



General Electric Company  
Vallecitos Nuclear Center  
6705 Vallecitos Road, Sunol, CA 94586

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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. 40 for the General Electric Nuclear Test Reactor.

Sincerely,

  
B. M. Murray  
Senior Licensing Engineer  
(925) 862-4455

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Enclosures

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***GE Nuclear Energy***

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*Vallecitos Nuclear Center  
Sunol, California*

***GENERAL ELECTRIC  
NUCLEAR TEST REACTOR***

***ANNUAL REPORT NO. 40***

***LICENSE R-33  
DOCKET 50-73***

**GENERAL ELECTRIC  
NUCLEAR TEST REACTOR**

**ANNUAL REPORT NO. 40**

**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, 1999, through December 31, 1999.

**II. GENERAL**

- A. The reactor was operated at or above critical for 606.54 hours; 242 startups were made. Total plant operation equaled 2.463 MWd in 1999.
- B. The average radiation exposure to facility personnel was 1.015 Rem.
- C. There were three reactor scrams and one unscheduled manual shutdown.
- D. There were no occurrences during 1999 that required notification of the NRC.
- E. There was one NRC inspection. No violations of NRC requirements were issued.

**III. ORGANIZATION**

There were five changes to the organization or personnel in the organization during this report period.

- A. Dennis Smith, still a GE company employee, is on an extended leave of absence.
- B. Edward Ehrlich was added to the NTR staff as Manager, NTR, and has passed radiological controls training and NRC SRO license examinations. He has been licensed by the NRC as a SRO on the NTR and has been qualified as a radiation worker. Mr. Ehrlich has begun NDT certification training and also assists in neutron radiography under the direction and supervision of certified Level II and III NDT personnel.
- C. Mr. Tim Peterson was added to the NTR staff as a Specialist, NTR, and began radiological controls training and will soon begin formal SRO training and NDT certification training.

- D. Mr. Tim Keefhaver was added to the NTR staff as a contract employee to perform NDT neutron radiography tasks under the direction and supervision of the licensed SRO staff and certified Level II and III NDT personnel. He has passed radiological controls training and has been qualified as a radiation worker.
- E. Ms. Donna Crawford, a full-time Vallecitos site GE employee, is assisting part-time in setups and clerical work associated with NDT neutron radiography under the direction and direct supervision of the licensed SRO staff and certified Level II and III NDT personnel.

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

**A. Facility Changes**

Pursuant to 10CFR50.59(a), there were no facility changes in 1999 requiring Facility Manager approval.

**B. Tests**

Pursuant to 10CFR50.59(a), there were no special tests performed during 1999 requiring Facility Manager approval.

**C. Experiments**

Pursuant to 10CFR50.59(a), there were no new experiments in 1999 requiring Facility Manager approval.

**D. Procedures**

Pursuant to 10CFR50.59(a), there were no procedure changes during 1999 requiring Facility Manager approval.

**V. MAJOR PREVENTIVE OR CORRECTIVE MAINTENANCE**

There were no major preventive or corrective maintenance activities performed in 1999.

## VI. UNSCHEDULED SHUTDOWNS

- A. During 1999 there were three reactor scrams during the report period.
1. Transient utility power low-voltage conditions or interruptions caused two of the scrams.
  2. One reactor scram was due to a two-out-of-three coincident overpower trip. The trip resulted from a normal power increase due to xenon burnoff shortly after a startup. The automatic scram prevented the reactor power from exceeding the Technical Specification limit.
- B. There was one unscheduled shutdown:

The unscheduled shutdown occurred during a normal startup for reactivity testing. After establishing critically, the operator withdrew control rods to raise power. The operator observed that the startup rate (period indication) was less than expected for the full-out position indicated for the fine motion control rod (Fine Rod Full Out Indicator Light). The operator also observed that the digital position indication for the fine control rod was less than it should be if the rod were fully withdrawn. The SRO immediately fully inserted all safety and control rods and shut down the reactor.

The cause of the unusual behavior was determined by a subsequent inspection of the fine control rod. The rod limit switch wires had been inadvertently moved during SRO training so that they were positioned directly under the full-out switch actuator which caused the switch to actuate prematurely, thus preventing further out-motion of that control rod.

Corrective action consisted of wire re-alignment and staff training. The wires were correctly re-aligned and secured to prevent a reoccurrence. The wires of all other safety rods and control rods were also inspected and found to be properly positioned. The situation was discussed with the staff. The need for vigilance and careful observation of all actions and movements during activities around the control rods, particularly during SRO training, was emphasized.

The reactor was capable of being immediately and fully shut down at all times. Thus, the situation was evaluated to be neither a safety problem nor a potential safety problem and is non-reportable.

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

The data below are from sample and dosimeter results accumulated during 1999. 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 1999 are as follows.

Alpha Particulate, <0.09  $\mu\text{Ci}$  (predominantly radon-thoron daughter products)  
Beta-Gamma Particulate, <1.0  $\mu\text{Ci}$   
Iodine-131, 8.7  $\mu\text{Ci}$   
Noble Gases, 247.3 Ci

Noble gas activities recorded from the NTR stack integrate both background readings and the actual releases. The background readings may account for as much as 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.

Alpha Concentration:

Maximum,  $5.8\text{E-}14$  (predominantly radon-thoron daughter products)  
Average,  $2.5\text{E-}15$   $\mu\text{Ci/cc}$

Beta Concentration:

Maximum,  $1.9\text{E-}13$   $\mu\text{Ci/cc}$   
Average,  $2.4\text{E-}14$   $\mu\text{Ci/cc}$

### C. Gamma Radiation

The yearly dose results for the year 1999 as determined from evaluation of site perimeter TLD environmental monitoring dosimeters showed no departure from normal stable backgrounds.

### 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 2, 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 1.605 Rem, and the lowest was 0.030 Rem. The average dose was 1.178 Rem per person-year\*.

### 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



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E. H. Ehrlich, Manager  
Nuclear Test Reactor

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\*The average dose was calculated as the quotient of the total dose divided by the total person-years worked at the NTR. Because of the personnel changes during the year, an average dose per individual worker would result in a deceptively low value (0.818 Rem/person).