March 3, 2004

Dr. Howard Aderhold
Ward Center for Nuclear Sciences
Ward Center
Cornell University
Ithaca, New York 14853-7701

SUBJECT: NRC ROUTINE COMBINED INSPECTION REPORTS NO. 50-97/2004-201 AND 50-157/2004-201

Dear Dr. Aderhold:

This letter refers to the inspection conducted on January 5-8, 2004, at the Ward Center for Nuclear Science's research reactors. The inspection included a review of activities authorized under NRC license Nos. R-89 and R-80. The enclosed report presents the results of that inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concerns or noncompliance of NRC requirements were identified. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning this inspection, please contact Stephen Holmes at 301-415-8583.

Sincerely,

/RA/

Patrick M. Madden, Section Chief
Research and Test Reactors Section
New, Research and Test Reactors Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

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

Enclosure: NRC Inspection Report Nos. 50-97 and 50-157
cc w/enclosure: Please see next page

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

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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No:	50-97 50-157
Report Nos:	50-97/2004-201 50-157/2004-201
License Nos:	R-89 R-80
Licensee:	Cornell University
Facility:	Ward Center for Nuclear Sciences
Location:	Ithaca, New York
Dates:	January 5-9, 2004
Inspector:	Stephen W. Holmes, Reactor Inspector
Approved by:	Patrick M. Madden, Section Chief Research and Test Reactors Section New, Research and Test Reactors Program Division of Regulatory Improvement Programs Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Cornell University
Ward Center for Nuclear Sciences
Report Nos: 50-97/2004-201 and 50-157/2004-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the Cornell TRIGA and Zero Power reactor facilities safety programs including: organization and staffing, review and audit functions, plant operations, procedures, maintenance and surveillance, emergency preparedness, physical security, radiation protection, effluent and environmental monitoring, training, and transportation activities. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

Organizational and Staffing

- The operations organizational structure and functions were consistent with Technical Specification Sections (R-89) 6.1 and 6.8 and (R-80) 6.1 and 6.11.

Review, Audit, and Design Change Functions

- Ward Center Safety Committee membership, meeting schedule, and conduct of their review functions were in accordance with Technical Specification Section 6.2.

- Changes made at the facility had been reviewed and approved in accordance with the guidance of 10 CFR 50.59.

Plant Operations

- Operational, experimental, and fuel handling activities were consistent with applicable Technical Specification and procedural requirements.

Procedures

- The Reactor Facility procedural control and implementation program was acceptably maintained and satisfied Technical Specification Section 6.3 requirements.

Maintenance and Surveillance

- The licensee's program for surveillance and limiting conditions for operation confirmations satisfied Technical Specification requirements.

- The maintenance program was being carried out as required.

Radiation Protection Program

- The radiation protection program satisfied the requirements of 10 CFR Part 19.12 and 10 CFR Part 20.1101.

- Surveys were performed and documented as required by 10 CFR Part 20.1501(a), Technical Specifications, and licensee procedures.

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- Radiological postings satisfied regulatory requirements.

- The personnel dosimetry program was acceptably implemented and doses were in conformance with licensee and 10 CFR Part 20 limits.

- Portable survey meters, radiation monitoring, and counting lab instruments were being maintained according to Technical Specifications, industry/equipment manufacturer standards, and licensee procedures.

Effluent Monitoring

- Effluent monitoring satisfied license and regulatory requirements and releases were within 10 CFR 20.1101(d), 10 CFR 20.2003, and 10 CFR Part 20, Appendix B limits.

Transportation of Radioactive Materials

- The program for transportation of radioactive materials satisfied Department of Transportation, NRC, and Cornell Radiation Safety Manuel requirements.

Emergency Preparedness

- The emergency preparedness program was conducted and implemented in accordance with the Emergency Plan.

Physical Security

- Security, facilities, equipment, and procedures of the Ward Center satisfied the Physical Security Plan requirements.

Training

- The 10 CFR Part 19 training was performed in accordance with established procedures.

- The Operator Requalification Program had been implemented as required.

REPORT DETAILS

Summary of Plant Status

The Cornell reactors were permanently shut down and all fuel has been removed from the facility. The last critical operation was performed on April 21, 2003. A decommissioning plan has been submitted to the NRC for approval.

