

U.S. NUCLEAR REGULATORY COMMISSION

Report No. 50-70/83-02
50-73/83-01

Docket No. 50-70 Licensee No. TR-1, R-33 Safeguards Group _____
50-73

Licensee: General Electric Company
Vallecitos Nuclear Center
P. O. Box 460, Pleasanton, California 94566

Facility Name: General Electric Test Reactor (GETR) and Nuclear Test Reactor (NTR)

Inspection at: GETR and NTR Facilities

Inspection Conducted: February 7-10, 1983

Inspectors: *D. F. Kirsch* 2/22/83
for J. P. Stewart, Reactor Inspector Date Signed

D. F. Kirsch 2/22/83
for J. O. Elin, Reactor Inspector Date Signed

Date Signed

Approved by: *D. F. Kirsch* 2/22/83
D. F. Kirsch, Chief, Reactor Projects Section No. 3 Date Signed
Reactor Projects Branch No. 2

Summary:

Inspection on February 7-10, 1983 (Report Nos. 50-70/83-02 and 50-73/83-01)

Areas Inspected: Routine, unannounced inspection of organization, logs, and records; review and audit functions; operator requalification training; and facility procedures, surveillance, and experiments; Licensee Event Report follow-up; and independent inspection effort. The inspection involved 45 inspector-hours by two inspectors.

Results: No items of noncompliance or deviations were identified by the inspectors.

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DETAILS

1. Persons contacted

- *L. Reed, Manager, Advanced Nuclear Applications
- *D. Smith, Manager, Nuclear Test Reactor
- *E. Strain, Nuclear Safety Engineer
 - W. King, Manager, Nuclear Safety
 - B. Johnson, Operations Supervisor, NTR
 - P. Swartz, Manager, GETR

*Indicates attendance at exit meeting on February 10, 1983.

2. Organization, Logs, and Records (NTR)

Mr. D. Smith has recently been assigned as the manager of the Nuclear Test Reactor. There are presently two licensed senior reactor operators and two reactor operators awaiting receipt of their operator licenses from the NRC. The inspector determined that the facility organization was in compliance with the requirements of the Technical Specification, and that minimum staffing requirements were met or exceeded.

The records of operation for the period since the last inspection (July 1981) were examined on a sampling basis. These records included the operations logs, pre-start checklists, and maintenance repair and calibration records. Additionally, selected operating and maintenance procedures were examined.

No items of noncompliance or deviations were identified.

3. Reviews and Audits (NTR)

The minutes of the Vallecitos Technical Safety Council (VTSC) for the period since the previous inspection were reviewed to verify that the review and audit functions had been carried out in accordance with the requirements of the Technical Specification and the Charter defined in the Vallecitos Nuclear Center (VNC) Safety Standard 1.1, Revision 3. The inspector determined that the VTSC meetings were held as required by the VTSC Charter, VNC Safety Standard, and Technical Specifications.

The inspector reviewed selected facility procedures which had been revised during the period since the last NRC inspection and determined that the procedures had been independently and properly reviewed by the Nuclear Safety Technology function as required by VNC Safety Standard 1.2, Revision 3.

No items of noncompliance or deviations were identified.

4. Requalification Training (NTR)

The inspector, through review of training records and examination results, verified that requalification training was performed in accordance with the approved program. The records indicate satisfactory completion of examinations by the licensed operators and those operators for which licenses are pending. The inspector determined that the exam questions were of sufficient depth and detail to ensure operator knowledge of the facility and operation procedures.

No items of noncompliance or deviations were identified.

5. Experiments (NTR)

The inspector reviewed the Nuclear Test Reactor Standard Operating Procedures (SOP), Chapter 10 "Experiment Operations," including all changes, revisions and new experiment procedures approved since the last inspection. The inspector determined that changes to experiment procedures had received the required approval and that these changes had been reviewed to determine that they did not constitute unreviewed safety questions. The inspector found that potential hazards had been identified, reactivity effects had been considered, as appropriate, and radiation protection measures were defined and specified, as appropriate to the hazards involved.

