



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Rhode Island Atomic Energy Commission  
NUCLEAR SCIENCE CENTER  
16 Reactor Road  
Narragansett, R.I. 02882-1165

March 3, 2000


Mr. Marvin Mendonca  
Senior Project Manager  
Non-Power Reactors Decommissioning and  
Environmental Project Directorate  
Division of Reactor Projects III/IV/V  
U S Nuclear Regulatory Commission  
Washington DC 20555

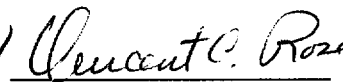
Subject: Request for Adjustment of Facility Operating License No. R-95  
for the Rhode Island Atomic Energy Commission (RIAEC);  
Docket No. 50-193


Dear Mr. Mendonca:

Facility Operating License No. R-95, which is for the Rhode Island Atomic Energy Commission (RIAEC), is scheduled to expire at midnight August 27, 2002. The Rhode Island Atomic Energy Commission hereby requests that this license be adjusted to expire at midnight November 28, 2004 for the purpose of recovering time during which the reactor was either under construction or shutdown for modification. Information supporting this request is contained in the Safety Review enclosed. This request has been reviewed and approved by the Rhode Island Atomic Energy Commission and the Nuclear and Radiation Safety Committee (NRSC). Correspondence concerning this request should be directed to Dr. Terry Tehan.

Sincerely,

  
Terry Tehan, Ph.D.  
Director, RIAEC

  
Vincent C. Rose, Ph.D.  
Chairman, RIAEC

  
Harold N. Krickle, Ph.D.  
Chairman, NRSC

TT:cd

Enclosure

cc: Mr. Craig Bassett, Senior Non-Power Reactor Inspector  
U S Nuclear Regulatory Commission, Region 2

A020  
11

## Safety Review

### Adjustment of Facility Operating License No. R-95

#### 1. Description of Change

Facility Operating License No. R-95 expires at midnight, August 27, 2002. It is proposed that this license be adjusted so that it expires at midnight, November 28, 2004 in order to recover time during which the reactor was under initial construction and shutdown for modification. Table One provides a chronology of the operating license. The time intervals for which an adjustment is requested are listed below.

- (a) On August 27, 1962, the United States Atomic Energy Commission (AEC) issued Construction Permit No. CPRR-73 to the Rhode Island Atomic Energy Commission (RIAEC). Construction then began on the original reactor facility. On July 21, 1964, the AEC issued Facility Operating License No. R-95, which authorized operation at power levels up to 1 MW. The license became effective on its date of issuance and shall expire at midnight, August 27, 2002. Initial criticality was achieved on July 28, 1964.

Given the above, an adjustment of Facility Operating License No. R-95 is justified because its expiration date was based retroactively from the authorized start of construction. A more appropriate approach would have been to base the expiration date on either the actual date of issuance of the license itself (July 21, 1964) or on the date of initial criticality (July 28, 1964). If the former is used then the facility operating license should be extended by one year and eleven months. If the latter is used, then the adjustment should be for two years and one day. The latter date has been used here.

- (b) On March 17, 1993, the Order, Amendment No. 17 to Facility Operating License No. R-95, was issued to authorize the conversion from high-enriched uranium (HEU) fuel to low-enriched uranium (LEU) fuel. The Order was to become effective on the later date of either (1) the day of receipt of an adequate number and type of LEU fuel elements that are necessary to operate the facility as specified or (2) 30 days after the date of publication of this Order in the Federal Register. At 1600 July 2, 1993, the HEU core was shutdown for the last time and further operation was precluded until the conversion was completed.

Given the above, an adjustment of Facility Operating License No. R-95 is justified because its expiration date was not altered to allow for the time that the reactor was shutdown for the conversion. This shutdown lasted from July 3, 1993 to October 6, 1993 and the facility operating license should therefore be adjusted by three months.

Table One

Chronology of Facility Operating License No. R-95

<u>Date</u>	<u>Event</u>	<u>Power Level Authorized</u>
August 27, 1962	Construction Permit CPRR-37 issued.	None
July 21, 1964	Facility Operating License No. R-95 issued retroactive to August 27, 1962.	1 MW
July 28, 1964	Initial criticality of RINSC reactor.	1 MW
September 10, 1968	Amendment No. 1 issued. This authorized operation at 2 MW	2 MW
March 17, 1993	Amendment No. 17 issued for LEU conversion order.	2 MW
October 6, 1993	Initial operation of LEU core at 2 MW	2 MW

