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Enclosure: Annual Report No. 47

Enclosed is the Annual Report No. 47 for the General Electric Nuclear Test Reactor (NTR) located at Vallecitos Nuclear Center in Sunol, California.

If there are any questions or additional information required, please contact me at the number above

Sincerely Yours,

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GE Nuclear Energy

Vallecitos Nuclear Center
General Electric Company
Sunol, California

GENERAL ELECTRIC
NUCLEAR TEST REACTOR

ANNUAL REPORT NO. 47
FOR THE YEAR 2006

LICENSE R-33
DOCKET 50-73

MARCH 2007

General Electric Nuclear Test Reactor

Annual Report No. 47

This report summarizes the operation, changes, tests, experiments, and major maintenance at the General Electric Nuclear Test Reactor (NTR), which were authorized pursuant to License R-33, Docket 50-73, and 10CFR50, Section 50.59, for the period of January 1, 2006 through December 31, 2006.

I. General

Specific information about the operation of the NTR during the reporting period is presented as follows:

1. There were 243 reactor startups (run numbers 15,365-15,601) with the reactor operating at or above critical for 645.73 hours. Total power generation equaled 629.13 EFPH equivalent to 2.62 MW-days in 2006.

2. The average radiation exposure to regular full-time NTR Operations personnel was 0.450 Rem.

3. There were no reactor scrams or unscheduled shutdowns of the reactor by the operator after reaching criticality.

4. There were no occurrences during 2006 that required notification of the NRC. The NRC was informed of the failure of Control Rod #2 to fully drive in on 3/10/06 as described in section IV of this report.

II. Organization

The details of changes in the status of personnel, which occurred during the reporting period, are described as follows:

1. Mr. Daniel Thomas replaced Mr. Ehrlich in November as Manager NTR. He had been acting as Manager NTR since May 2006. Mr. Thomas continues to provide full time SRO duties. He remains an active qualified NDT Level II.

2. In May 2006, through mutual agreement with Level 3 management, Mr. Edward Ehrlich agreed he would not stand critical reactor control panel watches while being treated for a temporary medical condition. He continued to perform other SRO administrative, maintenance and training duties. It is anticipated that Mr. Ehrlich will return to full scope SRO duties in 2007 following satisfactory completion of the routine NRC medical examination. Mr. Ehrlich remains an active qualified NDT Level III.

3. There was no change in the status of Mr. Dennis Smith who continues as a part-time GE employee (pensioner) providing SRO duties, Quality Assurance (QA) consulting and NDT training services, and SRO tutoring.

4. There was no change in the status of Mr. Peterson who continues his operational duties governed by his Reactor Operators license. Mr. Peterson also remains an active qualified NDT Level III.

5. Mr. Art Raya continued on the NTR staff in 2006 as a contract employee to perform NDT neutron radiography tasks and non-reactor system maintenance tasks under the direction and supervision of the licensed SRO staff and certified Level II and III NDT personnel.

6. Mr. Max Paronable continued on the NTR staff in 2006 as a contract employee to perform NDT neutron radiography tasks and non-reactor system maintenance tasks under the direction and supervision of the licensed SRO staff and certified Level II and III NDT personnel.

III. Facility Changes, Tests, Experiments, and Procedure Changes Approved by The Facility Manager

In accordance with written procedures, facility manager approval is required for changes to the facility, procedures, tests, and experiments. Specific information about the reporting period is presented as follows:

A. Facility Changes

Pursuant to 10CFR50.59(a), there were three facility changes made in 2006 requiring Facility Manager, Regulatory Compliance and VTSC approval as requested.

1. As a contingency, the purchase of two (2) Leads & Northrop Speedomax G Model G recorders was reviewed and approved as equivalent or better replacements for the NTR Log N and Temperature recorders. The procurement was completed and NTR remains operating with the existing older model plant equipment until a need arises.

2. Additions were approved and made to the reactor cell lighting. Two parallel banks of high illumination lights were installed high on the reactor cell walls and another light was added at the cell entry. These lights effectively replace the original cell lighting fixtures, which were progressively failing and could not be safely maintained in their cell overhead locations.

