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May 13, 2005

Daniel E. Hughes, Project Manager  
Research and Test Reactors Section  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation  
United States Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

**SUBJECT:** Responses to Request for Additional Information (RAI) Concerning  
Decommissioning Plan for the Ward Center for Nuclear Studies at Cornell University, TRIGA  
Reactor, Docket No 50-157, License R-80 and the ZPR, Docket No. 50-97, License R-89

Dear Mr. Hughes:

Attached to this letter are Cornell's responses to your Request for Additional Information (RAI) related to the Decommissioning Plan (DP) for the Ward Center for Nuclear Studies at Cornell University, Revision 1, July 2003 (DP) for Facility Operating Licenses No. R-80 and R-89 for the Cornell University Reactors, as originally submitted to your office in August, 2003.

Please review these responses and advise us of any additional information or clarification that you require.

By my signature below, I hereby affirm that I am authorized to represent Cornell University in these matters and that the statements made in response to the RAI are true and accurate to the best of my knowledge and belief.

Sincerely,

Charles R. Fay  
Vice Provost for Research Administration  
TRIGA D&D Project Director

Enclosures: RAI, revised decommissioning plan pages

cc: Howard Aderhold, Director, Ward Lab of Nuclear Sciences  
Stephen M. Beyers, TRIGA D&D Project Manager  
Joseph A. Burns, Vice Provost for Physical Sciences and Engineering

A020

May 10, 2005

**Attachment A: Responses to Request for Additional  
Information (RAI), Cornell University Research  
Reactors, Docket No. 0-157/97**

- 1) Decommissioning Plan (DP), Page 12 of 73, Current Facility Status  
What is the date that the TRIGA was permanently shut down? (Please use the Technical Specification (TS) definition of Shutdown)? What is the date that all fuel reached DOE storage facilities?

Response:

*The TRIGA reactor was permanently shut down on April 21, 2003. The last day of operations above a power level in excess of 10 Watts was on June 28, 2002. Between June 28, 2002 and April 21, 2003 the reactor was operated in support of Operator re-qualifications and reactivity measurements. The integrated power level between June 28, 2002 and April 21, 2003 was less than 20 Watt-hours.*

*The TRIGA reactor fuel reached the DOE storage facility in Idaho Falls on November 20, 2003.*

*Page 12 has been revised to summarize this updated information.*

- 2) DP, Page 12 of 73, Section 1.2.2 Reactor Decommissioning Overview  
Discuss the source of the contamination in the floor drains and the possibility that it has spread beyond the drains. What are the nuclides expected as the contaminant?

Response:

*Likely sources of contamination in the floor drains include leaks associated with the biological shield and any incidental spills or leaks which may have occurred within the Reactor Equipment Room. Material entering sinks in the Isotope Handling Room could also potentially enter traps in this drain system.*

*The Reactor Bay, Equipment Room, and Handling Room floor drains flow into the hot sump within the Reactor Equipment Room where the liquids are collected and pumped to the Liquid Waste Hold-Up Tank in Room B15. The waste in the Liquid Waste Hold-up Tank is analyzed prior to discharge to the sanitary sewer system.*

*At this time there is no reason to believe that any residual activity has spread beyond the drainage system. This assumption will be confirmed during decommissioning by performing a series of core bores or excavations to collect samples for analysis adjacent to and just below floor drains to demonstrate that activity has not leaked from the drains.*

*During the characterization survey in 2003 several samples were collected for analysis in order to identify the potential radionuclides of concern associated with the floor drains. These samples included samples from the drain within the Isotope Handling Room, the sump in the Reactor Equipment Room, and 2 resin samples collected from a resin tank located within the Reactor Equipment Room. Radionuclides identified in one or more of these samples above the instrumentation MDA, as documented in the characterization survey report, included H-3, C-14, Co-57, Mn-54, Co-58, Co-60, Ni-63, Zn-65, Sb-124, Cs-134, Cs-137, Eu-152, Th-228, Th-230, Th-232, U-234, U-235, and U-238.*

- 3) DP, Page 13 of 73, Section 1.2.2 Reactor Decommissioning Overview  
Discuss the statement "Either decontaminate and release the material as non-radioactive waste, or package for transport as radioactive waste." What is the screening process to be used to determine whether or not the waste is "non-radioactive?" Also see Section 2.3.1.1.3.3, bullet 7 (page 27 of 73).

