



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

December 12, 2022

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

SUBJECT: GE HITACHI NUCLEAR ENERGY NRC INSPECTION REPORT 050-00018/2022-002, 050-00070/2022-002, AND 050-00183/2022-002

Dear Mr. Pedley:

This letter refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted on November 7-9, 2022, 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). The NRC inspectors discussed the results of this inspection with you and members of your staff on November 9, 2022. 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.

Based on the results of this inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred. The violation was evaluated in accordance with the NRC Enforcement Policy. The current NRC Enforcement Policy is included on the NRC's Web site at (<https://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>).

The violation cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because it was identified by the NRC and corrective actions had not been fully articulated on the docket at the time of the final exit meeting. Therefore, you are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosure, 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,



Signed by Warnick, Gregory
on 12/12/22

Gregory G. Warnick, Chief
Decommissioning, ISFSI, and Operating
Reactor Branch
Division of Radiological Safety and Security

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

Enclosures:

1. Notice of Violation
2. Inspection Report 050-00018/2022-002;
050-00070/2022-002; 050-00183/2022-002

GE HITACHI NUCLEAR ENERGY NRC INSPECTION REPORT 050-00018/2022-002;
050-00070/2022-002; 050-00183/2022-002 DATED DECEMBER 12, 2022.

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GE Vallecitos ListServ
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GE HITACHI NUCLEAR ENERGY NRC INSPECTION REPORT 050-00018/2022-002; 050-00070/2022-002;
050-00183/2022-002

ADAMS ACCESSION NUMBER: **ML22339A174**

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OFFICIAL RECORD COPY

NOTICE OF VIOLATION

GE Hitachi Nuclear Energy
Vallecitos Boiling Water Reactor
GE Test Reactor
ESADA Vallecitos Experimental Superheat Reactor

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

During an NRC inspection conducted on November 7-9, 2022, one violation of NRC requirements of greater than minor significance was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

10 CFR 20.1601(a) states, in part, "The licensee shall ensure that each entrance or access point to a high radiation area has one or more of the following features(3) Entryways that are locked, except during periods when access to the areas is required, with positive control over each individual entry."

Licensee Procedures WI-27-105-01, "Posting and Control of Radiological Areas," revision 3, and WI-27-105-15, "High Radiation Area Access Control," revision 2, implements the positive control provision of the regulation as stated above. Procedure WI-27-105-01, section 4.6.2, describes several ways to establish controls for a high radiation area when one is unlocked. These include assigning an attendant at the entrance to prevent unauthorized access or providing a control device with a conspicuous visible or audible alarm neither of which were implemented. Procedure WI-27-105-15, section 4.1.4, states "If a guard will be used to control high radiation area (HRA) access, then ensure the Guard has been briefed and understands the responsibilities of a Guard per Attachment 3, Access Control Guard Responsibilities." Attachment 3 requires, in part, that the guard maintains direct "line-of-sight" surveillance of the access to the high radiation area until it is locked/secured and prevents unauthorized entry into the high radiation area by verifying individuals seeking access to the high radiation area are authorized on the radiation work permit.

Contrary to the above, on November 9, 2022, GE Hitachi Nuclear Energy failed to establish positive controls over an entry to a posted high radiation area. Specifically, during an NRC tour of the Waste Evaporator Plant (WEP) building, the licensee failed to assign and brief an attendant per procedures WI-27-105-01 and WI-27-105-15, and as a result, the licensee failed to maintain positive control over the posted high radiation area.

This is a Severity Level IV violation (Section 6.3).

Pursuant to the provisions of Title 10 *Code of Federal Regulation* (CFR) 2.201, GE Hitachi Nuclear Energy is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, Region IV, 1600 E. Lamar Blvd., Arlington, TX 76011-4511, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved.

Your response may reference or include previously docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be

issued requiring information as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-001, with a copy to the Regional Administrator, Region IV.

