



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 E. LAMAR BLVD
ARLINGTON, TX 76011-4511

May 01, 2015

Mr. Thomas A. Caine, Manager
Vallecitos Nuclear Center
GE-Hitachi Nuclear Energy
6705 Vallecitos Road
Sunol, CA 94586

SUBJECT: NRC INSPECTION REPORT 070-00754/15-001

Dear Mr. Caine:

This letter refers to the inspection conducted from March 17-19, 2015, at your Vallecitos Nuclear Center in Sunol, California, with continued in-office inspection-related activities through April 28, 2015. This inspection was an examination of activities conducted under your license s they relate to public health and safety to ensure 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. The preliminary inspection findings were presented to you at the conclusion of the onsite inspection, and the final inspection findings were presented to your staff by telephone on April 28, 2015. The enclosed report presents the results of this inspection.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter, its enclosure, 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 Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

If you have any questions concerning this inspection, please contact Dr. Robert Evans, Senior Health Physicist, at 817-200-1234, or the undersigned at 817-200-1911.

Sincerely,

/RA/

Ray L. Kellar, P.E., Chief
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety

If you have any questions concerning this inspection, please contact Dr. Robert Evans, Senior Health Physicist, at 817-200-1234, or the undersigned at 817-200-1911.

Sincerely,

/RA/

Ray L. Kellar, P.E., Chief
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety

Enclosure:

NRC Inspection Report 070-00754/15-001

w/attachment: Supplemental Inspection Information

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Dr. Robert B. Weisenmiller, Commissioner, California Energy Commission
Gonzalo Perez, Chief, California Dept. of Public Health
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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: 070-00754

License: SNM-960

Report: 070-00754/15-001

Licensee: GE-Hitachi Nuclear Energy

Facility: Vallecitos Nuclear Center

Location: Sunol, California

Dates: March 17-19, 2015

Inspector: Robert Evans, Ph.D., P.E., C.H.P., Senior Health Physicist
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety
Region IV

Approved By: Ray L. Kellar, P. E., Chief
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety
Region IV

Enclosure

EXECUTIVE SUMMARY

GE-Hitachi Nuclear Energy Americas LLC
U.S. Nuclear Regulatory Commission (NRC) Inspection Report 070-00754/15-001

This inspection was a routine, announced inspection of licensed activities being conducted at the Vallecitos Nuclear Center. In summary, the licensee was conducting site activities in accordance with license and regulatory requirements.

Management Organization and Controls

- The licensee provided oversight and control of site activities in accordance with regulatory, license, and procedure requirements. Site staffing was adequate to fulfill the requirements of the license. The licensee implemented the radiation protection program review, safety review committees, and As Low As Reasonably Achievable (ALARA) program as stipulated in regulations, the license, and site procedures. (Section 1.2)

Training

- The licensee's failure to conduct annual criticality safety refresher training was previously identified as a violation of the license. The inspector confirmed that the licensee took corrective actions that should prevent recurrence of the violation. (Section 2.2)

Operational Safety

- The licensee consolidated its possession of special nuclear material (SNM) in accordance with its consolidation plan. The licensee continued to store SNM that remained outside of the storage bunker in secured locations. (Section 3.2.a)
- As allowed by the license, the licensee removed one of two criticality alarm systems from service. The licensee continued to maintain the remaining criticality alarm system in service in accordance with site procedures. (Section 3.2.b)
- The licensee continued to maintain calibration records for portable instrumentation. In response to NRC discussions, the licensee elected to reconsider its technical justifications for using default instrument efficiencies. (Section 3.2.c)
- The licensee continued to maintain its fire protection program in accordance with license and procedure requirements. (Section 3.2.d)
- In response to previous inspector observations, the licensee updated its SNM license application to provide updated information describing how it monitored the main plant ventilation stack. (Section 3.2.e)

Radiation Protection

- The licensee implemented its radiation protection program in accordance with license and regulatory requirements. No individual exceeded the regulatory exposure limits during 2014. The licensee maintained extensive records for various routine samples and surveys. Based on a random review of these records, the inspector confirmed that no unrestricted

area was contaminated and no component was released for unrestricted use with contamination above background levels. The inspector also confirmed that postings and labels were in agreement with observed radiation exposure rates. (Section 4.2)

Effluent Control and Environmental Protection

- The licensee collected all environmental samples as required by the license, and no sample result exceeded any license or regulatory limit. Doses to members of the public were less than regulatory limits. (Section 5.2)

Report Details

Site Status

At the time of the inspection, the licensee continued to possess special nuclear material (SNM) at the Vallecitos Nuclear Center. Previously, licensed activities included examinations of fuel within various hot cells. At the time of the inspection, no fuel examinations were in progress and most SNM remained in long-term storage.