1. Organizational Structure, Staffing and Reports

a. Inspection Scope (Inspection Procedure [IP] 69001)

The inspector interviewed licensee staff and reviewed the following to ensure that the requirements in Technical Specifications (TS) Sections (R-89) 6.1 and 6.8 and (R-80) 6.1 and 6.11 were being met:

- TS for the Cornell University TRIGA Research Reactor, Amendment No. 11, dated May 23, 1997
- TS for the Cornell University Zero Power Research Reactor (ZPR), Amendment No. 4, dated February 12, 1997
- Cornell University Rules and Procedures Manual (CURL 3), revised December 2000
- administrative controls and management responsibilities specified in TS
- organization and staffing
- staff qualifications
- selected portions of the Reactor Operations Logbook No. 47 from June 29, 2001 to present
- Annual Report for Facility License Nos. R-80 and R-89 for July 1, 2001 to June 30, 2002, dated November 20, 2002
- Annual Report for Facility License Nos. R-80 and R-89 for July 1, 2002 to June 30, 2003, dated August 11, 2003

b. Observations and Findings

The reactors' operation structure consisted of a new Center Director (CD) who is a former ZPR and TRIGA Director and current senior reactor operator (SRO). The inspector interviewed the CD, and determined that he was cognizant of the duties and responsibilities required by TS Section 6.1 (R-89) and (R-80) and CURL 3 Section 1. The inspector verified that the CD satisfied the training and experience required by TS Sections 6.1.c and 6.1.d for both the CD and reactor supervisor positions he filled. The inspector also determined that no functional changes had occurred in the rest of the organizational structure as outlined in Chart I of the TS since last inspected May 21-25, 2001 (refer to NRC Combined Inspection Nos. 50-97/2001-201 and 50-157/2001-201, ADAMS Accession No. ML011660502).

The inspector verified that the radiation safety officer was, as required by TS Sections 6.1.f (R-89) and 6.1.g (R-80), organizationally independent of the Ward Center.

Review of records verified that management responsibilities were administered as required by TS, applicable procedures, and that transitions in the reactor staff were properly managed. The 2002 and 2003 annual reports summarized the required

information and were issued at the frequency specified in TS Sections 6.8.c (R-89) and 6.11.e (R-80). No special reports were submitted pursuant to TS Sections 6.8.a or b (R-89) and 6.11.a, b, or c (R-80).

c. Conclusions

The operations organizational structure and functions were consistent with TS Sections (R-89) 6.1 and 6.8 and (R-80) 6.1 and 6.11.

2. Review, Audit, and Design Change Functions

a. Inspection Scope (IP 69001)

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of TS Section 6.2 were being met:

- TS for the Cornell University TRIGA Research Reactor, Amendment No. 11, dated May 23, 1997
- TS for the Cornell University ZPR, Amendment No. 4, dated February 12, 1997
- CURL 3, revised December 2000
- Ward Center Safety Committee (WCSC) minutes since June 2001
- WCSC reviews of TS, 10 CFR 50.59, and procedure changes since June 2001
- 50.59 documentation for installation of an alternate TRIGA pool water deionizing system, dated July 7, 2003
- 2000-2001 audit, dated November 14-15, 2002
- 2001-2002 audit, dated February 28 to March 1, 2003
- Annual Report for Facility License Nos. R-80 and R-89 for July 1, 2001, to June 30, 2002, dated November 20, 2002
- Annual Report for Facility License Nos. R-80 and R-89 for July 1, 2002, to June 30, 2003, dated August 11, 2003

b. Observations and Findings

Review of the WCSC membership and meeting schedules confirmed that they met TS Sections 6.2.c, 6.2.e, and 6.2.f requirements for composition, quorum and frequency. The inspector reviewed the minutes of the last seven WCSC meetings and confirmed that the topics considered were as stipulated in TS Section 6.2.b. The WCSC, as required by TS Sections 6.2.b.1 and 6.2.b.2, reviewed and approved new and substantial changes to existing procedures. The WCSC also reviewed license amendment requests as required by TS Section 6.2.b. The annual audits performed by the committee satisfied TS Section 6.2.b.8 requirements. The inspector reviewed the minutes of the WCSC and determined that they provided guidance, direction, and operations oversight.

The inspector reviewed the recent 50.59 change made to the facility-the installation of an alternate TRIGA pool water deionizing system and observed the final electrical hookup of the system. The inspector noted that the design change review was concise but thorough and adequately addressed the requirements of 10 CFR 50.59(c)(2). The

change had been acceptably documented in accordance with 10 CFR 50.59 and applicable licensee requirements. The change did not require an amendment to the facility TS. The inspector determined that the design control program at the facility was acceptably implemented.

c. Conclusions

WCSC membership, meeting schedules, and conduct of their review functions were in accordance with TS Section 6.2. Changes made at the facility had been reviewed and approved in accordance with the guidance of 10 CFR 50.59.

