

May 30, 2012

Mr. Tony McFadden  
Vallecitos Nuclear Center  
General Electric Company  
6705 Vallecitos Road  
Sunol, CA 94586

SUBJECT: GENERAL ELECTRIC - NRC ROUTINE, ANNOUNCED INSPECTION REPORT  
NO. 50-73/2012-201

Dear Mr. McFadden:

On May 7-10, 2012, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted a routine, announced inspection at the General Electric Vallecitos Nuclear Center (Inspection Report No. 50-73/2012-201). The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concern or noncompliance with NRC requirements was identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390, Public inspections, exemptions, requests for withholding," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (Agencywide Document Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) <http://www.nrc.gov/reading-rm/adams.html>.

Should you have any questions concerning this inspection, please contact Greg Schoenebeck at 301-415-6345 or by electronic mail at [Greg.Schoenebeck@nrc.gov](mailto:Greg.Schoenebeck@nrc.gov).

Sincerely,

**/GMorlang for RA/**

Johnny H. Eads Jr., Chief  
Research and Test Reactors Oversight Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-73  
License No. R-33

Enclosure:  
As stated  
cc: See next page

General Electric

Docket No. 50-73

cc:

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California Department of Health  
ATTN: Chief  
Radiologic Health Branch  
P.O. Box 997414, MS 7610  
Sacramento, CA 95899-7414

Test, Research, and Training  
Reactor Newsletter  
University of Florida  
202 Nuclear Sciences Center  
Gainesville, FL 32611

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**U. S. NUCLEAR REGULATORY COMMISSION**  
**OFFICE OF NUCLEAR REACTOR REGULATION**

Docket No: 50-73

License No: R-33

Report No: 50-73/2012-201

Licensee: General Electric Company

Facility: Nuclear Test Reactor (NTR)

Location: Sunol, CA

Dates: May 7-10, 2012

Inspectors: Gregory M. Schoenebeck  
Ossy Font (Inspector in Training)

Approved by: Johnny H. Eads, Jr., Chief  
Research and Test Reactor Oversight Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

## EXECUTIVE SUMMARY

General Electric  
Vallecitos Nuclear Center  
NRC Inspection Report No. 50-73/2012-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the General Electric Company (GE, the licensee) Class II research reactor facility safety programs including: procedures; experiments; health physics; design changes; committees, audits and reviews; and transportation. The licensee's programs were acceptably directed toward the protection of public health and safety, and were in compliance with the U.S. Nuclear Regulatory Commission (NRC) requirements.

### Procedures

- Procedure administrative review, revision, adherence to, and implementation satisfied Technical Specification (TS) requirements.

### Experiments

- There were no new experiments since the last inspection. Previous experiment review and approval was done in accordance with TS requirements, licensee procedures, and Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 regulations.

### Health Physics

- The licensee's health physics program and operations were in compliance with 10 CFR Part 20 regulations, licensee procedures, and TS. The licensee has an impressive database system to aid with their as low as reasonably achievable (ALARA) program.

### Design Changes

- Design changes were made in accordance with 10 CFR 50.59 requirements, TS, and licensee procedures.

### Committees, Audits, and Reviews

- The Reactor Committee provided the oversight required by the TS.

### Transportation

- Since the last inspection, there were no shipments of radioactive material from the R-33 license.

## REPORT DETAILS

### Summary of Facility Status

The General Electric Company's (GE, the licensee's) 100 kilowatt research reactor has been operated in support of neutron radiography, reactor operator training, and periodic equipment surveillances. During the inspection the reactor was operated to support radiography operations.

#### 1. Procedures

##### a. Inspection Scope (IP 69001)

The inspectors reviewed the following to ensure that the requirements of Technical Specifications (TS) Section 6.4, Procedures, were being met concerning written procedures:

- Standard Operating Procedure 6.7 "Startup Summary", Reviewed December 22, 2010

##### b. Observations and Findings

Records showed that procedures for TS required items were available. Since the last inspection it was determined that there were no substantive changes to the procedures that had been spot checked by one inspector. The licensee maintained approved procedures to satisfy the requirements of the TS.

A reactor startup was performed to support several radiography shoots. The startup was performed satisfactorily in accordance with reviewed and approved procedures.

##### c. Conclusion

Procedure administrative review, revision, adherence to, and implementation satisfied TS requirements.

