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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

March 19, 2008

Mr. David Turner, Manager
Vallecitos Nuclear Center
GE-Hitachi Nuclear Energy Americas, LLC
6705 Vallecitos Road
Sunol, California 94586

SUBJECT: NRC INSPECTION REPORT 050-00018/08-001

Dear Mr. Turner:

This refers to the inspection conducted on February 25 through 29, 2008, of the General Electric (GE) Vallecitos Boiling Water Reactor (VBWR) in Sunol, California. The inspection was an examination of decommissioning 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 included reviews of your decommissioning status, occupational radiation exposures, solid radioactive waste management, and transportation of radioactive materials. Details of the inspection were presented to your staff at the conclusion of the onsite inspection. The enclosed report presents the results of that inspection.

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred involving the failure to post an area that contained a strontium-90 check source with the radioactive symbol and the words Caution Radioactive Materials. This non-repetitive, licensee identified violation is being treated as a non-cited violation (NCV), consistent with Section VI.A of the Enforcement Policy. This violation is described in Section 2.2 of the subject inspection report. If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to: (1) the Regional Administrator, Region IV; and (2) the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact the undersigned at (817) 860-8197 or Mr. Emilio M. Garcia, Health Physicist, at (530) 756-3910.

Sincerely,

/RA/

Jack E. Whitten, Chief
Nuclear Materials Safety Branch B

Docket No.: 050-00018
License No.: DPR-1

Enclosure: NRC Inspection Report No. 050-00018/08-001

cc w/encl.: California State Radiation Control Program Director

bcc w/enclosure (via e-mail distribution):
LDWert
JEWhitten
JTBuckley, FSME/DWMEP/DURLD
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SUNSI Review Completed: EMG ADAMS: ■ Yes ☐ No Initials: EMG
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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	050-00018
License No.:	DPR-1
Report No.:	050-00018/08-001
Licensee:	GE-Hitachi Nuclear Energy Americas, LLC
Facility:	General Electric Vallecitos Boiling Water Reactor
Location:	6705 Vallecitos Road Sunol, California 94586
Dates:	February 25 through 29, 2008
Inspector:	Emilio M. Garcia, Health Physicist
Approved By:	Jack E. Whitten, Chief Nuclear Materials Safety Branch B
Attachment:	Supplemental Inspection Information

ENCLOSURE

EXECUTIVE SUMMARY

GE-Hitachi Vallecitos Nuclear Center
NRC Inspection Report No. 050-00018/08-001

This inspection was a routine, announced inspection of activities being conducted at the General Electric (GE) Vallecitos Boiling Water Reactor (VBWR) during the removal of equipment and components from the reactor building. The inspection included tours of the reactor site, a review of applicable records, observations of activities in progress, and interviews with site personnel.

Decommissioning Status (IP 71801)

- Decommissioning activities were being conducted by the licensee in accordance with license requirements (Section 1).

Occupational Radiation Exposure (IP 83750)

- A non-cited violation was identified related to failure to post an area that contained a strontium-90 check source with the radioactive symbol and the words Caution Radioactive Materials. Other areas of the radiation protection program were in compliance with regulatory requirements and license conditions (Section 2).

Solid Radioactive Waste Management and Transportation of Radioactive Materials (IP 86750)

- A procedure was revised to provide guidance on size reduction of waste. The inspector concluded that this procedural change did not negatively impact the solid radioactive waste management and transportation of radioactive materials programs (Section 3.1).

- Personnel involved in the transfer, packaging, and transport of radioactive waste, and the transportation of other radioactive materials, had received the required training (Section 3.2).

- The licensee maintained copies of the applicable regulations and the licenses of the recipients of radioactive materials (Section 3.3).

- The licensee had implemented a transportation program for radioactive materials in accordance with NRC and the U.S. Department of Transportation regulations (Section 3.4).

Report Details

Summary of Plant Status

The GE VBWR achieved full power operations at 50 Mw(t) in 1957 but was permanently shut down in 1963. At the time of this inspection, the reactor fuel had been permanently removed from the reactor and shipped off site. The VBWR license authorizes the possession of the associated reactor equipment and components and the related byproduct material. At the time of the inspection, the reactor was in SAFSTOR, a decommissioning alternative which authorizes a licensee to safely store the reactor and related byproduct material for an extended period of time, pending final decommissioning. The primary reason GE had placed the reactor in SAFSTOR was to allow for the decay of cobalt-60 which in turn would reduce radiation exposures to occupational workers during future decommissioning activities.

