

September 21, 2000

Mr. Robert Bean, Laboratory Director
1290 Nuclear Engineering Building
Department of Nuclear Engineering
Purdue University
West Lafayette, IN 47907-1290

SUBJECT: NRC INSPECTION REPORT NO. 50-182/2000-201

Dear Mr. Bean:

This letter refers to the inspection conducted on August 28-30, 2000 at the Purdue University PUR-1 research reactor. 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 noncompliances with 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/NRC/ADAMS/index.html>. If you have any questions, please contact Mr. Craig Bassett at 404-562-4712.

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 No. 50-182
License No. R-87

Enclosure: NRC Inspection Report
No. 50-182/2000-201

cc w/encls: Please see next page

cc:

Mayor
City of West Lafayette
609 W. Navajo
West Lafayette, IN 47906

State Board of Health
ATTN: Director, Bureau of Engineering
1330 West Michigan Street
Indianapolis, IN 46206

Indoor and Radiologic Health
Indiana State Department of Health
2 North Meridian Street, 5th Floor
Indianapolis, IN 46204-3006

Mr. Ed Merritt
Reactor Supervisor
Department of Nuclear Engineering
Purdue University
West Lafayette, IN 47907

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U. S. NUCLEAR REGULATORY COMMISSION

Docket No.: 50-182

License No.: R-87

Report No.: 50-182/2000-201

Licensee: Purdue University

Facility: Purdue University PUR-1 Research Reactor

Location: West Lafayette, Indiana

Dates: August 28-30, 2000

Inspector: Craig Bassett

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

Purdue University
Report No: 50-182/2000-201

This routine, announced inspection included onsite review of selected aspects of various licensee programs including: organization and staffing, audit and review, radiation controls and procedures, transportation of radioactive materials, physical security, and material control and accountability since the last NRC inspection of this research reactor facility.

Organization and Staffing

- The licensee's organization and staffing remain in compliance with the requirements specified in the Technical Specifications.

Review and Audit Functions

- Audits were being conducted acceptably by the Committee on Reactor Operations in compliance with the requirements specified in the Technical Specifications.

Radiation Protection Program

- Surveys were generally being completed and documented acceptably.
- Postings met the regulatory requirements.
- Personnel dosimetry was being worn as required and doses were well within the licensee's procedural action levels, and NRC's regulatory limits.
- Radiation monitoring equipment was being maintained and calibrated as required.
- The Radiation Protection and ALARA Programs satisfied regulatory requirements.
- There were no measurable releases of radioactive effluents from the facility.

Transportation of Radioactive Materials

- The licensee did not ship any radioactive material under the reactor license.

Physical Security

- The licensee had implemented and was maintaining an adequate physical security program.

Material Control and Accountability

- No deficiencies were identified in the licensee's Material Control and Accounting program.

REPORT DETAILS

Summary of Plant Status

Although the licensee's non-power reactor (NPR) was not operated during this inspection, a review of the applicable records indicated that the reactor continues to be operated at various power levels up to five hundred watts (500 w) for physics experiments and to support research and training.

1. Organization and Staffing (69001)

a. Inspection Scope

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of the Technical Specification (TS) were being met:

- organizational structure
- management responsibilities
- staffing requirements for the research reactor facility

b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that management responsibilities and the organization at the facility had not changed since the previous NRC inspection in April 1999 (Inspection Report No. 50-182/99-201).

Through review of records and logs and through discussions with licensee personnel, the inspector determined that the staffing at the facility was acceptable to support the current workload and ongoing activities. The staffing and organization were consistent with the requirements of the TS.

c. Conclusions

The licensee's organization and staffing remain in compliance with the requirements specified in the TS.

2. Review and Audit Functions (69001)

a. Inspection Scope

The inspector reviewed the following to ensure that the audits and reviews stipulated in the requirements of the TS were being completed:

- Committee on Reactor Operations (CORO) meeting minutes
- Subcommittee on Reactor Operations meeting minutes
- TS duties specified for the CORO including review and audit functions
- Audits completed by the CORO

b. Observations and Findings

The inspector reviewed the CORO and the Subcommittee meeting minutes from December 1998 to the present. These meeting minutes showed that the committee and subcommittee met as required by the TS with a quorum being present. The inspector also noted that the CORO had considered the types of topics outlined by the TS.