#### 2. Experiments

##### a. Inspection Scope (IP 69001)

In order to verify that any modifications to the facility were consistent with TS requirements, procedures, and Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 regulations, the inspector reviewed selected aspects of:

- Annual Report for License R-52, Docket 50-113, for the period of January 1, 2011 through December 31, 2011
- Nuclear Test Reactor Standard Operating Procedures (NTR SOP) #10.1 Experiment Type Approvals (ETAs) for explosive material radiography, various dates

b. Observations and Findings

One inspector reviewed the process for the approval and conduct of experiments at the facility; during this inspection there was a specific focus on experiments involving the radiography of explosive material in the south and north cells. The purpose of the inspector's investigation of the ETAs for explosive material radiography was to determine if TS requirements (i.e., TNT equivalent material) for experiments and storage on site were being addressed and in adherence. In the past year there has been an increase in production workload which has increased the amount of TNT-equivalent explosive material onsite. The inspector determined that the experimental review process and approval for handling and storage of TNT-equivalent explosive material is in accordance with TS and approved procedures.

c. Conclusion

Experiment review and approval was done in accordance with TS requirements, licensee procedures, and 10 CFR 50.59 regulations.

**3. Health Physics**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 20 requirements:

- Annual Report for License R-52, Docket 50-113, for the period of January 1, 2011 through December 31, 2011
- Radiation Work Permit (RWP)/Task Scan Sheets, various 2012
- Dosimetry records, various for 2011 and 2012

b. Observations and Findings

Upon visiting the facility, the inspectors watched two orientation videos, both of which adequately covered the hazards and measures necessary for basic radiation protection at the Vallecitos Nuclear Center (VNC). Additionally, the Reactor Supervisor performed an orientation walk-through for site evacuation in the event of an emergency for the 105 Building where the NTR is located.

The licensee has implemented a system to enhance their As Low As Reasonably Achievable (ALARA) program. The licensee uses a semi-automated RWP which the NTR staff uses to control, track, and make dose reduction enhancements. Each NTR licensed operator has a unique login identification to a database where at the beginning of the workday, the individual uses a scanner over several RWPs which have unique bar codes for the job they will do in that one instance (i.e., reactor operations, radiography north room, etc.). By scanning the applicable RWP the computer prompt screen opens and shows the individual their limitations for work (e.g., max dose, max dose rate, etc.) and requirements

for the job (e.g., extremity monitoring, whole body dosimetry, etc.). The database has been implemented recently, but it has already produced useful, definitive data to determine weaker areas of an ALARA program by knowing which jobs at the NTR are impacting overall dose; thus lowering the total man-rem at the facility.

In 2011, the highest annual exposure to any full time NTR worker was 1.172 Rem; the lowest was recorded as 0.282 Rem.

Since the last inspection, environmental records showed that there was no alpha, beta or gamma activity attributable to activities at the NTR facility which was found on or in vegetation in the vicinity of the site; there was no release of radioactivity in water or to groundwater greater than the limits specified in 10 CFR Part 20, Appendix B; and the results of samples collected from off-site locations indicate normal background for the regional area.

The facility did not discharge radiological effluent waste to the sewer system since the last inspection.

c. Conclusion

The licensee health physics program and operations were in compliance with 10 CFR part 20 regulations, licensee procedures, and TS. The licensee has an impressive database system to aid with their ALARA program.

**4. Design Changes**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that if design changes were made, they were reviewed and approved in accordance with 10 CFR 50.59, the TS, and the licensee's administrative procedures:

- Annual Report for License R-52, Docket 50-113, for the period of January 1, 2011 through December 31, 2011
- Change Authorization 301 "NTR Fine Control Rod Drive Split-Nut Assembly Replacement", dated March 9, 2012
- Administrative Procedure 9.4 "Change Authorization" Rev. 561, dated February 7, 2006

b. Observations and Findings

The licensee conducted several maintenance activities at the reactor facility, one of which was a repair to the reactor's Fine Control Rod Drive. During a reactor startup on March 5, 2012, the control rod drive failed to withdraw. A subsequent investigation by the licensee determined that the threaded portion of the control rod stripped the split drive nut assembly during operation; grease buildup on the lead screw of the Fine Control Rod caused a cross threading condition.

There was no direct replacement part available, therefore the licensee needed to manufacture the bronze drive nut. Since there was no design drawing available to fabricate a replacement drive nut for the Fine Control Rod, a reverse engineering effort was undertaken to provide a satisfactory replacement. Since the new parts could not be considered a like-for-like replacement, an evaluation was conducted to ensure form, fit, and function. Additionally, since the Fine Control Rod Drive provides the motive force for moving the Fine Control Rod, and since the Fine Control Rod is classified as a component important to safety, a 10 CFR 50.59 evaluation was conducted in accordance with regulations and internal procedures.

It was noted that the licensee had revised their Change Authorization to become consistent with the evaluation criteria listed in 10 CFR 50.59. Since the licensee revised their Change Authorization the inspector considers inspector follow-up item (IFI) 50-73/2011-02 closed.

c. Conclusion

Design changes were made in accordance with 10 CFR 50.59 requirements, TS, and licensee procedures.