No items of noncompliance or deviations were identified.

6. Procedures (NTR)

The inspector reviewed Standard Operating Procedure (SOP) 9.14 (Explosive Handling) for compliance with Section 8.9 of the Technical Specification (Experimental Limitations). The inspector determined that the maximum amounts of explosives permitted at the NTR facility by the SOP was in accordance with the limits established in the Technical Specification. The inspector also reviewed SOP 9.30 (Experiment Type Approval) and found that it was in compliance with the applicable requirements of the Technical Specification. Review of SLP 10.14 (Operating Procedure for C&I Facility at NTR), Revision 1, identified that unlicensed operators may affect reactivity changes by movement of nuclear detectors undergoing testing. The licensee indicated that these reactivity changes had been evaluated as negligible and had been routinely performed for approximately the last six years with no noticeable change in reactor power or other measured parameters.

No items of noncompliance or deviations were identified.

7. Reactor Surveillance (NTR)

Facility records were examined by the inspector to determine the status of compliance with the Technical Specifications Surveillance Requirements of Sections 10.1, 10.2, 10.3, 10.4, and 10.5.

Compliance with surveillance requirement 10.1 was verified by review of the Daily Operational Check Sheets in the control room, by interviews with operators during the performance of their tasks, and by observation of a reactor startup. Particular attention was paid to the calibration of instruments monitoring reactor parameters and the setting of various trip points in the reactor protective circuitry. The requirements of Technical Specification section 10.1 were satisfactorily followed.

Technical Specification 10.2 requires that Safety Rod scram times be measured at least four (4) times per year at three month intervals. The inspector reviewed the monthly and quarterly maintenance records to verify that this requirement was met and that the rod insertion time was less than 270 milliseconds as required by paragraph 6.2.1 of the Technical Specification. The licensee had records to show that these requirements were met but the inspector had questions as to the validity of the licensee's program to ensure proper Safety Rod function. These questions are discussed in paragraph 8 of this report.

Technical Specification 10.3 requires that the direction of air flow be checked while the ventilation system is operating every six months to assure that the air flow is toward the reactor cell. The inspector found that the air flow direction was determined by measuring the pressure difference between the reactor cell and the control room daily. This was accomplished by reading a manometer in the control room.

The inspector selected several limiting conditions for operation and ascertained how these conditions were met and that operating personnel were aware of the requirements. The inspector additionally reviewed each reactor trip function to determine the method of setting the trip point and the method of calibration of each instrument, used to calibrate reactor protective circuits, to National Standards.

No items of noncompliance or deviations were identified.

8. Licensee Event Report Follow-up of Failure of Safety Rod to Insert After Scram (NTR)

On February 1, 1983 the NRC Region V was notified of a failure of a Safety Rod to insert after a scram on January 31, 1983 during a routine safety test while the reactor was shutdown. The licensee stated that "the cause of the failure (was) under investigation, and the reactor (would) not resume operation until the rod (was) satisfactorily operable".

As noted in paragraph 7 above, the inspector determined that the licensee had performed the quarterly and monthly tests required by the Technical Specification and the licensee's maintenance instructions to assure Safety Rod operability. These tests were measurements of "Safety Rod Inflight Times" and "Magnet Drop Out Tests" which determined the time difference between rod holding power switch opening and the rod bottom switch closure, and the minimum current in the coil of the rod holding magnet that is required to hold the rod in a withdrawn position. The licensee had specified in his procedures that a maximum time of 270 milliseconds was required for the Safety Rod Inflight Time measurement and a minimum Magnet Drop Out current of 5 milliamps was required for the rod drop out test.

The inspector determined that, prior to the failure of the rod to insert on January 31, 1983, all rods had been found to be within these parameters.

The inspector determined that the requirement for Safety Rod Inflight Time was in accordance with the Technical Specification paragraph 6.2.1 which states that "the safety system shall be capable of scrambling the reactor so that the total time for the safety rod insertion to the shock absorber is within 270 milliseconds after a scram signal from the power switch."

