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U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Attention: Document Control Desk

Reference: License R-33, Docket 50-73

Gentlemen:

Enclosed are three signed copies of Annual Report No. 34 for the General Electric Nuclear Test Reactor.

Sincerely,

G. E. Cunningham  
Senior Licensing Engineer  
(510) 862-4330

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Enclosures

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GE Nuclear Energy

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Vallecitos Nuclear Center  
Pleasanton, California

GENERAL ELECTRIC  
NUCLEAR TEST REACTOR

ANNUAL REPORT NO. 34

LICENSE R-33  
DOCKET 50-73

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NUCLEAR TEST REACTOR

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**I. INTRODUCTION**

This report summarizes the operation, changes, tests, experiments, and major maintenance at the Nuclear Test Reactor (NTR) which were authorized pursuant to License R-33 and 10CFR50, Section 50.59, for the period January 1, 1993, through December 31, 1993.

**II. GENERAL**

- A. The reactor was operated at or above critical for 521.13 hours; 247 startups were made. Total plant operation equaled 1.428 MWd in 1993.
- B. The average radiation exposure to facility personnel was 1.16 Rem.
- C. There were no scrams or unscheduled shutdowns.
- D. There were no occurrences during 1993 that required notification of the NRC.
- E. There were no notices of violation issued as the result of NRC inspections.

**III. ORGANIZATION**

There were no changes to the organization or personnel in the organization during this report period.

**IV. FACILITY CHANGES, TESTS, EXPERIMENTS  
AND PROCEDURE CHANGES  
APPROVED BY THE FACILITY MANAGER**

**A. Facility Changes**

Pursuant to 10CFR50.59(a), the Facility Manager authorized the following facility changes in 1993.

1. Primary Outlet Temperature Meter

*Description:* An old temperature meter and alarm unit for the reactor primary coolant was replaced with a newer model.

*Safety Analysis:* The new instrument is as accurate and responsive as the old one. All functions remained the same. The new instrument was calibrated and functionally checked prior to use.

2. Core Reel Handle Extension

*Description:* This change authorized the removal of the extension rod on the core reel drive assembly.

*Safety Analysis:* This extension rod was not needed at this time and did not serve any purpose. The drive shaft was locked to prevent unintentional movement of the core reel.

3. Primary Vent Valve

*Description:* Previously, relocation of a high reactor primary coolant temperature scram test button and a remote primary system vent valve were authorized. This amendment authorized the relocation of the related primary pump control switch, the solenoid vent valve switch and the conductivity meter. These changes will enable operations personnel to remain in lower exposure areas while performing daily tests and inspections.

*Safety Analysis:* Relocating existing equipment has no effect on safety. All equipment will be functionally tested/calibrated prior to reactor operation.

**B. Tests**

Pursuant to 10CFR50.59(a), there were no special tests performed during 1993 requiring Facility Manager approval.

**C. Experiments**

Pursuant to 10CFR50.59(a), there was one new experiment in 1993 requiring Facility Manager approval.

Reactivity Test

Description: A strip of cadmium was placed in a manual poison sheet (MPS) position. Measurements were made to determine the reactivity worth of the remaining MPS and to establish with more certainty the existing core life.

Safety Analysis: The present MPS configuration results in less than 76¢ potential excess reactivity. Any additional cadmium will decrease the potential excess reactivity.

**D. Procedures**

Pursuant to 10CFR50.59(a), there were no procedure changes during 1993 requiring Facility Manager approval.

**V. MAJOR PREVENTIVE OR CORRECTIVE MAINTENANCE**

Major preventive or corrective maintenance activities performed in 1993 are described in Section IV.A., Facility Changes, above.

## VI. UNSCHEDULED SHUTDOWNS

There were no scrams or unscheduled shutdowns during this report period.

## VII. RADIATION LEVELS AND SAMPLE RESULTS AT ON- AND OFF-SITE MONITORING STATIONS

The data below are from sample and dosimeter results accumulated during 1993. Except for the NTR stack data, these data are for the entire VNC site and include the effects of operations other than the NTR.

### A. NTR Stack

Total airborne releases (stack emissions) for 1993 are as follows.

Alpha Particulate, < 0.11  $\mu\text{Ci}$  (predominantly radon-thoron daughter products)  
Beta-Gamma Particulate, < 0.61  $\mu\text{Ci}$   
Iodine-131, 9.7  $\mu\text{Ci}$   
Noble Gases,  $1.30 \times 10^2$  Ci

Noble gas activities recorded from the NTR stack integrate both background readings and the actual releases. The background readings may account for 40 to 50% of the indicated release.

### B. Air Monitors (Yearly average of all meteorological stations.)

Four environmental air monitoring stations are positioned approximately 90 degrees apart around the operating facilities of the site. Each station is equipped with a membrane filter which is changed weekly and analyzed for gross alpha and gross beta-gamma.

**B. Air Monitors** (Continued)

Alpha Concentration:

Maximum	$3.3 \times 10^{-15}$ $\mu\text{Ci/cc}$	(predominantly radon-thoron daughter products)
Average	$1.1 \times 10^{-15}$ $\mu\text{Ci/cc}$	

Beta Concentration:

Maximum	$4.2 \times 10^{-14}$ $\mu\text{Ci/cc}$
Average	$1.9 \times 10^{-14}$ $\mu\text{Ci/cc}$

**C. Gamma Radiation**

The yearly dose results for the year 1993 as determined from evaluation of site perimeter TLD environmental monitoring dosimeters showed acceptable levels.

**D. Vegetation**

No alpha, beta or gamma activity attributable to activities at the NTR facility was found on or in vegetation in the vicinity of the site.

**E. Water**

There was no release of radioactivity in water or to the ground water greater than those limits specified in 10CFR20, Appendix B, Table II, Column 2.

**F. Off-Site**

Samples taken off the site indicate normal background for the area.

**VIII. RADIATION EXPOSURE**

The highest annual dose to NTR Operations personnel was 1.29 Rem, and the lowest was 0.93 Rem. The average dose was 1.16 Rem per person.

## IX. CONCLUSIONS

The overall operating experience of the Nuclear Test Reactor reflects another year of safe and efficient operations. There were no reportable events.

GENERAL ELECTRIC COMPANY  
Vallecitos and Morris Operations

A handwritten signature in cursive script that reads "D. R. Smith". The signature is written in dark ink and is positioned above a horizontal line.

D. R. Smith, Manager  
Nuclear Test Reactor