June 25, 2001

Dr. Kenan Ünlü, Director
Ward Center for Nuclear Sciences
Ward Laboratory
Cornell University
Ithaca, New York 14853-7701

SUBJECT: NRC ROUTINE COMBINED INSPECTION REPORTS NOS. 50-97/2001-201 AND 50-157/2001-201

Dear Dr. Ünlü:

This refers to the inspection conducted on May 21-25, 2001, at the Ward Laboratory research reactors. 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 concern or noncompliance to NRC requirements was 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/NRC/ADAMS/index.html.

Should you have any questions concerning this inspection, please contact Mr. Thomas Dragoun at 610-337-5373.

Sincerely,

/RA/

Ledyard B. Marsh, Chief
Events Assessment, Generic Communications
and Non-Power Reactors Branch
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: Inspection Report 50-97/2001-201
and 50-157/2001-201

cc w/enclosure: Please see next page

cc:

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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

Docket Nos:	50-97 50-157
License Nos:	R-89 R-80
Report Nos:	50-97/2001-201 50-157/2001-201
Licensee:	Cornell University
Facility:	Ward Center for Nuclear Sciences
Location:	Ithaca, New York
Dates:	May 21-25, 2001
Inspector:	Thomas F. Dragoun
Approved by:	Ledyard B. Marsh, Chief Events Assessment, Generic Communications and Non-Power Reactors Branch Division of Regulatory Improvement Programs Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

This routine, announced inspection included onsite review of selected aspects of the operations program, organizational structure and functions program, review and audit program, radiation protection program, environmental protection program, operator requalification program, surveillance program, experimental program, procedural control program, emergency preparedness program and safeguards program since the last NRC inspection.

The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

ORGANIZATIONAL STRUCTURE AND FUNCTIONS
The organizational structure and functions were consistent with Technical Specification requirements.

OPERATIONS
The operations program satisfied Technical Specification requirements.

REVIEW AND AUDIT
The review and audit program satisfied Technical Specification requirements.

RADIATION PROTECTION
The radiation protection program satisfied NRC requirements.

ENVIRONMENTAL PROTECTION
The environmental protection program satisfied NRC requirements.

OPERATOR REQUALIFICATION
Operator requalification was conducted as required by the Requalification Program.

SURVEILLANCE
The surveillance program satisfied Technical Specification requirements.

EXPERIMENTS
The program for experiments satisfied Technical Specification and procedural requirements.

PROCEDURES
The procedural control and implementation program satisfied Technical Specification requirements.

EMERGENCY PREPAREDNESS
The emergency preparedness program was conducted in accordance with the Emergency Plan.

SAFEGUARDS
Special Nuclear Materials were acceptably controlled and inventoried.

Report Details

Summary of Plant Status

During the inspection the reactor was started and shutdown several times for experiments, student tours, and service irradiations. A vote by the University Trustees during this inspection affirmed a proposal by the University President to close the Ward Center.

1. ORGANIZATIONAL STRUCTURE AND FUNCTIONS

a. Scope [Inspection Procedure (IP) 69001]

The inspector reviewed selected aspects of:

- organization and staffing
- qualifications
- management responsibilities
- administrative controls

b. Observations and Findings

The organizational structure has not changed since the last inspection and remained as required by Technical Specifications (TSs). A permanent Senior Reactor Operator was hired and another candidate was in training. However, the Reactor Supervisor position remains vacant with the Chief Responsible Person (licensee title) filling the duties. Review of records verified that management responsibilities were administered as required by the TSs. Staffing during reactor operations satisfied regulatory requirements and licensee procedures.

c. Conclusions

The organizational structure and functions were consistent with TS requirements.

2. OPERATIONS

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- operational logs and records
- selected operational, startup, and shutdown activities

b. Observations and Findings

Reactor pre-startup equipment checks by a Senior Reactor Operator were thorough, professional, and efficient. The operating logs and records were clear and provided an indication of operational activities. Calibration and surveillance records were cross referenced to the date, page, and volume of the console log to provide additional information. Logs and records also showed that operational conditions and parameters were consistent with license and TS requirements.

Observation of operational activities further confirmed that these conditions and requirements were satisfied.

c. Conclusions

The operations program satisfied TS requirements.