Response:

*All waste generated during the decommissioning will either be free released or packaged and transported as radioactive waste to a licensed disposal facility. Materials to be free released will be surveyed and shown not to be radioactive and not to have total or removable contamination in excess of the minimum detectable activities associated with the survey methodology. Materials that cannot be adequately surveyed will not be free released. Survey records will be maintained for all materials free released, documenting that they were not radioactive and did not have total or removable contamination in excess of the minimum detectable activities associated with the survey methodology.*

*The decommissioning contractor will prepare a procedure for Cornell's approval addressing the requirements for surveying materials for free release.*

- 4) Page 14 of 73, Section 1.2.5 Program Quality Assurance  
Please provide a more detailed summary of the Quality Assurance Program. Please specify the percentage of samples analyzed by the vendor laboratory that will be held for possible verification by the NRC or their contractor.

Response:

*It is assumed that this question relates primarily to samples collected for analysis during the performance of the final status survey.*

*During the performance of the final status survey, a minimum of 5 percent of the samples collected for analysis, with the exception of smears collected for accessing removable activity, will be duplicate samples. These duplicate samples will be in addition to analyses performed for quality assurance by the analytical laboratory, as identified in Section 1.2.5.3 of the DP.*

*To ensure that the NRC or their contractor has the opportunity to verify the sample analysis results associated with the final status survey, all samples collected during the performance of the final status survey, with the exception of smears collected for accessing removable activity, will be stored for a minimum of 180 days from the date of analysis by the analytical laboratory prior to disposal.*

*The decommissioning contractor will prepare a final status survey plan for Cornell. This plan will be submitted to the NRC for review and comment and will address the requirements for sample analyses, including appropriate quality control measures.*

- 5) DP, Page 16 of 73, Top Paragraph  
Please differentiate between the regulation in 10 CFR 20.1402 and the "guidance" documents listed.

Response:

*The text in Section 1.2.5.3 has been revised to differentiate between the regulations contained in 10 CFR20.1402 and the guidance provided in the referenced NUREGS*

*Section 1.2.5.3 has been revised to read:*

*"... will be performed to provide data required to meet the regulations contained in 10CFR20.1402, Radiological Criteria for Unrestricted Use (Ref. 1-4) and the guidance provided in NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual, (MARSSIM) (Ref. 1-5), and NUREG-1727, NMSS Decommissioning Standard Review Plan (Ref. 1-2)."*

- 6) DP, Page 23 of 73, Section 2.2.1  
With a history of pool leaks and facility floor drains shown to be contaminated, please clarify the impact, if any, the leaks may have had on the soil, the ground water and specify the outfall of the floor drains.

Response:

*The leaks occurred at the interface of the high density concrete and the low density concrete associated with the biological shield. In most cases the leaks were minor and did not reach the floor of the Reactor Bay. There are no reports of contamination resulting from the leaks.*

*The Reactor Bay floor drains flow into the hot sump within the Reactor Equipment Room where the liquids are collected and pumped to the Liquid Waste Hold-Up Tank in Room B15. The waste in the Liquid Waste Hold-up*

*Tank is analyzed prior to discharge to the sanitary sewer system. At no point in the Center's history was this liquid waste found to contain radioactive activity above sewer discharge limits.*

*At this time there is no reason to believe that any residual activity has spread beyond the drainage system. This assumption will be confirmed during decommissioning by performing a series of core bores or excavations to collect samples for analysis adjacent to and just below floor drains.*

- 7) DP, Page 24 of 73, Section 2.3.1.1 Characterization Surveys  
Discuss the characterization surveys that are planned to be done prior to decommissioning and completion of the Final Status Survey (FSS) Plan.