On September 30, 2009 (ADAMS Accession Number ML092950541), the licensee submitted a renewal application for its SNM-960 license. The SNM license expired on June 30, 2010, but the license remains under timely renewal as provided in Title 10 of the *Code of Federal Regulations* (CFR) 2.109(a). After consultation with NRC and State of California staff, the licensee resubmitted its renewal application in November 2012, requesting that the license be converted into a possession and storage only license. The licensee subsequently submitted revised license renewal applications to the NRC by letters dated December 13, 2013 (ML13352A033), February 27, 2014 (ML14058A669), and March 18, 2015 (ML15077A501). At the close of the inspection period, the NRC staff continued to review the licensee's revised application, and the license continued to be in timely renewal.

1 Management Organization and Controls (88005)

1.1 Inspection Scope

The inspector reviewed the licensee's oversight and control of licensed activities including site staffing and routine program reviews.

1.2 Observations and Findings

a. Site Staffing

License Condition S-1 references Appendix A to the license. Appendix A provides the detailed safety requirements for the licensee's possession of SNM. The site personnel requirements are provided in Section 4 of Appendix A. At the time of the inspection, all managerial and staff positions were filled with qualified individuals. The radiation safety staff included the radiation safety manager, radiation protection supervisor, and four technicians. Other site staff who provided support to the radiation protection department, included the instrument technician who performed instrument calibrations and the radiochemistry leader who was responsible for onsite radiological sample analyses. In summary, site staffing was adequate to fulfill the requirements of the license.

The licensee implemented two staff changes since the previous inspection. By letter dated February 27, 2015 (ML15056A227), the licensee notified the NRC of a change in environmental health and safety managers. The inspector confirmed that the new individual exceeded the minimum qualifications as specified in Section 4.3 of Appendix A.

In addition, the licensee elected to eliminate one program manager position, a position previously filled by the radiation safety officer. Currently, the radiation protection supervisor fulfills the duties of the radiation safety officer. During a previous inspection,

the inspector confirmed that the radiation protection supervisor exceeded the minimum qualifications for the position.

b. Routine Program Reviews

Regulation 10 CFR 20.1101(c) requires licensees to conduct annual reviews of the radiation protection program content and implementation. The inspector inquired about the status of the licensee's annual radiation program audit. At the time of the inspection, the licensee had not finalized its annual program review for 2014. The inspector will review the 2014 program review during a future inspection.

The inspector noted that the licensee conducted mini-audits of certain radiation protection program areas, to supplement the annual program review. For 2014, these regulatory compliance reviews included audits of radiation dosimetry, bioassays, radiation surveys, radiological postings, and radiation work permits. These limited audits identified that surveys and survey recordkeeping were inconsistent, suggesting that additional training was warranted to ensure consistent survey techniques and recordkeeping. The licensee provided this refresher training to site staff in September 2014.

Section 4.4 of Appendix A specifies that the licensee's Vallecitos Technological Safety Council (VTSC) shall review site safety and compliance program performance at least annually. The license requires the VTSC to meet at least quarterly and discuss relevant topics including radiation and criticality safety. The inspector reviewed meeting minutes for the 2014-2015 quarterly meetings and discussed the meeting topics with licensee staff. The VTSC discussed relevant topics including the occupational exposure goals for the As Low As Reasonably Achievable (ALARA) program and recordkeeping requirements for employee exposures obtained at other licensed sites. Also, the VTSC approved a change authorization to remove one of two criticality alarm systems from service (this topic is further discussed in Section 3.2 of this inspection report). In summary, the VTSC continued to function in accordance with license requirements.

Section 7.1 of Appendix A requires the licensee to establish and maintain a comprehensive set of standards for operational health and safety. These standards include instructions for maintaining exposures ALARA and for establishing and implementing an ALARA committee. The inspector reviewed the status of the ALARA committee. The committee met quarterly during 2014-2015, to discuss relevant topics such as high-dose work activities and ALARA dose goals.