2. Safety Evaluation

The basis of this request for the adjustment of Facility Operating License No. R-95 is that RIAEC will not have received the full benefit of that license if it is allowed to expire at midnight August 27, 2002. This failure to achieve full benefit was not and is not within RIAEC's control. Rather it is the result of certain practices that are inherent in the licensing process. These include (1) the retroactive dating of an operating license to the date of issuance of the associated construction permit, (2) the counting of time spent on facility modifications against the operating license even though the facility could not be legally operating during that interval (i.e., a conversion order issued to convert to LEU type fuel). The issuance of an operating license constitutes a significant investment both on the part of the licensee and on the part of society with the latter acting through the cognizant regulatory agency. It makes little sense to waste a portion of that investment.

It should be recognized that this request is for a license adjustment and not a renewal. Accordingly, the criteria on which this request should be evaluated are not those of a license renewal. In particular, findings established at the time of issuance of the original license and/or its amendments remain valid. The principal question should therefore be whether or not the licensee (RIAEC) is capable of continuing to operate the facility in a manner such that public health and safety are not endangered. RIAEC is clearly capable of so doing. The best evidence for this conclusion is the facility's operating record. This

is documented in reports provided annually to the U.S. Nuclear Regulatory Commission or its predecessor agencies. These give the history of the facility, document the types of education and research activities conducted with the reactor, list changes in facility design and procedures, and provide summaries of operational activities including effluent releases. These reports show the RIAEC to have an excellent safety record while at the same time maintaining high standards of accomplishment.

Central to RIAEC's capability to continue operation of the Rhode Island Nuclear Science Center (RINSC) Research Reactor in a safe manner is the protocol that has been established to ensure that all proposed changes to the facility are properly reviewed. Such changes might include the updating of a procedure to incorporate new regulatory requirements, the installation of a new item of equipment, or the initiation of a new experiment. Whenever a change is to be made, a written safety review is prepared. This document consists of a description of the proposed change, a safety evaluation, and a determination of whether or not an unreviewed safety question, as defined in 10 CFR 50.59, exists. If the change involves equipment or material, a quality assurance program, which among other things documents the quality of materials used and installation methods, will also be established. All safety reviews require the approval of the Director, RIAEC and the Nuclear and Radiation Safety Committee (NRSC). The NRSC is a group of engineers and scientists, some affiliated with RIAEC and some with other organizations, who provide a broad range of expertise in all aspects of reactor design, operation, and management. This committee provides an independent check on facility operation. The NRSC meets in its entirety at least annually and acts through an approved subcommittee on a more frequent basis. Finally, if a safety review does involve an unreviewed safety question, it is submitted to the U.S. Nuclear Regulatory Commission for prior approval.

The safety review process ensures that all proposed changes in the facility's design and operation conform to the cognizant regulations. In order to ensure that all appropriate changes are identified, RIAEC has established a system of reviews and/or audits. Some of these are license requirements. For example such is the case with the annual reports that are submitted every August to the NRC. Others are the result of NRC requirements. These include an annual review of the emergency plan which is done together with an annual exercise of that plan. A reciprocal agreement with the University of Massachusetts at Lowell reactor reviews operating and radiation safety. Other review requirements include an annual review of the security plan, quality assurance plan, and operating procedures. These audits and others are performed by the Reactor Operations Staff. If any of these audits identifies a deficiency, it is corrected and the result documented. If a suggestion is made for improved operation, it is considered and, if adopted, a safety review is prepared.

In summary, the combination of the safety review process and the audit requirements establishes a check and balance system that ensures that the facility is operated safely and that any incipient problems are readily identified and corrected. A further check is, of

course, the periodic inspections that are conducted by the NRC. The reports filed in conjunction with these inspections show RIAEC to have an excellent safety record.

As further evidence that RIAEC is capable of continuing to operate the RINSC Research Reactor in a safe manner, and in terms of their compliance with current regulations.