Response:

*In 2003 Duratek performed a comprehensive radiological characterization survey of the Ward Center for Nuclear Studies. The results of this survey were documented in a characterization survey report. The survey addressed most of the areas within the Ward Center that were accessible at the time of the survey. At this time there are no plans to perform additional characterization surveys prior to initiating decommissioning activities.*

*Areas within the Ward Center for Nuclear Studies that were not included in the characterization survey in 2003 may be surveyed during the remedial activities associated with the decommissioning. However, all areas within the Ward Center for Nuclear Studies will be included in the final status survey regardless of whether or not they were included in the characterization survey. In addition, additional surveys or scans are anticipated in many areas to verify extent and completion of decontamination work prior to the formal FSS.*

- 8) DP, Page 26 of 73, Section 2.3.1.1.3.1 Disposition of Decommissioning Equipment and Materials and Section 4.1.2, page 64 of 73  
RG 1.86, "Termination of Operating Licenses for Nuclear Reactors," June 1974 described methods and procedures considered acceptable by the Regulatory staff for the termination of operating licenses for nuclear reactors. NUREG 1575, MARSSIM, provides information on planning, conducting, evaluating, and documenting building surface and surface soil final status radiological surveys for demonstrating compliance with dose or risk-based regulations or standards. It is not appropriate to use either document as criteria for determination of clean waste vs. radioactive waste. The appropriate criterion is that no licensed radioactive material may be disposed of as clean waste. For practical purposes, that means no detectable licensed material. The licensee is responsible for determining that waste

disposed as clean waste contains no licensed radioactive material. Please propose a program for screening waste.

For guidance use:

Information Notice No. 88-22, "Disposal of Sludge from Onsite Sewage Treatment Facilities at Nuclear Power Stations" at (<http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/1988/in88022.html>),

Information Notice No. 85-92, "Surveys of Wastes Before Disposal From Nuclear Reactor Facilities" at (<http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/1985/in85092.html>), and

IE Circular No. 81-07, "Control of Radioactively Contaminated Material" at (<http://www.nrc.gov/reading-rm/doc-collections/gen-comm/circulars/1981/cr81007.html>)

### Response

*All items to be free released during the decommissioning will be surveyed and shown not to be radioactive and not to have total or removable contamination in excess of the minimum detectable activities associated with the survey methodology*

*The decommissioning contractor will prepare a procedure for Cornell's approval addressing the requirements for surveying materials for free release.*

*Section 2.3.1.1.3.1 was revised to read:*

*"The equipment, materials, instrumentation, and tools that are used or encountered during the decommissioning may be free released if surveyed and shown not to be radioactive or to have total or removable contamination in excess of the minimum detectable activities associated with the survey methodologies employed. Items that can not be free released will be handled using one of the three methods described below;*

- *The items may be shipped directly for disposal as radioactive waste at a licensed facility*
- *The items may be shipped for processing at a licensed facility*
- *The items may be shipped to another licensed facility for storage or use"*

*In each case the term 'licensed facility' refers to a facility holding the appropriate radioactive material disposal, processing, storage, or use license appropriate to the class of waste involved."*

9) DP, Section 2.3.1.3, page 32 of 73

In this section it is stated that "...a final status survey (FSS) of each of the reactor rooms and other applicable locations covering the Ward Center will be performed and documented." In DP, Section 2.3.1.1.3, it is stated that the entire Ward Center will be decontaminated and surveyed.

Please verify your intended coverage of Ward Center with respect to the FSS.