The inspector reviewed the licensee's ALARA goal for 2014. During 2014, the ALARA goal for combined occupational exposures was 12.992 rem (0.12992 Sievert). The licensee subsequently reduced the ALARA goal to 11.392 rem (0.11392 Sievert) based on its reduced work with State-licensed radioactive sources.

At the beginning of 2015, the licensee tabulated the actual doses for 2014. The combined total dose for 2014 was 9.261 rem (0.09261 Sievert). Most occupational doses were assigned to nuclear test reactor workers, but some maintenance activities also contributed to doses. Because most SNM remained in storage, the SNM-related work did not contribute significantly to occupational exposures in 2014. In summary, the licensee implemented the ALARA program as stipulated by regulatory and license requirements.

1.3 Conclusions

The licensee provided oversight and control of site activities in accordance with regulatory, license, and procedure requirements. Site staffing was adequate to fulfill the requirements of the license. The licensee implemented the radiation protection program review, safety review committees, and ALARA program as stipulated in regulations, the license, and site procedures.

2 **Training (88010)**

2.1 Inspection Scope

The inspector reviewed the licensee's corrective actions taken in response to a previously cited violation involving criticality safety training.

2.2 Observations and Findings

Regulation 10 CFR 19.12 requires licensees to provide instructions to workers. The training requirements are provided in Appendix A to the license. Appendix A, Section 5.8, specifies that a criticality control training program shall be maintained to emphasize the need to follow criticality control procedures and to aid personnel in understanding the various parameters which are essential to maintaining subcritical conditions.

During the September 2014 inspection, documented in NRC Inspection Report 070-00754/14-002 dated December 3, 2014 (ML14337A776), the NRC identified a violation (VIO 070-00754/1402-01) involving the licensee's failure to conduct annual criticality safety refresher training between August 2011 and September 2014, contrary to the requirements of License Condition S-1. The licensee conducted work with SNM in criticality limit areas in 2013-2014 without providing the license-required annual refresher training to workers.

The licensee responded to the violation by letter dated November 24, 2014 (ML14328A750). In this letter, the licensee committed that it will update the applicable procedure, provide the training, and create a mechanism for ensuring that training will be conducted in the future. During the inspection, the inspector confirmed that the licensee had taken all actions discussed in its letter. For example, the licensee provided the criticality safety training in mid-November 2014, and revised the applicable training procedure to clarify the training requirements.

The licensee also conducted a non-conformance assessment which included an apparent cause evaluation. The inspector reviewed the assessment report and discussed the report with licensee representatives. The licensee identified one causal factor that contributed to the non-conformance, namely the applicable procedure was not reviewed for compliance with license requirements prior to being issued. In response to the assessment findings, the licensee revised a document control procedure to ensure that license compliance reviews are conducted when procedures that implement license requirements are revised. At the end of the onsite inspection, the licensee had not updated the document control procedure, but the licensee continued to maintain an open condition report to ensure that the procedure is updated.

In summary, the inspector confirmed that the licensee had taken corrective actions as specified in its letter to the NRC. In addition, the licensee conducted a non-conformance assessment to identify potential causes of the non-compliance. The inspector concluded that the licensee's corrective actions should prevent recurrence of the violation. Accordingly, Violation VIO 070-00754/1402-01 was closed.

2.3 Conclusions

The licensee's failure to conduct annual criticality safety refresher training was previously identified as a violation of the license. The inspector confirmed that the licensee took corrective actions that should prevent recurrence of the violation.

3 **Operational Safety (88020)**

3.1 Inspection Scope

The inspector reviewed the licensee's control of operational activities to ensure compliance with license and procedural requirements.

3.2 Observations and Findings

a. Review of SNM Consolidation Efforts

The licensee plans to convert its SNM license from a possession and use license into a limited use license. In support of this effort, the licensee developed an inventory consolidation plan. The purpose of the consolidation plan was to reduce the inventory of SNM within site laboratories and hot cells, and to consolidate and store this material at the onsite storage bunker. The inspector reviewed the status of the licensee's SNM consolidation efforts.