3. Plant Operations

a. Inspection Scope (IP 69001)

To verify that the licensee was operating the reactor and conducting operations in accordance with TS Sections 2.0, 3.0, 6.3 and procedural requirements, the inspector reviewed selected portions of the following:

- TS for the Cornell University TRIGA Research Reactor, Amendment No. 11, dated May 23, 1997
- TS for the Cornell University ZPR, Amendment No. 4, dated February 12, 1997
- OP 100 - Normal-Mode TRIGA Operations revised August 18, 1999
- OP 101 - Normal-Mode TRIGA Operations Checklists, revised August 18, 1999
- OP 102 - Pulsed-Mode TRIGA Operations, revised December 12, 1995
- OP 103 - Pulsed-Mode TRIGA Operations Checklists revised April 13, 1999
- OP 104 - TRIGA Reactor Operations Log Format, revised, December 12, 1995
- OP 200 - Inspection of fuel Elements, revised November 25, 1991
- OP 400 - Fuel Handling and Core Loading Procedures, revised February 14, 1996
- selected portions of the Reactor Operations Logbook No. 47 from June 29, 2001 to present
- selected Normal-Mode TRIGA Operations Checklists from June 2001
- selected Pulsed-Mode TRIGA Operations Checklists from June 2001
- experiment logs and records since June 2001
- Irradiation/Operations Request Forms (revised January 13, 1999) since June 2001
- Neutron Activation analysis Experiment Approval Forms (revised January 13, 1999) since June 2001
- General Experiment Approval Forms (revised January 13, 1999) since June 2001
- approved reactor experiments
- WCSC minutes since June 2001
- Letter, “Procedure for handling fuel and equipment in preparation for loading of all spent TRIGA fuel elements into NAC-LWT cask,” dated November 3, 2003
- fuel handling equipment and instrumentation
- fuel handling and examination records since June 2001

b. Observations and Findings

(1) Reactor Operations

During the inspection the reactors were permanently shut down, completely defueled and the fuel shipped off site. The last experiment was performed June 28, 2002. A review of the Reactor Operations Log No. 47 from June 2001 to present indicated that operational problems and events, including reactor scrams, had been identified and reported and resolved as required before the resumption of operations under the authorization of a SRO. The inspector verified that these items, and other TS and procedure required entries, had been logged in the Reactor Operations Logbook and cross-referenced with other checklists or records as required. A review of the logs and records also showed that operational conditions and parameters were consistent with license and TS Sections (R-89) 2.0 and 3.0 and (R-80) 6.7 and 6.10 requirements and that no operational limit had been exceeded.

(2) Experiments

The inspector's review of experiments performed during 2001 and 2002 confirmed that experiments were reviewed and approved by the operations supervisor or referred to the WCSC as required by TS Section 6.4. Review of current experiment, activation, and irradiation authorizations, procedures, and related reactor log book entries by the inspector confirmed that experiments were installed, performed, and removed as outlined in the approved experiment authorizations. No new experiments were approved since the last inspection.

(3) Fuel Handling

The inspector reviewed fuel related Ops 200 and 400, selected fuel movement logs, and associated inspection records since June 2001.

The fuel related procedures were found to be of sufficient detail to ensure appropriate fuel handling and inspection operations. Fuel movement, inspections, log keeping, and data recording were acceptable, followed licensee procedures, and satisfied TS Section 4.1 requirements.

c. Conclusions

Based on the procedures and records reviewed during the inspection, the inspector determined that operational, experimental, and fuel handling activities were consistent with applicable TS and procedural requirements.

4. Procedures

a. Inspection Scope (IP 69001)

To verify compliance with TS Section 6.3, the inspector reviewed selected portions of the following:

- TS for the Cornell University TRIGA Research Reactor, Amendment No.11, dated May 23, 1997
- TS for the Cornell University ZPR, Amendment No. 4, dated February 12, 1997

- Cornell University TRIGA Reactor OP 100 thru 500, revised August 19, 1999
- administrative controls
- CURL 3, revised December 2000
- records for changes and temporary changes since June 2001
- procedural implementation
- logs and records since June 2001

b. Observations and Findings

The inspector confirmed that written health physics (HP) and operations procedures were available for those tasks and items required by TS Section 6.3. The licensee's procedures were found to be acceptable for the current facility status and staffing level.

The procedures were routinely updated as needed. Temporary changes to the procedures that did not change the original intent were made by the Responsible Person on Duty with the concurrence of the RS or CD and subsequently were reviewed by the WCSC as required by TS Section 6.3.b.

c. Conclusions

Based on the procedures and records reviewed during the inspection, the inspector determined that the procedural control and implementation program was acceptably maintained and satisfied TS Section 6.3 requirements.