Your response will be made available electronically for public inspection in the NRC Public Document Room or in the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at: <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary or safeguards information so that it can be made available to the public without redaction.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 12 day of December 2022

**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.: 050-00018/2022-002; 050-00070/2022-002; and 050-00183/2022-002

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: November 7-9, 2022

Inspectors: Stephanie G. Anderson
Senior Health Physicist
Decommissioning, ISFSI, and Operating Reactor Branch
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Accompanied By: Eric S. McManus
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Decommissioning, ISFSI, and Operating Reactor Branch
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Approved By: Gregory G. Warnick, Branch Chief
Decommissioning, ISFSI, and Operating Reactor Branch
Division of Radiological Safety and Security

EXECUTIVE SUMMARY

GE Hitachi Nuclear Energy

NRC Inspection Report 050-00018/2022-002; 050-00070/2022-002; and 050-00183/2022-002

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 inspectors identified one Severity Level IV violation. Other than the one identified violation, the licensee was conducting these activities in accordance with site procedures, license requirements, and applicable NRC regulations.

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. (Section 1.2)

Safety Reviews, Design Changes, and Modifications at Permanently Shutdown Reactors

- The licensee implemented its safety review program in accordance with its procedures and regulatory requirements. (Section 2.2)

Problem Identification and Resolution at Permanently Shutdown Reactors

- The inspectors concluded that the licensee was adequately implementing its corrective action program in accordance with regulatory requirements. (Section 3.2)

Fire Protection Program at Permanently Shutdown Reactors

- 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 4.2)

Occupational Radiation Exposure at Permanently Shutdown Reactors

- The inspectors concluded that the licensee conducted its radiation control program in accordance with license conditions and regulatory requirements, with one exception of more than minor significance. The inspectors identified one Severity Level IV violation in the high radiation area controls area of occupational radiation exposure. The licensee monitored occupational exposures, and the results for 2021 - to date in 2022 were less than regulatory limits. The licensee continued to conduct annual radiological surveys within each of the shutdown reactor structures as required by the three licenses, and the licensee reported the results to the NRC in an annual report. (Section 5.2)

Radioactive Waste Treatment, and Effluent and Environmental Monitoring

- The licensee collected and analyzed all required effluent and environmental monitoring samples, and no sample result exceeded the respective regulatory or procedural limits. Site operations had a negligible effect on public doses during 2021. (Section 6.2)

Report Details

Summary of Plant Status

The GE Hitachi Nuclear Energy Americas, LLC (GEH or Licensee) transitioned 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) from a possession-only, safe storage (SAFSTOR) condition, with no fuel remaining in the reactors or spent fuel pools to DECON status.

On December 15, 2015, the licensee submitted a request for license continuance under Title 10 to the *Code of Federal Regulations* (10 CFR) 50.51(b) for reactor licenses DR-10 and TR-1 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML15349A045). That request was approved by letter dated January 2, 2019 (ML18352A450). The licensee also submitted a request on July 10, 2015 (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 March 19, 2021 (ML19304B459), the NRC staff submitted a SECY paper to the Commissioners, SECY-21-0033, "Request for an exemption from the decommissioning schedule requirements for shutdown reactors at GE Hitachi Vallecitos Nuclear Center." In the SECY paper, there were two options for the Commission's consideration. Option 1 was to approve a 10 CFR 50.12 exemption from the applicable decommissioning schedule requirements of 10 CFR 50.82(a)(3) and 10 CFR 50.82(b)(4)(i) for the EVESR and GETR and delegate to the staff only the authority to grant or deny such an exemption for the VBWR based on GEH's demonstration of the VBWR's continued structural integrity. Option 2 was to deny the exemption request for all three shutdown reactors at the Vallecitos Nuclear Center (VNC). The NRC staff recommend approving Option 1, a 10 CFR 50.12 exemption from the applicable decommissioning schedule requirements of 10 CFR 50.82(a)(3) and 10 CFR 50.82(b)(4)(i) for the EVESR and GETR and to delegate to the staff the authority to grant or deny such an exemption for the VBWR based on the licensee's demonstration of the VBWR's continued structural integrity.

