UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

November 6, 2019

Mr. Matt Feyrer, Site Manager
Vallecitos Nuclear Center
GE Hitachi Nuclear Energy
6705 Vallecitos Road
Sunol, CA 94586-8524

SUBJECT: GE HITACHI NUCLEAR ENERGY - NRC INSPECTION REPORT
050-00018/2019-002, 050-00070/2019-002, AND 050-00183/2019-002

Dear Mr. Feyrer:

This letter refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted on September 9-12, 2019, at your Vallecitos Nuclear Center in Sunol, California. The inspection covered the following shutdown reactors under the subject licenses, Vallecitos Boiling Water Reactor (VBWR), General Electric Test Reactor (GETR), and Empire State Atomic Development Associates Incorporated Vallecitos Experimental Superheat Reactor (EVESR). A debrief meeting was conducted on September 12, 2019, with you and members of your staff, and representatives from the Wilmington, North Carolina office. Upon completion of the in-office evaluations, the NRC inspectors presented the results of the inspection in a final exit meeting which was conducted telephonically on October 3, 2019. The inspection results are documented in the enclosure to this letter.

During this inspection, the NRC inspectors examined activities conducted under your licenses as they relate to public health and safety, the environment, and to confirm compliance with the Commission's rules and regulations, as well as with the conditions of your license. Within these areas, the inspection consisted of the examination of selected procedures and representative records, tour of the reactors and supporting equipment, independent radiation surveys, and interviews with personnel. Within the scope of the inspection, no violations were identified and a response to this letter is not required.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC's Website 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 report, please contact Stephanie Anderson at 817-200-1213, or the undersigned at 817-200-1249.

Sincerely,

/RA/

Gregory G. Warnick, Chief
Reactor Inspection Branch
Division of Nuclear Materials Safety

Docket Nos.: 050-00018; 050-00070;
and 050-00183
License Nos.: DPR-1; TR-1; and DR-10

Enclosure:
Inspection Report 050-00018/2019-002;
050-00070/2019-002; 050-00183/2019-002
w/Attachment: Supplemental Information

cc:
S. Murray
GE Hitachi Nuclear Energy Americas, LLC.

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.:	050-00018; 050-00070; and 050-00183
License Nos.:	DPR-1; TR-1; and DR-10
Report Nos.:	050-00018/2019-002; 050-00070/2019-002; and 050-00183/2019-002
Licensee:	GE Hitachi Nuclear Energy
Facility:	Vallecitos Boiling Water Reactor (VBWR) GE Test Reactor (GETR) ESADA Vallecitos Experimental Superheat Reactor (EVESR)
Location:	6705 Vallecitos Road Sunol, California
Inspection Dates:	September 9-12, 2019
Inspectors:	Stephanie G. Anderson, Health Physicist Reactor Inspection Branch Division of Nuclear Materials Safety Austin C. Roberts, Health Physicist Materials Licensing and Decommissioning Branch Division of Nuclear Materials Safety Jack D. Parrott, Senior Project Manager Reactor Decommissioning Branch Office of Nuclear Materials Safety and Safeguards Anthony M. Huffert, CHP, Senior Health Physicist Reactor Decommissioning Branch Office of Nuclear Materials Safety and Safeguards N. Jeff Griffis, CHP, Senior Health Physicist Specialized Technical Training & Support Branch Office of the Chief Human Capital Officer
Approved By:	Gregory G. Warnick, Branch Chief Reactor Inspection Branch Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

GE Hitachi Nuclear Energy
NRC Inspection Report 050-00018/2019-002; 050-00070/2019-002; and 050-00183/2019-002

This U.S. Nuclear Regulatory Commission (NRC) inspection was a routine, announced inspection of licensed activities being conducted at the three permanently defueled reactors at the Vallecitos Nuclear Center. In summary, the licensee was conducting these activities in accordance with site procedures, license requirements, and applicable NRC regulations. Within the scope of the inspection, no violations were identified.

Decommissioning Performance and Status Review at Permanently Shutdown Reactors and Class III Research and Test Reactors

- The licensee conducted annual inspections and audits of the three shutdown reactors in accordance with regulatory, license, and procedure requirements. The licensee had implemented a fire protection program that reasonably prevented fires from occurring and was capable of rapidly extinguishing those fires that occurred. (Section 1.2)

Organization, Management and Cost Controls at Permanently Shutdown Reactors

- The licensee conducted effective management and oversight of the Radiological Emergency Plan for the three shutdown reactors at the Vallecitos Nuclear Center site. The inspectors found that the emergency preparedness program is being effectively maintained through emergency preparedness assessments, the review of the resulting condition reports, and self-assessments of reportable events. (Section 2.2)