3. A rack used to stage explosive devices in the control room prior to radiography, which was originally located along the west wall of the control room, was approved for relocation to the east wall of the control room. This removed the staging rack away from the natural traffic pattern in the control room. This reduced the risk of bumping into the staging rack potentially resulting in dropped explosive devices.

B. Tests

Pursuant to 10CFR50.59(a), there were no special tests performed during 2006 requiring Facility Manager approval.

C. Experiments

Pursuant to 10CFR50.59(a), there were no new experiments in 2006 requiring Facility Manager approval.

D. Procedure Changes

Pursuant to 10CFR50.59(a), there were procedural changes initiated to incorporate editorial or typographical corrections and technical data, changes to requirements, or to provide additional or clarification of information and reliability of performance. Changes made during 2006 were made with Facility Manager approval and after Regulatory Compliance review when required. A summary list of the procedural changes are presented below:

1. SOP 9-15, Preventative and Corrective Maintenance Program
   Revised (Rev. 950) to implement a controlled index and completion record for the NTR preventative maintenance items found in the SOP chapter 12. A summary table was added as Exhibit 4, which lists the PMs, date last performed, and quarter and date next due. In addition, margin notes were added to act as an aide for scheduling and compliance. The margin notes provide information in regards to who is required to perform the PM and if the PM is specified by Technical Specifications.

2. SOP 7-11, Release of Customer Materials
   Revised (Rev. 951) to establish new lower limits for release of temporally activated customer materials following radiography. Provided for consistency with the equivalent VNC Nuclear Safety Procedure 3555. Additional administrative controls were also added to the NTR radiography laboratory procedures. By incorporating a signed release authorization document on every box being shipped, the potential for a shipment error involving shipping the wrong, or too many, or too few boxes was reduced.

3. SOP for PM 12-41 Safety Rod Magnets
   Revised (Rev. 953) data sheet to insert a signoff of Step 3.3, which is the observation of the limit switch cables, verifying clearance, during the full pull test.

4. SOP for PM 12-43 Safety Rod Springs
   Revised (Rev. 954) to incorporate a process to ensure repeatability in the spring tension test and clear up confusion in regards to the zero reference position for the test.

5. SOP for PM 12-25 Recorders
   Revised (Rev. 955) to Reference ID changes for the newer model L&M recorders approved by CA.

6. SOP for PM 12-30 Stack Particulate Monitor
   Revised (Rev. 956) to accommodate the use of alternate sources to complete the saturation test of the instrument.

7. SOP 9-5 Source, Byproduct and Special Nuclear Material Control and Shipment
   Revised (Rev. 957) was changed to reflect the deactivation and elimination of CLAs-3 &4 and the limits applicable to the one remaining NTR CLA-1.

8. SOP 1.3 Primary Coolant Water Chemistry
   Revised (Rev. 958) to incorporate updated sampling procedures initiated by analytical chemistry.

9. SOP for PM 12-15 Primary Chemistry
   Revised (Rev. 959) to incorporate updated sampling procedures initiated by analytical chemistry.

10. SOP for PM 12-25 Recorders
    Revised (Rev. 960) to assign sub-letters for each individual recorder to make the administration and scheduling of those PMs easier and better managed.

11. SOP 9-15 Preventive and Corrective Maintenance Program
    Revised (Rev. 961) the NTR Preventive Maintenance Index & Completion Record to break out the individual Control Panel Recorders on PM-25 to allow summary documentation of their individual completions.

12. SOP 7-9 Radiation Work Permit
    Revised (Rev. 962) to invoke the VNC site Operating Procedures and Safety Standards for RWPs as they are used elsewhere on site in addition to NTR. The change does not affect the content or performance of NTR RWPs.

13. SOP for PM 12-24 Log N Period Amplifier and Power Supply
    Revised (Rev. 963) to proscribe our standard practice of checking spec conditions and only doing adjustment if finding shows out of spec readings.

14. SOP PM 9-17 Hazardous Material Handling
    Revised (Rev. 964) to reflect the current document routing and correct titles of personnel involved with the report.

15. SOP PM 12-45 Densitometer
    Revised (Rev. 965) to include a "zero-adjust" step on the densitometer prior to taking density readings.