On August 6, 2021 (ML21218A110), the Commission disapproved the staff's recommendation to grant GEH an exemption of 10 CFR 50.12, to extend the decommissioning schedule for EVESR, GETR, and VBWR and instead approved a denial of the request under Option 2. On August 25, 2021 (ML21237A064), GEH requested to withdraw its exemption request for the shutdown reactors from an alternate decommissioning schedule. By letter dated October 12, 2021 (ML21258A042), the NRC staff sent a letter to GEH accepting the withdraw of the exemption request and reviewed the requirements from 10 CFR 50.82 that apply to the decommissioning of the shutdown reactors at the VNC.

On September 21, 2022 (ML22264A325), GEH submitted their Limited Post-Shutdown Decommissioning Activities Report (LPSDAR) to demonstrate compliance with 10 CFR 50.82(a)(4), 10 CFR 50.82(a)(6), and 10 CFR 50.82(a)(7). Although 10 CFR 50.82(a)(4) requirements for content of the PSDAR do not apply to VBWR and EVESR, GEH agreed to prepare the LPSDAR consistent with the description in 10 CFR 50.82(a)(4) and Regulatory Guide 1.185, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report."

For 2023 inspection activities, in accordance with Inspection Manual Chapter 2561, "Decommissioning Power Reactor Inspection Program," the direct inspection effort associated

with the implementation of the core inspection procedures will increase as the site transitions to a Category 3 site as defined as Actively Decommissioning (DECON), no fuel in the spent fuel pool.

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. Vallecitos Boiling Water Reactor

The 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 shut down 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 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 does monitor the water level weekly in the reactor vessel and at the time of the inspection, the manometer was not in service due to active work around the reactor vessel to prepare the vessel for removal from the containment.

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 identified humidity and temperature sensors in the retired facility. The inspectors observed multiple crack formation throughout the containment building. The cracks are being monitored by the licensee to determine growth rate. During the inspection, the inspectors did not identify any standing 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 for processing.

b. 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.

c. General Electric Test Reactor

The 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 inspectors toured the containment building, old control room, and tank farm. 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.

d. Other

The licenses for the three shutdown reactors require, in part, that activities involving access to the facility area and use of any area shall be conducted under the direction of a designated facility manager with functional responsibility and commensurate authority to maintain the facility in a safe and secure condition at all times. The inspectors reviewed the licensee's organization and discussed the organizational structure with members of the licensee's organization. Based on discussions and observations, the inspectors determined that the individual fulfilling the licensed responsibility as the facility manager for the defueled reactors, adequately met the license condition requirements.

The licensee is managing the site as required by all regulatory and license requirements including management of their decommissioning file as required by 10 CFR 50.75(g). The inspectors evaluated the licensee's decommissioning cost planning and assessment, being an important part of the decommissioning process. The inspectors determined that the licensee's cost planning and assessment were inclusive of current and planned major decommissioning activities as identified in the LPSDAR.

1.3 Conclusions

The licensee conducted annual inspections and audits of the three shutdown reactors in accordance with regulatory, license, and procedure requirements.

2 Safety Reviews, Design Changes, and Modifications at Permanently Shutdown Reactors (37801)

2.1 Inspection Scope

The inspectors reviewed the licensee's control and oversight of the safety review program to ensure design changes, tests, experiments and modifications were effectively conducted, managed, and controlled during plant decommissioning.

2.2 Observations and Findings

There were three 10 CFR 50.59 modifications by the licensee related to the shutdown reactors to review for 2022 to date. All three modifications were for the VBWR and included the installation of a staircase in lieu of a ladder to the basement area, radioactive characterization of the reactor vessel, and removal of shielding materials around the vessel in preparation for vessel removal. The inspectors reviewed VSS 2.0, "Change Authorization," revision 24, and determined that the licensee had appropriately followed the procedure to screen the changes. It was noted by the inspectors through document review and interviews that cognizant licensee personnel were knowledgeable and appeared to be appropriately trained.