Occupational Radiation Exposure

- The inspectors concluded that the licensee conducted its radiation control program in accordance with license conditions and regulatory requirements, with the exception of two violations in program areas related to occupational radiation exposure that remain open from the previous inspection. (Section 3.2)

Radioactive Waste Treatment, and Effluent and Environmental Monitoring

- The licensee implemented its effluent and environmental monitoring program in accordance with its Environmental Monitoring Manual and the regulatory requirements provided under 10 CFR Part 20. (Section 4.2)

Report Details

Summary of Plant Status

The GE Hitachi Nuclear Energy Americas, LLC (GEH or Licensee) continued to maintain the three shutdown reactors, Vallecitos Boiling Water Reactor (VBWR), General Electric Test Reactor (GETR), and Empire State Atomic Development Associates Incorporated Vallecitos Experimental Superheat Reactor (EVESR) in a possession-only, safe storage (SAFSTOR) condition, with no fuel remaining in the reactors or spent fuel pools. The condition of SAFSTOR is a decommissioning alternative in which the licensee is authorized to maintain the facility in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated to levels that permit release for unrestricted use within 60 years of permanent cessation of operations. Licensees who choose the SAFSTOR option must meet all NRC financial and safety regulations, both prior to and during the SAFSTOR period.

On April 24, 2015 (ADAMS Accession Nos. ML15114A437 and ML15114A438), the licensee submitted a request for a partial site release of approximately 610 acres of non-impacted property on the northern section of Vallecitos Nuclear Center (VNC) site, for unrestricted use pursuant to Title 10 *Code of Federal Regulation* (CFR) 50.83(b). The NRC approved the partial site release of 610 acres by letter dated May 3, 2016 (ADAMS Accession No. ML16007A348). The property continues to remain under the ownership of GEH.

On December 15, 2015, the licensee submitted a request for license continuance under 10 CFR 50.51(b) for reactor licenses DR-10 and TR-1 (ADAMS Accession No. ML15349A045). That request was approved by letter dated January 2, 2019 (ADAMS Accession No. ML18352A450). The licensee also submitted a request on July 10, 2015 (ADAMS Accession No. ML15195A088), for an alternate decommissioning schedule as described in 10 CFR 50.82(a)(3) and 50.82(b)(4)(i), using the exemption criteria of 10 CFR 50.12.

On May 16, 2017, the NRC staff issued a request to GEH for additional information on the structural integrity of the reactor buildings and how the integrity would be ensured during the extended decommissioning period, in order to assess whether the request would result in undue risk to public health and safety (ADAMS Accession No. ML17138A121). The licensee responded to this request by letter dated July 31, 2017 (ADAMS Accession No. ML17212B019).

Based on this response and a site visit conducted by NRC on September 13, 2017, the NRC determined that certain additional information must be provided by GEH to show how the licensee is ensuring the confinement of residual radioactivity associated with the shutdown reactors at the VNC and evaluating and monitoring the long term physical safety of the reactor structures. The NRC requested more detailed information by letter dated January 18, 2018 (ADAMS Accession No. ML17312B359). On March 28, 2018 (ADAMS Accession No. ML18087A384), GEH provided a response indicating that it would provide an interim status report for the hydrological and structural analyses in approximately 6 months and anticipated completing the actions within approximately 12 months, which would be March 2019. On May 31, 2018 (ADAMS Accession No. ML18151A861), GEH submitted a partial response to the request for additional information. On October 23, 2018 (ADAMS Accession No. ML18296A159), GEH provided an interim status report on the efforts to respond to the two remaining requests for additional information. On March 28, 2019 (ADAMS Accession No. ML19087A221), GEH provided the response for some of the requested additional information, and provided a schedule for submitting the remaining hydrological and structural analysis needed to support the exemption request for an alternate decommissioning schedule.

As of the time of the inspection, the remaining analysis had not been formally submitted to the NRC.

On December 14, 2018 (ADAMS Accession No. ML18348A425), the licensee submitted a request for a partial site release of approximately 7 acres of non-impacted property along Vallecitos Road to be made available to Alameda County Transportation Commission to support road development and widening. The NRC held a public meeting in Dublin, CA on March 28, 2019, as required by 10 CFR 50.83, "Release of part of a power reactor facility or site for unrestricted use," to discuss the request for the partial site release. On September 30, 2019, the NRC approved the request for the partial site release (ADAMS Accession No. ML19249C554).

1 Decommissioning Performance and Status Review at Permanently Shutdown Reactors (71801) and Class III Research and Test Reactors (69002)

1.1 Inspection Scope

The inspectors reviewed the licensee's control and oversight of the three shutdown reactors.

