UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

October 8, 2010

EA-10-096

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

SUBJECT: NRC INSPECTION REPORT 070-00754/10-001

Dear Mr. Turner:

This refers to the inspection conducted on April 5-8 and August 16-19, 2010, at the Vallecitos Nuclear Center located in Sunol, California. The preliminary inspection results were presented to you at the conclusion of the onsite inspection. A final exit briefing was conducted with you telephonically on September 23, 2010. The enclosed report presents the results of this 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 selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of this inspection, three apparent violations were identified and are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's website at www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html. The apparent violations are associated with an incident that occurred on February 16, 2010, resulting in the uptake of radioactive material by two site contractors and inadequate control of contaminated worker clothing. The apparent violations involved the failure to follow procedures, to conduct adequate surveys and to report offsite contamination to the NRC. Details about the incident and the apparent violations are provided in Section 3 of the enclosed inspection report.

Since the NRC has not made a final determination in this matter, a Notice of Violation is not being issued for these inspection findings at this time. In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review.

A predecisional enforcement conference to discuss these apparent violations has been scheduled for November 10, 2010, at the NRC Region IV Office in Arlington, Texas. This conference will be open for public observation in accordance with Section V of the NRC Enforcement Policy. A notice providing additional details regarding this conference will be provided separately.

The decision to hold a predecisional enforcement conference does not mean that the NRC has determined that a violation has occurred or that enforcement action will be taken. This conference is being held to obtain information to assist the NRC in making an enforcement decision. This may include information to determine whether a violation occurred, information to determine the significance of a violation, information related to the identification of a violation, and information related to any corrective actions taken or planned to be taken. The conference will provide an opportunity for you to provide your perspective on these matters and any other information that you believe the NRC should take into consideration in making an enforcement decision. In addition, you should be prepared to discuss your decision-making process regarding reportability of the February 16, 2010, uptake event. In presenting your corrective actions, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violations. The guidance in the enclosed excerpt from NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," may be helpful.

You will be advised by separate correspondence of the results of our deliberations on this matter. No response regarding these apparent violations is required at this time.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, if you choose to provide one, 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's Web site at 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 Mr. Robert Evans, Senior Health Physicist, at (817) 860-8234, or Dr. D. Blair Spitzberg, Chief, Repository and Spent Fuel Storage Branch, at (817) 860-8191.

Sincerely,

/RA/

Arthur T. Howell III, Director
Division of Nuclear Materials Safety

Docket Number: 070-00754
License Number: SNM-960

Enclosures:
1. NRC Inspection Report 070-00754/10-001
2. NRC Information Notice 96-28

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■ Publicly Available		☐Non-publicly Available	☐Sensitive	■ Non-sensitive
Category – **KEYWORD**:		EA-10-096 PEC Letter GE Valecitos Nuclear		

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Evans/Schlapper	DBSpitzberg	RKellar	CBoote	ATHowell
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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	070-00754
License No.:	SNM-960
Report No.:	070-00754/10-001
Licensee:	GE-Hitachi Nuclear Energy Americas LLC
Facility:	Vallecitos Nuclear Center
Location:	Sunol, California
Dates:	April 5-8, 2010 August 16-19, 2010
Inspectors:	Robert Evans, PE, CHP, Senior Health Physicist Repository and Spent Fuel Safety Branch
	Gerald A. Schlapper, PhD, CHP, Health Physicist Repository and Spent Fuel Safety Branch
Approved By:	D. Blair Spitzberg, PhD, Chief Repository and Spent Fuel Safety Branch
Attachment:	Supplemental Inspection Information

ENCLOSURE

EXECUTIVE SUMMARY

GE-Hitachi Nuclear Energy Americas
NRC Inspection Report 070-00754/10-001

This inspection was a routine, announced inspection of licensed activities being conducted at the Vallecitos Nuclear Center.

Management Organization and Controls

- The licensee provided oversight and control of site activities during 2009 in accordance with license conditions and regulatory requirements (Section 1).

Operational Safety/Fire Protection

- The licensee's operational safety and fire protection activities were conducted in accordance with license requirements (Section 2).

Radiation Protection

- The licensee implemented its radiation protection program in accordance with license conditions and regulatory requirements during 2009. The licensee monitored workers for occupational exposures and no individual exceeded the regulatory limits for occupational exposures during 2009 (Section 3.2.a).

- Transportation activities were being conducted in accordance with regulatory requirements (Section 3.2.b).