Response:

*The final status survey will include all areas within the Ward Center for Nuclear Studies (building surfaces, permanent structures, systems, etc.).*

*The decommissioning contractor will prepare a final status survey plan for Cornell. This plan will be submitted to the NRC for approval and will define the areas to be surveyed as part of the final status survey, the corresponding survey units designed to facilitate the surveys and the survey unit classifications.*

*Section 2.3.1.3 was revised to read;*

*"Following the completion of remedial activities within the Ward Center for Nuclear Studies a final status survey will be performed and documented demonstrating that the Ward Center for Nuclear Studies meets the criteria for release for unrestricted use. The final status survey will include all areas within the Ward Center for Nuclear Studies.*

10) DP, Section 2.4, page 32 of 73

Discuss the functions, responsibilities, and qualifications of the Cornell Project Manager.

Response:

*The Cornell Project Manager (PM) is responsible to Cornell administration and management for the successful completion of the decommissioning work. The role of the PM includes facilitating the pre-qualification and selection of contractors, regulatory interface, management of the contractor's efforts, management of submittal review and approval, approval of contractor payments, review and recommendations regarding changes to the contract, oversight of inspection and QA activities, management of approved budget, and communication between Cornell staff during the decommissioning process.*

*The Organization Chart (Figure 2-4) has been revised to identify the central role of this position in the decommissioning process.*

*Qualifications of the project manager include an engineering degree, license to practice Professional Engineering in New York State, a successful history in managing site remediation, experience with regulatory interface, and a thorough understanding of Cornell's procedures and policies for work with contractors and multi-million dollar project budgets.*

11) DP, Section 2.4, page 32 of 73

Discuss the functions, responsibilities, qualifications, and composition of the Cornell D and D Oversight Committee.

Response:

*The Cornell D and D Oversight Committee represents Cornell University in ensuring that the Decommissioning work is performed safely, efficiently, and effectively. Their role is as advisors and quality assurance over the process and for assisting the PM and project director in assuring adequate resources and funding for the project. They are not responsible for day-to-day coordination or approvals.*

*The D and D Oversight Committee consists of a diverse set of campus administration leaders. The current composition of the committee includes the following individuals:*

- *Dr. Joseph Burns, Vice Provost for Physical Science and Engineering (Chair)*
- *Steven P. Johnson, Assistant Vice President for Government and Community Relations*
- *Jacque Powers, Senior Communications and Legislative Associate*
- *Ted Murray, Interim Director, Environmental Health and Safety*
- *Dr. Robert Kay, Professor, Earth and Atmospheric Sciences*
- *Dr. Francis Kallfelz, Professor, Clinical Sciences (Chair, University Radiation Safety Committee)*
- *Dr. Vaclav Kostroun, Professor, Applied and Engineering Physics*
- *Dr. Thomas O'Rourke, Professor, Civil and Environmental Engineering*
- *John Kiefer, P.E., Interim Director, Planning, Design, and Construction*

12) DP, Section 2.4.2, page 36 and 37 of 73

Please clarify how Ward Center Director for Nuclear Studies position and the Reactor Supervisor position fit in Figure 2-4.



**Response:**

*The Organizational Chart included in the original DP unintentionally left out the Director position. At the time that the DP was produced in the Summer of 2003, it was envisioned that the Director would perform many of the tasks now delegated and assigned to the Cornell Project Manager. Due to the current operational status of the facility, the Reactor Supervisor is no longer a separate entity. The Supervisor functions have all been delegated to the Ward Center Director.*

*Figure 2.4 was replaced and Section 2.4.2 was revised to read as follows:*

***"2.4.2 Cornell Project Manager***

*The Cornell Project Manager functions include:*

- Selecting a decommissioning contractor to assist Cornell with the Decommissioning of Ward Center for Nuclear Studies*
- Overseeing the decommissioning contractors performance relative to the terms of their contract, this decommissioning plan, and all subsequent plans and procedures*
- Ensuring that all decommissioning activities comply with applicable regulations and are performed in accordance with all license conditions*
- Approving minor changes to this decommissioning plan and subsequent plans and procedures (which do not change the original intent of the plans and procedures and do not involve an unreviewed safety question)*
- Managing the decommissioning budget and approving contractor payments*
- Communicating with the D&D Oversight Committee and Project Director*
- Overseeing inspections and QA activities associated with the decommissioning and reporting findings*
- Communicating with regulators*