The VBWR license has no expiration date. The licensee does not intend to decommission the reactor in the near future, but intends only to remove components and equipment as permitted under the current license. License Condition 5.a to Amendment 21 of the license authorizes the licensee to dispose of any component parts or devices from the facility in accordance with the provisions of 10 CFR Part 20. The licensee, in preparation of activities for removing components and equipment from the reactor building, had procured the services of a contractor, Nuclear Fuel Services (NFS).

As the primary contractor, it was the responsibility of NFS to manage, supervise, assure health and safety on the project, and to conduct the removal of components from the VBWR. This specific project was referred to by the licensee as the NFS Liability Reduction Project (NFS Project). This inspection reviewed the progress being made by the licensee for removing components and equipment from the reactor building. This effort by NFS did not include the removal of the reactor vessel. The licensee projected that the work of removing equipment and components would be completed by June 18, 2008.

1 Decommissioning Status (IP 71801)

1.1 Inspection Scope

The inspector interviewed cognizant personnel, reviewed selected documents, and toured portions of the site to observe work activities including housekeeping, safety practices, fire loading, and radiological controls.

1.2 Observations and Findings

As noted in the previous inspection report, the NFS Project had developed a Component Removal Project Plan (CRMP). The inspector confirmed that activities outlined in the CRMP would be conducted under the exiting reactor license. No new Change Authorizations related to the NFS Project had been approved since this license was last inspected in November 2007. Four revised or new project specific procedures had been approved by GE-Hitachi Vallecitos Regulatory Compliance and Area Managers since this license was last inspected in November 2007. These revised procedures included:

1. NFS-VNC-OPS-9203, Packaging and Labeling of Radioactive Materials
2. NFS-VNC-OPS-9204, VBWR Air Sampling
3. NFS-VNC-OPS-9208, Surveillances

4. NFS-VNC-OPS-9402, Project-Specific Instruments

The schedule maintained by the NFS Project Manager at the time of the inspection projected that the removal project would be completed by June 18, 2008, with the actual components removed and shipped by the end of May 2008. At the time of the inspection, the total work force for the project, including project management and supervision, was 16 individuals.

The inspector conducted tours of the VBWR building, Building 300, including the Mechanical Test Laboratory. During these tours, the inspector observed work in progress, interviewed personnel, and conducted independent radiation surveys. The work-in-progress activities were being conducted in a safe and orderly manner. The inspector conducted independent radiological surveys using a Ludlum Model 2401-EC survey meter (NRC No. 21175G, calibration due date July 10, 2008). Radiological controls, including postings and barriers, were observed by the inspector to be in place. Good housekeeping and fire protection practices were being implemented in the areas toured by the inspector.

At the time of the inspection, most of the equipment in the lower level of the reactor building had been removed. Remaining work included removal of the spent fuel pool and reactor water clean-up filters, resins and shields, and removal of bioshield wall.

1.3 Conclusion

Decommissioning activities were being conducted by the licensee in accordance with license requirements.

2 Occupational Radiation Exposure (IP 83750)

2.1 Inspection Scope

The inspector reviewed the implementation of the radiation protection program as it relates to the VBWR components removal project.

2.2 Observations and Findings

The inspector reviewed two procedures that were recently issued or revised. A new procedure, NFS-VNC-INST-9402, Project-Specific Instruments, was approved on February 7, 2008. This procedure addresses the calibrations and operational response checks of project-supplied radiation protection instruments that are not already procedurally addressed in VNC procedures. Additionally procedure NFS-VNC-INST-9404, VBWR Air Sampling, was revised on February 7, 2008. This revision reorganized the procedure and provided directions for the process for counting air sample filters for gross activity by NFS Project personnel.

On January 10, 2008, training was provided to four radiation protection technicians on the Control and Transfer of Radioactive Material. This training included the applicable NRC regulations and VNC procedural requirements for the labeling and posting of radioactive material. The training also included the VNC procedural requirements for the transfer of radioactive material.

On January 22 and 23, 2008, GE-Hitachi Regulatory Compliance conducted an audit of the NFS Project to evaluate the implementation of VNC Safety Standards 5.1.1, Radiation Posting and Labeling, and 5.4, Radiological Surveys and Procedure No. 3350, Surface Contamination-Measurement and Control. The audit included observations of posting, labeling, performance of radiological surveys including contamination and dose rate evaluations, routine radiological instrument checks, and contractor safety. According to the GE-Hitachi VNC Manager of Regulatory Compliance and Environmental Health and Safety, this audit did not identify any problems. The documentation of this audit was pending at the time of this inspection.