- Two radiation workers experienced uptakes of radioactive material during February 2010 when they opened a drum, in violation of a site procedure, to collect swipe samples from the components in the drum. While the intakes were determined not to exceed exposure limits, the licensee's failure to follow site procedures was an apparent violation of a license condition. In addition, the licensee's failure to make or cause to be made surveys was an apparent violation of regulatory requirements. Finally, the licensee's failure to report contaminated worker clothing found offsite to the NRC in a timely manner was an apparent violation of regulatory requirements (Section 3.2.c).

Operator Training/Retraining and Emergency Preparedness

- The licensee implemented training and emergency preparedness programs as required by license condition and regulatory requirements. In response to the February 2010 uptake event, the licensee retrained site personnel to reinforce its expectations of adherence to radiation protection program requirements (Section 4).

Maintenance and Surveillance Testing of Safety Controls/Permanent Plant Modifications

- The licensee tested and operated the criticality alarm systems in accordance with site procedures and regulatory requirements. The licensee conducted instrument calibrations and check source leak tests in accordance with license requirements (Section 5).

Effluent Control and Environmental Protection

- The licensee implemented its effluent and environmental monitoring programs in accordance with license conditions and regulatory requirements. All required samples were collected, and no sample result exceeded any license or regulatory limits (Section 6).

REPORT DETAILS

Summary of Plant Status

At the time of the inspection, the licensee continued to possess and store special nuclear material (SNM) at the facility. Licensed operations included fuel examinations within various hot cells. Other work in progress included manufacturing of sealed sources under the licensee's State of California license. Future work activities include cleanup of several hot cells containing SNM.

The licensee subdivided the various areas containing SNM into criticality limit areas to control the amount of SNM that is permitted in a given area. Compliance with these area limits eliminates the potential for a criticality accident. The licensee's main office conducted a recalculation of these SNM criticality limits. The licensee implemented these updated criticality limits during early May 2010. The licensee still has to update the local software that is used to help control the movement of SNM from area to area. During the inspection, based on the licensee's records, no area contained SNM in excess of the authorized limits.

Since the previous inspection, the licensee completed the refurbishment of Cell 4, an area that previously contained radioactive material owned by the U.S. Department of Energy (DOE). According to the licensee's records, 18,735 pounds of contaminated waste material and approximately 35 curies of radioactivity were removed from Cell 4. This waste material was subsequently shipped offsite for permanent disposal. The licensee plans to use Cell 4 for bulk storage of radioactive materials licensed by the State of California.

During the inspection, the licensee was conducting a detailed assessment of legacy wastes at the site. The licensee estimated that it was in possession of approximately 285 drums or similar containers of legacy wastes. These wastes include NRC-regulated and non-NRC-regulated wastes. The licensee plans to characterize the wastes for shipment and disposal. The licensee plans to identify the contents of each container through a records review and/or field sampling. To support field sampling, the licensee established an area for opening the drums in a controlled manner. The area will be positively controlled, for example, through use of special ventilation equipment. The material in damaged drums may be repacked into a new drum, or the damaged drums may be placed into overpacks. The licensee plans to dispose of the legacy wastes, and the disposal pathway depends on the contents of the drums.

1 Management Organization and Controls (88005)

1.1 Inspection Scope

The inspectors reviewed the licensee's control and oversight of licensed activities.

1.2 Observations and Findings

The inspectors reviewed the licensee's organizational structure and discussed the structure with licensee management. All management positions continued to be filled with qualified individuals. Since the previous inspection, the licensee dissolved the engineering and materials services group and transferred the various functions into other existing groups. For example, the shipping staff and the radiological counting room staff positions were transferred into the facilities and maintenance group. At the time of the inspection, approximately 110 individuals were assigned to the site including licensee employees and contractor employees.

Appendix A, Section 4.4, of the license application specifies the Vallecitos Technological Safety Council (VTSC) requirements. The inspectors reviewed the licensee's implementation of the VTSC requirements. The VTSC met quarterly, and a quorum was always present. The VTSC discussed relevant issues including recent events and trends.

The licensee previously implemented an enhanced As Low As Reasonably Achievable (ALARA) program. During 2009, the licensee established a site-wide goal of 32.5 rems of collective dose. The actual dose was 36.2 rems. The primary reason for the exceedance was the licensee's underestimation of dose required to complete Cell 4 cleanout work. In addition, a number of work activities were performed that were not apparent during initial annual ALARA planning. For 2010, the licensee has established a preliminary goal of 18.4 rems of collective dose. This goal takes into consideration the level of effort needed for cobalt-60 source production, routine job coverage, and test reactor operation.