The consolidation of the SNM was conducted in phases. One of the first phases involved the transfer of some SNM to the licensee's out-of-state fuel fabrication facility for recycling and reuse. The inventory consolidation plan also provided instructions for shipment of SNM wastes to an out-of-state disposal facility. The majority of the SNM will be stored in an approved onsite storage facility. At the end of calendar year 2013, the licensee had completed the transfer of most SNM to the approved onsite storage facility. The licensee subsequently submitted an updated consolidation status report to the NRC by letter dated February 27, 2014.

In July 2014, the licensee transferred additional SNM to the storage facility. At the request of the NRC, the licensee submitted an additional update to the consolidation status report to the NRC by letter dated November 24, 2014. The inspector reviewed the report during the onsite inspection. In addition, the inspector conducted a walk-down of the remaining SNM being stored outside of the approved onsite storage facility, in part, to ensure that the material was being stored in a safe and secure manner.

At the time of the inspection, only small quantities of SNM remained outside of the approved onsite storage facility. The material included residual SNM in evaporation sludge material, residual SNM in radioactive wastes, and SNM in fission chambers and sealed sources. The sludge material was being stored in drums inside a locked building, and the licensee plans to ship this material to an offsite location at some later date. The

remainder of the SNM will either be stored in secured locations outside of the approved onsite storage facility or eventually transferred. The inspector confirmed that the licensee continues to store the SNM outside of the approved onsite storage facility in compliance with the requirements of 10 CFR 20.1801, Security of Stored Material.

As part of the consolidation efforts, the licensee removed accountable quantities of SNM from the hot cells in the radioactive materials laboratory. The licensee conducted swipe measurements in the hot cells to determine the sources of removable residual radioactivity in the cells. The swipe samples were not meant to be representative of the quantities of residual radioactivity remaining in the cells but were meant to identify the mixtures of radionuclides in the cells. The inspector reviewed these swipe sample results with licensee staff.

The licensee collected approximately 3 swipe samples from each of four cells and the main corridor between cells. The swipe samples were consolidated into three groups. The first group consisted of hot cells 1 and 2. As expected, the radionuclide of concern was cobalt-60, because these two cells were used for construction of State-licensed sealed sources. The second set of samples was collected from hot cells 3 and 5, cells that were previously used for fuel examinations. These sample results indicate that residual fuel fission products, including cesium-137 and strontium-90, remained in the cells. The licensee has no plans for reusing cells 3 and 5 at this time. Finally, the third set of samples were collected in the main corridor, and the sample results identified only cobalt-60 contamination.

b. Review of Criticality Alarm Systems

Regulation 10 CFR 70.24 requires licensees to maintain criticality alarm systems. The licensee previously maintained two criticality alarm systems to monitor for criticality accidents. During 2014, the licensee elected to remove one of two alarm systems from service. The inspector reviewed the licensee's technical basis for removing the alarm from service and confirmed that the other alarm system remained in service.

The licensee elected to eliminate the criticality alarm located within the radioactive materials laboratory because it had previously removed all accountable SNM from the building. The licensee issued a change authorization in September 2014 to remove the alarm from service, although some of the wall-mounted support equipment would be left in place in case the licensee elected to restore the alarm at a later date. The licensee's VTSC approved the change, and the licensee removed the alarm from service in mid-December 2014.

License Condition S-7 provides exemptions for monitor alarm requirements. One exception includes areas that do not contain more than one "safe batch" of SNM. Since the licensee had removed all SNM from the building, with the exception of residual radioactive contamination on wall surfaces in two hot cells, the building no longer contained more than one safe batch of SNM. Accordingly, License Condition S-7 allows the licensee to remove the radioactive materials laboratory building criticality alarm system from service. The licensee plans to retain the equipment that was physically removed from service for use as spares.

The inspector ensured that the remaining criticality alarm system, located at the storage bunker, remained in service. The licensee successfully conducted monthly criticality

system functional tests in accordance with site procedures. The inspector confirmed that the tests were up to date, indicating that the alarm system continued to remain operable.

c. Review of Instrument Calibration Efficiencies

The inspector reviewed the licensee's instrument calibration records for survey meters in use at the site. By procedure, the licensee is required to calibrate its portable monitoring equipment at least annually. The licensee is authorized by the State of California to conduct instrument calibrations. Certain instruments had to be calibrated by a vendor, depending on the type of instrument. The licensee maintained records of instrument calibrations.