5. Maintenance and Surveillance,

a. Inspection Scope (IP 69001)

To verify that the licensee was meeting the requirements of TS Sections 2.0, 3.0, 4.0, 6.2 and licensee procedures, the inspector reviewed selected aspects of:

- TS for the Cornell University TRIGA Research Reactor, Amendment No. 11, dated May 23, 1997
- TS for the Cornell University ZPR, Amendment No. 4, dated February 12, 1997
- OP 200 - Inspection of fuel Elements, revised November 25, 1991
- OP 201 - Control Rod Calibration by the Inhour Method, revised February 14, 1996
- OP 202 - Control Rod Drop Time Measurements, revised November 25, 1991
- OP 203 - Inspection and Cleaning of Transient Control Rod Drive Cylinder, revised November 25, 1991
- OP 204 - TRIGA POWER Calibration by the Calorimetric Method, revised December 4, 1991
- OP 205 - Calibration of Radiation Monitoring Equipment, revised December 12, 1995
- OP 206 - Temperature Calibration Procedure, dated December 12, 1995
- OP 207 - Temperature Calibration Checklist, revised December 12, 1995
- OP 208 - Annual Reactor Surveillance and Maintenance Checklist, revised January 15, 1999
- OP 209 - Argon Monitor Efficiency Calibration, undated.

- OP 300 - Transient Rod Removal and/or Replacement, revised December 4, 1991
- OP 301 - Control Rod Removal and/or Replacement for Safety, Shim, or Regulating Rods, revised November 25, 1991
- OP 302 - Testing of Containment Isolation Butterfly Valves and Air Supply, revised November 25, 1991
- OP 303 - Normal Mode TRIGA Six-Month Operations Checklist, revised January 1, 1992
- OP 304 - General TRIGA Maintenance and Repair Operations Procedure, revised July 11, 1997
- OP 305 - Reactor Equipment Maintenance/Repair/Modification Report Sheet, revised July 11, 1997
- TRIGA: Required Surveillance and & Preventive Maintenance Permanent Log, Parts I & II from June 2001 to present
- selected portions of the Reactor Operations Logbook No. 47 since June 2001
- Reactor Equipment Maintenance, Repair, and Modification Log entries since June 2001
- Annual Maintenance Records for 2001 and 2002
- Normal Mode TRIGA six month operational checks from June 22, 2002 to July 8, 2003
- Reactor Monthly Checklists from August 2003
- surveillance, calibration, and test data sheets and records since June 2001

b. Observations and Findings

(1) Maintenance

The inspector reviewed both the reactor log and the Reactor Equipment Maintenance, Repair, and Modification Log for maintenance items. Routine, preventive, and unscheduled maintenance were documented as required by TS Section 6.3 and consistent with licensee OP Section III - Reactor Maintenance Procedures. Maintenance activities ensured that equipment remained consistent with the Safety Analysis Report and TS requirements. Verifications and operational systems checks were performed after maintenance activities were completed to ensure system operability.

(2) Surveillance

Since the last NRC inspection conducted June 2001, management has revised its annual, biennial, and irregular interval checks, inventories, calibrations, inspections, surveillances, and Limiting Conditions for Operation (LCO) verifications. The CD stated that, since operations ceased as of April 2003 and the fuel was removed in December, those checks, inventories, calibrations, inspections, surveillances, and LCO verifications which were only required for reactor operations have been stopped. All others will continue to be performed as required by TS Sections 2.0, 3.0, and 4.0, and OP Section II - Surveillance Procedures.

The inspector reviewed records of all TS required surveillances and LCO verifications performed since June 2001. All data reviewed, including surveillance

inspections and LCO verifications showed that the periodic checks, tests, and verifications were completed in accordance with and at the intervals required by TS Section 4.1 and licensee procedures. The results of these surveillances were within prescribed TS Sections 2.0, 3.0, and 4.0 limits. The results also met facility procedure parameters and were in close agreement with the previous surveillance results. All were valid for reactor operations through its last criticality April 21, 2003.

c. Conclusions

The licensee's program for surveillance and limiting conditions for operation confirmations satisfied TS requirements. Maintenance was being completed as required.

