



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

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

March 21, 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, D.C. 20555

Subject: Supplemental Information Supporting the 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:

On March 3, 2000, the Rhode Island Atomic Energy Commission requested an adjustment to the expiration date of Facility Operating License No. R-95 from August 27, 2002 until November 28, 2004 to recover time during which the reactor was either under construction or shutdown for modification. Additional information supporting this request is contained in the Environmental Data enclosed.

Correspondence concerning this data should be directed to Mr. Henry J. Bicehouse, Assistant Director for Radiation and Reactor Safety or the undersigned.

Sincerely,

Terry Tehan, Ph.D.  
Director, RIAEC

Enclosure

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

Mr. McMahon  
Office of Occupational & Radiological Health, RI Dept. of Health

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## Environmental Data

### Introduction

The proposed action is necessary for the continued operation of the Research Reactor in order to continue medical, environmental and physical science research and development.

The Research Reactor is located Narragansett, Rhode Island. The Research Reactor is an open-pool type research reactor with a 2 MW licensed power level. The NRC licensed the facility in 1964. The original license permitted operation at a power level of 1 MW. The license was amended in 1968 permitting operation at 2 MW. Since about 1964, the facility has operated about 1625.4 megawatt-hours per year on average.

Liquid and solid releases of radioactive material have been in accordance with the applicable requirements of 10 CFR 20 and Technical Specification 3.7.2.

The radiological effects of the continued operation will be minimal based on past radiological releases. The radiological exposures for facility operations have been within regulatory limits. Conditions are not expected to change.

With regard to potential non-radiological impacts, the proposed action does not involve any historic sites. It does not affect non-radiological effluents and has no other environmental impact. Therefore, there are no significant non-radiological environmental impacts associated with the proposed action.

The alternative to the proposed action for the Research Reactor Facility is to deny the application (i.e., \*no action\* alternative). If this were the case, the Rhode Island Atomic Energy Commission would apply for license renewal and operate under the timely renewal provisions of 10 CFR 2.109 until the Commission renewed or denied the license renewal application. With operation under timely renewal or renewal, the actual conditions of the reactor would not change. If the Commission denied license renewal, Rhode Island Nuclear Science Center research reactor operations would stop and decommissioning would be required with a likely small impact on the environment.

This action does not involve the use of any resources not previously considered in the Hazards Analysis prepared for the issuance of the license in April 1963.

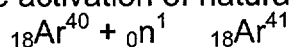
Since no changes to the facility are requested, past environmental performance is a reasonable indication of the potential environmental impact from the requested amendment. Environmental data are provided for the period 1995 through 1999. Recent facility performance supports the conclusion that there will be no significant environmental impact associated with the requested extension to our license.

## Annual Airborne Effluent Releases

All gaseous radioactive waste from the beam ports, thermal column, pneumatic irradiation system and all other radioactive gas exhaust points associated with reactor operation are collected in a manifold and discharged to the reactor stack through an absolute filter. A stack exhaust gas monitor continuously draws a representative sample of air from the exhaust gas during reactor operation. The exhaust monitor has beta particulate and gamma scintillation detectors set to alarm if airborne particulates and/or activated noble gases approach release limits.

## Argon-41 Releases

The primary airborne effluent from the RINSC is Argon-41. Argon-41 is produced during routine operation by the activation of natural Argon-40:



Argon-40 constitutes 99.60% of natural argon. Natural argon is present in air at 0.94 volume percent. Argon-41 has a half-life of 1.83 hours and decays to stable Potassium-41.

RINSC produces an average of 0.15 curies of Argon-41 per MW-hr of operation. Annual emissions of Argon-41 are shown in following table.

<b>Year</b>	<b>Curies</b>
1995	236.52
1996	55.89
1997	225.08
1998	160.05
1999	50.00

The EPA's Comply Code was used to project annual committed effective dose equivalents (CEDE) to a hypothetical individual residing 100 meters from the facility for the period 1995-99. Those dose equivalents are shown in following table.

<b>Year</b>	<b>CEDE (mrem)</b>
1995	5
1996	1.2
1997	4.7
1998	3.4
1999	1.1

## Other Airborne Effluent Releases

The gaseous effluent monitor particulate filters are removed and counted on a gas-flow proportional counter. The following table summarizes total beta particulate activity released during the last five years.

<u>Year</u>	<u>Beta Activity (<math>\mu\text{Ci}</math>)</u>
1995	1.41
1996	0.26
1997	1.33
1998	1.45
1999	0.99

### **Annual Gamma Doses**

We use thermoluminescent dosimeters (TLD) supplied by our dosimetry service to measure gamma dose rates associated with our operation. The TLD readings are taken on the outside surface of our reactor building.

The hypothetical maximally exposed individual is in the northeast quadrant, approximately 49 meters from the building wall. Since the area is not used as a residence, that individual is assumed to be present seven hours per day; five days per week; and fifty weeks per year. The following table shows the total TLD readings and provides projected annual dose equivalents based on those TLD readings.

<u>Year</u>	<u>TLD Reading</u>	<u>Projected Dose Equivalent mrem</u>
1995	400	0.06
1996	1700	0.25
1997	1440	0.21
1998	1220	0.18
1999	1030	0.15

### **Liquid Effluent Releases**

Annual liquid effluent releases from the facility are minimal. All liquid waste (except sanitary waste) from the reactor building flows into retention tanks. The liquids are analyzed prior to discharge to the sewer system. The retention tanks are discharged very infrequently. The following table summarizes liquid effluent releases since 1995.

<u>Year</u>	<u>Volume (gallons)</u>	<u>Isotope(s)</u>	<u>Total Activity (<math>\mu\text{Ci}</math>)</u>
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1995	1.264 <sup>1</sup>	Co-60, Zn-65, Ru-106, Cs-134, Cs-137, Ba-133, I-131	0.00146
1996	No discharges		
1997	No discharges		
1998	3000	H-3, Sb-122, Sc-46	3.17
1999	2150	H-3	550

### Low-level Solid Radioactive Waste

Solid radioactive wastes are accumulated onsite until they can be transferred to a facility licensed for disposal. Between 1995 and 1999, a total of 56.8 ft<sup>3</sup> (1.61 m<sup>3</sup>) of solid radioactive waste containing 11.6 mCi (430.5 MBq) was transferred.

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<sup>1</sup> Laboratory samples only