It was noted various individuals designated by the CORO to conduct audits had completed audits of the radiation protection, emergency preparedness, and security programs and that the audits were completed within the time stipulated by TS. The inspector noted that the audits and the resulting findings were acceptable. If the findings contained recommendations for possible changes, the licensee responded and took corrective actions as necessary.

c. Conclusions

Audits were being conducted acceptably by the CORO according to the requirements specified in the TS.

3. Radiation Control (69001)

a. Inspection Scope

The inspector reviewed the following to verify compliance with 10 CFR Part 20 and the applicable licensee TS requirements and procedures:

- health physics survey records
- radiological signs and posting
- dosimetry records
- calibration and periodic check records for radiation monitoring instruments
- the Radiation Protection Program
- the ALARA Program
- the 1998 and 1999 Annual Reports

The inspector also toured the licensee's facility and observed the use of dosimetry and radiation monitoring equipment. Licensee personnel were interviewed as well.

b. Observations and Findings

(1) Surveys

TS Section 6.5.1.g requires that facility records shall be prepared and retained for at least five years documenting facility radiation and contamination surveys.

Radiological and Environment Management Procedure, "Reactor Room Survey Standard Operating Procedure," requires in Step 1 that the procedure be performed once during each calendar month. The procedure includes the requirement to conduct a radiation survey and a wipe test to check for

contamination.

The monthly contamination and radiation surveys were generally completed by Radiological and Environmental Management (REM) staff as required by TS and procedure. Results were evaluated to ensure that the survey results had not exceeded established action levels. It was noted that no survey was completed during December 1999. It was determined that this failure constitutes a violation of minor significance and is being treated as a Non-Cited Violation (NCV) consistent with Section IV of the NRC Enforcement Policy (NCV 50-182/2000-201-01).

(2) Postings and Notices

Postings at the entrances to the controlled areas, including the Reactor Room, were acceptable for the hazards present. The facility's radioactive material storage areas were properly posted. No unmarked radioactive material was noted. Copies of current notices to workers required by 10 CFR Part 19, including NRC Form 3, were posted in appropriate areas in the facility.

(3) Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program (NVLAP) accredited vendor to process personnel dosimetry. Examination of the records for the past two years through the date of the inspection showed that all exposures were well within NRC limits and the licensee action levels. Dosimetry was acceptably used by facility personnel.

(4) Radiation Monitoring Equipment

The calibration of portable survey meters was typically completed by licensee personnel. Calibration frequency met TS requirements and records were maintained as required.

(5) Radiation Protection Program

The licensee's Radiation Protection Program was established in the Purdue University Radiation Safety Manual. The program included requirements that all personnel who had unescorted access to the facility receive training in radiation protection, policies, procedures, requirements, and facilities. Completion of this training was verified by REM personnel for university employees or by the School of Nuclear Engineering for students. The program appeared to be acceptable.

It was noted during a previous inspection that the required annual review of the Radiation Safety Program had not been documented. The inspector determined that the latest review of the program was completed in 1999 and it was found to be acceptable.

(6) ALARA Program

The ALARA Program was also outlined and established in the Purdue University Radiation Safety Manual. The ALARA program provided guidance for keeping doses as low as reasonably achievable and was consistent with the guidance in 10 CFR Part 20.

(7) Facility Tours

The inspector toured the Reactor Room, selected laboratories, and support areas. Control of radioactive material and control of access to radiation areas were acceptable. The inspector also determined that there were no measurable releases of gaseous or liquid radioactive material from the research reactor facility.

c. Conclusions

Surveys were generally being completed and documented acceptably. Postings met regulatory requirements. Personnel dosimetry was being worn as required and doses were well within the licensee's procedural action levels and the NRC's regulatory limits. Radiation monitoring equipment was being maintained and calibrated as required. The Radiation Protection Program and the ALARA Program satisfied regulatory requirements. No radioactive effluents had been released from the research reactor facility.

4. Transportation (86740)

a. Inspection Scope

The inspector reviewed selected aspects of:

- radioactive materials shipping procedures
- radioactive materials transportation and transfer records

b. Observations and Findings

Through records review and discussions with licensee personnel, the inspector determined that the licensee had not shipped any radioactive material from the reactor facility under the reactor license. Such material is transferred to the Purdue University Broad Scope license and handled, shipped, and/or disposed of under that license.

c. Conclusions

No radioactive material was shipped from the reactor facility under the reactor license.