1.2 Observations and Findings

a. Status and tours of the shutdown reactors

1. Vallecitos Boiling Water Reactor

Vallecitos Boiling Water Reactor (VBWR) is a possession-only reactor under License No. DPR-1, Amendment 21. It was a 50-megawatt (MW) power reactor that achieved full power operations in 1957, after receiving its Construction Permit No. CPPR-3 on May 14, 1956. It was shutdown on December 9, 1963, for an extended period of time and subsequently was deactivated. All fuel has been removed from the facility.

The possession-only facility license DPR-1, License Condition 4 states in part, that there should be an audible control device maintained on the doors to the containment building. In addition, License Condition 5 authorizes GE Hitachi (GEH) to dispose of component parts or devices from the VBWR facility in accordance with the provisions of 10 CFR Part 20. The licensee removed extensive components from the facility between October 2007 and November 2008. All reactor systems have been removed except for the reactor vessel. The licensee monitored the water level in the reactor vessel and the inspectors confirmed that it had remained essentially constant at approximately 95 inches of water, since the last NRC inspection conducted in March 2019.

The inspectors toured the facility with licensee representatives. The inspectors confirmed there was an audible control device functioning on the manual doors to the containment building that provided an alarm at the 300-area alarm panel and at the Central Alarm Station. The inspectors observed that the roll-up door was secured, which was installed in place of the equipment hatch. The inspectors entered the basement level to observe the condition and integrity of the retired facility. The inspectors observed crack formation. The cracks are being monitored by the licensee to determine growth rate. During the inspection, the inspectors did not identify any water on the floor

of the basement. The sump pump was in operation at the time of the inspection, and any water that is collected in the basement of VBWR is pumped to the VBWR transfer tank, then ultimately transferred to the onsite waste evaporator plant (WEP) for processing.

During the previous NRC inspection in March 2019, the inspectors identified a violation (VIO 05000018/2019001-01) associated with License Condition 3.a., which requires the licensee to possess the facility in the condition described in the "Final Report of Deactivation of Vallecitos Boiling Water Reactor." Licensee Procedure 6.2, "Patrols and Inspections," Revision 11, required the licensee to inspect the condition and integrity of the retired facility during the annual inspection, including inspecting the basement for water intrusion and verifying that the sump pump system is properly functioning (ADAMS Accession No. ML19163A294).

The licensee responded to the Notice of Violation (NOV) by letter dated July 23, 2019, (ADAMS Accession No. ML19205A023). The licensee's corrective actions included revising Procedure 6.2, "Patrols and Inspection," to clarify that the spent fuel pit area requires inspection, and to detail how to inspect this area. The licensee also sampled the water in the spent fuel pit area, determined that the samples were consistent with prior samples of accumulated water in the VBWR basement, and discharged the water through the VBWR basement sump system. The implementation of these corrective actions closes the violation.

2. ESADA Vallecitos Experimental Superheat Reactor

The ESADA Vallecitos Experimental Superheat Reactor (EVESR) is a possession-only reactor under License No. DR-10, Amendment No. 7. The EVESR was a light water moderated, steam cooled, superheat, experimental research reactor that used slightly enriched uranium dioxide as fuel. It operated at a maximum of 17 MW thermal and was initially licensed in 1963. It achieved full power operation in 1964, and was shut down on February 1, 1967, and subsequently deactivated. All fuel and other special nuclear material had been removed and shipped offsite. In addition, a significant amount of equipment used to operate the reactor, such as nuclear instrumentation, piping, pumps, and valves has been removed.

The inspectors toured the facility with licensee representatives. The inspectors confirmed there was an audible control device functioning on the airlock door to the containment building that provided an alarm at the 300 feet elevation area alarm panel and at the Central Alarm Station. The licensee had a portable dehumidifier to remove significant quantities of condensation that tended to buildup in the facility. The licensee had lighting installed and it was operating sufficiently to ensure the passageways and stairs were safely lit. The stack was no longer operational, and the licensee was using a portable ventilation system.

The radiation levels were generally less than 1 milliroentgen per hour (mR/hr) throughout the facility, except in certain areas. The inspectors measured 1.5 mR/hr on the two emergency cooling discharge valves located on the 534-ft level, using a Thermo Scientific RadEye PRD gamma survey meter (Serial No. 37894, calibration due date of November 9, 2019). The licensee maintained concrete blocks over the reactor vessel and the head/shield plug storage pit. In addition, a wooden cover was installed over the empty spent fuel storage pool, with an installed railing to prevent entry since the wooden

cover was not designed to support a load. The licensee maintained control of the keys to the locked cover installed over the stairwell that provided access to areas below the main 549-ft level.

3. General Electric Test Reactor

The General Electric Test Reactor (GETR) is a possession-only reactor under License No. TR-1, Amendment No. 17. The reactor was a 50 MW thermal experimental test, development, and isotope production reactor that utilized highly enriched plate fuel and was initially licensed to operate in 1959. The reactor was shut down in 1977 and subsequently deactivated. All fuel and isotope production targets containing special nuclear material have been removed from the facility and shipped offsite. The reactor, systems and piping, and spent fuel pool have been drained of water. The containment polar crane was functional, and only required re-certification for it to be considered operable.

The inspectors toured the containment building and GETR auxiliary buildings immediately adjacent to the containment structure. The radiation levels inside the containment building were generally less than 1 mR/hr throughout the facility, except in certain areas. The inspectors measured 5 mR/hr on the outside of the locked Experiment Liquid Effluent Holdup System cubicle door.

As GETR has been shut down since 1977, there are no licensed operators nor a requalification program, which is appropriate for the plant conditions. Staffing was appropriate to meet the required weekly surveillance patrols, which were being conducted in accordance with site procedures.

b. Fire Protection

The licensee is required under 10 CFR 50.48(f) to maintain a fire protection program to: (1) reasonably prevent fires from occurring; (2) rapidly detect, control, and extinguish those fires that do occur and that could result in a radiological hazard; and (3) ensure that the risk of fire-induced radiological hazards to the public, environment, and plant personnel are minimized. The three shutdown reactors are required to have a fire protection program; however, they are not required to maintain fire detection or suppression equipment at their facilities because the majority of flammable materials have been removed. The inspectors reviewed the fire protection program from an emergency preparedness perspective to verify that the program can reasonably prevent fires from occurring and rapidly extinguish those fires.

The inspectors noted that the licensee had implemented a fire extinguisher program with a significant number of fire extinguishers present onsite. The inspectors noted that three fire extinguishers had not been inspected in the previous month, contrary to the requirements of the fire extinguisher program that the licensee had implemented. The licensee initiated condition report (CR) 32509 to ensure the thoroughness of the monthly fire extinguisher inspections.

1.3 Conclusions

The licensee conducted annual inspections and audits of the three shutdown reactors in accordance with regulatory, license, and procedure requirements. The licensee had implemented a fire protection program that reasonably prevented fires from occurring and was capable of rapidly extinguishing those fires that occurred.

2 Organization, Management and Cost Controls at Permanently Shutdown Reactors (36801)

2.1 Inspection Scope

The inspectors reviewed the licensee's management and oversight of the Radiological Emergency Plan (REP) and the regulatory requirements for the three shutdown reactors.

2.2 Observations and Findings

a. Status of the radiological emergency plan for the shutdown reactors

All of the reactors at Vallecitos Nuclear Center (VNC) are covered by the REP January 2018 revision, including the shutdown reactors and the still operating non-power Nuclear Test Reactor (NTR). By letter dated March 19, 2013 (ADAMS Accession No. ML19261A225), NRC requested each licensee of a decommissioning reactor to address the applicability of the NRC's emergency preparedness (EP) regulations to their specific facility. If the licensee found that the regulations did apply to their facility, they were to make appropriate changes to the facility emergency plan or to apply for an exemption from the regulations if they felt the regulations did not apply. Therefore, by letter dated April 11, 2013 (ADAMS Accession No. ML13105A447), the licensee requested an exemption from the NRC's EP regulations on the basis of the shutdown reactors were in SAFSTOR condition (defueled) and did not have any of the spent fuel from the shutdown reactors stored onsite. After further discussion with the NRC, the licensee then withdrew the exemption request, by letter dated May 24, 2013 (ADAMS Accession No. ML13144A752), based on there being no fuel from the shutdown reactors stored on the site, the SAFSTOR condition of the shutdown reactors, the contamination levels within the shutdown reactor buildings, and the EP plan for the NTR (which includes the shutdown reactor facilities) was sufficient for emergency planning and preparedness for the shutdown reactors. To date, there has been no formal response to the licensee's letters from the NRC. The licensee has continued to carry the shutdown reactors within the scope of the REP including the current January 2018 revision.

By letter dated July 17, 2019 (ADAMS Accession No. ML19182A197), the licensee submitted a public version of a request for a license amendment to revise the REP that covers all of the reactors at the site. This proposed revision to the REP is being reviewed by NRC. Through the review, the applicability of the REP to the shutdown reactors at the VNC will be addressed.