*The minimum qualifications for the Cornell Project Manager are:*

- A professional engineering degree*
- Ten years of project management experience*
- Experience managing site remediation projects for Cornell*
- A thorough understanding of Cornell's policies and procedures for working with contractors on multi-million dollar projects"*

*Section 2.4.3 was revised to better define the functions assigned to the Ward Center Director for Nuclear Studies:*

***"2.4.3 Ward Center Director for Nuclear Studies***

*"The Ward Center Director for Nuclear Studies functions include:*

- *Maintaining the Ward Center for Nuclear Studies in a safe and proper condition during the decommissioning, in accordance with the requirements set forth in applicable facility licenses*
- *Review plans and procedures*
- *Provide engineering and logistical support during the decommissioning"*

*Figure 2-4 was revised to identify this role. In addition, the Table of Contents has been revised to reflect the changed paragraph headers for paragraphs 2.4.2 and 2.4.3, reflecting these revised titles and personnel descriptions.*

13) DP, Section 2.7, Page 40 of 73

The last sentence of the next to the last paragraph states that "...small amounts of concrete from the radiologically controlled area may be released using the volumetric soil release criteria." Please describe and justify the process that is being proposed.

*Response:*

*The intent was to allow concrete, primarily concrete associated with the biological shield, with minor amounts of volumetric contamination to be either free released and removed from the site during decommissioning or shown to meet the criteria for release for unrestricted use and left on site following decommissioning.*

*Following discussions with the NRC and further discussions with Cornell staff, this decision has been changed. It has now been determined that no waste materials, including concrete, with detectable activity or contamination will be free released during decommissioning.*

*Section 2.7 was revised to delete the last sentence of the next to last paragraph.*

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### TRIGA and ZPR Reactors

In 1959 Cornell began construction of a facility to house the TRIGA Reactor, the ZPR Reactor, the Gamma Cell and supporting systems (e.g., Instrumentation and Control Systems, Forced Cooling System, Water Demineralization System, Ventilation/Exhaust System, Radiation Monitoring Systems, etc.). Following construction and reactor hardware installation, the TRIGA Reactor was brought to initial criticality in January of 1962. The TRIGA Reactor ceased operations on April 21, 2003. The TRIGA Reactor's Fuel was shipped to Idaho Falls arriving on November 20, 2003. The ZPR ceased operations in 1996. Following the removal of the ZPR fuel the ZPR was partially disassembled.

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### Current Facility Status

The TRIGA Reactor, situated in the Reactor Complex, was placed in "Possession-Only-Amendment" (POA) status, through an amendment to the USNRC License No. R-80.

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The ZPR ceased operations in 1996. The ZPR fuel was returned to the DOE in April 2000.

Ward Center utility services required for facility operation and maintenance under POA status conditions are active.

Manually actuated and automated fire alarm systems in the Ward Center are operational.

Ward Center security and radiological alarm systems will remain active.

### **1.2.2 Reactor Decommissioning Overview**

Prior to implementing the decommissioning actions described herein, the Ward Center will have been cleared of all extraneous fixtures, equipment and materials. The majority of the remediation will focus on components with the TRIGA reactor's pool, the bioshield surrounding the TRIGA reactor, and possibly portions of the floor drains within the reactor complex. In other areas of the facility only minor remediation requirements are anticipated. The general activities to complete the Plan objectives are:

- Remove the components within the TRIGA reactor's pool.
- Remove the activated/contaminated portion of the bioshield.
- Remediate the floor drains if required.
- Perform additional decontamination and dismantlement of the structure and equipment in accordance with this plan.

