

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-602/89-07

Construction Permit: CPPR-123

Docket: 50-602

Licensee: University of Texas (UT)
College of Engineering
Department of Mechanical Engineering
Nuclear Engineering Programs
Austin, Texas 78758

Facility Name: Nuclear Engineering Teaching Laboratory (NETL)

Inspection At: Balcones Research Center, Austin, Travis County, Texas

Inspection Conducted: December 13-14, 1989

Inspectors:

Blaine Murray
Blaine Murray, Chief, Facilities Radiological
Protection Section

1/9/90
Date

D. M. Carlson
D. M. Carlson, Reactor Security Specialist

1/11/90
Date

Approved:

A. B. Beach
A. B. Beach, Director, Division of Radiation
Safety and Safeguards

1/11/90
Date

Inspection Summary

Inspection Conducted December 13-14, 1989 (Report 50-602/89-07)

Areas Inspected: Routine, announced, preoperational inspection of the licensee's radiation protection (RP), physical security, and emergency preparedness programs.

Results: Within the areas inspected, no violations or deviations were identified. The licensee has made good progress concerning the closing of the open items identified in NRC Inspection Report 50-602/89-04. Several new procedures have been developed to address RP program areas. An individual has been hired to fill the Health Physicist position.

Enclosure Contains PROPRIETARY INFORMATION
Decontrolled when separated from enclosure.

Installation and calibration of all RP instrumentation and in-place testing of the high-efficiency particulate air (HEPA) filters had not been completed. A full scale emergency preparedness exercise had not been conducted. Several matters regarding the physical security program were identified along with suggested changes to the August 1985 physical security plan (PSP).

Enclosure Contains PROPRIETARY INFORMATION
Decontrolled when separated from enclosure.

DETAILS

1. Persons Contacted

*D. Klein, Associate Dean for Research
*B. Wehring, Director, NETL
*T. Bauer, Assistant Director, NETL
*R. Woodward, Health Physicist, NETL
*B. Bryant, UT, Radiation Safety Officer
W. Tisdale, UT, Security
M. Krause, Senior Reactor Officer

*Denotes attendance at the exit interview on December 14, 1989.

2. Licensee Actions on Previous Inspection Findings

(Closed) Open Item (602/8904-01): Organization and Staffing - This item was previously discussed in NRC Inspection Report 50-602/89-04 and involved the hiring of an NETL Health Physicist. An individual was hired in October 1989 to fill the Health Physicist position. This individual had about 5 years of nuclear Navy experience between 1977 through 1983 involving RP activities. For the past 6 years, the individual had been working as an instructor for a contractor providing operations training at a commercial boiling water reactor. This item is considered closed.

(Open) Open Item (602/8904-02): Qualification and Training - This item was previously discussed in NRC Inspection Report 50-602/89-04 and involved the development of a radiological protection training program to satisfy 10 CFR 19.12 requirements for personnel allowed access into the reactor facility controlled access area. The inspector discussed with the licensee the need to ensure that training included the specific regulatory requirements in 10 CFR 19.12 and also the recommendations of Regulatory Guides 8.13 and 8.29. The licensee had issued Procedure HP4, "Radiation Protection Training," Revision 0, dated November 5, 1989. This procedure did not address all of the topics identified in 10 CFR 19.12 nor the information discussed in Regulatory Guides 8.13 and 8.29. However, the licensee was in the process of developing a supplement to the above procedure which appeared to include a proper training agenda. This item remains open pending further review of the proposed training program.

(Closed) Open Item (602/8904-03): Procedures, Audits, Reports, and Surveillances - This item was previously discussed in NRC Inspection Report 50-602/89-04 and involved the development of radiological protection implementing procedures. The licensee had established procedures that addressed the various radiological protection program areas. However, the inspector found that several of the new procedures did not provide enough detailed instructions or technical information to ensure that the tasks would be accomplished in a proper manner. Since procedures have been identified to address general topical areas, this

Enclosure Contains PROPRIETARY INFORMATION
Decontrolled when separated from enclosure.

item is considered closed. However, comments on the contents of the new procedures are included as part of the status of other open items discussed in this report.

(Open) Open Item (602/8904-04): External and Internal Radiation Exposure Control - This item was previously discussed in NRC Inspection Report 50-602/89-04 and involved the personnel dosimetry and ALARA programs. The personnel dosimetry program has special interest because of the potential neutron exposures from the use of experiment beam ports. The licensee's personnel monitoring program is discussed in Procedure HP-1, "Radiation Monitoring - Personnel," Revision 0, dated November 7, 1989. The licensee stated that they are still in the process of selecting the type of personnel dosimetry device that will be used at the NETL. The licensee stated that their personnel monitoring program would satisfy the recommendations of Regulatory Guide 8.14 and also include the information discussed in NRC Information Notices 81-26 and 83-59.

The licensee's ALARA program is described in Procedures HP-3, "NETL ALARA Program," Revision 0, dated November 7, 1989, and HP-7, "Radiation Work Permits," Revision 0, dated December 12, 1989. The inspector noted that Procedure HP-3, Section D, "Contamination Control," included a discussion of acceptable contamination levels for unconditional release of radioactive materials. The contamination levels appearing in Procedure HP-3 appeared to be same values listed in ANSI/ANS-15.11-1987 and Regulatory Guide 1.86, "Termination of Operating Licenses For Nuclear Reactors." The inspector discussed with the licensee the need to review Procedure HP-3 to ensure that the procedure is not in conflict with the requirements of 10 CFR 20.301 or the information provided in NRC Information Notice 85-92, "Surveys of Wastes Before Disposal from Nuclear Reactor Facilities."

The item remains open pending further review of the personnel monitoring and ALARA programs.

(Open) Open Item (602/8904-05): Contamination Control and Instrument Calibration - This item was previously discussed in NRC Inspection Report 50-602/89-04 and involved personnel survey procedures, calibration and operating procedures for health physics instrumentation, availability of a high range survey meter, and analysis of contamination smears and air samples.

The licensee had developed Procedures HP-5, "Portable Radiation Monitoring Equipment," Revision 0, dated December 12, 1989, and SRV-14, "Installed Radiation Monitors," Revision 0, dated December 12, 1989, to address some of the matters discussed in Open Item 8904-05. The following is an update of this open item:

Personnel Survey Procedures: The licensee stated that a hand-held frisker will be located at each of the three exits from the reactor controlled area. In addition, the licensee is looking into the

Enclosure Contains PROPRIETARY INFORMATION
Decontrolled when separated from enclosure.

possibility of purchasing an automated hand and foot counter that would be located near the main building exit door. The licensee stated that the personnel survey equipment would be installed and operational before the receipt of reactor fuel at the facility.

Laboratory Counting Instrument: The licensee stated that an alpha-beta proportional counter will be located in the NETL to analyze contamination smears and air samples. An installation date for the counter has not been established.

High Range Survey Meter: The licensee had obtained a suitable high range ion chamber survey meter. This portion of the open item is considered closed.

Procedure HP-5, "Portable Radiation Monitoring Equipment":

- a. Section C, Response Checks: This section did not contain response check criteria for the following instruments:

Eberline RO-2A
Eberline PRS2
Bicron Micro-Rem

- b. Bicron Frisk-Tech Calibration: This section specifies that a pulse generator be used to verify the status of the rate meter electronic circuit. However, a radioactive source is not used to verify that the instrument will detect radioactivity.

- c. Form B-2, Calibration Sheet: The left "source" column appears to contain several typing errors.

- d. Form-D Eberline, PRS2 Calibration: The procedure specifies that a PU-BE source be used as a neutron calibration source. The use of a PU-BE source presents two problems: (1) the radiation levels produced by the source are not high enough to permit full-scale calibration and (2) the neutron energies produced from a PU-BE source are probably not representative of neutrons that would cause exposure problems at a TRIGA Mark II facility.

Procedure SRV-14, "Installed Radiation Monitors":

- a. Ludlum 333-2 Calibration Procedure: This instrument is used to monitor airborne concentrations and alert personnel of the possibility of exceeding maximum permissible concentration (MPC) levels. However, the calibration values are expressed in units of counts per minute (CPM) without equating CPM results to concentrations (uCi/cc) or MPC values.

- b. PRM AR-100 Calibration: This instrument is used to continuously monitor airborne concentrations (Argon-41) being released from the facility. The sample is collected above the reactor and

Enclosure Contains PROPRIETARY INFORMATION
Decontrolled when separated from enclosure.

delivered via a 1-inch sample line to the detector located near the control room. In-place testing of the sample collection and transfer system had not been performed to verify that the sample collected is representative of the sample arriving at the detector. It was also noted that the calibration procedure involved the use of a solid source, but did not include calibrating the detector with a gaseous radioactive source to verify detector efficiency under anticipated operating conditions.

The primary purpose of this monitor is to monitor gaseous effluents to ensure concentrations do not exceed regulatory limits. However, the calibration results are recorded in CPM without any reference to $\mu\text{Ci/cc}$ concentrations.

Laboratory Counting Instrument: Operating and calibration procedures have not been developed for the proportional counter used to analyze smear and air samples.

This item remains open pending further review.

(Open) Open Item (602/8904-06): Radiation Protection Facilities - This item was discussed in NRC Inspection Report 50-602/89-04 and involved in-place testing of the HEPA system, reactor coolant isolation valves, and inventory/control of byproduct material removed from the reactor. The licensee stated that in-place testing of the HEPA filter system had not been completed. The licensee also stated that a procedure will be developed that addresses: (1) designation of the boundary where samples/experiments removed from the reactor are transferred from the 10 CFR 50 license to a byproduct license and (2) establish an inventory and tracking program for radioactive material transferred from the 10 CFR 50 license to the byproduct license.

The inspectors reviewed valve line-up procedures used to ensure isolation of reactor coolant systems. No problems were identified, but this area will be reviewed further as part of preoperation test results.

This item remains open pending further review.

(Closed) Open Item (602/8904-07): Liquid and Gaseous Effluents - This item was discussed in NRC Inspection Report 50-602/89-04 and involved installation and calibration of the particulate and noble gas airborne monitors. These matters are being tracked as part of Open Item 602/8904-05. Open Item 602/8904-07 is considered closed.

(Open) Open Item (602/8904-08): Emergency Preparedness - This item was discussed in NRC Inspection Report 50-602/89-04 and involved establishing and stocking emergency response kits, training emergency support personnel, obtaining letters of agreement with emergency support agencies, and conducting a full scale emergency response exercise. An emergency

Enclosure Contains PROPRIETARY INFORMATION
Decontrolled when separated from enclosure.

cabinet has been established and stocked with basic emergency supplies and equipment. The licensee stated that training has been provided to emergency support agencies (e.g., security, fire department, and medical) and that letters of agreement have been established with support agencies. A full scale emergency exercise has not been conducted. The licensee stated that a full scale exercise will be completed before transferring fuel from Taylor Hall to the Balcones facility. This item is considered open pending completion of a full scale exercise.

(Open) Open Item (602/8904-09): Physical Security and Safeguards - This item was discussed in Attachment 1 to NRC Inspection Report 50-602/89-04 and involved implementation of the licensee's PSP. The matter concerning the PSP is considered Proprietary Information and is documented in Attachment 1 to this report.

(Open) Open Item (602/8904-10): Irradiated Fuel and Cobalt-60 Irradiator Transfer - This item was discussed in NRC Inspection Report 50-602/89-04 and concerned the development of procedures and training of personnel involved with the handling and transfer of fuel and the irradiator from Taylor Hall to the Balcones Research Center. The licensee stated that all work has not been completed for this item. This item remains open pending further review.

3. Remote Radiation Monitoring

The inspectors noted that the reactor facility was not equipped with remote radiation monitoring capability that would alert appropriate personnel of unusual radiation levels in the facility during nonroutine hours. For example, a remote radiation alarm was not located at the UT Security Office to provide 24-hour coverage in the event of increased radiation levels. The inspectors stated that this matter would be discussed with the Project Manager, Office of Nuclear Reactor Regulation.

This is considered an open item pending further review. (602/8907-01)

4. Exit Interview

The inspectors met with the licensee representatives identified in paragraph 1 at the conclusion of the inspection on December 14, 1989. The inspectors summarized the inspection findings.