

May 17, 2006

Dr. Charles R. Fay  
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SUBJECT: WARD CENTER FOR NUCLEAR STUDIES AT CORNELL UNIVERSITY TRIGA  
RESEARCH REACTOR AND ZERO POWER REACTOR - ENVIRONMENTAL  
ASSESSMENT RE: AMENDMENT FOR APPROVAL OF DECOMMISSIONING  
(TAC NO. MC1141)

Dear Dr. Fay:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for amendment of Facility Operating License No. R-80 for the TRIGA Research Reactor (TRIGA) and Facility Operating License No. R-89 for the Zero Power Reactor (ZPR) at the Ward Center for Nuclear Studies at Cornell University submitted on August 22, 2003 (Environmental Report dated March 2003), as supplemented on May 13, September 27, and October 26, 2005. The proposed amendment would approve the decommissioning plan for the Ward Center for Nuclear Studies at Cornell University, which includes the TRIGA and the ZPR.

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 Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket Nos. 50-157 and 50-97  
License Nos. R-80 and R-89

Enclosure: Environmental Assessment

cc w/enclosure: Please see next page

Cornell University

Docket Nos. 50-157/97

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UNITED STATES NUCLEAR REGULATORY COMMISSIONDOCKET NO. 50-157/97WARD CENTER FOR NUCLEAR STUDIES AT CORNELL UNIVERSITYTRIGA RESEARCH REACTOR AND ZERO POWER REACTORENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering the issuance of license amendments to Facility Operating License No. R-80 and No. R-89, that would allow decommissioning of the Ward Center for Nuclear Studies (WCNS) TRIGA Research Reactor (TRIGA), Docket No. 50-157, License No. R-80 and Zero Power Reactor (ZPR), Docket No. 50-97, License No. R-89, located in Ithaca, New York.

ENVIRONMENTAL ASSESSMENTIdentification of the Proposed Action

By letters dated August 22, 2003, as supplemented on May 13, September 27, October 26, December 13, 2005 and February 13, 2006, the licensee submitted a decommissioning plan (DP) in accordance with 10 CFR 50.82(b)(1), in order to dismantle the 500-kilowatt (thermal) WCNS TRIGA Reactor and the 0.1-kilowatt (thermal) WCNS ZPR, 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-80 and No. R-89 will be terminated. The licensee submitted an Environmental Report on March 31, 2003, dated March 2003, that addresses the estimated environmental impacts resulting from decommissioning the WCNS, which includes the TRIGA Reactor and the ZPR.

Cornell University ceased operations of the WCNS TRIGA reactor on April 21, 2003, and the WCNS ZPR ceased operations on February 12, 1997. All the reactor fuel has been removed from both of the reactors.

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 Ward Center for Nuclear Studies at Cornell University Reactor Facility" was published in the FEDERAL REGISTER on August 10, 2005 (70 FR 46549), and in the Ithaca, New York daily newspaper, *The Ithaca Journal*, on September 3, 2005. No comments were received.

#### Need for the Proposed Action

The proposed action is necessary because of Cornell University's decision to cease operations permanently at the WCNS TRIGA Reactor and ZPR. 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. Cornell 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 18 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 Cornell's radiation protection program to control effluent releases, the licensee expects the radiation exposure to the general public to be negligible. The licensee's 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 WCNS, which includes the TRIGA Reactor and the ZPR. 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 licensee anticipates that about 4700 ft<sup>3</sup> (133 m<sup>3</sup>) of low level radioactive waste generated during the decommissioning process will be shipped during approximately twenty truck shipments in appropriate shipping containers to a disposal facility. 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 either the Barnwell, South Carolina, or the Envirocare of Utah disposal sites. Included in these shipments will be mixed waste of activated and/or contaminated lead.

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 or solidified 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 accident with the greatest potential impact on members of the public is the dropping of a waste shipping liner containing radioactive material. The maximum TEDE to a member of the public at the site boundary for this accident is about 40 mrem, 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."

Based on the review of the specific proposed activities associated with the dismantling and decontamination of the WCNS, which includes the TRIGA Reactor and the ZPR, 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 WCNS site is elemental lead. Proper precautions will be taken to reduce the exposure to lead dust. Asbestos is also present in WCNS 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 WCNS 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 four alternatives for disposition of the WCNS, which includes the TRIGA Reactor and the ZPR are: DECON, SAFSTOR, ENTOMB, and no action. Cornell 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. ENTOMB is the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained; and continued surveillance is carried out until the radioactivity decays to a level permitting release of the property for unrestricted use. The no-action alternative would leave the facilities in their present configuration, without any decommissioning activities required or implemented.

The SAFSTOR, ENTOMB, 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. The ENTOMB option would also result in lower radiological exposure than the DECON option but would involve the continued use of resources. Cornell University has determined that the proposed action (DECON) is the most efficient use of WCNS, including the TRIGA Reactor and the ZPR, 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 submitted on March 31, 2003, dated March 2003, as supplemented on May 13, September 27, October 26, and December 13, 2005, for the Cornell University WCNS TRIGA Reactor and ZPR.

#### Agencies and Persons Contacted

On November 4, 2005, the staff consulted with a New York State official, Robert Dansereau of the New York State Health Department Bureau of Environmental Radiation Protection, regarding the environmental impact of the proposed action. The staff also consulted with other New York State officials including the Program Manager of the Radioactive Waste Policy and Nuclear Coordination Office of the New York State Energy Research & Development Authority, Chief of the Radiation Section Division of Hazardous Waste and Radiation

Management of the New York State Department of Environmental Conservation, and the Director of the Bureau of Environmental Radiation Protection of the New York State Health Department. The State officials had no comments.

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 August 22, 2003, as supplemented on May 13, September 27, October 26, 2005, December 13, 2005, and February 13, 2006, 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 Agencywide 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](mailto:pdr@nrc.gov).

Dated at Rockville, Maryland, this 17<sup>th</sup> day of May, 2006.

FOR THE NUCLEAR REGULATORY COMMISSION

**/RA/**

Brian E. Thomas, Branch Chief  
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Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation