

Overall, programs appeared to be good and no significant concerns were identified in the areas reviewed. The reactor facility appeared to be well managed and adequately staffed. Reactor operators were qualified and training was performed as required. Reactor operations were not observed because the reactor had not achieved criticality. Surveillances that were able to be performed with the reactor shutdown were accomplished.

In general, procedures were good. However, concerns were expressed about three procedures (paragraph 8). The licensee had not approved any reactor experiments. The radiation protection program at NETL was considered adequate.

The licensee was implementing the physical security program and emergency response activities concerning emergency training and drills in accordance with the approved physical security plan and emergency plan.

DETAILS

1. PERSONS CONTACTED

Licensee

- *B. W. Wehring, Director, NETL
- *T. L. Bauer, Assistant Director, NETL
- L. Hamlin, Acting Radiation Safety Officer
- *M. G. Krause, Manager of Operations and Maintenance, NETL
- W. G. Tisdale, Officer, UT Police Department
- *J. C. White, Health Physicist, NETL

Others

- R. L. Herrington, Deputy Director, City of Austin Emergency Medical Services Department
- F. Kovic, Secretary to Administrator, Brackenridge Hospital
- W. Kotrla, Austin Fire Department, Station 8

NRC

- *B. Murray, Chief, Facilities Inspection Programs Section
- A. Adams, Project Manager, NRR
- J. Gagliardo, Chief, Test Programs Section, Division of Reactor Safety

* Denotes those present at the exit meeting on March 6, 1992.

2. FOLLOW-UP ON PREVIOUS INSPECTION FINDINGS (92701)

(Closed) Violation (192/9001-01): Records of Surveys - This violation was discussed in NRC Inspection Report 50-192/90-01 and involved the failure to maintain records of results of radiation surveys performed in Room 131 of Taylor Hall and to record dose rates in areas surrounding Room 131 in the proper units. The inspectors examined the licensee's corrective actions in their September 10, 1990, response to the violation. The inspectors reviewed records of radiation surveys performed in and outside of Room 131 of Taylor Hall and found that the licensee had properly maintained these records and that they were recorded in the proper units. The licensee's corrective actions were adequate to close this violation.

(Closed) Open Item (602/8904-09): Physical Security Plan - This item was reviewed in NRC Inspection Report 50-602/90-04 and involved improvements to security equipment been completed. The item was left open pending NRR approval of the security plan. The inspectors determined that the revised physical security plan, dated June 6, 1990, had been approved by NRR in their

Safety Evaluation Report issued in January 1992. The approval of the physical security plan by NRR was adequate to close this open item.

(Open) Open Item (602/8904-10): Transfer of Irradiated Reactor Fuel and Cobalt-60 Irradiator - This item was discussed in NRC Inspection Reports 50-602/89-04, 50-602/89-07, and 50-602/90-04 and concerned the development of procedures and the training of personnel involved in the handling and transfer of reactor fuel and the irradiator from Taylor Hall to the Balcones Research Center. Procedures had been developed for the transfer of the reactor fuel and the fuel has been transferred (NRC Inspection Report 50-192/91-01). However, as noted in NRC Inspection Report 50-602/90-04, procedures have not been established for the transfer of the 450-curie cobalt irradiator. The licensee stated that they are still in the process of identifying a transfer cask for transferring the cobalt sources. The licensee stated that procedures will be written and detailed training will be conducted for all personnel involved with the transfer of the irradiator.

This item remains open pending further review of personnel training and irradiator transfer procedures.

3. REACTOR STATUS TRIGA - MARK I

The TRIGA Mark I reactor located at Taylor Hall had not been operated since April 29, 1988. All fuel had been removed from the core and there were no plans for future operation of the TRIGA Mark I reactor. A 450-curie cobalt irradiator, authorized by License Condition 2.B.5, was located in the reactor pool, pending transfer to the NETL facility.

The TRIGA Mark I reactor fuel was moved to the TRIGA Mark II reactor at the NETL facility in August 1991.

TRIGA MARK II

The most activities discussed in this inspection report involved activities performed in preparation for reactor startup. Subsequent to completing this inspection, the licensee informed NRC that initial criticality was achieved at 11:58 a.m. on March 12, 1992. The licensee plans to operate the reactor at about 1kw during startup testing and proceed to full power operation by March 31, 1992.