6. Radiation Protection

a. Inspection Scope (IP 69001)

The inspector reviewed the following selected aspects of the radiation protection program (RPP) to verify compliance with 10 CFR Parts 19 and 20, TS, and licensee administrative requirements:

- TS for the Cornell University TRIGA Research Reactor, Amendment No. 11, dated May 23, 1997
- Cornell Radiation Safety Manuel (CRSM), updated March 4, 2003
- Survey Guide for Unsealed Radioactive Material, dated January 24, 2000
- Special Procedure No.1: Requirements for Badge Users at Cornell University, dated February 8, 2000
- Ward Center Radiation Protection Program (WCRPP), dated July 7, 2002
- CURL 3, revised December 2000
- OP 205 - Calibration of Radiation Monitoring Equipment, revised December 12, 1995
- OP 209 - Argon Monitor Efficiency Calibration, undated.
- Environmental Health and Safety (EH&S) Survey Meter Calibration Procedure, Revision 2, dated October 15, 2003
- Liquid Scintillation Operations Manual, WALLAC LSC dated August 1993
- Canaberra ACCUSPEC Operations Users Guide Version 6.0 dated March 1991
- As Low As Reasonably Achievable (ALARA) reviews since June 2001
- radiation protection training since June 2001
- radiological signs and posting
- facility and equipment during tours
- Ward Center monthly and quarterly contamination and area radiation surveys since June 2001
- Ward Center personnel dosimetry records since June 2001
- periodic checks, quality control, and test source certification documentation since June 2001

b. Observations and Findings

(1) Radiation Protection Program

The licensee's RPP and ALARA programs were established and described in the CRSM and through the WCRPP. The programs contained instructions concerning organization, training, monitoring, personnel responsibilities, material use, record keeping, emergencies, and maintaining doses ALARA. The programs, as established, appeared to be acceptable. The ALARA program provided guidance for keeping doses as low as reasonably achievable which was consistent with the guidance in 10 CFR Part 20. Although the portions of the CRSM and WCRPP had been revised, the RPP had not appreciably changed since the last NRC inspection.

The Institute's annual review of the RPP required by 10 CFR 20.1101 was performed by EH&S and evidenced by the annual updates to the CRSM.

Review of procedure change records, experiment authorizations, and HP records confirmed that the radiation safety officer or his/her deputy oversaw the safety of Ward Center operation from the standpoint of radiation protection as required by CRSM Section 2.2 and TS Sections 6.1.g and 6.3.c.

(2) Radiation Protection Postings

During tours, the inspector observed that caution signs, postings, and controls were acceptable for the hazards involving radiation and contaminated areas and were implemented as required by CRSM Section 5.2 and 10 CFR 20, Subpart J. Through observations of and interviews with licensee and Ward Center staff the inspector confirmed that personnel complied with the signs, postings, and controls. No unmarked radioactive material was detected in the facility. The inspector confirmed that current copies of NRC Form-3, "Notice to Employees," were posted in the facility as required by 10 CFR Part 19.

(3) Radiation Protection Surveys

The inspector audited all monthly, quarterly and other periodic contamination and radiation surveys since June 2001. They were performed and documented as required by CRSM Section 2.4.5.7 and Survey Guide for Unsealed Radioactive Material Sections II, IV, and VI. Results were evaluated and corrective actions taken and documented when readings/results exceeded levels set forth in CRSM Section 5.1 and tables 5.4-External Dose Rate Limits from Radiation Fields, 5.5-Removable Contamination Limits, and 5.6-External Dose Rate Limits from Fixed Contamination. The inspector's review of the survey records since June 2001 confirmed that contamination in the facility was infrequent and well below the CRSM limits. The inspector determined that the survey program satisfied 10 CFR 20.1501(a) requirements.

(4) Dosimetry

The dosimetry program requirements and procedures had not changed since the last inspection April 2000. A National Voluntary Laboratory Accreditation Program-accredited vendor was used to provide dosimetry for personnel, environmental, and

area monitoring. The inspector confirmed that dosimetry was being issued to staff and visitors as required by the CRSM Section 8.4 and Special Procedure No.1. All occupational exposures were well within NRC limits specified in 10 CFR 20.1201 and licensee guidelines of 60mRem/month, 90mRem/2 months, 120mRem/3 months, 250mRem/6 months, and 500mRem/year. Most records showed no exposure above background.

A documented program was available for limiting the dose to the embryo/fetus of a declared pregnant woman in CRSM Section 8.3. The licensee did not require a respiratory protection program or planned special exposure program.

(5) Radiation Monitoring Equipment

The calibration and periodic checks of the portable survey meters, radiation monitoring, and counting lab instruments were performed by the licensee's staff, EH&S calibration facilities, or by certified contractors. The portable survey meter calibrations were tracked and controlled using a Paradox database. The inspector confirmed that the licensee's calibration procedures and frequencies satisfied TS Section 4.4, Radiation Monitoring Equipment, EH&S calibration procedure and 10 CFR 20.1501(b) requirements, and the American National Standards Institute N323 "Radiation Protection Instrumentation Test and Calibration" or the instrument manufacturers' recommendations. The inspector verified that the calibration and check sources were traceable to the National Institute of Standards and Technology and that the sources' geometry and energies matched those used in actual detection/analyses.

