

April 7, 2008

Dr. William A. Baeslack III
Dean, College of Engineering
142A Hitchcock Hall
Ohio State University
2070 Neil Avenue
Columbus, OH 43210

SUBJECT: OHIO STATE UNIVERSITY RESEARCH REACTOR ENVIRONMENTAL
ASSESSMENT REGARDING RENEWAL OF FACILITY LICENSE NO. R-75
(TAC NO. MA7724)

Dear Dr. Baeslack:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact regarding the application submitted by Ohio State University (OSU) dated December 15, 1999, as supplemented on August 21, 2002, August 18, 2005, July 26, 2006, May 22, 2007, May 31, 2007, September 4, and September 28, 2007; and February 29, 2008 for a renewed Facility License No. R-75 for the Ohio State University Research Reactor (OSURR). The proposed action would renew Facility License No. R-75 for twenty years from the date of issuance of the renewed license. If you have any questions regarding this review, please contact William B. Kennedy at 301-415-2784, or me at 301-415-1631.

Also enclosed is a Notice of Issuance of Environmental Assessment which is being forwarded to the Office of the Federal Register for publication.

Sincerely,

/RA/

Daniel E. Hughes, Project Manager
Research and Test Reactors Branch A
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-150
Enclosures: As stated
cc w/enclosures: Please see next page

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DATE	7/11/2007	7/11/2007	7/23/2007	7/30/2007	/ /2008	/ /2008

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Ohio State University

Docket No. 50-150

cc:

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

UNITED STATES NUCLEAR REGULATORY COMMISSION

OHIO STATE UNIVERSITY

DOCKET NO. 50-150

OHIO STATE UNIVERSITY RESEARCH REACTOR

ENVIRONMENTAL ASSESSMENT AND FINDING OF

NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (NRC) is considering issuance of a renewed Facility License No. R-75, to be held by Ohio State University (OSU or the licensee), which would authorize continued operation of the Ohio State University Research Reactor (OSURR), located in Columbus, Franklin County, Ohio. Therefore, pursuant to 10 CFR 51.21, the NRC is issuing this Environmental Assessment and Finding of No Significant Impact.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action:

The proposed action would renew Facility License No. R-75 for a period of 20 years from the date of issuance of the renewed license. The proposed action is in accordance with the licensee's application dated December 15, 1999, as supplemented on August 21, 2002, August 18, 2005, July 26, 2006, May 22, May 31, September 4, and September 28, 2007, and February 29, 2008. In accordance with 10 CFR 2.109, the license remains in effect until the NRC takes final action on the renewal application.

Need for the Proposed Action:

The proposed action is needed to allow the continued operation of the OSURR to routinely provide teaching, research, and services to numerous institutions for a period of 20 years.

Environmental Impacts of the Proposed Action:

The NRC has completed its safety evaluation of the proposed action and concludes there is reasonable assurance that the OSURR will continue to operate safely for the period of time specified in the renewed license. The details of the staff's safety evaluation will be provided in renewed Facility License No. R-75.

The OSURR is located approximately 1.5 miles (2.4 km) west of the main campus on land owned by OSU and is a part of the Ohio State University Research Center. The reactor is housed in a steel frame structure with insulated metal walls which serves as a confinement. The reactor building footprint is 62 feet X 48 feet (approx. 19 m X 15 m). The site comprises the reactor building and a small area immediately surrounding it, bounded by a chain-link fence. The site is adjacent to parking lots to the north and east, fields to the west, and the main building of the OSU Research Center to the south. The nearest permanent residences are located approximately 0.3 miles (0.5 km) to the west and approximately 0.3 miles (0.5 km) to the south. There are no nearby industrial, transportation, or military facilities that could pose a threat to the OSURR.

