

April 5, 2000

Mr. Terence Tehan, Director
Nuclear Science Center
Rhode Island Atomic Energy Commission
16 Reactor Road
Narragansett, RI 02882

SUBJECT: RHODE ISLAND ATOMIC ENERGY COMMISSION RESEARCH REACTOR
(TAC NO. MA8405)

Dear Mr. Tehan:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for amendment dated March 4, 2000, and supplement dated March 21, 2000. The proposed amendment would amend Facility Operating License No. R-84 to allow extension of the license expiration date from August 27, 2002, to November 28, 2004.

The assessment is being forwarded to the Office of the Federal Register for publication.

Sincerely,

/RA/

Marvin M. Mendonca, Sr. Project Manager
Events Assessment, Generic Communications, and
Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-193

Enclosure: Environmental Assessment

cc w/enclosure:
Please see next page

Rhode Island Atomic Energy Commission

Docket No. 50-193

cc:

Dr. Vincent C. Rose, Chairman, RIAEC
University of Rhode Island
Chemical Engineering Department
118 Crawford Hall
Kingston, RI 02881

Dr. Harry Knickle, Chairman
Nuclear and Radiation Safety Committee
University of Rhode Island
College of Engineering
102 Bliss Hall
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Mr. Charles McMahon
Supervisor, Radiation Control Specialist
Rhode Island Department of Health
Division of Occupational and
Radiological Health
3 Capitol Hill Cannon
Providence, RI 02808-5097

Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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UNITED STATES NUCLEAR REGULATORY COMMISSION

RHODE ISLAND ATOMIC ENERGY COMMISSION

NUCLEAR RESEARCH REACTOR

DOCKET NO. 50-193

ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering the issuance of a license amendment to Facility Operating License No. R-95, issued to Rhode Island Atomic Energy Commission (the licensee) for operation of the Rhode Island Atomic Energy Commission Research Reactor.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action

The proposed action would allow extension of the license expiration time from August 27, 2002, to November 28, 2004, for the Rhode Island Atomic Energy Commission Research Reactor. By letter dated March 4, 2000, and supplement dated March 21, 2000, the licensee requested this license extension in accordance with the provisions of 10 CFR 50.90. The licensee submitted an Environmental Report with their supplement dated March 21, 2000.

Need for the Proposed Action

The proposed action is needed to allow continued operation of the Rhode Island Atomic Energy Commission Research Reactor for medical, environmental and physical science research, and development activities beyond the current term of the license.

Environmental Impact of the Proposed Action

The Rhode Island Atomic Energy Commission Research Reactor is on the Narragansett Bay Campus of the University of Rhode Island, in Narragansett, Rhode Island. The research reactor is housed in a metal and concrete building.

The Rhode Island Atomic Energy Commission Research Reactor is a moderate power (2 megawatts), pool-type research reactor. The NRC licensed the facility for operation up to 1 megawatt power level in 1964 and authorized operations up to 2 megawatts in 1968. Since 1964, the facility has operated 1625.4 megawatt-hours per year on average. The NRC ordered conversion from high-enriched to low-enriched uranium fuel in 1993. Data from recent operations, from 1995 to 1999, was assessed. The gaseous radiological release of Argon-41, the primary airborne effluent, has ranged from a high of 236.52 curies (Ci) in 1995 to a low of 50 Ci in 1999. Liquid effluents have been relatively small with the highest value in 1999 at 0.55 mCi. Low-level solid radioactive waste between 1995 and 1999 was 11.6 mCi in 56.8 cubic feet of material.

The Commission concludes that 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 significantly.

As for 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, no significant non-radiological environmental impacts are associated with the proposed action.

In addition, the environmental impact associated with operation of research reactors has been generically evaluated by the staff and is discussed in the attached generic evaluation.

This evaluation concludes that no significant environmental impact is associated with the operation of research reactors licensed to operate at power levels up to and including 2 megawatts thermal. We have determined that this generic evaluation is applicable to operation of the Rhode Island Atomic Energy Commission Research Reactor and that there are no special or unique features that would preclude reliance on the generic evaluation.

Accordingly, the Commission concludes that there are no significant environmental impacts associated with the proposed action. The proposed action will not increase the probability or consequences of accidents, no changes are being made in the types of any effluents that may be released off site, and there is no significant increase in occupational or public radiation exposure. Therefore, there are no significant radiological environmental impacts associated with the proposed action.

Alternatives to the Proposed Action

An alternative to the proposed action for the Research Reactor Facility is to deny the application (i.e., "no action" alternative). If the application is denied, the licensee has indicated that it 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 Atomic Energy Commission Research Reactor Operations would stop and decommissioning would be required with a likely small impact on the environment. The environmental impacts of the proposed action and alternative action are similar.

Alternative Use of Resources:

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.

Agencies and Persons Contacted

The proposed action will not increase the probability or consequences of accidents, no changes are being made in the types of any effluents that may be released off site, and there is no significant increase in occupational or public radiation exposure. Therefore, there are no significant radiological environmental impacts associated with the proposed action.

On March 22, 2000, the staff consulted with the State of Rhode Island Division of Occupational & Radiological Health Official, Charles McMahon, regarding the environmental impact of the proposed action. The State official had no comment.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the environmental assessment, the Commission concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the NRC has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's letter dated March 4, 2000, and supplement dated March 21, 2000, which is available for public inspection at the Commission's Public Document Room, the Gelman Building, 2120 L Street, NW., Washington, DC 20555.