4. PREPARATION FOR INITIAL CRITICALITY

During February 10-13, 1992, NRC inspectors reviewed the licensee's startup plan that had been issued for precritical testing, initial core loading, initial criticality, and subsequent reactor operations. The startup plan for the reactor included the reactor startup tests to be performed prior to

initial startup of the facility. The mechanical, instrumentation and other tests that were specified in the plan appeared to be appropriate. The inspectors also reviewed the test records that had been prepared to document the testing activities in preparation for initial fuel loading. The test data was comprehensive, but the inspectors were concerned that all of the data sheets had not been dated, and quantitative acceptance criteria had not been specified for some of the critical parameters being monitored. This concern was discussed with licensee representatives.

The inspectors observed activities related to the initial criticality of the reactor. This included the initial fuel loading process and the acquisition of core neutron multiplication data. This data is used to predict at what number of loaded fuel elements the reactor would become critical. The inspector determined that the licensee followed the procedure that had been developed for the initial fuel loading and approach to criticality. Neutron counting data was provided to the reactor operator by the reactor instrumentation and auxiliary neutron counting equipment that was installed for the initial start-up in accordance with procedures.

On February 11 with 47 elements installed in the core, multiple counts were taken from the neutron counting systems for zero, one, two, three, and four control rods withdrawn. While withdrawing control rod shim 2 from the core with 53 elements installed in the core, shim 2 stuck at approximately 80 percent withdrawn. Manipulating the control rod drive freed the rod and the problem did not occur during multiple withdraws. Measurements were made of withdrawal and drop times. These times were within specifications and consistent with past measurements.

At this point, the licensee attempted to adjust the position readout on the control console for shim 1. Upon attempting the adjustment the system would not respond properly. The licensee replaced the variable resistors (pots) for both the zero set and span. One pot appeared to have mechanically failed and the other appeared to have overheated. After a great deal of troubleshooting the system, the licensee determined that two wires were connected backwards in the variable resistor on the shim 1 control rod drive. General Atomics had rebuilt the drive for the licensee. After reversing these wires, the system adjusted properly. The licensee is continuing discussions with General Atomics concerning this problem.

On February 12, 1992, shim 2 stuck again at approximately 80 percent withdrawn. On February 13, 1992, the licensee examined the circuit that provides upward bias on the control rod drive motor to compensate for the weight of the control rod. Shim 2 was found to be low when compared to shim 1 and was adjusted to match shim 1. As before, shim 2 was withdrawn a number of times without sticking and withdrawal and drop times were measured and found to be within specifications and past measurements.

The licensee continued to load elements into the reactor core. At this point in the loading procedure, the number of elements loaded at one time was determined by the calculation of the number of elements required to reach criticality. No more than one-half of the elements estimated to reach criticality was loaded in a step. If one-half of the elements estimated to reach criticality was estimated to be less than one element, then one element was added to the core. Before each loading step, the inspector independently determined the number of elements to be loaded in the next step from the licensee's data. Calculations indicated criticality with all rods fully withdrawn in the 62 to 64 elements loaded range.

On February 13, 1992, with 59 elements loaded into the core, shim 2 stuck at approximately 80 percent withdrawn. On February 14, 1992, the licensee removed both rod drives from the reactor bridge for inspection. The resistance to movement in the shim 2 rod drive was significantly larger than in shim 1. Both rod drives were returned to General Atomics for troubleshooting and repair.

No violations or deviations were identified.

5. ORGANIZATION AND MANAGEMENT CONTROLS (40750)

The inspectors reviewed the licensee's organization and staffing to determine compliance with Section 6.1 of the Technical Specifications (TS).

The inspectors verified that the organizational structure was as specified in the Technical Specifications. All organizational positions were staffed by qualified personnel. The licensee had several staffing changes since the last NRC inspection. In November 1991 the licensee hired a new reactor health physicist. The previous reactor health physicist left the licensee's employment for another position. Also, on February 28, 1992, the University of Texas Radiation Safety Officer (RSO) retired. The University was in the process of finding a replacement RSO.

No violations or deviations were identified.

6. TRAINING AND QUALIFICATIONS (40750)

The inspectors reviewed the training program to determine compliance with the requirements of 10 CFR Parts 19.12 and 55.59 and the operator requalification program, Revision 1, dated November 1990.

The inspectors noted that the radiological safety training for personnel frequenting the reactor facilities was implemented by personnel attending specified lectures. The inspectors determined that the training satisfied the requirements of 10 CFR Part 19.12.