2.3 Conclusions

The licensee implemented its safety review program in accordance with its procedures and regulatory requirements.

3 Problem Identification and Resolution Action at Permanently Shutdown Reactors (40801)

3.1 Inspection Scope

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

3.2 Observations and Findings

At the time of the inspection the licensee was implementing its corrective action program under procedures CP-16-108, "Corrective Action Program," revision 13.4, WI-16-108-01, "Condition Review Process," revision 12.0, WI-20-106-06, "Corrective Action Program Qualifications," revision 7.0, and CP-16-202, "Common Cause Analysis," revision 6.0. These procedures apply to all the GE-Hitachi nuclear sites including the facilities at the VNC. The inspectors reviewed the implementation of those procedures and a list of corrective action condition reports on the shutdown reactors generated between August 2021 and the time of the inspection, including several specific condition reports (CRs)

related to the shutdown reactors (i.e., CRs 38035, 40513, 40514, and 40551) for adherence to the corrective action procedure.

The inspectors also reviewed CR-39044, a three-year trend analysis of CR categories specific to the VNC for trends and common causes for identified trends, the process and results of GEH's Vallecitos specific trend analysis of CR categories based on key words, the recent efforts by GEH to better specify trend categories specific to the activities done on site and related to the shutdown reactors for better identification of issues, and how these trending issues are reviewed by management. Also reviewed was the 2022 Vallecitos Radiation Survey Audit, the identification of opportunities for improvement, and the capture of those issues in the corrective action system.

3.3 Conclusions

The inspectors concluded that the licensee was adequately implementing its corrective action program in accordance with regulatory requirements.

4 Fire Protection Program at Permanently Shutdown Reactors (64704)

4.1 Inspection Scope

The inspectors evaluated the licensee's fire protection program to support licensed activities and regulatory requirements.

4.2 Observations and Findings

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 also reviewed the fire drill report for 2022, fire extinguisher monthly surveillances, fire training, fire hoses conditions, and the preventive maintenance monthly inspections.

4.3 Conclusions

The licensee had implemented a fire protection program that reasonably prevented fires from occurring and was capable of rapidly extinguishing those fires that occurred.

5 Occupational Radiation Exposure at Permanently Shutdown Reactors (83750)

5.1 Inspection Scope

The inspectors reviewed occupational exposures and the results of the licensee's radiological surveys within the three shutdown reactors for compliance with license and regulatory requirements.

5.2 Observations and Findings

The inspectors toured accessible areas within the site restricted areas, in part, to observe radiological postings, area boundaries, and access controls. During site tours, the inspectors conducted independent radiation measurements to ensure postings and boundaries reflected actual radiological hazards. The inspectors independently measured ambient gamma radiation levels using a Ludlum Model 2401-EC2 survey meter (serial number 181580, calibration due date of 1/28/23, calibrated to cesium-137).

The inspectors toured the VBWR. The operating deck measured under 1 millirem per hour. The basement area of the VBWR measured less than 5 millirem per hour, with the sump area measuring around 3-4 millirem per hour. The general areas of the EVESR and GETR measured under 5 millirem per hour, and areas that exceeded 5 millirem per hour in GETR were properly posted as radiation areas as required by 10 CFR 20.1902(a). The inspectors also toured the onsite radiological count room and waste evaporator plant. The count room and waste evaporator plant (WEP) measured less than 5 millirem per hour with most areas at or near background levels.

The inspectors noted that the licensee performed several non-routine work activities in the VBWR in 2022 as part of initial decommissioning activities. The inspectors reviewed a sampling of documentation associated with these activities, including radiological surveys and radiation work permits and did not identify any issues of more than minor significance. The inspectors walked down the storage location of waste generated from a recent activity involving removing shielding materials around the VBWR in preparation for eventual shipment. The inspectors determined that the containers were appropriately labeled, and the area was appropriately posted.