Dated at Rockville, Maryland, this

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Ledyard B. Marsh, Chief
Events Assessment, Generic Communications, and
Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Attachment:
Environmental Considerations

ENVIRONMENTAL CONSIDERATIONS REGARDING THE LICENSING OF RESEARCH REACTORS AND CRITICAL FACILITIES

Introduction

This discussion deals with research reactors and critical facilities which are designed to operate at low power levels, 2 MWt and lower, and are used primarily for basic research in neutron physics, neutron radiography, isotope production, experiments associated with nuclear engineering, training and as a part of a nuclear physics curriculum. Operation of such facilities will generally not exceed a 5-day week, 8-hour day, or about 2000 hours per year. Such reactors are located adjacent to technical service support facilities with convenient access for students and faculty.

Sited most frequently on the campuses of large universities, the reactors are usually housed in already existing structures, appropriately modified, or placed in new buildings that are designed and constructed to blend in with existing facilities. However, the environmental considerations discussed herein are not limited to those which are part of universities.

Facility

There are no exterior conduits, pipelines, electrical or mechanical structures or transmission lines attached to or adjacent to the facility other than for utility services, which are similar to those required in other similar facilities, specifically laboratories. Heat dissipation is generally accomplished by use of a cooling tower located on the roof of the building. These cooling towers typically are on the order of 10' x 10' x 10' and are comparable to cooling towers associated with the air-conditioning systems of large office buildings.

Make-up for the cooling system is readily available and usually obtained from the local water supply. Radioactive gaseous effluents are limited to Ar-41 and the release of radioactive liquid effluents can be carefully monitored and controlled. Liquid wastes are collected in storage tanks to allow for decay and monitoring prior to dilution and release to the sanitary sewer system. Solid radioactive wastes are packaged and shipped offsite for storage at NRC-approved sites. The transportation of such waste is done in accordance with existing NRC-DOT regulations in approved shipping containers.

Chemical and sanitary waste systems are similar to those existing at other similar laboratories and buildings.

Environmental Effects of Site Preparation and Facility Construction

Construction of such facilities invariably occurs in areas that have already been disturbed by other building construction and, in some cases, solely within an already existing building. Therefore, construction would not be expected to have any significant effect on the terrain, vegetation, wildlife or nearby waters or aquatic life. The societal, economic and aesthetic impacts of construction would be no greater than those associated with the construction of a large office building or similar research facility.

Environmental Effects of Facility Operation

Release of thermal effluents from a reactor of less than 2 MWt will not have a significant effect on the environment. This small amount of waste heat is generally rejected to the atmosphere by means of small cooling towers. Extensive drift and/or fog will not occur at this low power level.

Release of routine gaseous effluents can be limited to Ar-41, which is generated by neutron activation of air. Even this will be kept as low as practicable by using gases other than air for supporting experiments. Yearly doses to unrestricted areas will be at or below established guidelines in 10 CFR Part 20 limits. Routine releases of radioactive liquid effluents can be carefully monitored and controlled in a manner that will ensure compliance with current standards. Solid radioactive wastes will be shipped to an authorized disposal site in approved containers. These wastes should not require more than a few shipping containers a year.

Based on experience with other research reactors, specifically TRIGA reactors operating in the 1 to 2 MWt range, the annual release of gaseous and liquid effluents to unrestricted areas should be less than 30 curies and 0.01 curies, respectively.

No release of potentially harmful chemical substances will occur during normal operation. Small amounts of chemicals and/or high-solid content water may be released from the facility through the sanitary sewer during periodic blowdown of the cooling tower or from laboratory experiments.

Other potential effects of the facility, such as aesthetics, noise, societal or impact on local flora and fauna are expected to be too small to measure.

Environmental Effects of Accidents

Accidents ranging from the failure of experiments up to the largest core damage and fission product release considered possible result in doses that are less than 10 CFR Part 20 guidelines and are considered negligible with respect to the environment.

Unavoidable Effects of Facility Construction and Operation

The unavoidable effects of construction and operation involve the materials used in construction that cannot be recovered and the fissionable material used in the reactor. No adverse impact on the environment is expected from either of these unavoidable effects.

Alternatives to Construction and Operation of the Facility

To accomplish the objectives associated with research reactors, there are no suitable alternatives. Some of these objectives are training of students in the operation of reactors, production of radioisotopes, and use of neutron and gamma ray beams to conduct experiments.

Long-Term Effects of Facility Construction and Operation

The long-term effects of research facilities are considered to be beneficial as a result of the contribution to scientific knowledge and training. Because of the relatively small amount of capital resources involved and the small impact on the environment, very little irreversible and irretrievable commitment is associated with such facilities.

Costs and Benefits of Facility Alternatives

The costs are on the order of several millions of dollars with very little environmental impact. The benefits include, but are not limited to, some combination of the following: conduct of activation analyses, conduct of neutron radiography, training of operating personnel, and education of students. Some of these activities could be conducted using particle accelerators or radioactive sources which would be more costly and less efficient. There is no reasonable alternative to a nuclear research reactor for conducting this spectrum of activities.

Conclusion

The staff concludes that there will be no significant environmental impact associated with the licensing of research reactors or critical facilities designed to operate at power levels of 2 MWt or lower and that no environmental impact statements are required to be written for the issuance of construction permits or operating licenses for such facilities.