The OSURR is a pool-type, light water moderated and cooled research reactor licensed to operate at a steady-state power level of 500 kilowatts thermal power (kW(t)). The reactor design is based on the Bulk Shielding Reactor (BSR) operated at Oak Ridge National Laboratory, and is of the class generally referred to as Materials Testing Reactors (MTR). The core is located at the bottom of a fiberglass-epoxy-lined, concrete pool that is 20 feet (6 m) deep. The reactor is fueled with solid, flat plate low-enrichment uranium-silicide (U_3Si_2) fuel clad in aluminum. Reactivity control is provided by 3 shim safety rods and 1 regulating rod. The OSURR has no pulse capability. A detailed description of the reactor can be found in the OSURR Safety Analysis Report (SAR). The major modifications to the Facility License were

conversion from high enriched fuel to low enriched fuel in 1988 and a licensed power increase from 10 kW(t) to 500 kW(t) in November 1990.

The licensee has not requested any changes to the facility design or operating conditions as part of this renewal request. The proposed action will not significantly increase the probability or consequences of accidents. No changes are being made in the types of effluents that may be released off site. There should be no increase in occupational or public radiation exposure. Therefore, license renewal should not change the environmental impact of facility operation. Data from the last five years of operation was assessed to determine the projected radiological impact of the facility on the environment during the renewal period.

I. Radiological Impact

Gaseous effluents are discharged via the ventilation fan, located 30 feet (9 m) up the north wall of the reactor building, at a volumetric flow rate of 0.472 m³/s. The reactor staff analyzes the effluent stream daily with an annually-calibrated effluent monitor. Other release pathways exist, however, they are normally secured during reactor operation and have insignificant volumetric flow rates compared to the ventilation fan. The only significant nuclide found in the gaseous effluent stream is Argon-41. Gaseous radioactive releases reported to the NRC were within the limits set by 10 CFR 20, Appendix B. Dose rates to members of the general public, calculated using the COMPLY Code of the U.S. Environmental Protection Agency, were within the limits set by 10 CFR 20.1301, and demonstrate compliance with 10 CFR 20.1101(d)

Annual Report Year	Argon-41 Release (Ci)	Argon-41 Release (% 10 CFR 20 Limits)	COMPLY Dose (mrem/yr)
2003-2004	1.90E-01	1.28E+00	1.00E-01
2002-2003	7.55E-02	5.10E-01	5.20E-02
2001-2002	8.23E-02	5.05E-01	5.70E-02
2000-2001	1.49E-01	1.01E+00	1.00E-01
1999-2000	8.21E-02	5.50E-01	5.70E-02

Liquid effluents are discharged to the sanitary sewer and releases are reported to the OSU Radiation Safety Section of the Office of Environmental Health and Safety. Measurable releases occur every few years as a result of maintenance work that requires the reactor pool be drained. The volume, activity, and inventory of the effluent stream is recorded to ensure compliance with applicable regulations. The only nuclide of significant concentration found in the liquid effluent stream is tritium. Liquid radioactive releases reported to the NRC were within the limits set by 10 CFR 20, Appendix B. Tritium releases were diluted in 5700 gal (22,000 L) of water.

Annual Report Year	Tritium Release (Ci)	Tritium Release (% 10 CFR 20 Limits)
2003-2004	1.76E-03	8.16E+00
2002-2003	0.00E+00	0.00E+00
2001-2002	0.00E+00	0.00E+00
2000-2001	4.15E-03	1.92E+01
1999-2000	0.00E+00	0.00E+00

Un-compacted solid low-level radioactive waste is transferred to the OSU Radiation Safety Section of the Office of Environmental Health and Safety. The waste consists of gloves, pads, and various activation products from experiments conducted using the OSURR. The reactor has not shipped any high-level radioactive waste since the high enriched fuel was removed in 1995 following the conversion to low enriched fuel. Solid radioactive releases for the period between July 1999 and June 2004 totaled 12 ft³ (0.3 m³) and had a total activity of 7.44 mCi. The OSURR does not anticipate the need to ship any high-level radioactive waste during the 20-year period of license renewal.