The licensee continues to expand its ALARA program. During 2009, the licensee introduced the ALARA work planning process for high dose jobs. The licensee plans to introduce the ALARA job observation and ALARA suggestions programs during 2010. Collectively, these programs are intended to help the licensee maintain control and oversight of work projects in order to minimize occupational exposures.

10 CFR 20.1101(c) requires that licensees review radiation program content and implementation at least annually. The inspectors reviewed the licensee's annual radiation protection program report for 2009 and discussed the contents of the report with licensee representatives. The report provided detailed information to licensee management about the status of the radiation protection program for the previous year.

1.3 Conclusions

The licensee provided oversight and control of site activities during 2009 in accordance with license conditions and regulatory requirements.

2 Operational Safety/Fire Protection (88020/88055)

2.1 Inspection Scope

The inspectors reviewed the licensee's control and oversight of licensed activities.

2.2 Observations and Findings

The inspectors conducted site tours to observe work in progress. The inspectors compared the criticality equipment and facility design criteria specified in the license application to the actual conditions found in the facility. Areas and equipment observed included door interlocks, continuous air monitors, radiation meters, ventilation system operation, and ventilation hood airflows. All equipment and areas in service were found to be in compliance with license application requirements. The inspectors also reviewed the licensee's fire protection equipment for operability, and all equipment appeared to be fully functional.

During site tours, the inspectors measured the ambient gamma exposure rates using a Ludlum Model 2401-EC2 survey meter (NRC number 35487G, calibration due date 12/09/10). The inspectors confirmed that all radiation areas that were toured were properly identified and posted by the licensee.

The licensee maintained records of the quantities of SNM in its possession. The inspectors compared the amount of SNM in the possession of the licensee at the time of the inspection to the limits specified in the license. Based on the licensee's inventory records, the amount of SNM in the licensee's possession was less than the licensed limits. During site tours, the inspectors compared the licensee's possession of SNM against the inventory list. All stored material was accounted for in the areas toured. Also, the inspectors randomly compared the amount of material being stored in a given area against the criticality limits for the area. No criticality limit area contained SNM in excess of the authorized limit. The licensee used computerized tracking software to help ensure that the SNM limits were maintained during movement of SNM from one area to another area.

2.3 Conclusions

The licensee's operational safety and fire protection activities were conducted in accordance with license requirements.

3 Radiation Protection (88030)

3.1 Inspection Scope

The inspectors reviewed the radiation protection program to verify compliance with 10 CFR Part 20 and the license.

3.2 Observations and Findings

a. Radiation Protection Program Review for 2009

The inspectors reviewed the licensee's occupational exposure records for 2009 to ensure that no individual had exceeded the limits specified in 10 CFR 20.1201. The licensee monitored employees for both external and internal exposures. Occupational doses consisted of combined doses from exposures to radioactive materials licensed by both the State of California and the NRC, including the NRC's SNM license. Neutron-detecting dosimeters were assigned to selected site workers based on work activity. Any neutron doses were assigned to individuals in addition to gamma radiation doses.

During 2009, the licensee monitored approximately 520 individuals for occupational exposures, including visitors. The highest total effective dose equivalent exposure to an individual was about 1.8 rem with a regulatory limit of 5 rem. The individual who received this dose was responsible for remediation of Cell 4. Selected individuals were assigned finger rings to measure extremity doses. The highest extremity dose was 4.58 rem with a regulatory limit of 50 rem.

The licensee also conducted whole body counting and bioassay sampling to further monitor workers for intakes of radioactive material. The licensee's records indicate that bioassay samples were taken from 15 individuals during 2009 and no sample revealed a

measurable amount of radioactive material. Based on the licensee's whole body counting and bioassay sampling results, no measurable internal dose was assigned to any individual during 2009. The inspectors confirmed this finding through interviews with site personnel.

The licensee had implemented extensive contamination control, air sampling, and area radiation monitoring programs. The licensee maintained extensive records of these program areas. The inspectors reviewed a representative sample of these records to ensure that the programs were properly implemented and to ensure that radioactive material was not migrating out of the restricted areas. The inspectors determined that during 2009, no measurements taken outside of the restricted area were identified which exceeded the licensee's action levels. The licensee also maintained thorough records of equipment being released from the restricted areas. A review of the licensee's records indicated that no equipment, which exceeded licensee action levels, had been released.

b. Review of Transportation Activities

The inspectors reviewed the licensee's transportation activities for 2008-2010. The licensee's records indicate that it had shipped 17,643 cubic feet of Class A waste totaling 1.34 curies in 23 shipments to a disposal site in Utah during 2008. This waste included demolition debris from the Vallecitos Boiling Water Reactor. During 2009, the licensee shipped 1,667 cubic feet of Class A waste totaling 0.22 curies in 3 shipments to the disposal site. This waste included mixed waste containing mercury from the Empire State Atomic Development Associates Incorporated Vallecitos Experimental Superheat Reactor. Also during 2009, the licensee made 21 mixed waste shipments of DOE material for disposal at the Waste Isolation Pilot Plant in New Mexico. During 2010, the licensee shipped liquid and sludge material to Tennessee for incineration. The material was shipped in drums that were packed in specially designed and shielded shipment boxes.