The inspector reviewed the facility calibrations performed since June 2001. The portable meters were calibrated annually and records were maintained as required. Area Radiation Monitors and air monitors were being calibrated annually not to exceed fourteen months as required by OP-205 and OP-209. Additionally, the calibrations for the EH&S's office's liquid scintillation counter, and the Ward Center multichannel analyzer were being performed in accordance with their manufactures' recommendations. The inspector reviewed selected procedures and determined them to be acceptable. All instruments checked had current calibrations appropriate for the types and energies of radiation they were used to detect and/or measure.

c. Conclusions

The inspector determined that, because: 1) surveys were being completed and documented as required by 10 CFR Part 20.1501(a), TS, and licensee procedures; 2) postings met regulatory requirements; 3) the personnel dosimetry program was acceptably implemented and doses were in conformance with licensee and 10 CFR Part 20 limits; and 4) Portable survey meters, radiation monitoring, and counting lab instruments were being maintained and calibrated as required, the RPP being implemented by the licensee satisfied regulatory requirements.

7. Effluent Monitoring

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify that the licensee was complying with the regulatory requirements concerning radioactive effluents: :

- TS for the Cornell University TRIGA Research Reactor, Amendment No. 11, dated May 23, 1997
- CRSM, updated March 4, 2003
- EH&S Procedures for Disposal of Radioactive Materials, dated January 24, 2000
- WCRPP, dated July 7, 2002
- New York Code, Rules, and Regulations, Part 380, "Rules and Regulations for Protection and Control of Environmental Pollution by Radioactive Materials," dated March 24, 1994
- Ward Center "Waste Water Reports" since June 2001
- counting and analysis programs
- Annual Report for Facility License Nos. R-80 and R-89 for July 1, 2001 to June 30, 2002, dated November 20, 2002
- Annual Report for Facility License Nos. R-80 and R-89 for July 1, 2002 to June 30, 2003, dated August 11, 2003

b. Observations and Findings

The inspector reviewed all liquid releases since June 2001 and verified that radioactive liquid releases were adequately analyzed and were below New York Code, Rules, and Regulations 380, 10 CFR 20.2003, and 10 CFR Part 20, Appendix B limits prior to release to the sanitary sewer. Releases to the sanitary sewer were also as required by EH&S Procedures for Disposal of Radioactive Materials Section 3.7.

Gaseous discharges were directly monitored using the stack gas monitor. The inspector reviewed the discharges since June 2001 and verified that the releases were below 10 CFR Part 20, Appendix B limits.

The annual dose to the public from air emissions were calculated using the Environmental Protection Agency COMPLY computer program. This dose was well below the constraint limit of 10 mRem specified in 10 CFR 20.1101(d).

c. Conclusions

Effluent monitoring satisfied license and regulatory requirements and releases were within 10 CFR 20.1101(d), 10 CFR 20.2003, and 10 CFR Part 20, Appendix B limits. Releases also satisfied Cornell's administrative requirements.

8. Transportation of Radioactive Materials

a. Inspection Scope (IP 86740)

To verify compliance with 10 CFR Part 71.5 and procedural requirements for the transfer or shipment of licensed radioactive material, the inspector reviewed the following:

- CRSM, updated March 4, 2003
- radioactive materials shipping procedures
- training records of staff members responsible for shipping licensed radioactive material
- Ward Center shipping checklists, Radioactive Material Limited Quantity, June 21, 2001 to December 9, 2003
- Shipping package: Sapphire XTAL-Neutron Radiography equipment to Kansas State, dated February 17, 2003
- Shipping package: Plutonium-Beryllium Neutron sources to Los Alamos, dated January 28, 2004
- Shipping package: Tritium (H^3) Neutron Tube to Thermo Electron, Dated February 2, 2004
- selected radioactive materials transportation and transfer records since June 2001

b. Observations and Findings

Through records review and discussions with licensee personnel, the inspector determined that the licensee had shipped various types of radioactive material since the previous inspection in this area. Limited quantity packages were shipped by a reactor staff member specifically trained and certified by EH&S. Other material shipments were performed by certified EH&S personnel.

The records indicated that the radioisotope types and quantities were calculated and dose rates measured as required. The records also indicated that the shipping containers were appropriate and had been labeled as required. All radioactive material shipment records reviewed by the inspector had been completed in accordance with Department of Transportation, NRC, and CRSM Section 7.2 requirements. The inspector also verified that the licensee maintained copies of the recipients' licenses to possess radioactive material as required and that the licenses were verified to be current prior to initiating a shipment.

The training of the staff members responsible for shipping the material was reviewed. Training had been conducted according to licensee procedure and met NRC IE 79-19 and 49 CFR requirements.

c. Conclusions

The program for transportation of radioactive materials satisfied Department of Transportation, NRC, and CRSM requirements.