Personnel exposures reported to the NRC were within the limits set by 10 CFR 20.1201, and ALARA (As Low As is Reasonably Achievable). The average and maximum annual occupational TEDE for years during which pool maintenance was not performed were 55 mrem (0.55 mSv) and 130 mrem (1.30 mSv), respectively. The average and maximum annual occupational TEDE for years during which pool maintenance was performed were 815 mrem (8.15 mSv) and 2.412 rem (24.12 mSv), respectively. No changes in reactor operation that would lead to an increase in occupational dose are expected as a result of license renewal.

The licensee conducts a voluntary environmental monitoring dosimetry program and an unrestricted area radiation survey program to record and track the radiological effect of OSURR operation on the surrounding unrestricted area. The environmental monitoring dosimetry program consists of quarterly exposure measurements at five stations surrounding the OSURR restricted area. Exposures are recorded using film badges processed by the OSU Radiation Safety Section of the Office of Environmental Health and Safety. The unrestricted area radiation survey program consists of dose rate measurements at eight locations surrounding the restricted area during full-power reactor operation. The survey program indicates that, given conservative assumptions, the maximally-exposed member of the general public could receive a TEDE of 61.47 mrem/yr (0.6147 mSv/yr). This value demonstrates compliance with 10 CFR 20.1301. No changes in reactor operation that would affect off-site radiation levels are expected as a result of license renewal.

II. Non-Radiological Impact

The OSURR core is cooled by a light water primary system consisting of a 5800 gal (22,000 L) pool, a heat removal system, and a processing system. Cooling occurs by natural convection, with the heated coolant rising out of the core and into a plenum containing the heat removal system suction. The heat removal system transfers heat to the secondary system via

a plate-and-frame heat exchanger. The secondary system uses a water and ethylene glycol mixture to transport heat to a fan-forced air-cooled unit (dry cooler) located adjacent to the east side of the reactor building or a city-water-cooled heat exchanger. During operation, the secondary system is maintained at a higher pressure than the primary system to minimize the likelihood of primary system contamination entering the secondary system, and ultimately the environment.

Release of thermal effluents from the OSURR will not have a significant effect on the environment. The small amount of waste heat, approximately 500 kW at operation at full power, is rejected to the atmosphere by means of the dry cooler, and therefore will not lead to creation of fog. Extensive drift will not occur at this heat dissipation rate. The amount of water used for operation of the city-water-cooled heat exchanger is 0.009% of the total OSU water usage. The proposed action will not have a significant impact on the local water supply.

Environmental Effects of Accidents:

Accident scenarios are discussed in Chapter 8 of the OSURR SAR. The maximum hypothetical accident is the release of the fission products contained in one fuel plate to the reactor building and uncontrolled environment. Occupational doses resulting from this accident would be below 10 CFR Part 20 limits, given a maximum, conservative stay time of 30 minutes. Maximum doses for members of the general public were conservatively calculated to be 25 mrem/day (0.25 mSv/day), and are below the 10 CFR Part 20 limit of 500 mrem (5 mSv). The proposed action will not increase the probability or consequences of accidents.

National Environmental Policy Act (NEPA) Considerations:

I. Endangered Species Act (ESA)

The site occupied by the OSURR does not contain any Federally- or State-protected fauna or flora, nor do the OSURR effluents impact the habitats of any such fauna or flora.

II. Costal Zone Management Act (CZMA)

The site occupied by the OSURR is not located within any managed coastal zones, nor do the OSURR effluents impact any managed costal zones.

III. National Historical Preservation Act (NHPA)

The National Register Information System lists several historical sites located on the Ohio State University Campus, including the Ohio Stadium located approximately one mile (1.6 km) East of the OSURR. Continued operation of the OSURR will not impact any historical sites.

Environmental Impacts of the Alternatives to the Proposed Action:

As an alternative to license renewal, the staff considered denial of the proposed action. If the Commission denied the application for license renewal, facility operations would end and decommissioning would be required with no significant impact on the environment. The environmental impacts of license renewal and this alternative action are similar. In addition, the benefits of teaching, research, and services provided by facility operation would be lost.