The inspector determined that the Technical Specification did not address any requirements for magnet drop out tests. The licensee stated that he was not aware of the basis for the 5 milliamp minimum standard required for the rod drop out test. The licensee also stated that no measurements of actual scram spring tension were made as part of the routine maintenance and surveillance activities.

The inspector determined that the original operating instructions for the NTR facility, General Electric Document Number GEI-92828, dated April 1965, stated in Section III, paragraph 3.1.12.(c) on page 3-9 the following "Safety Rod Magnet disconnect (weekly check): Turn safety amplifier ammeter control to 'Magnet No.4' position and reduce current with screwdriver adjustment until magnet releases and audible indication is heard over speaker on control console. Dropout current should be 75 ma" This procedure also defines the normal latch current as 150 ma. Section V of this document, in paragraph 5.4, "Safety Rod Repairs," indicates that normal magnet separation should occur at between 75 and 80 milliamps and 100 milliamps is acceptable.

The inspector determined that the current maintenance procedure "Nuclear Test Reactor Preventive Maintenance, Quarterly, Safety Rod Drive, NTR Section 12.3" stated in paragraph 12.3.7 that the magnet drop out current should be between 5 and 150 ma.

The licensee, as stated above, was unaware of the basis for the 5 ma requirement, or the justification for the reduction from the 75 ma requirement of 1965, other than a belief that longer spring life would occur from the lower setting of the drop out current parameter because of reduced spring tension.

The Summary Safeguards Report for the General Electric Nuclear Test Reactor, APED-4444-A, dated October 1, 1968 states, in section 11.2, that two independent springs are used on each of the four safety rods and implies that either spring should ensure the rod insertion independently. This document also states that the rods are inserted with an acceleration about 2.0 times that of gravity so that friction or minor obstructions would not prevent rod insertion.

The licensee stated that the rod which failed to insert did insert after a small radial force was applied to the latch mechanism. This was repeatedly verified. The licensee stated that normal rod function was restored after magnet replacement. The licensee is continuing to investigate the cause of the failure. The inspector emphasized that the scope of the investigation into the rod failure should also include a reevaluation of the maintenance procedures and the acceptance criteria used to assure rod function. The results of the licensee's investigation and the technical basis for his maintenance acceptance criteria will be examined during a future NRC inspection. (50-73/83-01-01)

9. Maintenance and Contamination Control Practices (NTR)

The inspector noted that several maintenance and contamination control activities observed in effect at the facility did not appear consistent with sound engineering practice. Specifically, instrumentation cables were noted to be routed in an unsupported manner rather than through the raceways provided in the original design. Also, several cables were supported by masking tape or duct tape rather than standard cable supports. Some instrument wires were terminated by twist caps rather than standard terminations.

The inspector noted that excessive amounts of materials were stored in the reactor cell in an apparently uncontrolled manner. These materials included small amounts of combustible and flammable materials, superfluous maintenance supplies, and unused test equipment from previous operations.

The inspector also noted that upon leaving the controlled contamination area of the reactor cell an individual had to traverse the control room and enter the hallway to a monitoring station adjacent to the coffee facilities. The inspector pointed out that a person exiting the contamination controlled area must be assumed to be contaminated until monitored. The arrangement of the monitoring facilities did not provide for separation from uncontaminated personnel or minimize the risk of internal contamination posed by the proximity of the coffee facilities to the monitoring facility.

This item will be reviewed during a future NRC inspection.
(50-73/83-01-02)

10. Long Term Shutdown Inspection (50-70 only)

The inspectors verified that the GETR facility is in a long term shutdown mode by a review of records and a walk-through of the facility. The inspectors noted that the facility was being maintained in good material condition and that routine surveillance was performed.

No items of noncompliance or deviations were identified.

11. Exit Meeting

At the conclusion of the inspection on February 10, 1983, the inspectors held an exit meeting with the persons indicated in paragraph 1 to review the scope of the inspection and the inspection findings, as detailed in this report.