

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-151 AND LICENSE NO. R-115

UNIVERSITY OF ILLINOIS NUCLEAR RESEARCH LABORATORY

TRIGA RESEARCH REACTOR

ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) staff has performed an environmental review of the University of Illinois' (University's or licensee's) Nuclear Research Laboratory (NRL) Decommissioning Plan (DP) for its Advanced Teaching Research Isotope General Atomic (TRIGA) Mark II nuclear research reactor located on the campus of the University of Illinois at Champaign-Urbana in the city of Urbana, Illinois. The NRL was completed in 1960 and the reactor first went critical in August 1960. In August 1998, the NRL TRIGA reactor was shut down permanently. In August 2004, the reactor fuel was removed and shipped off-site. The University has completed a Historical Site Assessment, an Environmental Report, and a Site Characterization Report. The characterization effort identified the reactor bioshield, the coolant pipe tunnel, and the concrete floor of the reactor room as the primary impacted areas. The soil under the reactor floor may be impacted with tritium (H-3), cobalt-60, and possibly other activation products due to historical tank leakage. After the reactor floor and tunnel floor have been removed, the exposed soil will be more fully characterized and contaminated soil will be disposed of. A comprehensive background radioactivity determination (soil, concrete and metals) will be made prior to the analysis for release of materials from the site. The building material and soil will be shipped for disposal at an authorized disposal facility according to its waste classification. The NRC staff has evaluated the University's request and has developed

an environmental assessment (EA) to support the review of the University's proposed DP and license amendment request, in accordance with the requirements of 10 CFR Part 51. Based on the staff evaluation, the conclusion of the EA is a Finding of No Significant Impact (FONSI) on human health and the environment for the proposed licensing action.

The staff's safety review of the proposed action will be documented in a Safety Evaluation Report.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action

By letters dated March 28, 2006 (See ADAMS ML060900623), and August 20, 2007 (See ADAMS ML072550089), the licensee submitted a DP in accordance with 10 CFR 50.82(b)(1), in order to dismantle the TRIGA Reactor, to dispose of its component parts and radioactive material, and to decontaminate the facilities in accordance with the proposed DP to meet the Commission's unrestricted release criteria. After the Commission verifies that the release criteria have been met, Facility Operating License No. R-115 will be terminated. The licensee submitted an Environmental Report dated December 2005, that addresses the estimated environmental impacts resulting from decommissioning the TRIGA Reactor. Illinois University ceased operations of the NRL TRIGA reactor on August 6, 1998, and it was placed in a SAFSTOR condition. On August 18, 2004, the reactor fuel was removed and shipped to the U.S. Department of Energy's Idaho National Laboratory.

A "Notice and Solicitation of Comments Pursuant to 10 CFR 20.1405 and 10 CFR 50.82(b)(5) Concerning Proposed Action to Decommission the University of Illinois at Urbana-Champaign Nuclear Reactor Laboratory" was published in the *Federal Register* on August 1, 2006 (71 FR 43528), and in the Champaign County, Illinois daily newspaper, *The*

News-Gazette, on August 3, 2006. No comments were received.

Need for the Proposed Action

The proposed action is necessary because of Illinois University's decision to cease operations permanently at the NRL TRIGA Reactor. As specified in 10 CFR 50.82, any licensee may permanently cease operation and apply to the Nuclear Regulatory Commission for license termination and authorization to decommission the affected facility. Further, 10 CFR 51.53(d) provides that each applicant for a license amendment to authorize decommissioning of a production or utilization facility shall submit with its application an environmental report that reflects any new information or significant environmental change associated with the proposed decommissioning activities. Illinois University is planning unrestricted use for the area that would be released.

Environmental Impact of the Proposed Action

The decommissioning plan states that all decontamination will be performed by trained personnel in accordance with the requirements of the radiation protection program, and will be overseen by a radiation safety officer with multiple years of experience in decommissioning health physics practices. All reactor and pool components will be removed from the facility as low level radioactive waste and managed in accordance with NRC requirements. The licensee estimates the total occupational radiation exposure for the decommissioning process to be about 8.5 person-rem. The licensee proposes controls, as mentioned above and in the DP, to minimize the occupational exposure to individual workers, thereby ensuring that the exposures are within the 10 CFR Part 20 limits. In addition, by keeping the public at a safe distance, using access control, and by using the approved DP and Illinois's radiation protection program to control effluent releases, the licensee expects the radiation exposure to the general public to be negligible. The licensees' conclusion is consistent with the estimate given for the "reference

research reactor” in NUREG- 0586, “Final Generic Environmental Impact Statement on Decommissioning of the Nuclear Facilities, August 1988.”