Direct surface beta measurements, removable contamination measurements, gamma exposure rates, soil sampling and any specialized measurements will be performed to provide data required to meet the regulations contained in 10CFR20.1402, *Radiological Criteria for Unrestricted Use* (Ref. 1-4) and the guidance provided in *NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual, (MARSSIM)* (Ref. 1-5), and *NUREG-1727, NMSS Decommissioning Standard Review Plan* (Ref. 1-2).

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### **Sample QC**

Quality Control (QC) samples will be obtained for minimum of 10% of all samples collected for radionuclide specific analysis. QC samples for direct measurements and smears are not required. The QC samples will be a combination of split, duplicate, blank, and/or spiked samples.

### **Sample Identification**

Direct surface beta measurements, removable contamination samples, exposure rates, and any specialized measurements will be identified as to location, type of measurement, specific instrument and probe used, sample time and date (as appropriate) and name of the person collecting the data.

Soil samples will be identified with a unique sample number, sample location, depth of sample, sample time and date as appropriate, and the name of the person collecting the sample.

### **Sample Chain-of-Custody**

Sample chain-of-custody shall be initiated for those samples being sent off site for analysis or transferred to another organization for analysis. A sample Chain-of-Custody Record will be generated which will document the sample identification and sample transfer and will accompany the sample during shipping to the new custodian of the sample.

### **Sample Analysis**

Vendor laboratories shall be on a QA Approved Suppliers List for the decommissioning contractor or Cornell University for the type of analytical services being provided. Cornell has the ultimate responsibility for ensuring that decommissioning sample analysis specifications and laboratory capabilities meet data quality requirements.

The list of expected radionuclides provided above is based on the assumption that reactor operation resulted in neutron activation of reactor core components and other integral hardware or structural members situated adjacent to, or in close proximity to, the reactor core. Specific items to be considered exposed to neutron activation include materials composed of aluminum, steel, stainless steel, graphite, cadmium, lead, concrete and possibly others. The determination of residual activity in structures surrounding the reactor will be based upon direct measurements and sampling.

#### **2.3.1.1.3.1 Disposition of Decommissioning Equipment and Materials**

The equipment, materials, instrumentation, and tools that are used or encountered during the decommissioning may be free released if surveyed and shown not to be radioactive or to have total or removable contamination in excess of the minimum detectable activities associated with the survey methodologies employed. Items that can not be free released will be handled using one of three methods described below;

- The items may be shipped directly for disposal as radioactive waste at a licensed facility
- The items may be shipped for processing at a licensed facility
- The items may be shipped to another licensed facility for storage or use

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In each case the term 'licensed facility' refers to a facility holding the appropriate radioactive material disposal, processing, storage, or use license appropriate to the class of waste involved.

#### **2.3.1.1.3.2 Reactor Containment Structure**

- The equipment, materials, instrumentation, and tools that are used during the decommissioning will be handled as described above in Section 2.3.1.1.3.1.
- All contaminated equipment will be removed and all other equipment will be surveyed and left in place.
- Reactor complex ventilation system filters will be removed and the remaining system will be surveyed and left in place.
- Concrete floors will be decontaminated by removing a portion of the upper concrete surface, as necessary. Tubes and drains will be surveyed and decontaminated as required.
- Building roof exhaust pipe will be surveyed and left in place.
- The Ward Center Crane will be utilized during the decommissioning activities. It will be surveyed, decontaminated in place as required and left intact and in operating condition.

The water treatment system will be removed which includes the L-1 Mixed Bed Deionizer, and the L-2 Carbon filter along with associated pipe, valves and instrumentation. The pool water cooling system will also be removed which includes a heat exchanger that utilizes campus-supplied chilled water, two pumps and associated piping valves and controls. The water treatment system is housed in the Reactor Equipment Room. The cooling system is mounted in the Reactor Bay on the exterior wall of the Reactor Equipment Room.

The hoods in the Isotope Handling Room and the ZPR laboratories will be removed. All parts of the Pneumatic Transfer System will be removed with exception of supplied air and electrical controls.