The licensee currently has two licensed senior reactor operators. The inspectors reviewed the licensee's documentation of the two senior reactor operators participation in the NRC approved Operator Requalification Program. The inspectors determined that both senior reactor operators had completed the required annual training. The inspectors noted that the requalification program exempts the reactor supervisor from the annual examination. At the time of the inspection the other operator had not taken an examination. The reactor supervisor stated that the exam was being prepared and that the senior operator would take the exam as soon as it was finalized. Also, neither senior reactor operator had performed the functions of a senior operator for a minimum of four hours each calendar quarter. Facility Operating License No. 129 for the University of Texas at Austin TRIGA Mark II was issued January 17, 1992.

No violations or deviations were identified.

7. REACTOR OPERATIONS (40750)

The inspectors reviewed logs and records to determine compliance with License Conditions 2.C.1 and 2.C.2 and Technical Specifications 2.0 and 3.0.

The inspectors reviewed reactor operation logs and records to determine compliance with the license conditions and Technical Specification requirements. As mentioned previously, at the time of the inspection the licensee was performing operations to achieve criticality, but had not achieved criticality. The inspectors noted that the operator logs dealt with maintenance actions required to achieve criticality. The logs accurately documented the required maintenance activities. Since the reactor was not critical, the inspectors did not observe operators perform reactor startup, shutdown, or any operation involving operation of the reactor.

No violations or deviations were identified.

8. PROCEDURES (40750)

The inspectors reviewed the procedures for operating and maintaining the reactor, conducting surveillances and calibrations, and conducting experiments to determine compliance with the requirements of the Technical Specifications.

The inspectors determined that the licensee had developed 6 administrative, 6 reactor operating, 7 surveillance, 6 maintenance, 7 health physics, 2 fuel movement, and 3 emergency/security procedures. A review of selected procedures (see Attachment 2), including new procedures or those revised and approved since the NRC inspection conducted July 18-19, 1990 (NRC Inspection Report 50-602/90-04), indicated that the licensee had established sufficient and satisfactory procedures to meet the requirements of Technical Specifications.

The operating procedures reviewed (OPER-1,2,3, and 4) were generally adequate to perform their intended function. The revision number was printed on the copies reviewed, but the procedures did not indicate the date of issuance. The procedures included comprehensive checklists to document the pre-startup checks and other important data. The reactor startup and shutdown procedure (OPER-2) did not have a provision assure that all applicable surveillances were up-to-date before the reactor startup was begun.

The inspectors noted that Revision 0 of procedure ADMN-6, "Authorization of Experiments," dated 9/91 did not include the reactor health physicist in the experiment review and approval process. The inspectors discussed with the licensee the need to have the health physicist be a part of the approval process. At the exit interview on March 6, 1992, the licensee stated that they would review the procedure and evaluate the inspectors concerns.

Revision 0 of procedure Main-4 titled "Area Radiation Monitor System" was reviewed and noted to include the calibration procedures for the argon-41 monitoring system. The inspectors discussed with the licensee that the calibration procedure did not appear to be comprehensive and was not easily understood. The licensee stated that the procedure was an interim one which would be replaced. The inspectors reviewed the calibration the licensee had performed using solid sources which were traceable to a previous AR-41 gas calibration conducted at General Atomics. The inspectors were satisfied that an adequate calibration had been performed to support initial reactor startup activities. The licensee stated that they plan to establish a standard in-place calibration program utilizing AR-41 about 6 months of full power operation.

The inspectors noted that Revision 2 of procedure HP-5, "Portable Radiation Monitoring Equipment," dated July 1990 was being revised. In particular, the licensee had added a procedure titled "Eberline PRS2/PNR4 Calibration," which outlined steps for the calibration of the neutron survey meters. The inspectors determined that the calibration procedure did not account or correct for neutron scatter in the room used to calibrate the instruments. The inspectors discussed with the licensee the need to account for room scattering of neutrons when the neutron survey meters were calibrated. The licensee stated that they would evaluate the procedure in regards to incorporating the room scattered component in the calibration of the neutron survey instruments.

The procedures reviewed by the inspectors had been reviewed and approved by the Reactor Safety Committee, the Reactor Supervisor, the Director of NETL, and the Radiation Safety Committee. The inspectors noted that the required approval signatures were affixed to the procedures.

The licensee maintained notebooks that contained the most recent revisions of administrative procedures, operating procedures, maintenance procedures,

surveillance procedures, health physics procedures, emergency/security procedures, fuel movement procedures, the Physical Security Plan, and the Emergency Plan. The licensee also kept up-to-date control room copies of the above for use by reactor operators.

No violations or deviations were identified.