The inspectors reviewed representative shipping records for each shipment type. The records included manifests, radiological surveys, and emergency contact information. During the inspection, the inspectors also observed licensee staff loading a container of liquids and sludge material onto a trailer for shipment to Tennessee. The licensee was conducting transportation operations in accordance with U.S. Department of Transportation requirements.

c. Worker Contamination and Uptake Event

During 2010, the licensee experienced a contamination event that resulted in the measurable uptake of radioactive material by two radiation workers (Worker A and Worker B). On February 16, 2010, the workers entered the Building 200 Area under a general radiation work permit. The Building 200 Area includes the various buildings that were constructed to support the operation of the former GE Test Reactor. The workers planned to open a 55-gallon drum containing residual waste material from the Cell 4 cleanup work. The workers wanted to collect swipe samples from the contents of the drum to further characterize the material for shipment and disposal. The drum was being stored inside the former spare parts storage building for the GE Test Reactor. The building was posted as a radiation area and a radioactive materials storage area. Worker A was wearing protective gloves and protective clothing on the upper half of his body, while the Worker B was wearing protective gloves only. Both were wearing safety glasses, but not respirators.

The workers opened the drum and collected smear samples of lead bricks located within the drum. During the swipe sampling, one worker accidently dropped a lead brick into the drum. This action may have caused loose contamination in the drum to become airborne. After collecting the samples, the workers closed the drum and exited the area. The workers conducted limited contamination scans at the restricted area exit point using a hand-held thin-window beta-gamma frisker. Worker A noted that he had low-level contamination, 200-300 counts per minute, on his wrist and on a binder. The individual decontaminated himself and the binder, and both individuals subsequently left the area.

The next day, Worker A and Worker B and a third individual (Worker C) returned to the same area to add additional waste material to a different drum. Upon exiting the area, the three workers conducted contamination scans of their hands and shoes. Contamination was identified on their shoes. The workers unsuccessfully attempted to decontaminate their shoes and subsequently donned shoe covers. At that time, the workers' supervisors and licensee management were both notified about the personnel contamination as required by licensee procedure; specifically, Section IV of Nuclear Safety Procedure 3200, Personnel Contamination Monitoring, Reporting, and Decontamination.

Immediately after site management became aware of the contamination event, whole body counts were conducted on all three workers to assess the potential for internal contamination. The whole body counts identified detectable amounts of cesium-137 contamination in Worker A, but the results of the whole body counts of the other two workers were less than the minimum detectable activity of the whole body counter. A nasal swab was obtained from Worker A and analyzed in the onsite counting laboratory. Low level beta particulate radioactivity was identified in the individual's right nostril. The beta particulate radioactivity was measured at 11 counts per minute with a minimum detectable concentration of 3.3 counts per minute for the measuring equipment.

The licensee conducted a reportability review and determined that the event was not reportable to the NRC. The licensee's conclusion was based on preliminary calculations that considered the amount of cesium-137 identified during the whole body counts and the ratio of cesium-137 to americium-241/plutonium based on swipe samples that were collected immediately after the event had occurred. This information was used to calculate a conservative estimate of the intakes which were then shown to be below the dose limits provided in 10 CFR 20.1201.

The individuals were also instructed to provide 24-hour urine and fecal samples. The bioassay samples were submitted to an independent laboratory that participated in the DOE Laboratory Audit Program. The urine and fecal samples were analyzed for americium-241 by alpha spectroscopy. In addition, the first four of five fecal samples were analyzed for selected plutonium isotopes by alpha spectroscopy. Finally, the first fecal sample was analyzed for selected plutonium isotopes by liquid scintillation counting and was analyzed for selected uranium isotopes by alpha spectroscopy.

The licensee's contractor conducted a dose assessment of the bioassay sample results. The dose assessment was conducted using guidance provided in NRC Regulatory Guide 8.9, "Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program." The dose assessment included the intake retention fractions from

NUREG/CR-4884, “Interpretation of Bioassay Measurements.” The fecal sample results indicated that the two individuals who opened the first drum had experienced an uptake of plutonium and americium-241.