The inspectors found that the EP program is being effectively maintained through EP assessments, the review of the resulting CRs, and self-assessments of reportable events. The inspectors reviewed "Emergency Preparedness Program Assessment Phase II," dated November 28, 2018. This document compared the requirements in the EP plan with the elements of NRC Regulatory Guide 2.6 and ANSI/ANS 15.16 criteria

which can be used to satisfy the requirements of 10 CFR 50.54 and 10 CFR 50, Appendix E. The inspectors also reviewed the "Pre-NRC 82501 Emergency Preparedness Inspection Self-Assessment," dated September 4, 2019. This document describes the review of the VNC Emergency Preparedness program to see if it is maintained in a state of readiness and if recent changes made to the program continue to comply with commitments and NRC requirements. The results of these assessments indicate that there were findings, weaknesses, and recommendations that needed to be addressed and were subsequently entered into the licensee's corrective action program.

b. Regulatory Requirements

During the March 2019 NRC inspection, documented in NRC Inspection Report 2019-001, the inspectors concluded that there was not enough information to determine if the licensee was in compliance with 10 CFR 50.71(e)(4) requirements and this issue was identified as an unresolved item (URI 05000183/2019-001). Title 10 CFR 50.71(e)(4) requires in part, subsequent revisions of the final safety analysis report (FSAR) must be filed annually or 6 months after each refueling outage provided the interval between successive updates does not exceed 24 months. After further review, it was determined that this requirement is not applicable to the two shutdown power reactors, VBWR and EVESR. The licensee was not required to submit revisions to the FSAR every 24 months in accordance with 10 CFR 50.71(e)(4). Accordingly, unresolved item (URI 05000183/2019-001) is closed.

2.3 Conclusions

The licensee conducted effective management and oversight of the REP for the three shutdown reactors at the VNC site. The inspectors found that the EP program is being effectively maintained through EP assessments, the review of the resulting CRs, and self-assessments of reportable events. The licensee was adequately implementing the regulatory requirements for the FSAR.

3 Occupational Radiation Exposure (83750)

3.1 Inspection Scope

The inspectors reviewed the licensee's radiation protection program related to the oversight of the three shutdown reactors.

3.2 Observations and Findings

Each of the shutdown reactors have license conditions that require annual entries for routine radiation surveys and general examination of conditions throughout the buildings. The licensee performed its entries and surveillances in accordance with Procedure 9.1, "Access Control," Revision 8, and submitted a summary report of these entries to the NRC on March 27, 2019. Based on the entries that were conducted and the documentation generated to support the entries, the inspectors determined that the dose rates, radiological contamination levels, and air sample results were consistent with historical data documented in previous annual reports.

In addition to the routine annual entries, the licensee had performed several additional entries into the three shutdown reactors since the last inspection. These entries were

made for various purposes, including performance of general housekeeping tasks, industrial safety assessments, and evaluation of locked rooms within the reactors for current radiological conditions. Some of these entries involved non-routine activities, such as entering rooms within GETR that were considered airborne radioactivity areas, high-radiation areas, and areas with elevated levels of removable contamination. For entries into the shutdown containment buildings, licensee personnel wore coveralls, booties, and gloves to minimize contamination. Staff who entered airborne radioactivity areas also wore self-contained breathing apparatus and full facepiece respirators. All entries into the shutdown containment buildings included at least one radiation protection staff who wore a lapel air sampler for the duration of the entry. The inspectors reviewed the radiation protection controls that were implemented for the entries into the shutdown reactors, including air sampling, contamination controls, respiratory protection, and assessment of internal dose. Select air sampling data was reviewed for specific entries into airborne radioactivity areas, and the inspectors also reviewed the medical qualifications, fit testing, and training for staff who donned respirators for these entries.

At the time of the inspection, the licensee was performing a review of their internal dosimetry program concurrently with their evaluation of the radiological characteristics within VBWR, EVESR, and GETR, including sources of contamination that could become airborne during work activities and periodic surveillances. During the inspection, the licensee issued CR 32561 to review their assignment of internal dose for worker entries into GETR on June 12, 2019. Due to the licensee's ongoing evaluation of its internal dosimetry program, a review of this portion of the inspection procedure will be continued in the next inspection.

Throughout the course of the inspection, the inspectors toured accessible areas within the VBWR, EVESR, and GETR containment buildings to observe radiological postings and access controls. The inspectors also performed independent radiation surveys to ensure that postings adequately reflected the radiological hazards. In addition to the tours of the containment buildings, the inspectors walked down several outside areas, storage buildings, and process buildings throughout the site to check radiation levels using a Thermo Scientific RadEye G survey meter (Serial No. 30728, calibration due date of December 12, 2019). Through these surveys, the inspectors determined that the postings and controls within the areas were adequate to protect worker health and safety.