**5. Committees, Audits, and Reviews**

a. Inspection Scope (IP 69001)

The inspectors reviewed the following to ensure that the audits and reviews stipulated in TS Section 6.2 were being completed by the cognizant Safety Review Groups:

- Annual Report for License R-52, Docket 50-113, for the period of January 1, 2011 through December 31, 2011
- Vallecitos Technical Safety Committee (VTSC) Audit Review Calendar, Quarterly Reviews for 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> Quarters 2011; 1<sup>st</sup> Quarter 2012

b. Observations and Findings

One inspector verified that the VTSC composition, meeting quorums, and meeting frequency were all in accordance with TS Section 6.2. The VTSC had quarterly meetings and a quorum was present as required. The inspector also verified that independent reviews required by TS Section 6.2 were completed by appointed individuals.

The inspector followed up on an Unresolved Item (URI) 50-73/2011-201-01 for the failure to perform periodic independent audit examination and verification of facility operations. The inspector interviewed the licensee and determined that a program is in place to perform a quarterly audit of applicable portions of the TS (e.g., Surveillances, Limiting Conditions of Operation, etc.) which is completed on a 2-year cycle. The inspector determined that the audit calendar and program is

sufficient to meet the intent of the TS periodic audit examination requirements. The inspector considers URI 50-73/2011-201-01 closed.

c. Conclusion

The VTSC provided the oversight required by the TS.

**6. Transportation**

a. Inspection Scope (IP 86740)

The inspectors interviewed licensee personnel and reviewed the following records to verify whether the licensee has established and is maintaining an effective management-controlled program, to ensure radiological and nuclear safety for shipping licensed radioactive material:

- Annual Report for License R-52, Docket 50-113, for the period of January 1, 2011 through December 31, 2011
- Standard Operating Procedure 7.11, "Release of Customer Materials", Revision 951 reviewed July 10, 2010

b. Observations and Findings

By nature of its operations, the VNC does not typically conduct waste transfer to or from the R-33 license.

The inspectors made one note with changes to the guidance for the release of irradiated materials to better conform to the regulatory requirements for exempt material. The facility has procedures that provide guidance for the unrestricted release of NTR neutron radiographed items. GE-VNC had evaluated isotopes for induced activity levels at the maximum or near maximum fluence expected to be received by NTR neutron radiographed items. The NTR release of neutron radiographed items is based on the evaluation of the limits of both Department of Transportation regulations of 49 CFR 173.436 and 10 CFR 30.70 and 10 CFR 30.71. The NTR conducted several calculations based on their typical radiographed inventory (i.e., < 22 lbs) and determined that a 9 hour decay is sufficient to meet the requirements of the Table of Exempt Material Activity Concentrations and Exempt Consignment Activity Limits for Radionuclides found in 49 CFR 173.436; for conservatism, the licensee typically uses an 18 hour decay period to allow for further decay.

c. Conclusion

Since the last inspection, there were no shipments of radioactive material from the R-33 license.

**7. Exit Interview**

The inspector presented the inspection results to licensee management at the conclusion of the inspection on May 10, 2012. The inspector described the areas inspected and discussed in detail the inspection observations. No dissenting comments were received from the licensee. The licensee acknowledged the observations presented and did not identify as proprietary, any of the material provided to or reviewed by the inspector during the inspection.

## **PARTIAL LIST OF PERSONS CONTACTED**

### Licensee

T. McFadden	VNC Manager
D. Thomas	NTR Manager
D. Krause	Regulatory Compliance Program Manager and Radiation Safety Officer
T. Dashiell	EHS and Regulatory Compliance Manager

## **INSPECTION PROCEDURES USED**

IP 69001	Class II Research and Test Reactors
IP 86740	Transportation

## **ITEMS OPENED, CLOSED, AND DISCUSSED**

### OPENED

None

### CLOSED

50-73/2011-201-01	URI	Failure to perform a periodic independent audit examination and verification of facility operations.
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50-73/2011-201-02	IFI	Review the evaluation criteria employed by the licensee concerning design change and experiments for consistency with 10 CFR 50.59
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### DISCUSSED

None

## **PARTIAL LIST OF ACRONYMS USED**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Document Access and Management System
ALARA	As Low As Reasonably Achievable
GE	General Electric Company
IP	Inspection Procedure
LCO	Limiting Condition of Operation
NRC	U.S. Nuclear Regulatory Commission
NTR	Nuclear Test Reactor
Rev.	Revision
RWP	Radiation Work Permit
TS	Technical Specifications
URI	Unresolved Item
VNC	Vallecitos Nuclear Center
VTSC	Vallecitos Technological Safety Council