9. EXPERIMENTS (40750)

The inspectors examined the licensee's development, review, and approval of reactor experiments to determine compliance with the requirements of the Technical Specifications.

The inspectors determined that the licensee had not approved any experiments. The Reactor Supervisor stated that the approved experiments used for the TRIGA Mark I, which was at Taylor Hall, would not be used for the new reactor at NETL with out being reviewed and approved.

No violations or deviations were identified.

10. SURVEILLANCES (40750)

The inspectors reviewed records and logs describing the conduct of Technical Specification related surveillances to determine compliance with the requirements of Section 4.0 of the Technical Specifications.

The licensee's records indicated that all required surveillances that could be performed without the reactor being critical were performed at their proper frequencies. This included water coolant system surveillances (TS 4.3.1), air confinement system surveillances (TS 4.3.2), and radiation monitoring systems surveillances (TS 4.3.3).

No violations or deviations were identified.

11. RADIOLOGICAL CONTROLS (40750 and 86740)

The licensee's radiation protection program was reviewed to determine compliance with the requirements of 10 CFR Part 20.

The inspectors reviewed selected records and logs, interviewed personnel, made observations, and performed independent radiological surveys in the reactor facility.

Radiation exposure records for reactor personnel were reviewed. It was noted that everyone who worked in the reactor facility had been issued adequate personal dosimetry. Visitors to the reactor area were issued pocket dosimeters. The licensee had acquired personal dosimetry from their vendor

that was sensitive to neutron energies that would be encountered. The vendor was determined to be accredited in accordance with the requirements of 10 CFR Part 20.202(c). The review of exposure records indicated that reactor personnel had not exceeded 10 CFR Part 20.101 limits.

The inspectors determined that the licensee had implemented a proper radiation survey program. The licensee had surveyed inside and outside Room 131 in Taylor Hall. The radiation surveys in Taylor Hall were performed at the proper frequencies and records were maintained in the proper units. Radiation surveys of the NETL reactor area were thorough and included neutron surveys. The inspectors performed independent radiation surveys of Taylor Hall and the NETL reactor facility and the results were found to be comparable to the licensee's surveys.

The inspectors reviewed the licensee's inventory of portable radiation survey instruments. The instruments were adequate and properly calibrated. The licensee had not made any radiological effluent releases or any shipments of radioactive material since the last inspection.

No violations or deviations were identified.

12. PHYSICAL SECURITY, SAFEGUARDS, AND MATERIAL CONTROL AND ACCOUNTING
(81401, 81810, 81431, and 85102)

The inspectors examined the licensee's implementation of the Physical Security Plan, Revision 1, dated August 1990, to determine compliance with the requirements of Section 2.C(3) of the Facility Operating License and of 10 CFR Part 50.54(p).

In accordance with 10 CFR Part 2.790(d), the material concerning the Physical Security Plan is exempt from disclosure. Therefore, this material is discussed in the Attachment to this Appendix and will not be placed in the Public Document Room.

No violations or deviations were identified.

13. EMERGENCY PREPAREDNESS (40750)

The licensee's emergency preparedness program for the University of Texas at Austin (UT) was examined to determine compliance with the requirements of Revision 1 (dated November 1990) to the NRC approved UT Emergency Plan and 10 CFR Parts 50.54(q) and (r).

The inspectors reviewed letters from various organizations which have agreed to assist NETL in the event of an emergency. The agreements were all obtained in 1989. Section 6.2 of the Emergency Plan states, in part, that letters of agreement with non-university emergency services will be subject to renewal

every 2 years. The inspectors discussed the renewals with the Reactor Supervisor and the supervisor sent out renewal letters the next day.

The inspectors interviewed personnel at the UT Police Department, the Austin Emergency Medical Services Department, the Austin Fire Department, and Brackenridge Hospital. It was noted by the inspectors that the organizations were aware of their responsibilities in an emergency.

The inspectors reviewed records of emergency drills and determined that they were conducted annually. The licensee had conducted a drill in 1990 which exercised off-campus emergency organizations and a drill in 1991 that exercised on-campus response only. The inspectors determined that the drills were adequate and as required by the Emergency Plan.

The inspectors examined the training of personnel and maintenance of emergency response equipment. The training of university personnel was adequate and the equipment was stored, and periodically inventoried.

No violations or deviations were identified.

14. COMMITTEE MEETINGS AND MINUTES, AUDITS, AND REVIEWS (40750)

The inspectors examined the licensee's audits and activities of the Nuclear Reactor Committee to determine compliance with the requirements of the Technical Specifications.