9. Emergency Preparedness

a. Inspection Scope (IP 69001)

To verify that the licensee was implementing and complying with the Emergency Plan for the Ward Center for Nuclear Sciences, Revision 3, dated January 1997, as approved by the NRC, the inspector reviewed selected aspects of:

- Emergency Plan (E-Plan) for the Ward Center for Nuclear Sciences, Revision 3, dated January 1997
- Emergency Procedures, Approved December 21, 2000
- emergency response facilities, supplies, equipment and instrumentation
- Ward Center, Public Safety (PS) and EH&S personnel training records since June 2001
- offsite support agreements
- emergency drills and exercises since June 2001

b. Observations and Findings

The inspector reviewed the E-Plan and confirmed that it was the same as the version most recently approved by the NRC. The inspector verified that the E-Plan and the procedures were reviewed biennially by the licensee as required by E-Plan Section 10.3.

Through reviews of training and drill records and interviews with reactor, EH&S, and PS personnel, the inspector confirmed that emergency response training had been given as required by E-Plan Section 10.1 and that emergency responders were capable to respond, and knowledgeable of the proper actions to take, in case of an emergency. Through random checks of the emergency supplies, decontamination facilities, and portable detection instrumentation, the inspector determined that they were being maintained and inventoried annually as required by the E-Plan Section 10.4.

The inspector confirmed that notification procedures and phone numbers in use by the PS dispatch were current. E-Plan support agreements with off-site response organizations (i.e., County Fire and Sheriff departments, local ambulance services, and medical services) were being reviewed by EH&S and were scheduled for an update in the near future.

Section 10.2 of the L. David Walthousen Critical Experimental facility's emergency plan requires that emergency drills be held annually. The inspector verified that emergency drills had been held annually since the last inspection. The last drill, held November 2003, was incorporated into the shipment of the ZPR and TRIGA fuel from Ward Center to the Department of Energy's facility in Idaho Falls, Idaho. The drill involved reactor, EH&S, PS, and offsite law enforcement personnel and provided a practical, reasonable, and an effective test of the combined staffs.

c. Conclusions

The emergency preparedness program was being implemented and conducted in accordance with the Emergency Plan.

10. Physical Security

a. Inspection Scope (IPs 81401 and 81431)

To verify compliance with the licensee's NRC-approved Physical Security Plan for the Ward Center for Nuclear Sciences, dated December 1996 and to assure that changes, if any, to the plan had not reduced its overall effectiveness, the inspector reviewed:

- the Physical Security Plan (PSP) for the Ward Center for Nuclear Sciences, dated December 1996
- security systems, equipment and instrumentations
- implementation of the Physical Security Plan
- PS/Security Logs for the Ward Center from June 2002 to February 2004
- security audits since June 2001

b. Observations and Findings

The PSP was the same as the latest submitted to the NRC. The inspector verified that the PSP was being reviewed biennially as required. It was also noted that the licensee was properly controlling and protecting the PSP and other proprietary and/or safeguards information as required by the regulations.

Through records reviews and interviews with licensee personnel, the inspector verified that there had been no safeguards events at the facility since the last inspection.

The inspector toured the facility and confirmed that the physical Security systems (barriers and alarms), equipment, and instrumentation were as required by PSP Sections 1.1.3, 1.2.3, 1.3.4, and 2.2. Access and key controls were implemented in accordance with licensee implementing procedures and as required by PSP Section 1.3.5. The inspector also confirmed that the security checks, tests, verifications, and periodic audits were performed and tracked as required by PSP Section 1.3. Security training was being provided as required by PSP Section 1.3.3. Acceptable security response and training of the staff were demonstrated through alarm response and drill participation in accordance with procedures.

The inspector interviewed the PS Crime Prevention Officer, a dispatcher, and two officers who perform security checks of Ward Center. All were found to be knowledgeable of their duties and responsibilities and proper response to security drills and alarms as outlined in PSP Section 3.1 was noted.

c. Conclusions

Based on the observations, the inspector found that the physical security features, equipment, and procedures of the Ward Center satisfied the PSP requirements.

11. Training

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- CRSM Revision 8, dated February 2002
- radiation protection training records and rosters
- radiation protection training procedures
- Ward Center Operator Requalification Program (ORP), dated June 16, 1992
- operator licenses
- operator training records since June 2001
- operator physical exam records since June 2001
- operator operational examination records since June 2001
- operator active duty status

b. Observations and Findings

(1) Radiation Protection

The inspector's reviews of Ward Lab staff's HP training records since the last inspection confirmed that 10 CFR Part 19, CRSM, and specific radiation protection training appropriate to individuals' status and work requirements had been provided to staff and visitors. Initial staff training was provided by EH&S and the site specific training was then provided by the appropriate permit holder (the CD for reactor staff). Self study of the annual updates to the CRSM satisfied the annual retraining requirements.