During the previous inspection the inspector noted that the approval of instrument calibrations by two off-site vendors was under review by the GE-Hitachi VNC Manager of Regulatory Compliance and Environmental Health and Safety. Radiation Safety Control Services (RSCS) was subsequently approved on November 30, 2007, and ENERCON Services, Inc. was approved on February 18, 2008.

During the previous inspection, the Manager Regulatory Compliance and Environmental Health and Safety stated that GE-Hitachi would review Procedure Number 3355 to clarify and expand the procedure. This procedure was revised on February 1, 2008. The procedure now states that health physics technicians qualified under the Radiation Monitoring Certification Program are considered Regulatory Compliance personnel and as such may perform surveys of material for release for unrestricted use.

The inspector reviewed the licensee-maintained NFS Project personnel exposure records for 2007 to ensure that no individual exceeded the regulatory limits specified in 10 CFR 20.1201. Exposure monitoring consisted of external and internal doses. GE-Hitachi used optically stimulated luminescent (OSL) dosimeters for the dose of record.

During 2007, 19 NFS Project personnel were monitored for exposure. All personnel exposures were below the regulatory limits specified in 10 CFR Part 20. The highest total effective dose equivalent exposure was 0.231 rems with a regulatory limit of 5 rems. The highest dose to the lens of the eye was 0.231 rems the regulatory limit of 15 rems. The highest dose to the skin of the whole body was 0.230 rems a regulatory limit of 50 rems.

All radiation doses were from external sources only. There were no assigned committed effective dose equivalent (internal) exposures during 2007. Based on whole body counting results, no radioactive material was detected in NFS Project personnel.

The inspector noted that the NFS Project had purchased twenty MGP Model DMC 2000S Alarming Dosimeters. These MGP dosimeters were calibrated by RSCS. RSCS used a cesium-137 source to calibrate these dosimeters. On September 20, 2007, at the request of the NFS Project Manager, the VNC instrument calibration laboratory performed a calibration verification on twenty DMC 2000S Alarming Dosimeters. The acceptance criteria used by VNC was $\pm$15% as measured at 100 millirems and 600 millirems per hour. Eight dosimeters passed the $\pm$15% criteria for both dose and dose rate. Twelve of the dosimeters were outside of one or both of the dose or dose rate criteria. VNC used a cobalt-60 calibration source, although the original calibration by the vendor was performed using a cesium-137 source.

The licensee possessed a copy of a report dated January 2001, prepared by Battelle Memorial Institute, Pacific Northwest Division, PNWD-3040, Evaluation of the MGP Instruments Model DMC 2000S Electronic Dosimeter, which states that the DMC 2000S dosimeters respond within ± 30% of deep dose equivalent from 53 keV to 6 MeV. The report further states that the DMC 2000S under-responds to cobalt-60 when the dosimeter was calibrated with cesium-137. The average ratio of the dosimeters' response to the true value was 1.19 to 1. These results are generally consistent with the results of the VNC calibration verification. Based on this information, the GE-Hitachi Manager, Regulatory Compliance and Environmental Health & Safety concluded that the calibration performed by RSCS was acceptable, and the MGP Instruments Model DMC 2000S Electronic Dosimeter could be used.

On October 12, 2007, Change Authorization No. 07-34, Vendor Calibration of MGP Alarming Dosimeters, was approved by GE-Hitachi. This Change Authorization approved the use of an outside vendor for the calibration of the MGP Model DMC 2000S Alarming Dosimeters. All 20 dosimeters were placed into service.

Prior to the approval of Change Authorization No. 07-34, from September 27 to October 12, 2007, radiation work permit records show that four DMC 2000S Alarming Dosimeters were used by the VBWR Project. One of these alarming dosimeters was outside of the VNC acceptance criteria. This alarming dosimeter was used once, and the RWP record indicates that the alarming dosimeter recorded a dose of 0.6 millirem. If the VNC calibration verification noted difference of -19.4% was used to correct this dose, the dose would have been 0.7 millirem. The individual who used this alarming dosimeter was assigned a dose of 22 millirems deep dose equivalent for the calender quarter in question and 110 millirems for the year, based on the OSL dosimeter of record.

The VBWR has been shut down since 1963, and considering the relative half-life of cobalt-60, 5.2 years, and cesium-137, 30.23 years, the inspector concluded that use of an electronic dosimeter calibrated to cesium-137 would be more appropriate than one calibrated to cobalt-60. The amount of cobalt-60 remaining would be less than 1% of the original quantity, whereas, for cesium-137 it would be about a third of the original quantity.