The contractor’s assessment concluded that Worker A received a total effective dose equivalent exposure of 2.4 rem. The same individual received a total organ dose equivalent of 42.48 rem to the bone surface (the most limiting organ). The second individual received a much lower dose. Worker B received a committed effective dose equivalent of approximately 0.1 rem and a committed dose equivalent to the bone surface of approximately 1.8 rem. The annual occupational dose limits established in 10 CFR 20.1201 are 5 rem total effective dose equivalent and 50 rem total organ dose equivalent. Worker A’s calculated doses approached regulatory limits, therefore, the contractor elected to include the individual’s deep dose equivalent exposure (62 millirems) in the calculation. However, Worker B’s dose did not approach regulatory limits, so the contractor elected not to include this individual’s deep dose equivalent exposure in the dose calculation. The NRC staff conducted an independent review of the contractor’s calculations and determined that the licensee was conservative in its calculations, in part, because the calculations were based on the conservative guidance provided in ICRP Publication 30, “Limits for Intakes of Radionuclides by Workers.”

The licensee recognized on February 19, 2010, three days after the incident, that contaminated clothing had been removed offsite when one worker returned to the site for a follow-up whole-body count. This whole-body count was unexpectedly high. The source of contamination was traced to the tops of the individual’s shoes and pants that were last worn on February 16, 2010, when the worker had swipe sampled the lead bricks in the drum. The clothing had not been washed between February 16 and February 19, 2010. This discovery led the licensee to conduct additional surveys of the individual’s home and automobile for contamination. These additional surveys led to the licensee’s discovery of additional contaminated clothing in the home of Worker A. A sweater and a pair of socks that had been worn on February 16, 2010, were found to be contaminated and were bagged and returned to the site for disposal. The sweater contamination was measured at 600 counts per minute with an instrument lower limit of detection of 100 counts per minute, while the sock contamination was measured at 200 counts per minute. No other contamination was identified in the home or the automobile of this first individual.

The second individual, Worker B, was also given a whole body count on February 19, 2010, and small spots of contamination were found on his shoes. As a result, this worker’s automobile was surveyed on February 22, 2010, and house was surveyed two days later. The automobile and house were found to be free of contamination; although, the individual had washed his clothes since the contamination event.

Once the licensee’s radiation safety staff became aware of the contamination event, the licensee took immediate corrective actions to address the programmatic issues. A self-imposed stop-work order was issued for work activities related to the event, with the exception for decontaminating the spare parts storage building (the location where the drums were stored). In addition to the stop work order, the licensee initiated a root cause analysis that was completed during mid-March 2010. The licensee’s investigation determined that:

- The opening of the drum was a new activity that was not recognized as such by the workers

- A procedure restriction for opening these drums, provided in Section 6.0 of "Hot Cell Project TRU Waste Removal Work Instructions," was not followed
- Personnel did not recognize the risks associated with opening the drum
- Despite the prohibition from opening the drums, there were inadequate radiation protection controls in place when the drum was opened
- Identification of the event was delayed when the wrist contamination was not reported

The preliminary root causes included:

- Lack of a formal conduct of operations in the contractor's work activities; specifically, a lack of operational procedures and practices for verbatim compliance with procedures, a questioning attitude, and group communications
- Lack of a formal work control document
- Improper number and experience level of site personnel for project management and work execution
- Inadequate integration of licensee controls over work planning/approval process by its contractors
- Inadequate indoctrination of project personnel into the licensee's radiation protection program

At the time of the April 2010 inspection, the licensee was still in the process of implementing its corrective actions to prevent recurrence of the event. During early April 2010, the licensee partially lifted the stop-work order to allow the contractor to conduct investigative surveys needed to prepare for restarting field work when the stop-work order was fully lifted. Also, shipping of waste material continued throughout the work stoppage because of previous scheduling commitments. Further, the contractor upgraded its work control programs, in part, to ensure that its workers complied with the licensee's procedures and site requirements. The licensee subsequently lifted the stop-work order after the April 2010 onsite inspection.

