

August 25, 2000

Dr. George E. Miller
Senior Lecturer Emeritus
Department of Chemistry and
Supervisor, Nuclear Reactor Facility
Director of Science Education Programs
School of Physical Sciences
University of California at Irvine
Irvine, CA 92697-2025

SUBJECT: UNIVERSITY OF CALIFORNIA, IRVINE NUCLEAR REACTOR FACILITY
ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT
IMPACT FOR LICENSE RENEWAL (TAC NO. MA6998)

Dear Dr. Miller:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for amendment dated October 18, 1999, as supplemented on April 24, and June 2, 2000. The proposed amendment would amend Facility Operating License No. R-116 to allow renewal of the license for a 20-year period.

This Environmental Assessment and Finding of No Significant Impact 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. 50-326

Enclosure: Environmental Assessment and
Finding of No Significant Impact

cc w/enclosure :
Please see next page

University of California at Irvine

Docket No. 50-326

cc:

Mr. Steve Hsu
Radiological Health Branch
State Department of Health Services
P.O. Box 9442732
Sacramento, CA 94234-7320

Dr. George E. Miller
Department of Chemistry
516 Physical Sciences 1
University of California, Irvine
Irvine, CA 92697-2025

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UNITED STATES NUCLEAR REGULATORY COMMISSION

UNIVERSITY OF CALIFORNIA, IRVINE

DOCKET NO. 50-326

NUCLEAR RESEARCH REACTOR

ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (NRC) is considering the issuance of a license amendment to Facility Operating License No. R-116, issued to University of California, Irvine (the licensee) for operation of their research reactor.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action

The proposed action would allow renewal of the license for 20 years for the University of California, Irvine Nuclear Reactor Facility (UCINRF). The proposed action is in accordance with the licensee's application for amendment dated October 18, 1999, as amended on April 24, and June 2, 2000. The licensee submitted an Environmental Report for license renewal.

Need for the Proposed Action

The proposed action is needed to allow continued operation of the UCINRF in order to continue education, training, research and development using neutrons and radioisotopes for experimental purposes beyond the current term of the license.

Environmental Impact of the Proposed Action

The research reactor is on the campus of the University of California, Irvine in Rowland Hall. Rowland Hall has research and teaching laboratories, lecture halls, classrooms, offices and workshops. It is surrounded by similar facilities in the immediate area.

The UCINRF is authorized by a NRC license to operate at steady-state thermal power levels up to a maximum of 250 kilowatts (KW). The reactor can also be operated in a pulse mode with reactivity addition of up to $\$3$ in a short period from power levels of 1 KW or less. The construction permit was issued on May 5, 1969, and the operating license was issued on November 24, 1969. The reactor has operated less than 218 effective full-power days over the approximate 30-year license period as indicted in SAR Section 1.3.2. Facility modifications have been minor as, outlined in the SAR Section 1.4. The licensee has not indicated any plans to significantly change the design or the level of usage. Since initial operation, the gaseous Argon-41 radiological release has been conservatively estimated to be less than 5.9×10^9 becquerels per year (0.160 curies per year). Average concentrations of Argon-41 were conservatively estimated by the licensee as 2.4×10^{-9} microcuries/milliliter. This concentration is well below the 10 CFR 20 Appendix B Table 2 limit of 1.0×10^{-8} microcuries/milliliter. Since 1992, the facility has had no radiological liquid or solid radiological releases. Material has been stored as required. Releases of radioactive material have been transferred and disposed of in accordance with the requirements of the licensee's byproduct license. Any necessary releases will be similarly treated. Currently, there are no plans to change any operating or radiological release practices or characteristics of the reactor during the license renewal period.

The NRC concludes that conditions are not expected to change and that the radiological effects of the continued operation will continue to be minimal. The radiological exposures for facility operations have been within regulatory limits and should continue to remain so.

The proposed action will not significantly increase the probability or consequences of accidents, no changes are being made in the types of any effluents that may be released offsite 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.

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 and 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 UCINRF and that there are no special or unique features that would preclude reliance on the generic evaluation.

Accordingly, the NRC concludes that there are no significant environmental impacts associated with the proposed action.

Alternatives to the Proposed Action

The alternative to the proposed action for the research reactor facility is to deny the application. If the NRC denied license renewal, UCINRF operations would stop and decommissioning would be required with, likely, a small impact on the environment. The environmental impacts of the proposed action and alternative are similar.

Alternative Use of Resources:

This action does not involve the use of any resources not previously considered in the safety analysis and evaluation for construction permit issuance and operating license issued in 1969.

Agencies and Persons Contacted

On July 25, 2000, the staff consulted with the California Department of Health Official, Steve Hsu, regarding the environmental impact of the proposed action. The State officials had no comment.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the environmental assessment, the NRC 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 October 18, 1999, as amended on April 24, and June 2, 2000. A hard copy is available for public inspection at the NRC's Public Document Room, the Gelman Building, 2120 L Street, NW., Washington, DC 20555. Publicly available records will also be accessible electronically from the ADAMS Public Library component on the NRC Web site, <http://www.nrc.gov> (the Electronic Reading Room).

Dated at Rockville, Maryland, this 25th day of August 2000.

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

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.