(2) Operator Requalification

The inspector reviewed the ORP and performed a review of operator requalification records.

Review of requalification records showed that all currently licensed SROs had successfully completed their emergency procedure and abnormal events training, the reactivity manipulations, and had participated in the ongoing training as required by the ORP. The inspector reviewed training records and confirmed that licensed operators attended lectures or performed self study on the appropriate subject material as required by the program and that annual operator performance exams and biennial comprehensive requalification exams had been given as required by the ORP. The inspector confirmed that: 1) past test questions covered the subject matter specified by the program and demonstrated technical depth; 2) required quarterly operation hours for SROs were being recorded; 3) training was provided to the reactor operators on maintenance operations and 10 CFR 50.59 design changes and evaluations; and 4) medical exams meeting 10 CFR 55.33(a)(1) requirements were performed.

In reviewing the requalification records the inspector noted that no operator had completed the last requalification program cycle ending December 31, 2003. The CD acknowledged therefore, that all operator licenses were no longer current as of January 1, 2004. The inspector determined that, since all fuel had been removed from the facility in November 2003 and reactor was permanently shutdown, licensed operators were no longer needed at the facility.

c. Conclusions

The 10 CFR Part 19 training was performed in accordance with established procedures. The ORP had been implemented as required.

12. Follow-up on Previously Identified Issues

a. Inspection Scope

The inspector followed up on two inspector follow-up items as identified and documented in Inspection Report 50-157/2001-201. The inspector reviewed these issues with the licensee to determine what actions, if any, had been taken.

b. Observations and Findings

1) Inspector Follow-up Item 50-157/2001-201-01 - Follow-up on EH&S staffs progress on documenting solubility criteria for its liquid effluents as recommended in NRC Information Notice 94-07.

During the last inspection the inspector noted that, solubility criteria for liquid effluents were met based on knowledge of processes generating the liquid waste. However, supporting information was not documented as recommended in NRC Information Notice 94-07.

At the time of this inspection EH&S has not completed updating solubility criteria documentation for its liquid effluents. Inspector Follow-up Item (IFI) 50-157/2001-201-01 is still open.

2) Inspector Follow-up Item (IFI) 50-157/2001-201-02 - Follow-up on EH&S staffs progress on updating agreements with outside response organizations.

During the last inspection, the inspector noted that the agreements with outside fire, police, medical facilities, and other emergency support entities had not been recently updated.

At the time of this inspection EH&S has not completed updating all the outside agency agreements. Inspector Follow-up Item (IFI) 50-157/2001-201-02 is still open.

c. Conclusion

Two IFIs as identified during the previous inspection were reviewed and were closed during this inspection.

13. Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on January 8, 2004. The licensee acknowledged the findings presented by the inspector during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

P. Mospan	Training Coordinator, Department of Public Safety
G. Sutfin	Crime Prevention Officer, Department of Public Safety
G. Sutfin	Patrol Officer, Department of Public Safety
* L. Hubble	Radiological Safety Specialist
P. Craven	Senior Reactor Operator
T. McGiff	Cornell University Radiation Safety Officer
* H. Aderhold	Ward Center Director
* V. Kostroun	Professor of Applied & Engineering Physics, Cornell University

(*Attended Exit Meeting)

INSPECTION PROCEDURE (IP) USED

IP 69001	Class II Non-Power Reactors
IP 81401	Plans, Procedures, and Reviews
IP 81431	Fixed Site Physical Protection of Special Nuclear Material of Low Strategic Significance
IP 86740	Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

NONE

Closed

NONE

Discussed

50-157/2001-201-01	IFI	Document solubility of liquid discharges.
50-157/2001-201-02	IFI	Update agreements for off-site emergency support.

PARTIAL LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
CD	Center Director
CRSM	Cornell Radiation Safety Manuel
CURL 3	Cornell University Rules and Procedures Manual
E-Plan	Emergency Plan
EH&S	Environmental Health and Safety
HP	Health Physics
IFI	Inspector Follow-up Item
LCO	Limiting Conditions for Operations
NRC	Nuclear Regulatory Commission
ORP	Operator Requalification Program
PSP	Physical Security Plan
PS	Public Safety
RPP	Radiation Protection Program
SRO	Senior Reactor Operator
TS	Technical Specifications
WCSC	Ward Center Safety Committee
WCRPP	Ward Center Radiation Protection Program
TS	Technical Specifications