Alternative Use of Resources:

The proposed action does not involve the use of any different resources or significant quantities of resources beyond those previously considered in the issuance of Amendment No. 13 to Facility License No. R-75 for the Ohio State University Research Reactor dated November 14, 1990, which authorized an increase in the maximum steady-state power level from 10 kW to 500 kW.

Agencies and Persons Consulted:

In accordance with the agency's stated policy, on January 22, 2007, the staff consulted with the State Liaison Officer regarding the environmental impact of the proposed action. The State official had no comments regarding the proposed action.

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 December 15, 1999 (ML993610185), as supplemented by letters dated August 21, 2002 (ML022380431), August 18, 2005 (ML052350564); July 26, 2006 (ML062090072); May 22, 2007 (ML071430417); May 31, 2007 (ML071550098); September 4, 2007 (ML072490367); September 28, 2007 (ML072750038); and February 29, 2008 (ML080650352). Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland. Publicly available records will be accessible electronically from the Agencywide Documents Access and Management System (ADAMS) Public Electronic Reading Room on the NRC Web site, <http://www.nrc.gov/reading-rm/adams.html>. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC PDR Reference staff at 1-800-397-4209, or 301-415-4737, or send an e-mail to pdr@nrc.gov.

Dated at Rockville, Maryland, this 7th day of April, 2008.

FOR THE NUCLEAR REGULATORY COMMISSION

Daniel S. Collins, Chief
Research and Test Reactors Branch A
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

UNITED STATES NUCLEAR REGULATORY COMMISSION
OHIO STATE UNIVERSITY RESEARCH REACTOR
DOCKET NO. 50-150
NOTICE OF ISSUANCE OF ENVIRONMENTAL ASSESSMENT
AND FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (NRC) is considering issuance of a renewed Facility License No. R-75, to be held by Ohio State University (OSU or the licensee), which would authorize continued operation of the Ohio State University Research Reactor (OSURR), located in Columbus, Franklin County, Ohio. Therefore, pursuant to 10 CFR 51.21, the NRC is issuing an Environmental Assessment and Finding of No Significant Impact.

Description of Proposed Action

The proposed action is approval of the licensee's application for renewal of Facility License No. R-75 for a period of 20 years from the date of issuance of the renewed license. The proposed action is in accordance with the licensee's application dated December 15, 1999, as supplemented on August 21, 2002, August 18, 2005, July 26, 2006, May 22, 2007, May 31, 2007, September 4, and September 28, 2007; and February 29, 2008.

The OSURR is located approximately 1.5 miles (2.4 km) west of the main campus on land owned by OSU and is a part of the Ohio State University Research Center. The site comprises the reactor building and a small area immediately surrounding it, bounded by a chain-link fence. The nearest permanent residences are located approximately 0.3 miles (0.5 km) to the west and approximately 0.3 miles (0.5 km) to the south. There are no nearby industrial, transportation, or military facilities that could pose a threat to the OSURR.

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description of the reactor can be found in the OSURR Safety Analysis Report (SAR). The major modifications to the Facility License were conversion from high enriched fuel to low enriched fuel in 1988 and a licensed power increase from 10 kW(t) to 500 kW(t) in November 1990.

The licensee has not requested any changes to the facility design or operating conditions as part of the renewal request. The proposed action will not significantly increase the probability or consequences of accidents. No changes are being made in the types of effluents that may be released off site. There is no significant increase in occupational or public radiation exposure. Therefore, license renewal should not change the environmental impact of facility operation.

Summary of the Environmental Assessment

The NRC staff reviewed the licensee's application which included an Environmental Report. To document its review, the NRC staff has prepared an environmental assessment (EA) which discusses the OSURR site and facility; radiological impacts of gaseous, liquid, and solid effluents; environmental and personnel radiation monitoring; radiation dose estimates for the maximum hypothetical accident (MHA); impacts of the "no action" alternative to the proposed action; alternative use of resources; considerations related to the National Environmental Policy Act (NEPA); and presents the radiological and non-radiological environmental impacts of the proposed action.

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.

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