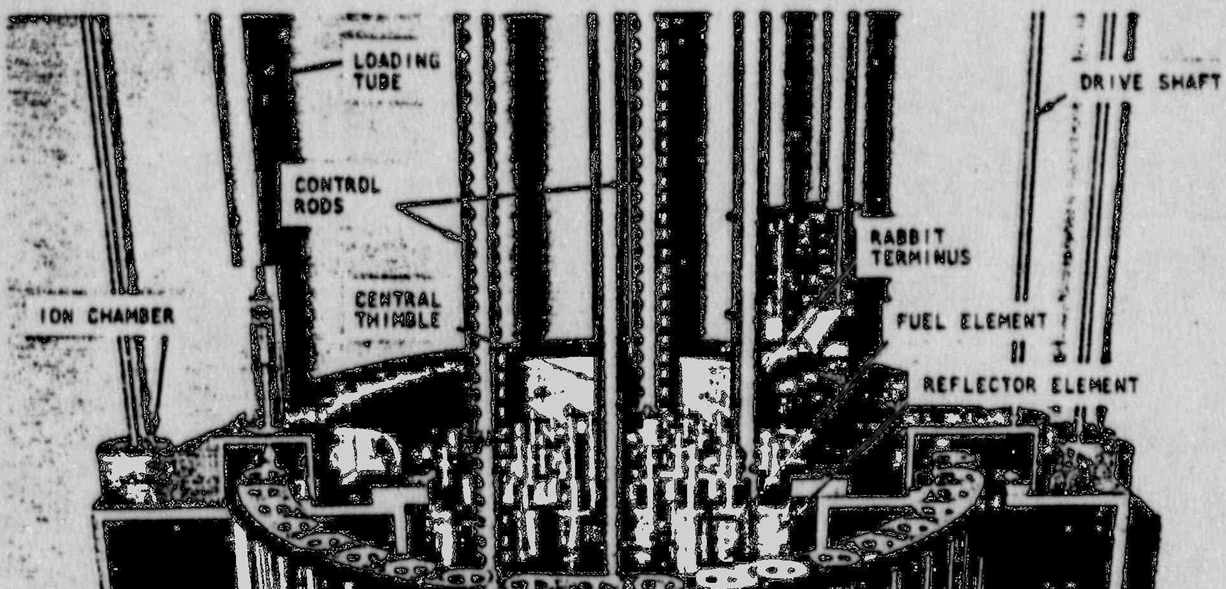

Fig. 2-3. Cutaway view showing TRIGA Mark F core arrangement with rotary specimen rack