The inspector reviewed the circumstances related to the improper storage of a strontium-90 (Sr-90) check source. A Sr-90 check source, serial number 2, was last tested for leakage on October 13, 2007. This source had an original assay of 3 millicuries on January 1, 1963. The inspector calculated that the remaining activity as of date of this leak test was 1.02 millicuries. This quarterly leak check was performed in building 102B of the VNC site. Sometime after this leak test was performed, possession of this check source was obtained by the NFS Project. The check source was then stored in the NFS office trailer, an unrestricted area.

10 CFR 20.1902(e) states, "The licensee shall post each area or room in which there is used or stored an amount of licensed material exceeding 10 times the quantity of such material specified in Appendix C to part 20 with a conspicuous sign or signs bearing the radioactive symbol and the words 'Caution, Radioactive Material(s)' or 'Danger, Radioactive Material(s).'" Appendix C to 10 CFR Part 20 lists the quantities of licensed material requiring labeling as 0.1 microcuries for Sr-90. Ten times this amount is 1 microcurie. The NFS office trailer was not posted as a radioactive materials area as defined in 10 CFR 20.1902(e). The NFS Project Health and Safety Coordinator stated

that he brought the Sr-90 source from building 102B for use by the NFS Project to verify radiation survey instrument response. Sometime after it was used, the Sr-90 check source was brought into the NFS office trailer by a technician and placed on a book shelf near the NFS Project Health and Safety Coordinator. The Health and Safety Coordinator believes that the source was situated there, at most, for a few days before he and others decided the source should be stored in a properly posted area.

The NFS Project Health and Safety Coordinator identified the improper storage of the Sr-90 check source and corrected it.

The failure to post an area that contained a Sr-90 check source with the radioactive symbol and the words Caution Radioactive Materials was identified as a violation of 10 CFR 20.1906(e). This non-repetitive, licensee identified and corrected failure satisfies the criteria as a non-cited violation (NCV 050-00018/0801-01).

2.3 Conclusion

A non-cited violation was identified related to failure to post an area that contained a strontium-90 check source with the radioactive symbol and the words Caution Radioactive Materials. Other areas of the radiation protection program were in compliance with regulatory requirements and license conditions.

3 Solid Radioactive Waste Management and Transportation of Radioactive Materials (IP 86750)

3.1 Changes in the Programs

a. Inspection Scope

The inspector interviewed cognizant personnel to determine if any major changes had been made by the licensee since the last inspection in organization, personnel, facilities, equipment, programs, and procedures that may have affected the solid radioactive waste management and transportation of radioactive materials programs being maintained by the licensee.

b. Observations and Findings

The inspector interviewed the GE-Hitachi Manager, Regulatory Compliance and Environmental Health & Safety, the NFS Project Manager, and the NFS Project Shipping and Technical Support Coordinator. These individuals indicated that no changes were made since the last inspection in organization, personnel, facilities, equipment, and programs that may have affected the solid radioactive waste management and transportation of radioactive materials' program. A procedure, NFS-VNC-OPS-9203, Packaging and Labeling of Radioactive Material, was revised on January 31, 2008. This procedure was revised to introduce guidance specific to the size reduction of debris and loading materials from multiple waste streams into a single package. Also, the text was re-formatted to improve readability. The inspector concluded that this procedural change did not negatively impact the solid radioactive waste management and transportation of radioactive materials programs.

c. Conclusions

A procedure was revised to provide guidance on size reduction of waste. The inspector concluded that this procedural change did not negatively impact the solid radioactive waste management and transportation of radioactive materials programs.

3.2 Training

a. Inspection Scope

The inspector interviewed cognizant personnel and review selected documents to determine if all personnel involved in the transfer, packaging, and transport of radioactive waste and transportation of other radioactive materials had received the required training. Items reviewed by the inspector included the initial training and periodic retraining in the US Department of Transportation (DOT) regulations, training in NRC regulations, and the waste burial license requirements, instructions in the transfer, packaging, and transport of radioactive waste, transportation of other radioactive materials, and the licensee's operating procedures.

b. Observations and Findings

The inspector interviewed the GE-Hitachi Specialist, Radiation Monitoring, NFS Project Manager, and the NFS Project Shipping and Technical Support Coordinator to determine if training had been provided since this area was last inspected in November 2007. Training was provided on January 10, 2008, to four radiation protection technicians on the performance of shipping surveys, in accordance with DOT regulations. On January 7, 2008, five recently hired NFS Project personnel were provided with general DOT hazardous material training and security awareness training. As noted in Inspection Report 050-00018/07-004, all other NFS Project individuals had completed the annual radwaste training presented by GE-Hitachi VNC.