The ZPR is no longer operational and significant progress has been made in preparing the facility for release for unrestricted use. The two cleanup filters and the demineralizer associated with the ZPR will be removed. It is anticipated that the remaining equipment can be surveyed and left in place.

The HVAC System will be left in place except that all filters will be removed.

#### **2.3.1.3 Surveys**

Following the completion of remedial activities within the Ward Center for Nuclear Studies a final status survey will be performed and documented demonstrating that the Ward Center for Nuclear Studies meets the criteria for release for unrestricted use. The final status survey will include all areas within the Ward Center for Nuclear Studies.

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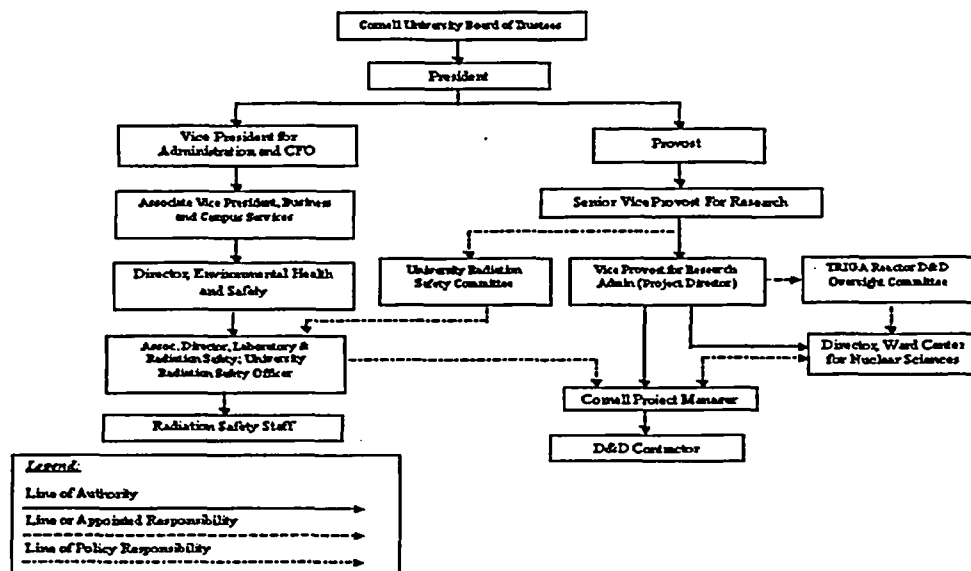
#### **2.3.2 Schedule**

The project schedule is presented as Figure 2-3. This schedule was developed using Microsoft Project. Based on project schedule information documented here in Figure 2-3, Cornell estimates that a formal request for termination of Facility Licenses No. R-80 and R-89 will be submitted to the USNRC approximately eighteen months after the approval of the decommissioning plan is received from the USNRC. The Ward Center Decommissioning Project is currently scheduled to run from January 2004 to May 2005. Changes to the schedule may be made at Cornell's discretion as a result of resource allocation, availability of a radioactive waste burial site, interference with ongoing Cornell activities, ALARA considerations, further characterization measurements and/or temporary on site radioactive waste storage operations.

### **2.4 DECOMMISSIONING ORGANIZATION AND RESPONSIBILITIES**

Cornell is committed to, and retains ultimate responsibility for, full compliance with the existing USNRC reactor licenses and the applicable regulatory requirements during decommissioning. University policies and goals will be followed to ensure high standards of performance in accomplishing the decommissioning tasks.