The inspector noted that the licensee routinely used conservative default instrument efficiencies when converting surface measurements from counts per minute to disintegrations per minute. These conversions were necessary to allow the licensee to compare survey results to release limits. The licensee used a default conversion of 10-percent for alpha particulate measurements and 20-percent for beta-gamma measurements. These default conversions were proceduralized in Nuclear Safety Procedure 3060, Revision 9, "Radiation Survey Records and Reporting," and Nuclear Safety Procedure 5100, Revision 9, "Inventory, Inspection, and Calibration of Instruments Used for Radiation Protection of Personnel."

During the previous inspection, the inspector questioned licensee representatives about the technical bases for these default efficiencies, in part, because the radionuclide mixture at the site may change over time. The licensee's staff agreed to confirm whether the two default efficiencies continued to be conservatively established. The licensee issued a Condition Report to investigate and document the technical bases for the two instrument efficiencies.

The inspector conducted a follow up review of the licensee's investigations of the instrument efficiencies. The inspector reviewed the licensee's technical bases for the two default parameters but continued to question the licensee's reasoning for using the 20-percent efficiency value. The licensee elected to update its technical evaluation and site procedures as necessary to explain the justifications for the two default conversions. At the end of the inspection period, the licensee had not updated the applicable site procedures. The inspector will review the licensee's efforts in this program area during a future inspection.

d. Review of Fire Protection Program

Section 4.5 of Appendix A to the SNM license requires the licensee to establish emergency procedures. The inspector reviewed the licensee's fire protection program and readiness for responding to a fire. The inspector interviewed the fire chief and conducted a walk-down of the fire protection equipment. The inspector confirmed that the licensee had established procedures, conducted training, and provided dedicated emergency equipment for this potential emergency. The inspector also noted that the licensee had established an extensive testing and inspection program to ensure that the fire protection components remained functional.

The inspector observed the status of stored emergency equipment. The equipment included self-contained breathing apparatus, air sampling pumps, cleanup kits, and radiological survey instruments. The licensee conducted routine inventories and inspections of the fire protection equipment including hand-held fire extinguishers, hose racks, and the onsite fire truck.

The inspector reviewed the status of the licensee's emergency training programs. The licensee conducted and documented the required training, including training for the onsite fire team. In summary, the inspector concluded that the licensee continued to maintain a program for responding to fires.

e. Review of Plant Ventilation Systems

In an effort to ensure that occupational exposures are ALARA, the licensee used process and engineering controls, to the extent practical, to control the concentrations of radioactive materials inside site structures. In its license renewal application, submitted to the NRC by letter dated February 27, 2014, the licensee provided a description of the ventilation systems for each of the major plant structures.

During the previous inspection, the inspector conducted a walk down of the licensee's plant ventilation systems to ensure that the as-built plant conditions matched the information provided in the license application. The inspector noted that the as-found stack sampling system in the exhaust of the radioactive materials laboratory differed from the description provided in the license application. In response to the inspector's findings, the licensee updated the license application. The licensee submitted a revised description of the ventilation systems to the NRC by letter dated March 18, 2015 (ML15077A501).

3.3 Conclusions

The licensee consolidated its possession of SNM in accordance with its consolidation plan. The licensee continued to store SNM that remained outside of the storage bunker in secured locations.

As allowed by the license, the licensee removed one of two criticality alarm systems from service. The licensee continued to maintain the remaining criticality alarm system in service in accordance with site procedures.

The licensee continued to maintain calibration records for portable instrumentation. In response to NRC discussions, the licensee elected to reconsider its technical justifications for using default instrument efficiencies.

The licensee continued to maintain its fire protection program in accordance with license and procedure requirements.

In response to previous inspector observations, the licensee updated its SNM license application to provide updated information describing how it monitored the main plant ventilation stack.

4 Radiation Protection (88030)

4.1 Inspection Scope

The inspector reviewed the licensee's radiation protection program to verify compliance with 10 CFR Part 20 and license requirements.

4.2 Observations and Findings

The inspector reviewed the licensee's occupational exposure records for 2014 to ensure that no individual exceeded the limits specified in 10 CFR 20.1201. Occupational doses for site workers were a combination of doses from exposure to radioactive materials licensed by the State of California and the NRC. The licensee monitored employees for both external and internal exposures. External doses were measured using optically stimulated dosimeters, while internal doses were monitored by whole body counting. Neutron-detecting dosimeters were assigned to selected site workers based on work activity. Any measured neutron doses were assigned to individuals in addition to gamma radiation doses.