16. SOP 9-2 Standard Operating Procedures
    Revised (Rev. 966) to remove references to outdated organization structure reassigning responsibilities as necessary. Updated the procedure format.

17. SOP 6-7 Startup Summary
    Revised (Rev. 967) to allow throttling of secondary cooling flow when ambient temperatures are cold.

18. SOPs 2-7, 6-5, 12-34, and 6-8 Various
    Revised (Rev. 970, 971, 972, & 973) to consolidate all references to the "thermopile conversion factor" value to a single location found in SOP 2-7 thereby eliminating multiple locations of the same value.

19. SOP for PM 12-24 Log N Period Amplifier and Power Supply
    Revised (Rev. 974) to add a 10% tolerance to the circuit check to determine if calibration is required.

20. SOP 9-1 Safety, Responsibility, and Authority
    Revised (Rev. 975) to remove a reference to App 1 of 10 CFR 55, which no longer exists.

21. SOP 10-6 Cable-Held Retractable Irradiation System
    Revised (Rev. 976) to incorporate the operational restrictions of 10CFR50.54(j).

22. SOP 8-1 Emergency Procedure Reference
    Revised (Rev. 977) to eliminate references to Building 105 Emergency Procedures, which are no longer being used and have been eliminated. NTR abnormal and emergency procedure follow-up is accomplished by VNC Site Emergency Procedures.

23. SOP 8-2 Non-Reactor Emergencies
    Revised (Rev. 978) to eliminate references to Building 105 Emergency Procedures, which are no longer being used and have been eliminated. NTR abnormal and emergency procedure follow-up is accomplished by VNC Site Emergency Procedures.

24. SOP 9-2 Standard Operating Procedures
    Revised (Rev. 979) to correct and typographical errors in a referenced NTR tech spec paragraph.

25. SOP 9-11 Reportable Incidents
    Revised (Rev. 980) to omit a reference to a Sr. Licensing Engineer, as that individual organization position no longer exists.

IV. Major Preventative or Corrective Maintenance

Routine preventive maintenance and surveillance checks were performed as required and scheduled during the reporting period.

Noteworthy corrective maintenance activity performed during the reporting period consisted of the following:

- On 3/10/06 Control Rod # 2 failed to automatically fully drive in during a normal reactor shutdown and could not be driven in manually. The reactor was verified as shutdown per NTR tech specs and secured. Investigation on 3/13/06 found CR #2 drive-in relay # 42 was arching and defective. The relay was replaced and CR#2 was driven in to its full in position. Applicable sections of PM 12-2 were performed and CR#2 and a reactor startup authorized.

V. Unscheduled Shutdowns

During the reporting period, there were no reactor scrams or unscheduled manual shutdowns.

VI. Radiation Levels and Sample Results at On-Site and Off-Site Monitoring Stations

The data below are from sample and dosimeter results accumulated during the reporting period. 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 2006 are as follows:

Alpha Particulate, 3.11 E-6 Ci (predominantly radon-thoron daughter products)
Beta-Gamma Particulate, 1.39 E-6 Ci
Iodine-131, 8.54 E-6 Ci
Noble Gases, 1.76 E+2 Ci

Noble gas activities recorded from the NTR stack integrate both background readings and the actual releases. 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, 6.9E-14 μCi/cc (predominantly radon-thoron daughter products)
Average, 2.6E-14 μCi/cc

Beta Concentration:
Maximum, 11.6E-14 μCi/cc
Average, 5.7E-14 μCi/cc

C. Gamma Radiation

The yearly dose results for the year 2006 as determined from evaluation of site perimeter 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 groundwater greater than the limits specified in 10CFR20, Appendix B, Table 2, Column 2.

F. Off-Site

The results of samples collected from off-site locations indicate normal background for the regional area.

VII. Radiation Exposure

The highest annual dose to full time NTR Operations personnel was 0.591 Rem and the lowest was 0.210 Rem. The average radiation exposure to personnel was 0.450 Rem per person.

VIII. Conclusion

The General Electric Company concludes that the overall operating experience of the NTR reflects another year of safe and efficient operations. There were no reportable events.

GENERAL ELECTRIC COMPANY
Vallecitos Operations

Daniel M. Thomas, Manager
Nuclear Test Reactor