DOT HAZMAT transportation security general awareness training was completed by all individuals. This HAZMAT training was provided by the licensee to all workers involved in the transfer, packaging and transport of radioactive materials. The inspector determined that each individual involved in the transfer, packaging, and transport of radioactive material had received the required initial training and retraining.

c. Conclusions

Personnel involved in the transfer, packaging and transport of radioactive waste, and transportation of other radioactive materials, had received the required training.

3.3 Implementation of the Solid Radioactive Waste Program

a. Inspection Scope

The inspector interviewed cognizant personnel and review selected documents to determine if the licensee maintained copies of the applicable regulations and licenses of recipients of radioactive materials being shipped from the site.

b. Observations and Findings

The inspector determined that NFS Project management had access to electronic copies of NRC, DOT, and the waste disposal vendor's State of Utah radioactive materials license. Additionally, the inspector confirmed that the licensee had maintained copies of the licenses for the recipients of all radioactive materials that had been shipped from the VBWR. The NFS Project management also maintained a copy of the State of Utah land disposal facility access permit.

c. Conclusions

The licensee maintained copies of the applicable regulations and the licenses of the recipients of radioactive materials.

3.4 Shipping of Low Level Radioactive Waste for Disposal, and Transportation of Other Radioactive Materials

a. Inspection Scope

The inspector reviewed records maintained by the licensee of radioactive material shipments made since the last inspection.

b. Observations and Findings

As of February 28, 2007, eight shipments of radioactive materials had been made from the VBWR since this area was last inspected in November 29, 2007. The inspector reviewed records for shipments GE-07-49-01, GE-07-49-02, GE-07-49-03, GE-07-49-04, GE-07-50-01, GE-07-50-02, GE-07-50-03 and GE-07-51-01. All of the shipping records included a copy of required radiological surveys conducted by the licensee, NRC Form 540, Uniform Low-Level Radioactive Waste Manifest, records that the driver had emergency response information, and instructions to the carrier for maintenance of exclusive use shipment controls.

The inspector confirmed that the emergency response number listed on the waste manifest was the telephone number for the licensee's security station. Documents that require shipper certifications were reviewed by the inspector who confirmed that all documents had been signed by an authorized licensee representative. The inspector also substantiated that all individuals signing shipper certifications for the above shipments had received the appropriate training as required by 49 CFR 172, Subpart H.

The Principal Engineer (Radioactive Waste) and the NFS Project Shipping and Technical Specialist stated that the licensee had not received any notices of noncompliance from DOT or other competent State authorities.

c. Conclusions

The licensee had implemented a transportation program for radioactive materials in accordance with NRC and the U.S. DOT regulations.

4 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at the exit meeting on February 29, 2008. The licensee did not identify any documents or other information provided to, or reviewed by, the inspector as proprietary.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Ayala, Specialist, Radiation Monitoring
C. Bassett, Manager, Facilities Maintenance and Quality Assurance
L. Mahlahla, Manager, Regulatory Compliance and Environmental Health & Safety
C. Martinez, Principal Engineer (Radioactive Waste)
H. Stuart, Specialist, Radiological Engineering
D. Turner, Manager, Vallecitos Nuclear Center

Nuclear Fuel Services - Contractor

S. Alvores, Laborer Supervisor
M. Arnerich, Project Health and Safety Cooridator
G. Astrauckas, Project Manager
J. Enabenter, Project Radiation Monitoring Technician
S. Finchum, Project Radiation Monitoring Technician
D. Jordan, Project Shipping and Technical Specialist

INSPECTION PROCEDURE USED

IP 71801	Decommissioning Status
IP 83750	Occupational Radiation Exposure
IP 86750	Solid Radioactive Waste Management and Transportation of Radioactive Materials

ITEMS OPENED AND CLOSED

Opened

050-00018/0801-01	NCV	Failure to post an area containing radioactive materials with the radioactive symbol and the words Caution Radioactive Materials.

Closed

050-00018/0801-01	NCV	Failure to post an area containing radioactive materials with the radioactive symbol and the words Caution Radioactive Materials.

Discussed

None

LIST OF ACRONYMS

CRMP	Component Removal Project Plan
DOT	U. S. Department of Transportation
GE-Hitachi	General Electric-Hitachi Nuclear Energy Americas, LLC
IP	NRC Inspection Procedure
Mw(t)	megawatts thermal
MeV	million electron volts
NCV	Non-Cited Violation
NFS	Nuclear Fuel Services
NFS Project	NFS Liability Reduction Project
OSL	Optically Stimulated Luminescent
RSCS	Radiation Safety Control Services
VBWR	Vallecitos Boiling Water Reactor
VNC	Vallecitos Nuclear Center