During 2014, all assigned doses were attributed to external sources. The licensee did not assign any internal doses to workers based on the results of its air sampling and whole body counting programs.

The inspector reviewed the licensee's tabulated data for 2014. A total of 126 individuals were monitored. The highest annual total effective dose equivalent exposure was 0.603 rem (0.00603 Sievert) with a regulatory limit of 5 rem (0.05 Sievert). Seventy-eight individuals did not receive a measurable dose. For comparison, during 2013, the licensee monitored 139 individuals, and the highest annual individual dose was 0.907 rem (0.00907 Sievert). The highest extremity dose in 2014 was 1.412 rem (0.01412 Sievert) with a regulatory limit of 50 rem (0.5 Sievert). The highest lens of eye dose was 0.358 rem (0.00358 Sievert) with a regulatory limit of 15 rem (0.15 Sievert).

During calendar year 2014, the licensee conducted approximately 340 whole body counts. In accordance with Section 8.11 of Appendix A to the license and site procedures, the licensee conducted initial, exit, and annual whole body counts for each worker. In addition, whole body counts were conducted based on work activity and at the request of the worker. During 2014, all results were negative, consequently, no internal doses were assigned to site workers or visitors.

The licensee placed dosimeters in buildings occupied by visitors and employees in order to assess the dose that could be received by a member of the public while visiting the Vallecitos Nuclear Center. The highest area dose was measured in the chemistry building. Based on the results of these measurements, the licensee could conservatively calculate a dose to an individual who may have occupied the building for 8 hours per day, 5 days per week, and 52 weeks per year. This occupancy would result in an annual dose of about 0.03 rem (0.0003 Sievert), a calculated dose that remained below the 0.1 rem (0.0001 Sievert) per year limit for individual members of the public as specified in 10 CFR 20.1301. For comparison, the licensee's 2013 area dose measurements and associated calculations conservatively estimated that an onsite worker could receive up to 0.08 rem (0.0008 Sievert) of dose.

Section 8.3 of Appendix A to the license provides the contamination control requirements. These requirements include routine radiological surveys for surface contamination and radiation exposure rates throughout the site. The licensee maintained extensive records of these routine surveys. The inspector randomly reviewed the licensee's survey results for 2014. The records indicate that the unrestricted areas, including lunchrooms and offices, were free of residual contamination. The inspector also randomly reviewed the licensee's equipment release records for 2014. Based on the licensee's records, no item was released from the site with contamination above background levels. Further, the inspector reviewed the licensee's radiation work permits for 2014 and concluded that the documents provided sufficient information to help control worker exposures to radiation and radioactivity.

The inspector observed a radiation technician conducting a routine survey of a research laboratory in the chemistry building. The technician used calibrated meters, area postings were found to be in agreement with survey results, and no loose contamination was identified above the action levels.

The inspector questioned licensee representatives about the personnel contamination release levels provided in the license versus the action level used in the plant. Section 8.12 of Appendix A to the license provides an action level of 200 disintegrations per minute per 100 square centimeters (dpm/100 cm²) for alpha contamination. However, the licensee routinely conducted personnel surveys using an action level of 100 counts per minute above background. This action level converts to 500 dpm/100 cm² when using the default conversion factor of 20-percent for beta-gamma radioactivity and 1,000 dpm/100 cm² when using the default conversion factor of 10-percent for alpha radioactivity.

The inspector questioned whether the licensee's standardized personnel contamination action level of 100 counts per minute above background was sufficient for identifying potential SNM contamination. The licensee informed the inspector that it would review its personnel contamination monitoring program, to ensure that it was effective for identifying SNM contamination. The licensee's representative stated that, in practice, individuals are not allowed to leave a restricted area if they have contamination that is detectable above background levels. The inspector did not identify any specific example indicating that the licensee had inappropriately released a potentially contaminated individual due to the differences in release criteria. The inspector will review the licensee's assessment of this program area during a future inspection.

The inspector conducted ambient gamma radiation measurements during site tours using a Thermo Scientific Model B20 survey meter (NRC No. 096531, calibration due date of 09/24/15). Based on measured radiation levels, the inspector noted that observed postings and labels were in compliance with regulatory and procedure requirements.