During the previous NRC inspection in March 2019, the inspectors identified a violation (VIO 0500018/2019001-02) associated with 10 CFR 20.1501(a) which requires that "the licensee shall make or cause to be made, surveys of areas, including the subsurface, 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; (ii) concentrations or quantities of residual radioactivity; and (iii) the potential radiological hazards of the radiation levels and residual radioactivity detected." During that inspection, the inspectors determined that the licensee had failed to perform adequate surveys in the shutdown reactor buildings to demonstrate compliance with 10 CFR 20.1902, which contains the posting requirements for radiation areas, high radiation areas, very high radiation areas, airborne radioactivity areas, and areas or rooms in which licensed material is used or stored. Specifically, the inspectors identified multiple postings that did not reflect the radiological conditions that currently existed in the areas that were observed. In addition, the inspectors identified multiple locked rooms within the containment buildings that were posted as high radiation areas

or airborne radioactivity areas, and there were no documented surveys of these rooms or knowledge of the current radiological conditions within the rooms to demonstrate that they were appropriately posted.

The licensee responded to the NOV by letter dated July 23, 2019 (ADAMS Accession No. ML19205A023). The licensee's corrective actions included performing special entries and surveys of the shutdown containment buildings from June 10, 2019 through June 21, 2019. As a result of these surveys, radiation postings in the containment buildings were updated and verified to reflect current radiological conditions. In addition, VSS Procedure 5.1, "Area Classification," Revision 10, was revised to clarify that radiation protection personnel are responsible for verifying and maintaining radiological postings, and VSS Procedure 5.1.1, "Radiation Posting and Labeling," Revision 6, was revised to clarify that posted radiation caution signs are to be periodically reviewed and verified to reflect current radiological conditions. The inspectors toured the shutdown containment buildings and observed that postings had been updated to reflect current radiological conditions. The inspectors also performed confirmatory radiation surveys within these areas to verify that the postings reflected actual radiation levels. The inspectors determined that the licensee's corrective actions were adequate, and this violation is closed.

During the previous inspection in March 2019, the inspectors identified violation (VIO 0500018/2019001-03) associated with 10 CFR 20.1501(c), which states "the licensee shall ensure that instruments and equipment used for quantitative radiation measurements (e.g., dose rate and effluent monitoring) are calibrated periodically for the radiation measured." Specifically, the inspectors determined that the licensee had not sampled and analyzed for hard-to-detect radionuclides (i.e., low-energy beta emitters such as carbon-14 and nickel-63) or transuranics in the shutdown reactors, even though such radionuclides could exist in the buildings due to the site's operational history. Without knowing the specific radionuclides that were present in the containment buildings, the licensee could not design a survey program that could adequately detect or quantify the radioactivity in those buildings.

The licensee responded to the NOV by letter dated July 23, 2019 (ADAMS Accession No. ML19205A023), and submitted various corrective actions. The corrective actions included finalizing a "Radiological Characterization Plan" for the VBWR, EVESR, and GETR containment buildings on June 6, 2019, and performing surveys and sample collection in the reactors between June 10, 2019 and June 21, 2019. The licensee's preliminary survey and analytical results indicated that hard-to-detect radionuclides and transuranics were not present in sufficient quantities to alter their current radiation survey instrument calibration program. During the previous inspection, the inspectors collected a limited number of dry smear samples within the shutdown reactors to identify radionuclides that could be present. These samples were subsequently analyzed at an independent laboratory for a broad range of radionuclides (including hard-to-detect radionuclides and transuranics). At the time of the inspection, the inspectors were provided by the licensee their preliminary results of their radiological surveys. The inspectors and licensee discussed preliminary results of the NRC's and the licensee's surveys. Both the licensee and the NRC need to perform further review of the radiological characterization data, so this violation will remain open until final data is available and the review can be completed.

During the previous inspection in March 2019, the inspectors identified violation (VIO 0500018/2019001-04) associated with 10 CFR 20.1703(c)(1), which states that "the licensee shall implement and maintain a respiratory protection program that includes air sampling sufficient to identify the potential hazard, permit proper equipment selection, and estimate doses." The inspectors had determined that workers had entered the VBWR basement on at least one occasion to perform non-routine work that involved vacuuming and cleaning of radioactive sediments. No air samples were taken during these non-routine activities to determine whether radioactive material in the sediments had become airborne and posed an internal hazard to the workers. Because no air sampling was performed, the licensee failed to identify whether airborne radioactive material was generated during these activities, and thus failed to identify the potential hazards to the workers. In addition, the failure to identify what airborne concentrations of radioactive material may have been generated from the activities resulted in a failure to estimate potential doses to the workers.

