

GENERAL ELECTRIC
NUCLEAR TEST REACTOR

ANNUAL REPORT NO. 28

LICENSE R-33

DOCKET 50-73

NUCLEAR OPERATIONS • GENERAL ELECTRIC COMPANY
VALLECITOS NUCLEAR CENTER, PLEASANTON, CALIFORNIA 94566

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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, 1987, through December 31, 1987.

II. GENERAL

- A. The reactor was operated at or above critical for 973.25 hours; 427 startups were made. There were no scrams during this report period. Total plant operation equaled 3.843 MW days in 1987.
- B. The average radiation exposure to facility personnel was 3.91 Rem.
- C. There was one occurrence during 1987 that required notification of the NRC.
- D. There was one citation (Severity Level IV) issued as the result of an NRC inspection.

III. ORGANIZATION

There were no organizational changes in 1987.

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

A. Changes

Pursuant to 10CFR50.59(a), the Facility Manager authorized the following change in 1987.

A Change Authorization allowed installation of a portable pump in the stack effluent monitoring system sample line. The temporary pump allowed the central pump to be taken out of service for maintenance.

Safety Analysis: The temporary pump provided an equivalent function as the permanent unit for the stack sampling system. The flow rate was adjusted to be within specifications. Other area sample stations were out of service, and work was not permitted in these areas during that time.

B. Tests

Pursuant to 10CFR50.59(a), there were no special tests performed during 1987 which required the approval of the Facility Manager.

C. Experiments

There were 1,221 individual experiments reviewed, approved, and performed in 1987. Three experiment type approvals were reviewed and approved. One was for irradiation and two for detector calibrations. These are discussed below.

1. An Experiment Type Approval authorized testing a standard product compensated ion chamber in the North Room modular stone monument (MSM), the horizontal facility thermal column, and the east face facility.

Safety Analysis: The only potential hazard is a radiation hazard to the involved personnel. The potential hazard is minimal, and it was determined that the experiment could be conducted safely utilizing existing procedures. The test will have no reactivity effect on the reactor.

2. An Experiment Type Approval authorized irradiation of salts or oxides of copper, gold, lanthanum, scandium, and sodium for use in calibration of a repaired germanium detector.

Safety Analysis: The irradiation can be safely conducted using existing hand tools and procedures. Only milligrams of the oxide and millicuries of activity are involved.

3. An Experiment Type Approval authorized testing of GE product line wide range monitor detectors in the neutron beam outside the graphite pack.

Safety Analysis: Areas for safety consideration such as reactivity, reactor effects, hazardous materials, radiation, and radioactive material release were addressed. It was determined that the experiment could be conducted safely within existing limits and restrictions.

V. MAJOR PREVENTIVE OR CORRECTIVE MAINTENANCE

- A. The stack fan motor bearings were replaced requiring one day of nonoperation.
- B. The Hoffman blower which provides a flow for the NTR stack and room filter sample stations was shut down for maintenance. A moto-air unit described in the previous section was used to provide stack sampling while the blower was out of service.

VI. UNSCHEDULED SHUTDOWNS

There were no scrams or unscheduled shutdowns in 1987.

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

The data below are from sample and dosimeter results accumulated during 1987. 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 1987 are as follows.

Alpha Particulate, $< 0.13 \mu\text{Ci}$ (predominantly radon-thoron
daughter products)
Beta-Gamma Particulate, $0.86 \mu\text{Ci}$
Iodine-131, $< 19.0 \mu\text{Ci}$
Noble Gases, $2.1 \times 10^2 \text{ Ci}$

Noble gas activities recorded from the NTR stack integrate background readings with the actual releases which may account for 40 to 50% of the activity released.

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 $< 4.5 \times 10^{-15} \mu\text{Ci/cc}$ (predominantly radon-thoron
daughter products)
Average $< 2.93 \times 10^{-15} \mu\text{Ci/cc}$

Beta Concentration:
Maximum $< 8.1 \times 10^{-14} \mu\text{Ci/cc}$
Average $< 2.99 \times 10^{-14} \mu\text{Ci/cc}$

C. Gamma Radiation

The yearly dose results for the year 1987 as determined from evaluation of site perimeter TLD environmental monitoring dosimeters showed normal background.

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 exposure to NTR Operations personnel was 5,020 mRem, and the lowest was 3,150 mRem. The average exposure was 3,913 mRem per person.

There was no significant exposure to outside (non-operations) personnel.

An NTR operator received 1,530 mRem in the third quarter without a documented review of the individual's exposure on a Form NRC 4 as required by 10CFR20.101. This was reported to Region V on October 30, 1987.

IX. CONCLUSIONS

The overall operating experience of the Nuclear Test Reactor reflects another year of safe and efficient operations. There were no scrams or unusual occurrences and one reportable event. Updated equipment and procedures should provide increased reliability in the ensuing years.

GENERAL ELECTRIC COMPANY
Irradiation Processing

By



R. Smith, Manager
Nuclear Test Reactor

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NUCLEAR ENERGY BUSINESS OPERATIONS
GENERAL ELECTRIC COMPANY • VALLECITOS NUCLEAR CENTER • PLEASANTON, CALIFORNIA 94566

February 17, 1988

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

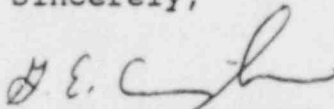
Attention: Document Control Desk

Reference: License R-33, Docket 50-73

Gentlemen:

Enclosed are three signed copies of Annual Report No. 28 for
the General Electric Nuclear Test Reactor.

Sincerely,



G. E. Cunningham
Senior Licensing Engineer
(415) 862-4330

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Enclosures

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