During mid-June 2010, at the request of the NRC, the licensee conducted an assessment of the contamination levels of the clothing that had been removed from the site. The licensee determined that the contamination was part fission product material and part SNM. The licensee compared the SNM contamination levels to the release limits provided in the license. For transuranics, the release limit in the license is 20 disintegrations per minute per 100-square centimeters (dpm/100 cm^2), and the reportability threshold limit specified in 10 CFR 20.2203(a)(3)(ii) is 10 times any applicable limit set forth in the license. In this particular situation, the reportability limit is 200 dpm/100 cm^2. The licensee's assessment concluded that the tongue of a shoe had 606 dpm/100 cm^2 of transuranic contamination, a quantity of radioactivity that exceeded the reportability limit. No other clothing item that was surveyed for alpha contamination exceeded the limit. The licensee subsequently submitted the 30-day report, required by 10 CFR 20.2203(a), on June 30, 2010.

The NRC staff conducted an independent review of the circumstances that resulted in the uptake event, including comparison to regulatory and license requirements. License Condition S-9 states that the licensee shall establish, maintain, and follow written procedures for carrying out licensed activities. Procedure "GEH Vallecitos Nuclear Center Hot Cell Project TRU Waste Removal Work Instructions," Revision 5, Section 6.0, states that "after the drum and transfer shield have been verified to be free

of removable contamination, the drum will be transported to the Building 200 Area for storage and further analysis. The drum will not be reopened on the site for any reason except to change the locking ring or if the drum becomes damaged and unsuitable for shipment." Contrary to this procedure requirement, on February 16, 2010, the licensee failed to follow written procedures for carrying out licensed activities as required by License Condition S-9. Specifically, two site contractors opened a drum in the Building 200 Area to conduct sampling of the contents of the drum. The opening of the drum was contrary to licensee procedure requirements and resulted in the uptake of radioactive materials to both individuals.

In addition, licensee Nuclear Safety Procedure 3200, "Personnel Contamination Monitoring, Reporting, and Decontamination," Revision 2, Section VI.A.1 states that personnel and clothing contaminations shall be documented as follows--initial contamination greater than 100 corrected counts per minute but less than 5,000 corrected counts per minute use a form similar to Attachment 3 to the procedure, "Personnel Contamination Log." Contrary to this procedure requirement, on February 16, 2010, one contractor identified contamination on his wrist at 300 uncorrected counts per minute but failed to log the personnel contamination as required by licensee procedure. With a background of approximately 40-70 counts per minute, the corrected counts per minute were estimated to be approximately 230-260, a contamination level that was above the procedure action level. This resulted in the possible delay of at least one day in the licensee's response to the event because no individual other than the two contractors were aware of the contamination event. The licensee's failure to follow two site procedures was identified as an apparent violation of License Condition S-9. (APV 070-00754/1001-01)

10 CFR 20.1501(a) states that each licensee shall make or cause to be made, surveys that - (1) may be necessary for the licensee to comply with the regulations in this part; and (2) are reasonable under the circumstances to evaluate - (i) the magnitude and extent of radiation levels; and (ii) concentrations or quantities of radioactive material; and (iii) the potential radiological hazards. As it is used in 10 CFR Part 20, *Survey* means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation. Contrary to the above, on February 16, 2010, the licensee did not make or cause to be made surveys that were reasonable under the circumstances to evaluate the concentrations or quantities of radioactive material. Although the workers performed a survey, they failed to perform an effective whole body survey (frisk) prior to exiting the restricted area. As a result, the workers left the site with five different pieces of contaminated clothing. The licensee's failure to make or cause to be made surveys was identified as an apparent violation of 10 CFR 20.1501(a). (APV 070-00754/1001-02)

10 CFR 20.2203(a)(3) states that each licensee shall submit a written report within 30 days after learning of any of the following occurrences: Levels of radiation or concentrations of radioactive material in--(i) a restricted area in excess of any applicable limit in the license; or (ii) an unrestricted area in excess of 10 times any applicable limit set forth in this part or in the license (whether or not involving exposure of any individual in excess of the limits in § 20.1301). Contrary to the requirements of 10 CFR 20.2203(a)(3), the licensee failed to submit a written report within 30 days after learning of an occurrence that resulted in levels of radiation or concentrations of radioactive material in an unrestricted area in excess of 10 times any applicable limit set forth in this part or in the license (whether or not involving exposure of any individual in excess of the limits in § 20.1301). On February 19, 2010, the licensee discovered a

contamination incident that resulted in plutonium-contaminated clothing (606 dpm/100 cm^2 – an amount greater than 10 times the applicable limit) in an unrestricted area. The licensee submitted the required 30-day report to the NRC on June 30, 2010; although, the report should have been submitted to the NRC within 30 days of discovery of the event. In other words, the event was discovered on February 19, 2010, and the 30-day report should have been submitted to the NRC by March 21, 2010. The licensee's failure to submit the 30-day report to the NRC in a timely manner was identified as an apparent violation of 10 CFR 20.2203(a)(3). (APV 070-00754/1001-03)

3.3 Conclusions

The licensee implemented its radiation protection program in accordance with license conditions and regulatory requirements during 2009. The licensee monitored workers for occupational exposures, and no individual exceeded the regulatory limits for occupational exposures during 2009. Transportation activities were being conducted in accordance with regulatory requirements.