4.3 Conclusions

The licensee implemented its radiation protection program in accordance with license and regulatory requirements. No individual exceeded the regulatory exposure limits during 2014. The licensee maintained extensive records for various routine samples and surveys. Based on a random review of these records, the inspector confirmed that no unrestricted area was contaminated and no component was released for unrestricted

use with contamination above background levels. The inspector also confirmed that postings and labels were in agreement with observed radiation exposure rates.

5 Effluent Control and Environmental Protection (88045)

5.1 Inspection Scope

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

5.2 Observations and Findings

The environmental monitoring program requirements are provided in Section 10 of Appendix A to the license and the licensee's Environmental Monitoring Manual. In accordance with Appendix A, the licensee is required to monitor gaseous effluents, liquid effluents, groundwater, stream bottom sediment, and vegetation. The Environmental Monitoring Manual provides additional instructions for measuring ambient gamma radiation levels and collecting ambient air particulate and pond water samples.

License Condition S-6 requires the licensee to summarize the effluent and environmental monitoring programs in an annual report to the NRC. The inspector reviewed the 2014 annual report, submitted to the State of California by letter dated February 25, 2015, with a copy to the NRC (ML15069A472). The inspector compared the various sample results to the license and regulatory limits as well as the licensee's action levels. The licensee established action levels to help prevent the regulatory limits from being exceeded.

In summary, the licensee collected all required samples. No sample result exceeded the action levels or release limits specified in the SNM license. As discussed later, several onsite groundwater sample results exceeded the gross beta-gamma action level provided in the Environmental Monitoring Manual. However, the licensee's assessment indicated that these samples contained only naturally occurring radioactive material.

The licensee measured gaseous effluents by sampling the discharges of various plant stacks. The licensee established action levels for each stack based on flow rate. The stacks were sampled for gross alpha, gross beta-gamma, iodine-131, and noble gas concentrations. The licensee's records indicate that no sample result exceeded an administrative action level in 2014.

The licensee collected air particulate samples at four sample stations. The air filters were exchanged weekly and analyzed for gross alpha and gross beta-gamma concentrations. A charcoal cartridge was installed at each sample station to measure iodine concentrations, but the licensee only analyzed these cartridges if a suspected release had occurred. The licensee's records indicate that no sample result exceeded the respective action levels.

Regulation 10 CFR 20.1101(d) places a constraint on air emissions of radioactive material to the environment. The licensee used the COMPLY computer code to analyze the doses for members of the public. For 2014, the licensee calculated an effective dose equivalent of 1 millirem (0.01 milliSievert) per year to the nearest resident. The licensee also calculated the projected dose at the industrial fence line. This calculated dose was 6.7 millirem per year (0.067 milliSievert). These calculated doses were less than the 10 CFR Part 20 constraint limit of 10 millirem per year (0.1 milliSievert).

The licensee measured ambient gamma radiation levels at 20 environmental sample stations. Previously, the licensee collected samples at 31 stations. Starting in 2014, the licensee reduced the number of environmental sampling stations from 31 stations to 20 stations and designated certain locations as background stations. The inspector reviewed the licensee's results for 2014. The difference between the highest and lowest environmental sample station was 16.5 millirem (0.165 milliSievert). The difference between the highest and lowest station measurement remained below the public dose limit of 100 millirem (1 milliSievert).

The license requires stream sediment and vegetation sampling to ensure that radioactive materials are not accumulating in the release pathways. These samples are collected once per year. The 2014 sample results were less than the respective action levels.

The licensee routinely sampled four 50,000-gallon water storage basins. Three of the basins are used to store industrial waste water, while the fourth is used to store sanitary waste water. In previous years, the licensee disposed of industrial waste water by discharge to a local drainage ditch, while sanitary waste water was disposed via land application. Since July 2003, the licensee disposed of all waste water by land application. During 2014, the total amount of wastewater disposed via land application was about 2.55 million gallons, down significantly from 2012 (6.78 million gallons) and 2013 (4.58 million gallons).

The licensee sampled the basin water for gross alpha and gross beta-gamma concentrations just prior to release of the water for land application. In accordance with site procedures, the licensee collected composite samples on a monthly basis for analysis of gross alpha/beta-gamma concentrations as well as various chemical constituents. No sample result exceeded the respective action levels during 2014.