Occupational and public exposure may result from offsite disposal of the low-level residual radioactive material from the NRL, which includes the TRIGA Reactor. In the DP the licensee stated that the handling, storage, and shipment of this radioactive material will meet the requirements of 10 CFR 20.2006, “Transfer for Disposal and Manifest,” and 49 CFR Parts 100-177, “Transportation of Hazardous Materials.” The waste that needs to be processed prior to disposal will be shipped by the licensee to a licensed waste processor. The DP states that waste for disposal will be shipped to an acceptable waste disposal site in accordance with applicable NRC and DOT regulations regarding waste packaging, labeling, and placarding. Included in these shipments will be mixed waste of activated and/or contaminated lead. It is expected that the *EnergySolutions* of Clive, Utah will receive the Class A waste. Based on the site characterization, Class B and C low-level radioactive waste are not expected at the NRL facility. The NRC Final Rule on License Termination, 10 CFR 20.1402, provides radiological criteria for release of a site for unrestricted use. Release criteria for unrestricted use is a maximum Total Effective Dose Equivalent (TEDE) of 25 mrem per year from residual radioactivity above background. Application of the as low as reasonably achievable (ALARA) principle is also a requirement. The results of the final status survey will be used to demonstrate that the predicted dose to a member of the public from any residual activity does not exceed the 25 mrem per year dose limit. The NRC will perform inspections and a confirmatory survey to verify the decommissioning activities and the final status survey.

The DP states that liquid waste that is generated during the decommissioning activities will be filtered and disposed of in accordance with the regulations in 10 CFR Part 20, Subpart K, “Waste Disposal.” Containment measures will be taken as necessary to minimize the spread of

contamination. Engineered features such as enclosures and temporary barriers with high-efficiency particulate air filters will be used to control the spread of airborne radioactive material. Airborne releases of radioactive materials are not expected.

The licensee analyzed accidents applicable to decommissioning activities. The dose consequence from transportation accidents has the potential for a moderate dose of between 1 and 25 mrem for the public which is within the dose limits for members of the public given in 10 CFR Part 20, Subpart D, "Radiation Dose Limits for Individual Members of the Public." Trucks containing building debris that is being sent to any local landfill will be scanned to make sure the total radiation from the trucks is less than twice background.

Based on the review of the specific proposed activities associated with the dismantling and decontamination of the NRL, which includes the TRIGA Reactor, the staff has determined that 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 will be no significant increase in occupational or public radiation exposure above those during the operation of the facility. Therefore, the staff concludes that there are no significant radiological environmental impacts associated with the proposed action.

With regard to potential non-radiological impacts, the proposed action does not involve any historic sites. The predominant hazardous material in the NRL site is elemental lead. Proper precautions will be taken to reduce the exposure to lead dust. Asbestos is also present in NRL construction materials (e.g. floor tiles, roofing materials). Asbestos will be removed by a licensed asbestos abatement contractor. Decommissioning activities will not affect non-radiological facility effluents and have no other environmental impact. The licensee states that there are no sensitive or endangered species on the NRL site and will ensure that all construction activities or any related disturbance will not result in the impairment of local

waterways. Therefore, the staff concludes that there are no significant non-radiological environmental impacts associated with the proposed action.

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

Alternatives to the Proposed Action

The three alternatives for disposition of the NRL, which includes the TRIGA Reactor are: DECON, SAFSTOR, and no action. Illinois University has proposed the DECON option. DECON is the alternative in which the equipment, structures, and portions of the facilities containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use. SAFSTOR is the alternative in which the nuclear facilities are placed and maintained in a condition that allows the nuclear facilities to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use. The no-action alternative would leave the facilities in their present configuration, without any decommissioning activities required or implemented. The SAFSTOR and no-action alternatives would entail continued surveillance and physical security measures to be in place and continued monitoring by licensee personnel. The SAFSTOR and no-action alternatives would also require continued maintenance of the facilities. The radiological impacts of SAFSTOR and no-action would be less than the DECON option because of radioactive decay prior to the start of decommissioning activities. However, these options involve the continued use of resources during the SAFSTOR or no-action period. Illinois University has determined that the proposed action (DECON) is the most efficient use of NRL, including the TRIGA Reactor, since it proposes to use the space that will become available for unrestricted uses. These alternatives would have no significant environmental impact. In addition, the regulations in 10 CFR 50.82(b)(4)(i) only allow an alternative which provides for delayed completion of

decommissioning only when the delay is necessary to protect the public health and safety. The staff finds that delay is not justified since the environmental impacts of the proposed action and the alternatives are similar and insignificant.

Alternative Use of Resources

This action does not involve the use of any resources not previously considered in the Environmental Report dated December 2005, for the Illinois University NRL TRIGA Reactor.

Agencies and Persons Contacted

On Tuesday, September 18, 2007, the staff sent a copy of a draft EA to an Illinois State official, the Acting Bureau Chief, Bureau of Environmental Safety, Illinois IEMA, Division of Nuclear Safety, regarding the environmental impact of the proposed action. The Acting Bureau Chief's comments were incorporated into this EA.

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 human health or the 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 letters dated March 28, 2006 (See ADAMS ML060900623), and August 20, 2007 (See ADAMS ML072550089), which are available for public inspection, and can be copied for a fee, at the U.S. Nuclear Regulatory Commission's Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland. The NRC maintains an Agency-wide Documents Access and Management System (ADAMS), which provides text and image files of NRC's public documents. These documents may be accessed through the NRC's Public Electronic Reading Room on the internet at <http://www.nrc.gov>. Persons who do not have

access to ADAMS or who have problems in accessing the documents located in ADAMS may contact the PDR reference staff at 1-800-397-4209, 301-415-4737 or by email at pdr@nrc.gov.

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