The licensee responded to the NOV by letter dated July 23, 2019 (ADAMS Accession No. ML19205A023). In their response, the licensee listed several completed and ongoing corrective actions, including issuance of a limited stop-work notice that stipulated all entries into the shutdown reactors were required to have lapel monitoring and coverage by Health Physics staff until site procedures could be reviewed and revised appropriately. Corrective actions are ongoing to include annual training on VNC Procedure 6.1, "Access Control," Revision 8 and a revision to Procedure 6.1, "Access Control," to clarify the need for air sampling sufficient to identify the potential hazard, permit proper respiratory protection equipment selection, and estimate potential doses. The inspectors reviewed the licensees completed and ongoing corrective actions and determined that additional information was necessary to review the specific conditions surrounding the non-routine work that was performed in the VBWR basement. The violation will remain open until the NRC has received this additional information for review and disposition.

3.3 Conclusions

The inspectors concluded that the licensee conducted its radiation control program in accordance with license conditions and regulatory requirements, with the exception of two violations in program areas related to occupational radiation exposure that remain open from the previous inspection.

4 Radioactive Waste Treatment, and Effluent and Environmental Monitoring (84750)

4.1 Inspection Scope

The inspectors reviewed the licensee's effluent and environmental monitoring program for the facility.

4.2 Observations and Findings

The licensee submitted its 2017 and 2018 annual report for the Effluent Monitoring and Environmental Surveillance Programs as required by various site licenses and permits issued by the NRC and the State of California. The inspectors reviewed the sample collection requirements provided in the Environmental Monitoring Manual and concluded that the licensee was performing its sample collection in accordance with the manual to

support the site's environmental monitoring program. The licensee collected and analyzed environmental data for air, groundwater, sediments, and vegetation in accordance with its procedures. In addition, the licensee performed analyses of both gross alpha and gross beta/gamma for water collected from surface water basins 1-4. Other analyses of the environmental samples collected were performed by state certified offsite laboratories. The analysis results documented that no radiological material was released equal to, or greater than the regulatory limits provided in 10 CFR Part 20, Appendix B, Table II, for air and water.

The inspectors reviewed the results from groundwater monitoring wells surrounding the site and walked down select well sites to observe their location and condition. The results from the monitoring wells were discussed with the licensee, as well as the licensee's protocols for preparing and analyzing well water samples. It was determined that all well samples were analyzed for gross alpha and beta levels and for tritium. If alpha or beta levels exceeded the count room's minimum detectable concentration, a gamma analysis was performed on the samples to identify specific gamma-emitting radionuclides. At the time of the inspection, the licensee was coordinating a review of their environmental monitoring program, including groundwater sampling and analysis, with an outside consultant. The results of their program review will be assessed by NRC inspectors during future inspections.

In the months of March and April 2019, the licensee installed a sump pump and piping in the basement of the VBWR containment to remove groundwater and condensation that had accumulated in the basement. The pump and piping were used to transfer standing water to a tank located adjacent to the VBWR containment structure. After being transferred to the tank, the licensee sampled the water, and then transferred it to the Waste Evaporator Plant (WEP) for processing. The inspectors walked down the sump drain lines that were added and interviewed licensee staff on how the lines were installed and used. In addition, inspectors reviewed the process for sampling and transferring the VBWR water from the holding tank to the WEP for processing. The inspectors toured the WEP and interviewed the operator on how the VBWR water was ultimately processed. In addition, the inspectors confirmed that the VBWR water was sampled and analyzed per Procedure VSS 7.2, "Radiological Effluent Control," Revision 11 prior to being processed in the WEP. The inspectors reviewed sample analysis results for water samples taken at the VBWR holding tank and the WEP hold-up tank. The inspectors also observed the WEP stack air sampler and interviewed staff on its availability during WEP operations. The inspectors reviewed the analyses for the last two air samples obtained from the WEP stack monitor to confirm levels of radioactivity were in accordance with the site's effluent release procedures.

The inspectors interviewed licensee staff regarding the collection of environmental samples and observed staff performing a weekly environmental air sample collection at Station 51 which is located near Building 109. The inspectors also observed select locations of environmental dosimeters used to measure direct radiation levels around the plant, and reviewed the placement and use of these dosimeters, as well as background and control dosimeters stored in Building 102B. The monitoring results of all environmental dosimeters were reported as gross values (no dose information from the background or control dosimeters was subtracted from the gross value of the deployed environmental dosimeter). The reported annual doses were below the dose limits to members of the public published in 10 CFR Part 20.