Two radiation workers experienced uptakes of radioactive material during February 2010 when they opened a drum in violation of a site procedure to collect swipe samples from the components in the drum. While the intakes were determined not to exceed exposure limits, the licensee's failure to follow site procedures was an apparent violation of a license condition. In addition, the licensee's failure to make or cause to be made surveys was an apparent violation of regulatory requirements. Finally, the licensee's failure to report contaminated worker clothing found offsite to the NRC in a timely manner was an apparent violation of regulatory requirements.

4 Operator Training/Retraining and Emergency Preparedness (88010, 88050)

4.1 Inspection Scope

The inspectors reviewed the licensee's training and emergency preparedness programs to ensure compliance with license and regulatory requirements.

4.2 Observations and Findings

The training requirements are provided in Sections 5.8 and 7.3 of Appendix A to the license. The licensee maintained an extensive training program for site workers. The licensee offered 40 training classes during 2009. A computerized tracking system was used to track worker training. The training courses included criticality safety, radiation safety, radiation protection refresher, respirator fundamentals and fit testing, emergency response, and industrial safety. U.S. Department of Transportation function specific training was presented during September 2008. In addition, the licensee conducted five emergency preparedness drills during 2009.

As noted in Section 3.2.c above, one root cause for the uptake of radioactive material by two contractors was the inadequate indoctrination of contractor personnel into the licensee's radiological controls program. In response, the licensee retrained contractor personnel in applicable portions of the licensee's radiological controls program, including the actions to be taken in the event of a radiological incident.

The inspectors reviewed overheads utilized in the presentations to the contract workers. Sign-in sheets to verify attendance were also provided to the inspectors. The inspectors interviewed selected workers to assess their knowledge of the information presented, and the interviews indicate worker understanding of the requirements of both the licensee and contractor organizations. The long-term effectiveness of this training will be reviewed during future inspections.

The inspectors reviewed the licensee's radiological emergency plan and discussed the plan with licensee management. The inspectors also compared the emergency plan to the general requirements specified in 10 CFR 70.22(i)(3) and determined that the plan includes all applicable requirements. In summary, the inspectors confirmed that the licensee provided training and drills as required by the emergency plan.

4.3 Conclusions

The licensee implemented training and emergency preparedness programs as required by license condition and regulatory requirements. In response to the February 2010 uptake event, the licensee retrained site personnel to reinforce its expectations of adherence to radiation protection program requirements.

5 Maintenance and Surveillance Testing of Safety Systems/Permanent Plant Modifications (88025/88070)

5.1 Inspection Scope

The inspectors conducted a review of the maintenance history of the criticality alarms and observed a functional test of the alarm system.

5.2 Observations and Findings

Regulation 10 CFR 70.24 provides the criticality accident requirements. In compliance with this regulation, the licensee maintains two criticality alarm systems to monitor for criticality accidents. In recent months, the licensee has experienced troubles with the two alarm systems primarily due to the age of the equipment. The inspectors reviewed the licensee's maintenance history of these two alarm systems and observed the licensee perform routine functional tests using a site surveillance procedure. The two alarm systems failed the surveillance test during the April 2010 inspection. In one location, the audible alarm failed, while in the second location, a detector failed to activate. In response to the failures, the licensee established administrative limits on SNM movement in both areas. During the onsite inspection, the technician repaired the audible alarm. The second alarm circuit was returned to service a few weeks later.

One recurring problem the licensee continues to experience with the criticality alarm systems involves the operability of the internal check sources. Internal check sources are used to activate the criticality alarms by simulating a high radiation field, but these check sources were no longer performing their intended function due to a reduction in source strength by radioactive decay. The licensee plans to modify the alarm systems, in part, by replacing the internal radioactive check sources with an external check source. This design change may allow the criticality alarm system to operate more efficiently with fewer test failures. The NRC will review any changes implemented by the licensee to the criticality alarm systems during future inspections.

Radiological survey instrument calibrations are required by Section 8.6 of Appendix A to the license. The inspectors reviewed the licensee's radiological survey instrument calibration program. The licensee utilized an annual calibration cycle. The inspectors determined that the licensee continued to conduct instrument calibration activities under its State of California license, although selected meters were sent offsite to a licensed vendor for calibration. The licensee had a sufficient number of meters available for use by site workers. During site tours, no meter was identified in use with an out-of-date calibration sticker.