- a) Administrative Condition: The administrative condition is excellent in that required facility documents are kept current both in terms of their description of the reactor and its systems, and in terms of their compliance with current regulations. Examples include:
  - (i) Safety Analysis Report (SAR): This report describes the reactor's design, its systems, and its instrumentation. Also, it provides a basis for the Technical Specifications (TS) that are part of the operating license. Whenever a reactor component that is described in the SAR or TS is changed, a 'revision' is prepared by the reactor staff and, after review and approval by the NRSC, submitted to the cognizant regulatory agency. The result is that the RIAEC Research Reactor Safety Analysis Report reflects the current status of the facility.
  - (ii) Emergency Plan and Procedures: The emergency plan is reviewed by the NRSC biennially. Revisions are made, under the aforementioned safety review process, whenever a change is deemed appropriate. For example, both the plan and its implementing procedures were revised in 1994 as a result of changes in 10 CFR 20.
  - (iii) Security Plan and Procedures: These are reviewed annually and revised in a manner similar to the emergency plan whenever it is so required.
  - (iv) Quality Assurance Program: this program is submitted every five years to the U.S. Nuclear Regulatory Commission for review and re-issuance of approval.
  - (v) Abnormal/Operating/Administrative Procedures: These documents and their associated checklists are updated on a more or less continuous basis with modifications and/or additions being made whenever appropriate.
- b) Material Condition: The material condition of all systems important to safety is excellent. This includes the confinement building, the reactor pool, the primary/secondary coolant systems, the nuclear and process safety systems, and the effluent monitoring equipment. Examples include:

- (i) Confinement Building: The RINSC has an emergency evacuation system that maintains a negative pressure within confinement during an emergency condition to minimize effluent releases. All penetrations and dampers are inspected semi-annually. In October 1999, the confinement building walls were patched and waterproof coating applied. In addition, the 115 foot reactor ventilation exhaust stack, the confinement building fire escape and exterior doors were prepared and painted.
- (ii) Core Component Inspection: All in-core components are inspected annually for evidence of degradation. The following should be noted:
  - (1) The core housing, pool liner, and all in-core components such as the natural circulation gates, anti-siphon valves and pool penetrations are inspected annually.
  - (2) Particular attention is given to water chemistry control of the primary system. The system is equipped with a demineralizer and with conductivity monitors that readout in the control room. These monitors provide an alarm to the console operator in the event that there is an abnormal increase in conductivity. Thus, any problem is detected in its incipient stages. In addition, the primary coolant is analyzed for pH and radioactivity.
- (iii) Control Blades: These are made of boron carbide and aluminum (Boral). They are inspected and the reactivity worths are determined annually. This ensures that any mechanical problems would be detected early and that the reactivity worth of these blades remains effective. The regulating blade was replaced as part of the LEU conversion in 1993.
- (iv) Reflectors: New graphite reflectors were installed in early 1983. The beryllium reflectors were installed as part of the LEU conversion in 1993.
- (v) Coolant Systems and Reactor Instrumentation: During the shutdown period to convert to LEU type fuel the primary and secondary coolant systems were upgraded. New primary pumps, valves, piping, heat-exchanger and cooling tower were installed. In addition, the Wide Range Linear Channels and the process control instrumentation were replaced. New remote area radiation monitors were installed. A purchase order for a new Startup and Intermediate Channel has been awarded.

- (vi) Tests and Calibrations: More than 100 tests and calibrations are conducted each year according to an established schedule. These ensure that all equipment is in proper operating condition and that any incipient failures are identified and repaired.
- c) Operator Training: The RIAEC has an approved training program both for the initial licensing of newly-hired personnel and for the maintenance of qualification of licensed personnel. In 1992, it was required by NRC that any operator or senior operator whose license was to expire in 1993 or 1994 be reexamined by NRC. All licensed operators in this category passed the NRC exam.
- d) Effluent Releases: Effluent releases are monitored by a gas and a particulate monitors. These monitors readout in the control room. In the event of detection of an abnormal effluent level, an alarm sounds and the building emergency exhaust system is activated by the console operator. Records show that effluent releases are well below allowable levels. This information is provided annually to the NRC in the annual reports.
- e) Financial Condition: The State of Rhode Island has the financial resources to support the continued safe operation of the facility.

The above information demonstrates that the Rhode Island Atomic Energy Commission is capable of continuing to operate the RINSC Research Reactor in a safe manner. The items cited are not comprehensive. Rather the intent is to provide examples of RIAEC's commitment to maintain and operate the facility such that "There is reasonable assurance (i) that the activities authorized by the operating license can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the rules and regulations of the USNRC."

### 3. Unreviewed Safety Question Determination

An un-reviewed safety question is judged to exist if (1) the probability of occurrence or the consequence of an accident or malfunction or equipment important to safety previously evaluated in the safety analysis report may be increased; or (2) a possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report may be created; or (3) the margin of safety as defined in the basis for any technical specification is reduced (10 CFR 50.59). The proposed adjustment of the RIAEC's facility operating license does not meet any of these three criteria because nothing is being changed except the expiration date of the license. Moreover, that adjustment would merely recover the full duration of the license as originally approved for reactor operation.