3. REVIEW AND AUDIT

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- safety committee meetings and agendas
- committee member qualifications
- independent safety reviews and audits

b. Observations and Findings

Records showed that the Ward Laboratory Safety Committee met at the required frequency and conducted reviews and approvals in areas specified by the TSs. The technical proficiency and numbers of committee members were as required. The committee provided oversight and ensured acceptable use of the reactor.

Independent annual audits by Armed Forces Radiobiology Research Institute personnel are sponsored by the committee to satisfy TS 6.2(8). The inspector noted that the safety reviews and audits and the associated findings were acceptably detailed and that the licensee responded and took corrective actions as needed.

c. Conclusions

The review and audit program satisfied TS requirements.

4. RADIATION PROTECTION

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- the radiation protection program
- annual program reviews
- worker training
- radiological signs and posting
- routine surveys and monitoring
- dosimetry program
- dose control for embryo/fetus
- maintenance and calibration of radiation monitoring equipment

- As Low As Reasonably Achievable (ALARA) reviews

b. Observations and Findings

The radiation protection program had not changed since the last inspection. The Campus Radiation Safety Committee reviewed the radiation protection program at least annually in accordance with 10 CFR 20.1101(c).

Basic training of workers was conducted by the Health Physics (HP) office. Site specific training was then provided by the reactor staff. Training required by 10 CFR 19.12 was provided.

Caution signs, postings and controls to radiation areas were as required in 10 CFR Part 20, Subpart J. Postings accurately reflected radiological conditions.

Use of dosimeters and exit frisking practices were in accordance with radiation protection requirements. The licensee used a National Voluntary Laboratory Accreditation Program-accredited vendor to process dosimetry monthly. Records showed that doses were low and were within 10 CFR Part 20 limitations. A documented program was available for limiting the dose to the embryo/fetus of a declared pregnant woman. The highest recorded dose was 3.9 rem to a dosimeter accidentally dropped into the reactor pool near the core. It was retrieved in about one hour.

Radiation monitoring and survey activities were as required. Equipment used for these activities were maintained and calibrated using a unique shadow shield to compensate for floor and wall shine.

The quarterly radiation survey by the HP staff was notable. Persons from the emergency response staff accompany the HP staff on a rotating basis during the survey at the Ward Laboratory. This one-on-one orientation training provided optimum results. The trainee used the emergency survey meters kept in the vehicle to conduct parallel surveys. In addition to radiation and contamination levels, the following useful information also was documented in the survey reports:

- reactor power level, area radiation monitor and exhaust stack monitor readings
- continuous ambient air monitoring and gamma cell radiation levels
- ALARA recommendations
- condition and calibration status of all survey meters in the facility
- a summary of key data from the 7 previous surveys for trending
- follow up on previous recommendations
- dose rate data reported as standard and tissue equivalent
- laboratory printouts of smear sample analysis data

Additional surveys were performed by the reactor staff as needed.

The inspector noted that leak tests of the sealed plutonium source required by TS 4.7 were analyzed for alpha activity using the liquid scintillation detector. The manufacturer's specifications did not include this capability. However, a search of scientific literature indicated that this equipment is normally about 100% efficient in detecting alpha radiation.

c. Conclusions

The radiation protection program satisfied NRC requirements.

5. ENVIRONMENTAL PROTECTION

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- liquid effluent release controls
- dose calculations
- release records
- counting and analysis program

b. Observations and Findings

Records indicated that liquid effluent was stored, sampled and analyzed by Department of Environmental Health and Safety for compliance with discharge limits, and was released after all required authorizations were documented. Solubility criteria 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. The licensee stated that this matter would be reviewed. Licensee action will be reviewed in a future inspection (Inspector Follow up Item 50-157/2001-201-01).

Calculations using the Environmental Protection Agency COMPLY computer program showed that annual air emissions meet the 10 CFR 20.1101(d) constraint.

c. Conclusions

The environmental protection program satisfied NRC requirements.

6. OPERATOR REQUALIFICATION

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- the Requalification Program
- operator licenses
- operator training records

- operator physical examination records
- operator examination records
- operator active duty status

b. Observations and Findings

The Requalification Program was maintained up to date. Operator licenses were also current. Records showed that operator training was consistent with the Requalification Program requirements. Physical examinations of the operators were conducted as required. Records showed that written and operating examinations of the operators were acceptably implemented. Logs showed that operators maintained active duty status as required.

The inspector noted that some questions in the HP area on the latest exam were based on regulations that were replaced. Department of Environmental Health and Safety personnel stated that the HP questions would be updated and expanded as required.

c. Conclusions

Operator requalification was conducted as required by the Requalification Program.