Figure 2-4 Ward Center Decommissioning Organization



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## 2.4.2 Cornell Project Manager

The Cornell Project Manager functions include:

- Selecting a decommissioning contractor to assist Cornell with the Decommissioning of Ward Center for Nuclear Studies
- Overseeing the decommissioning contractors performance relative to the terms of their contract, this decommissioning plan, and all subsequent plans and procedures
- Ensuring that all decommissioning activities comply with applicable regulations and are performed in accordance with all license conditions
- Approving minor changes to this decommissioning plan and subsequent plans and procedures (which do not change the original intent of the plans and procedures and do not involve an unreviewed safety question)
- Managing the decommissioning budget and approving contractor payments
- Communicating with the D&D Oversight Committee and Project Director
- Overseeing inspections and QA activities associated with the decommissioning and reporting findings
- Communicating with regulators

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The minimum qualifications for the Cornell Project Manager are:

- A professional engineering degree
- Ten years of project management experience
- Experience managing site remediation projects for Cornell
- A thorough understanding of Cornell's policies and procedures for working with contractors on multi-million dollar projects

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### 2.4.3 Ward Center Director for Nuclear Studies

The Ward Center Director for Nuclear Studies functions include:

- Maintaining the Ward Center for Nuclear Studies in a safe and proper condition during the decommissioning, in accordance with the requirements set forth in applicable facility licenses
- Reviewing plans and procedures
- Providing engineering and logistical support during the decommissioning

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The minimum qualifications for this position are:

- Current or previously certified reactor operator
- At least 2 years of experience in Reactor Operation at the TRIGA Facility, or at least 6 years of experience in Reactor Operations.

### 2.4.4 Radiation Safety Officer

The Radiation Safety Officer shall be responsible for providing radiological support in the decommissioning of the Ward Center. This function ensures that the activities involving potential radiological exposure are conducted in compliance with the applicable licenses, Federal and State regulations, and Ward Center standard operating procedures. The position includes responsibility for maintaining the TRIGA surveillance and monitoring program and for HP radiological protection procedures.

The Radiation Safety Officer for Cornell University will have oversight of all D&D operations. The scope of his oversight will include all D&D operations that involve work with systems or materials that have a radiological component.

The minimum qualifications for this position are:

- An advanced degree in health physics or a related field
- Ten years supervisory experience in health physics
- Ten years operational experience related to radiation safety

The RSO is responsible for ensuring that:

- a. Radiological controls are in place prior to and during any work involving radiation
- b. Applicable license conditions are satisfied
- c. Applicable state and federal regulations are met.

The Radiation Safety Officer has the authority to:

millirem (0.25 millisevert) per year and the residual radioactivity has been reduced to levels that are as low as is reasonably achievable (ALARA). The current NRC guidance for acceptable license termination screening values (meeting the 10 CFR 20.1402 criteria) of common radionuclides for building surface contamination and surface soil contamination are presented in NUREG-1757, Volume 1 *Consolidated NMSS Decommissioning Guidance, Decommissioning Process for Materials Licenses, Appendix B*, (Ref. 2-9). An ALARA analysis is not needed. As stated in NUREG-1727, Volume 1, Appendix D, "in light of the conservatism in the building surface and surface soil generic screening levels developed by the NRC staff, the staff presumes, absent information to the contrary, that licensees or responsible parties that remediate building surfaces or soil to the generic screening levels do not need to demonstrate that these levels are ALARA."

Upon completion of the decontamination and remediation activities (e.g. see Section 2.3 Decommissioning Tasks), a final status survey of the Ward Center will be performed using the method described in NUREG-1575, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)* (Ref. 2-11). The results of the survey(s) will be summarized in a report which will be submitted to NRC, as required by the U.S. Nuclear Regulatory Commission NUREG 1537 (Ref. 2-12), in support of a license termination request.

If it is impractical or not possible to satisfy release criteria (or conclusively demonstrate that they have been met), the location/item will be treated as radioactively contaminated and dispositioned as low-level waste.

The characterization did not indicate that there was any surface soil contamination. The release criteria for surface soil will be based upon the relative concentrations of isotopes on the material and their respective release criteria if more than one category of nuclide for beta-gamma emitters applies from Table 2-8.

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If additional screening values are required for nuclides not included in Table 2-7 or Table 2-8, they will be calculated using the NRC's D and D Code with default values.