The inspectors toured the areas inside Building 202 which is located adjacent to GETR. This building previously contained a liquid treatment system for water transferred from GETR. Although Building 202 no longer houses legacy resin tanks and equipment that were used during GETR operations, there is a tank farm directly adjacent to the building with three buried tanks and one above-ground tank that remain connected to certain GETR systems. The buried tanks are not actively used for water transfers or storage, but the licensee does collect and monitor surface water that intrudes into voids above the buried tanks. The inspectors discussed the licensee's plans for sampling the contents of the buried tanks, as well as collecting samples from locations beneath the buried tanks to identify potential leaks. In addition, inspectors observed the material condition of the piping and valves used to fill the aboveground tank (Tank 115) since it remains in service to store water for processing at the WEP. The inspectors performed confirmatory surveys of radiation levels around Building 202 and the adjacent tank farm.

During the tour of GETR containment building, inspectors noted that the GETR ventilation system was operating. The inspectors discussed GETR stack monitoring requirements with the licensee and observed the material condition of the air sampling system used to measure radionuclide concentrations in air exiting the GETR stack. The inspectors also reviewed the last two air samples obtained from the GETR stack to confirm that levels of radioactivity were in accordance with the site's effluent control procedures.

The inspectors performed additional radiological surveys in areas where radioactive materials and waste were stored at the Hillside Storage Area and in Building 304. Inspectors noted that radwaste storage drums, tanks, and containers appeared to be in good physical condition. The inspectors also performed a limited walkover scan survey of the irrigation field near the onsite surface water basins and facility entrance along Vallecitos Road. Radiation levels in the irrigation field were consistent with natural background radiation levels for that area of the site.

4.3 Conclusions

The licensee implemented its effluent and environmental monitoring program in accordance with its Environmental Monitoring Manual and the regulatory requirements provided under 10 CFR Part 20.

5 Exit Meeting Summary

On October 3, 2019, the NRC inspectors presented the final inspection results to the Site Manager and other members of the licensee's staff. The inspectors asked the licensee whether any material examined during the inspection should be considered proprietary information. No proprietary information was identified.

SUPPLEMENTAL INSPECTION INFORMATION

KEY POINTS OF CONTACT

Licensee

M. Feyrer, Site Manager
J. Smyly, Environmental, Health and Safety Manager
S. Murray, GEH Licensing Manager
D. Heckman, Regulatory Affairs and Licensing Lead
K. Zanotto, Lead Manufacturing Projects
J. Ayala, Radiation Protection Supervisor
H. Stuart, Radiation Monitor Technician

INSPECTION PROCEDURES

IP 71801 Decommissioning Performance and Status Review at Permanently Shutdown Reactors
IP 69002 Class III Research and Test Reactors
IP 36801 Organization, Management, and Cost Controls at Permanently Shutdown Reactors
IP 83750 Occupational Radiation Exposure
IP 84750 Radioactive Waste Treatment, and Effluent and Environmental Monitoring

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

05000018/2019001-01	VIO	Failure to implement Procedure 6.2, “Patrols and Inspections,” Revision 11, for activities associated with VBWR.
05000018/2019001-02	VIO	Failure to perform adequate surveys in VBWR, GETR, and EVESR containment buildings to demonstrate compliance with 10 CFR 20.1501(a).
05000183/2019001-01	URI	Regulatory Compliance with 10 CFR 50.71(e)(4) requirements for final safety analysis report.

Discussed

05000018/2019001-03	VIO	Failure to ensure that instruments and equipment used for radiation measurements in the containment buildings are calibrated for the radiation measured in compliance with 10 CFR 20.1501(c).
05000018/2019001-04	VIO	Failure to implement and maintain a respiratory protection program, for activities associated with air sampling of the containment buildings in compliance with 10 CFR 20.1703(c)(1).

LIST OF ACRONYMS

ADAMS	Agency Documents Access and Management Systems
CFR	*Code of Federal Regulations*
CR	Condition Report
EP	Emergency Preparedness
EVESR	Empire State Atomic Development Associates Incorporated Vallecitos Experimental Superheat Reactor
FSAR	Final Safety Analysis Report
GEH	GE Hitachi Nuclear Energy Americas, LLC
GETR	General Electric Test Reactor
MW	Megawatt
NRC	U.S. Nuclear Regulatory Commission
NOV	Notice of Violation
REP	Radiological Emergency Plan
VBWR	Vallecitos Boiling Water Reactor
VIO	Violation
VNC	Vallecitos Nuclear Center
WEP	Waste Evaporator Plant

GE HITACHI NUCLEAR ENERGY - NRC INSPECTION REPORT 050-00018/2019-002; 050-00070/2019-002; 050-00183/2019-002 - DATED NOVEMBER 6, 2019

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X SUNSI Review By: SGA	ADAMS: **X** Yes ☐ No	☐ Sensitive **X** Non-Sensitive	☐ Non-Publicly Available **X** Publicly Available	Keyword NRC-002

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