The inspectors reviewed the Reactor Safety Committee meeting minutes. The inspectors determined that the meetings were held at the required frequency and that the business conducted at the meetings adequately satisfied Technical Specifications.

The inspectors determined that adequate audits had been performed at the required frequencies. The Reactor Supervisor informed the inspectors that they were in the process of reviewing and updating their audit checklists for the new reactor.

No violations or deviations were identified.

15. RECORDS, NOTIFICATIONS, AND REPORTS (40750 and 81402)

The inspectors reviewed the licensee's submittal of reports and notifications to the NRC to determine compliance with the requirements of Technical Specifications 6.6 and 6.7.

The licensee had submitted the required annual reports of facility activities and operations. It was determined that the annual reports met the facility

license requirements. No special reports had been issued to the NRC since the previous inspection.

No violations or deviations were identified.

16. INSPECTOR INDEPENDENT INSPECTION EFFORTS (40750)

The inspectors performed independent radiation surveys. The results of the reactor radiation surveys performed by the inspectors showed comparable results to those of the licensee. The inspectors also observed the calibration of an area radiation monitor at NETL. The inspectors noted that the calibration was performed in accordance with the licensee's procedures.

17. EXIT MEETING (30703)

The NRC inspectors met with the licensee's representatives denoted in paragraph 1 on March 6, 1992, and summarized the scope and findings of the inspection as presented in this report. The Physical Security Plan was identified as proprietary information.

ATTACHMENT 2
TO
NRC INSPECTION REPORT
50-602/92-01
50-192/92-01

NEW AND REVISED PROCEDURES REVIEWED

ADMN-1	NETL PROCEDURE OUTLINE AND CONTROL	6/90	REV-A
ADMN-2	DESIGN FEATURES AND QUALITY ASSURANCE	1/92	REV-1
ADMN-3	PERSONNEL AND OPERATOR QUALIFICATIONS	1/92	REV-0
ADMN-4	RADIATION PROTECTION PROGRAM (PERSONNEL AND MATERIAL)	1/92	REV-0
ADMN-5	(F ₁ AND SAFETY) PROTECTION PROGRAMS	1/92	REV-0
ADMN-6	AUTHORIZATION OF EXPERIMENTS	1/92	REV-0
CHARTER	NUCLEAR REACTOR COMMITTEE CHARTER	8/90	REV-A
MAIN-1	ICS SYSTEM CHECK - INTERLOCK AND SCRAM FEATURES	1/92	REV-0
MAIN-2	ICS SYSTEM CHECK - INSTRUMENT SYSTEM FEATURES	1/92	REV-1
MAIN-3	ICS SYSTEM CHECK - SUPPORT SYSTEM FEATURES	1/92	REV-1
MAIN-4	AREA RADIATION MONITOR SYSTEM	7/90	REV-0
MAIN-5	FUEL INSPECTION AND MEASUREMENTS	1/92	REV-0
MAIN-6	ROD AND DRIVE MAINTENANCE INSPECTION	1/92	REV-0
SURV-1	FUEL TEMPERATURE CALIBRATION	1/92	REV-1
SURV-2	REACTOR POOL POWER CALIBRATION	1/92	REV-0
SURV-3	EXCESS REACTIVITY AND SHUTDOWN MARGIN	1/92	REV-0
SURV-4	REACTOR WATER SYSTEM SURVEILLANCE	1/92	REV-1
SURV-5	AIR CONFINEMENT SYSTEM SURVEILLANCE	1/92	REV-1
SURV-6	CONTROL ROD CALIBRATION	1/92	REV-0
SURV-7	PULSE CHARACTERISTIC COMPARISON	1/92	REV-0
OPER-1	STARTUP - SHUTDOWN CHECKS	6/90	REV-0
OPER-2	REACTOR STARTUP AND SHUTDOWN	6/90	REV-0
OPER-3	REACTOR OPERATION MODES	6/90	REV-0
OPER-4	OPERATION OF REACTOR WATER SYSTEMS	10/90	REV-1
OPER-5	OPERATION OF AIR CONFINEMENT SYSTEM	10/90	REV-1
OPER-6	REACTOR BAY SYSTEMS	9/91	REV-0
FUEL-1	MOVEMENT OF FUEL ELEMENTS OF CONTROL FOLLOWERS	6/90	
FUEL-2	MOVEMENT OF EXPERIMENTS	6/90	
PLAN-5	PHYSICAL SECURITY	6/90	REV-0

Enclosure contains PROPRIETARY INFORMATION
Decontrolled when separated from Attachment 1