Finally, License Condition S-3 requires the licensee to leak test all of its sealed plutonium sources. The licensee conducted the check source inventories and swipe tests on a semi-annual basis. No leaking or missing check sources were identified during the last inventory.

5.3 Conclusions

The licensee tested and operated the criticality alarm systems in accordance with site procedures and regulatory requirements. The licensee conducted instrument calibrations and check source leak tests in accordance with license requirements.

6 Effluent Control and Environmental Protection (88045)

6.1 Inspection Scope

The inspectors reviewed the licensee's effluent and environmental protection programs to ensure compliance with license and regulatory requirements.

6.2 Observations and Findings

The environmental monitoring program requirements are provided in Section 10 of Appendix A to the license application. The program consisted of effluent, liquid effluent, groundwater, stream bottom (sediment), and vegetation sampling. In addition, License Condition S-6 requires the licensee to provide a copy of the annual report to the NRC summarizing the effluent and environmental monitoring programs.

The 2009 annual report was submitted to the NRC on March 10, 2010. The inspectors noted that some information was missing from the report, including four figures that were accidently removed from the final report just prior to distribution. The inspectors reviewed this missing information during the onsite inspection. The licensee agreed to supplement the report by submitting the missing information to the NRC.

The inspectors reviewed the environmental monitoring report and compared sections of the report to the original data. The inspectors also compared the sample results to the licensee's action levels. During 2009, one sample result exceeded the licensee's action level. The noble gases being released from one building during October 2009 exceeded the action level; however, the licensee concluded that this event was the result of equipment failure and not an actual release. A failed circuit board was suspected to be the cause of the problem. At that time, there were no work activities in progress that could have resulted in a noble gas release. Following replacement of the circuit board, the noble gas release rate dropped significantly to near background levels.

The inspectors noted that all required samples were collected, and no sample result exceeded any regulatory limit. No adverse trends were identified by the inspectors. The licensee's results confirmed that exposures to individual members of the public were less than the 100-millirem annual dose limit as specified in 10 CFR 20.1301(a).

The licensee conducted an analysis of the dose to potential members of the public from gaseous effluents using the COMPLY computer code. The results of the analysis indicated that the effective dose equivalent for calendar year 2009 at the property line was 0.8 millirems from all emissions. This dose equivalent exposure was below the 10 millirems per year limit stipulated in 10 CFR 20.1101(d).

6.3 Conclusions

The licensee implemented its effluent and environmental monitoring programs in accordance with license conditions and regulatory requirements. All required samples were collected, and no sample result exceeded any license or regulatory limits.

7 Exit Meeting Summary

The inspectors presented the preliminary inspection results to the licensee's representatives at the conclusion of the onsite inspections on April 8, 2010, and August 19, 2010. A final telephonic exit briefing was conducted with representatives of GE-Hitachi on September 23, 2010, to review the inspection findings as presented in this report. Representatives of the licensee acknowledged the findings as presented. The licensee did not identify any information as proprietary with the exception of the contractor's dose assessment records.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Hall, Specialist, Radiation Control
C. Hill, Project Manager, Facilities Maintenance
D. Krause, Manager, Regulatory Compliance and EHS
S. Murray, Manager, Licensing & Liabilities COE, Nuclear
M. Schrag, Manager, Facilities
R. Shult, Project Manager, EnergySolutions
D. Turner, Manager, Vallecitos Nuclear Center

California Department of Public Health

K. Prendergast, Senior Health Physicist

INSPECTION PROCEDURES USED

IP 88005	Management Organization and Controls
IP 88010	Operator Training/Retraining
IP 88020	Operational Safety
IP 88025	Maintenance and Surveillance Testing of Safety Controls
IP 88030	Radiation Protection
IP 88045	Effluent Control and Environmental Protection
IP 88050	Emergency Preparedness
IP 88055	Fire Protection
IP 88070	Permanent Plant Modifications

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

070-00754/1001-01	APV	Failure to follow procedures resulting in uptake
070-00754/1001-02	APV	Failure to conduct effective survey
070-00754/1001-03	APV	Failure to submit 30-day report in timely manner

Closed

None

Discussed

None

LIST OF ACRONYMS

ALARA	As Low As Reasonably Achievable
APV	apparent violation
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
dpm/100 cm^2	disintegrations per minute per 100-square centimeters
IP	Inspection Procedure
SNM	special nuclear material
VTSC	Vallecitos Technological Safety Council