5. Physical Safeguards and Security (81401, 81402, 81431)

a. Inspection Scope

The inspector reviewed selected aspects of:

- the Physical Protection Plan
- security systems, equipment, and instrumentations
- implementation of the Physical Protection Plan

b. Observations and Findings

The inspector reviewed the implementation of the licensee's "Physical Security Plan for Purdue University Reactor," Rev. 3, dated May 15, 1987. The site and facilities were verified to be as described in the Physical Security Plan. Keys to access doors were held and controlled only by designated personnel. The facility was patrolled by Purdue University Police Department officers as required. It was verified that there had been no safeguards events since the last inspection.

c. Conclusion

The licensee had implemented and was maintaining an adequate physical security program.

6. Material Control and Accounting (85102)

a. Inspection Scope

To verify compliance with 10 CFR Part 70, the inspector reviewed:

- control of storage areas
- annual inventory results of Special Nuclear Material (SNM)
- associated records and reports

b. Observations and Findings

Records showed that SNM was adequately controlled and that physical inventories were conducted at least annually as required by 10 CFR 70.51(d). Nuclear Material Transaction Reports (DOE/NRC Form 741) and Material Status Reports (DOE/NRC Form 742) were being submitted by the licensee as required by 10 CFR 74.13(a)(1).

c. Conclusion

No deficiencies were identified in the licensee's Material Control and Accounting program.

7. Follow-up on Previously Identified Items (92701, 92702)

a. Inspection Scope

The inspector reviewed the licensee's actions taken in response to previously identified Inspector Follow-up Items.

b. Observation and Findings

- (1) (Closed) IFI 50-182/99-201-01 - During an inspection in April 1999, it was noted that the Emergency Plan and the Security Plan had been audited by members of the staff who were responsible for the programs' implementation. During this inspection it was determined that the licensee had changed that practice and that the audits were conducted by other personnel who were qualified but not responsible for the programs. This item is considered closed.
- (2) (Closed) IFI 50-182/99-201-02 - During the inspection in April 1999, it was also noted that the licensee had not been documenting their annual review of the radiation protection program as required. As noted above, during this inspection, the inspector reviewed the latest review of the radiation protection program and found it to be acceptable. This item is considered closed.
- (3) (Closed) IFI 50-182/92-001-01 - During an inspection in August 1992, the issue of a charter for the CORO was reviewed with the licensee. Although the composition, qualifications, duties, and responsibilities of the CORO were as described in the TS, no charter existed to provide further guidance and authority to the group. During this inspection it was verified that a "charter" or statement of responsibilities had been developed for the CORO and that the committee was functioning within the scope of that document. This item is considered closed.

c. Conclusions

The open items are closed.

8. Exit Meeting Summary

The inspection scope and results were summarized on August 30, 2000, with licensee representatives. The inspector discussed the findings for each area reviewed. Although proprietary material was provided to and reviewed by the inspector during this inspection, no such material is included in this report.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Bean, Reactor Supervisor
A. Bement, Head, School of Nuclear Engineering
E. Merritt, Laboratory Director

Radiation Safety Office

E. Lambert, Health Physicist, REM
J. Schweitzer, Radiation Safety Officer, REM

Public Safety Office

L. Stump, Chief of Police, Purdue University Police Department

INSPECTION PROCEDURES USED

IP 69001: Class II Non-Power Reactors
IP 81401: Plans, Procedures, and Reviews
IP 81402: Reports of Safeguards Events
IP 81431: Fixed Site Physical Protection of Special Nuclear Material of Low Strategic Significance
IP 85102: Material Control and Accounting - Reactors
IP 86740: Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-182/2000-201-01 NCV Failure to complete a monthly radiation and contamination survey of the reactor room during December 1999 as required.

Closed

50-182/2000-201-01 NCV Failure to complete a monthly radiation and contamination survey of the reactor room during December 1999 as required.

50-182/99-201-01 IFI Follow-up on the completion of audits of various programs by people who are not responsible for the implementation of those programs.

50-182/99-201-02 IFI Follow-up on the licensee's actions to resolve problem with the lack of documentation of the annual reviews of the radiation protection program.

50-182/92-001-01 IFI Follow-up on the licensee's actions to develop a charter for the CORO.

LIST OF ACRONYMS USED

ADAMS	(NRC's) Agencywide Documents Access and Management System
ALARA	As low as reasonably achievable
CFR	Code of Federal Regulations
CORO	Committee on Reactor Operations
DOE	Department of Energy
IFI	Inspector Follow-up Item
IP	Inspection Procedure
NCV	Non-Cited Violation
NPR	Non-Power Reactor
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
PARS	Publicly Available Records
REM	Radiological and Environmental Management
Rev.	Revision
SNM	Special Nuclear Material
TS	Technical Specifications