

March 30, 2004

Dr. Jay F. Kunze, Dean
College of Engineering
Idaho State University
P.O. Box 8080
Pocatello, ID 83209

SUBJECT: IDAHO STATE UNIVERSITY RESEARCH REACTOR FACILITY -
ASSESSMENT RE: AMENDMENT FOR LICENSE RENEWAL (TAC NO.
MB6757)

Dear Dr. Kunze:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for the amendment to renew Facility Operating License No. R-110 for the Idaho State University Research Reactor Facility submitted on November 21, 1995, as supplemented on January 31, 2003, and July 10, 2003. The proposed amendment would renew Facility Operating License No. R-110 for twenty years from its date of issuance.

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

Sincerely,

/RA/

Daniel E. Hughes, Project Manager
Research and Test Reactors Section
New, Research and Test Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-284

Enclosure: Environmental Assessment

cc w/enclosures: Please see next page

Idaho State University

Docket No. 50-284

cc:

Idaho State University
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Pocatello, ID 83209

Idaho State University
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Radiation Control Program Director
Division of Environment
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Boise, ID 83720

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

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UNITED STATES NUCLEAR REGULATORY COMMISSIONIDAHO STATE UNIVERSITYDOCKET NO. 50-284RESEARCH REACTOR FACILITYENVIRONMENTAL ASSESSMENT AND FINDING OFNO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (NRC) is considering the issuance of an amendment for Facility Operating License No. R-110, issued to the Idaho State University (the licensee or ISU) for operation of the Idaho State University Reactor Facility (ISURF) located in Pocatello, Bannock County, Idaho.

ENVIRONMENTAL ASSESSMENTIdentification of the Proposed Action

Renewal of the license (the proposed action) would allow an additional 20 years of operation for the Idaho State University Reactor Facility (ISURF). The proposed action is in accordance with the licensee's application for amendment dated November 21, 1995, as supplemented on January 31, 2003 and July 10, 2003. The licensee submitted an Environmental Report for license renewal. Therefore, as required by 10 CFR 51.21, the NRC is issuing this environmental assessment and finding of no significant impact.

Need for the Proposed Action

The proposed action is needed to allow continued operation of the ISURF to continue educational training and academic research beyond the current term of the license.

Environmental Impacts of the Proposed Action

The research reactor is on the campus of the Idaho State University in the Lillibridge Engineering Laboratory. Lillibridge Engineering Laboratory has research and teaching laboratories, lecture halls, classrooms, library/study room, offices, and workshops. It is surrounded by similar facilities in the immediate area.

The ISURF is authorized by an NRC license to operate at steady-state thermal power levels up to a maximum of 5 watts(t). The operating license was issued on October 11, 1967. Facility modifications have been minor as outlined in the SAR. The licensee has not indicated any plans to significantly change the design or usage. Since initial operation, the gaseous Argon-41 radiological release has been conservatively estimated to be less than 185,000 becquerels per year (5 microcuries per year). Average concentrations of Argon-41 are conservatively estimated to be less than 1.0×10^{-12} 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. Radioactive waste has been transferred and disposed of following the requirements of the licensee's byproduct license. 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 remain so.

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 operation during the renewal period will continue to be minimal.

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

Potential non-radiological impacts related to the proposed action were evaluated. The license renewal does not involve any historic sites. The facility is wholly located within the Lillibridge building on the campus of Idaho State University. The licensee does not plan any major refurbishment activities, therefore, there will be no new construction or ground disturbance. The proposed license renewal does not affect non-radiological facility effluents and has no other environmental impact. Therefore, there are no significant non-radiological environmental impacts 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 given 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. The NRC staff has determined that this generic evaluation is applicable to operation of the ISURF 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

As an alternative to the proposed action, the staff considered denial of the proposed action (i.e., the “no-action” alternative). If the NRC denied license renewal, ISURF operations would stop with no change in current environmental impacts. The environmental impacts of the proposed action and alternative action are similar.

Agencies and Persons Contacted

On November 13, 2003, the staff consulted with the Idaho State official, Mr. Doug Walker, Senior Health Physicist, Department of Environmental Quality, regarding the environmental impact of the proposed action. The State official had no comments.

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 November 21, 1995, as amended on January 31, 2003, and July 10, 2003. Documents may be examined, and/or copied for a fee, at the NRC’s Public Document Room, located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland. The NRC maintains an Agencywide Documents Access and Management System (ADAMS), which provides text and image files of NRC’s public documents. Documents from November 24, 1999, may be accessed through the NRC’s Public Electronic Reading Room on the Internet at <http://www.nrc.gov/NRC/ADAMS/index.html>. If you do not have access to ADAMS or if there

are problems in accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) Reference staff at 1-800-397-4209, 301-415-4737, or by email to pdr@nrc.gov.

Dated at Rockville, Maryland, this 30th day of March 2004.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Marvin M. Mendonca, Acting Chief
Research and Test Reactors Section
New, Research and Test Reactors Program
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 designed to operate at low power levels, 2 MWt and lower. These small research reactors 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. Generally, these facilities are operated less than 8 hours per day and fewer than 5 days per week, or about 2000 hours per year. These reactors are located adjacent to technical service support facilities with convenient access for students and faculty.

These reactors are usually housed in appropriately modified existing structures, or placed in new buildings that are designed and constructed to blend in with existing facilities on the campuses of large universities. However, the environmental considerations discussed herein are not limited to those facilities 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, if required, is generally accomplished by a heat exchanger whose secondary side includes a cooling tower located on the roof of or nearby the reactor building. The size of these cooling towers typically are on the order of 10 ft by 10 ft by 10 ft (3 m by 3 m by 3 m) and are comparable to cooling towers associated with the air-conditioning systems of large office buildings. Heat dissipation may also be accomplished by transfer through a heat exchanger to water flowing directly to a sewer or a chilled water system. Make-up for the cooling system is readily available and usually obtained from the local water supply.

Radioactive gaseous effluents during normal operations are usually limited to argon-41. 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 or the environment. This liquid waste may also be solidified and disposed of as solid waste. Solid radioactive wastes are packaged and shipped offsite for storage or disposal 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 an 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. The small amount of waste heat released to sewers, in the case of heat exchanger secondary flow directly to the sewer, will not raise average water temperatures in the environment.

Release of routine gaseous effluents can be limited to argon-41, which is generated by neutron activation of air. In most cases, this will be kept as low as practicable by using gases other than air for supporting experiments. Experiments that are supported by air are designed to minimize production of argon-41. Yearly doses to persons in unrestricted areas will be at or below established 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 the regulations. Solid radioactive wastes will be shipped in approved containers to an authorized disposal site or to a facility licensed to treat and consolidate radioactive waste. 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 (1,110,000 MBq) and 0.01 curies (370 MBq), 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. The quality of secondary cooling water may be maintained using biocides, corrosion inhibitors and pH control chemicals. The use of these chemicals for this purpose is approved by the Environmental Protection Agency (EPA). The small amounts of laboratory chemicals that may be used in research laboratories are disposed of in accordance with EPA and state requirements.

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 limits 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, operating licenses or license renewals for such facilities.

Revised: March 30, 2004