7. SURVEILLANCE

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- surveillance and calibration procedures
- surveillance, calibration and test data sheets and records

b. Observations and Findings

Surveillance and calibrations were completed on schedule and in accordance with licensee procedures. All the recorded results were within the TS and procedurally prescribed parameters. The records and logs reviewed were complete and were being maintained as required.

c. Conclusions

The surveillance program satisfied TS requirements.

8. EXPERIMENTS

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- experimental administrative controls and precautions
- logs and records

b. Observations and Findings

All experiment proposals were subjected to a full review by the Ward Laboratory Safety Committee (WLSC) for compliance with TS 3.8. This includes a rerun of any previously approved experiments. The results of the WLSC approval and imposed restrictions were documented in appropriate records.

c. Conclusions

The program for experiments satisfied TS and procedural requirements.

9. PROCEDURES

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- administrative control of changes
- procedural implementation

b. Observations and Findings

Procedures had consistent format, detail and high quality. Some minor improvements were made since the last inspection. Administrative controls of changes and temporary changes to procedures, and associated review and approval processes were as required by TS 6.2. Procedures were available for all activities specified in TS 6.3. Personnel conducted activities in accordance with applicable procedures.

c. Conclusions

The procedural control and implementation program satisfied TS requirements.

10. EMERGENCY PREPAREDNESS

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- the Emergency Plan
- emergency response facilities, supplies, equipment and instrumentation
- offsite support
- emergency drills and exercises

b. Observations and Findings

The Emergency Plan (E-Plan) in use at the reactor was the same as the version most recently approved by the NRC. The E-Plan was audited and reviewed as required by the WLSC. The date of the E-Plan was changed after each review. No special supplies, instrumentation and equipment were required by the plan. Agreements with outside response organizations had not been updated. The Department of Environmental Health and Safety staff stated that this would be done. This matter will be reviewed in a future inspection (Inspector Follow up Item 50-157/2001-201-02).

Emergency drills had been conducted as required by the E-Plan. No changes were made to the plan as a result of the critique. Emergency preparedness and response training for campus police was postponed due to other training requirements. The training was rescheduled to the earliest possible date.

c. Conclusions

The emergency preparedness program was conducted in accordance with the E- Plan.

11. SAFEGUARDS

a. Scope (IP 85102)

The inspector reviewed selected aspects of:

- accountability records and reports
- nuclear material inventory and locations

b. Observations and Findings

On April 28, 2000, approximately 1,700 kilograms of Zero Power Reactor fuel and loose pellets was transferred to the Department of Energy (DOE) on the premises of the Ward Laboratory. Reactor operators moved, inspected, surveyed, and loaded the fuel into packages provided by DOE. All shipping arrangements were by DOE. The manifest and transaction records for this shipment were completed satisfactorily.

On four occasions during 1999, new TRIGA fuel was received at the facility to be used to increase excess reactivity in the reactor to compensate for fuel burnup. This material was properly added to the inventory records. However, the fuel was not used due to direction from university management.

The material control and accountability forms (DOE/NRC Forms 741 and 742) were prepared and transmitted as required. The material control and accountability program tracked locations and content of fuel and fission detectors under the research reactor license. The possession and use of special nuclear material was limited to the locations and purposes authorized under the license.

c. Conclusions

Special Nuclear Materials were acceptably controlled and inventoried.

12. Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on May 24, 2001. The licensee acknowledged the findings presented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

Prof. K. Cady, Chairman, Ward Center Safety Committee
P. Craven, Senior Reactor Operator
A. Garcia-Rivera, Director, Office of Environmental Health
L. Hubble, Radiological Safety Specialist
T. McGiff, University Radiation Safety Officer
Prof. K. Ünlü, Director, WCNS

INSPECTION PROCEDURES USED

IP 69001	CLASS II NON-POWER REACTORS
IP 85102	MATERIAL CONTROL AND ACCOUNTING

ITEMS OPENED, CLOSED, AND DISCUSSED

OPENED:

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

CLOSED: None

LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DOE	Department of Energy
HP	Health Physics
IFI	Inspector Follow up Item
NRC	Nuclear Regulatory Commission
RSO	Radiation Safety Officer
TS	Technical Specification
WCNS	Ward Center for Nuclear Sciences
WLSC	Ward Laboratory Safety Committee