The licensee conducted groundwater sampling on a quarterly basis. The licensee is required to sample up to 14 wells, although not all wells have enough water to be sampled. The wells include the three original site wells, four wells that were installed in the 1970s in response to a pool leak, and seven wells that were installed in 2009 to comply with State of California requirements. Appendix A to the license provides action levels for two of the wells. The first well is located up-gradient of the site structures, and the second well is located down-gradient of the site structures. The sample results for 2014 indicate that the two wells did not exceed the action levels. No action levels have been established by the NRC for the remainder of the wells.

The samples collected from two onsite wells in the last quarter of 2014 and the first quarter of 2015 exceeded the gross beta-gamma radioactivity action level specified in the licensee's Environmental Monitoring Manual. Well 102K is located to the east of the radioactive materials laboratory, while Well 102G is located at the western end of the building. The Building 102 wells are sampled when sufficient water is available for sampling. The licensee analyze the samples using gamma spectroscopy. The sample results indicate that the radioactivity was due to naturally occurring potassium-40 and not licensed material.

The inspector reviewed the licensee's 2014 annual report. The inspector concluded that the licensee did not report all sample results to the NRC as required by the SNM license

during 2013-2014. In particular, the licensee did not report sample results from the two Building 102 wells and two building exhaust stacks.

The licensee operated the storage bunker ventilation system on an interim basis in 2013-2014 to support the SNM consolidation efforts. The licensee also operated the GE Test Reactor ventilation system on low speed during the previous two years. At the conclusion of the inspection, the licensee presented the inspector with the storage bunker and GE Test Reactor ventilation stack sample results, and the results were not detectable above background levels. The licensee noted that the GE Test Reactor does not contain licensed SNM; therefore, they were not required by the SNM license to report these sample results in the annual report.

The inspector concluded that the licensee's failure to report all sample results to the NRC in the annual report was not safety significant. This failure to comply with reporting sample result requirements specified in the license constitutes a minor violation that is not subject to enforcement action in accordance with the NRC's Enforcement Policy. The licensee collected and analyzed the samples, and no sample result exceeded a licensed limit. The licensee issued Corrective Action Report 14151 to ensure that the potential causes of the inspection finding and proposed corrective actions have been identified and documented. As part of its corrective action review, the licensee verbally notified the inspector that it planned to update the compliance calendar to ensure that all required samples are collected and reported, and review its sampling protocols for collecting groundwater from low-flow wells. The inspector will review the licensee's corrective action assessments during a future inspection.

5.3 Conclusions

The licensee collected all environmental samples as required by the license, and no sample result exceeded any license or regulatory limit. Doses to members of the public were less than regulatory limits.

6 **Exit Meeting Summary**

The inspector presented the preliminary inspection results to the licensee's representatives at the conclusion of the onsite inspection on March 19, 2015. The inspector presented the final inspection results to the licensee's staff by telephone on April 28, 2015. Representatives of the licensee acknowledged the findings as presented. During the inspection, the licensee did not identify any information reviewed by the inspector as proprietary.

SUPPLEMENTAL INSPECTION INFORMATION

Partial List of Persons Contacted

Licensee

J. Ayala, Radiation Protection Supervisor
T. Caine, Manager, Vallecitos Nuclear Center
T. Christman, Manager, Advanced Programs
E. Hagberg, Radiological Measurement Technician
D. Krause, Program Manager, Regulatory Compliance
S. Murray, Manager, Facility Licensing
E. Saito, Manager, Environmental Health and Safety

Inspection Procedures (IPs) Used

IP 88005	Management Organization and Controls
IP 88010	Training
IP 88020	Operational Safety
IP 88030	Radiation Protection
IP 88045	Effluent Control and Environmental Protection

Items Opened, Closed, and Discussed

Opened

None

Closed

070-00754/1402-01 VIO Failure to conduct annual criticality refresher training

Discussed

None

List of Acronyms

ALARA	As Low As Reasonably Achievable
CFR	<i>Code of Federal Regulations</i>
dpm/100 cm ²	disintegrations per minute per 100 square centimeters
GE	General Electric
IP	Inspection Procedure
NRC	U.S. Nuclear Regulatory Commission
SNM	special nuclear material
VTSC	Vallecitos Technological Safety Council