In the area of training, the inspectors reviewed procedure No. 1200, "Qualification of Radiation Monitoring Technicians," revision 0, and discussed its use with the radiation safety officer. This new procedure provides a framework for the licensee to review the qualifications of incoming radiation protection personnel and provide site-specific training. The inspectors noted that the implementation of this process is timely given increased use of radiation protection contractors for decommissioning work.

The occupational dose limits for adults are provided in 10 CFR 20.1201. The inspectors reviewed the licensee's occupational exposure records and discussed these records with the radiation safety officer. The licensee divided the site staff into groups based on major work activities. The groups included facilities management, nuclear test reactor, and radiation protection. Worker exposures were primarily from external sources but may include internal exposures based on air sample results.

During calendar year 2021, the onsite individual who received the highest total effective dose equivalent exposure worked at the nuclear test reactor. This individual received 0.697 rem with a regulatory limit of 5 rem. The highest dose to a facilities worker was 0.424 rem, while the highest dose to a radiation protection worker was 0.330 rem. The inspectors also reviewed the available occupational exposure records for calendar year 2022. At the time of the inspection, all doses were within the regulatory limit of 5 rem. The licensee continued to monitor worker exposures using optically stimulated dosimeters, electronic dosimeters, and air sampling as necessary based on the work assignment.

The licenses for the three shutdown reactors include conditions, which state that a general radiation survey shall be conducted at least annually, and the results of the survey shall be submitted to the NRC on an annual basis. The radiological surveys of the interiors of the three shutdown reactors were conducted in July and September 2021. The results of the surveys were submitted to the NRC by letter dated March 25, 2022 (ML22089A223). The radiological surveys included ambient and surface radiation levels, removable contamination levels, and ambient air samples. The inspectors reviewed the sample results for 2021. Although each building had variable levels of contamination, according to the licensee, the overall radioactivity levels were found to remain low. The licensee had completed their 2022 annual inspections and surveys of the shutdown reactors, but at the time of this inspection, the report had not been issued.

The inspectors toured the WEP, in part, to observe radiological postings and access controls. The licensee uses the WEP to process contaminated water from site facilities, including the VBWR. The WEP is enclosed in one building, which is posted as a high radiation area (HRA) and normally kept locked. As defined by 10 CFR 20.1003, a HRA is an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 0.1 rem (1 mSv) in 1 hour at 30 centimeters from the radiation source or 30 centimeters from any surface that the radiation penetrates. Within the WEP building, there are two specific areas where radiation dose rates are expected to exceed high radiation dose rate levels. One area is within the waste processing room and another under a holdup tank. The waste processing room was verified to be locked. The area under the holdup tank was accessible during the tour since the building was unlocked with access available through a door and two roll up doors to the building. Recent surveys in July and October 2022 both document a dose rate of 105 mrem/hour under the holdup tank, which exceeded the HRA criteria stated above.

The inspectors identified one Severity Level IV notice of violation (NOV) of 10 CFR 20.1601(a) for the licensee's failure to positively control an unlocked posted high radiation area. 10 CFR 20.1601(a) states, in part, "The licensee shall ensure that each entrance or access point to a high radiation area has one or more of the following features(3) Entryways that are locked, except during periods when access to the areas is required, with positive control over each individual entry."

Licensee procedures WI-27-105-01, "Posting and Control of Radiological Areas," revision 3.0 and WI-27-105-15, "High Radiation Area Access Control," revision 2.0 implements the positive control provision of the regulation as stated above. Procedure WI-27-105-01, section 4.6.2, describes several ways to establish controls for a high radiation area when one is unlocked. These include assigning an attendant at the entrance to prevent unauthorized access or providing a control device with a conspicuous visible or audible alarm neither of which were implemented. Procedure WI-27-105-15, section 4.1.4, states, "If a guard will be used to control HRA access, then ensure the Guard has been briefed and understands the responsibilities of a Guard per Attachment 3, Access Control Guard Responsibilities." Attachment 3 requires, in part, that the guard maintains direct "line-of-sight" surveillance of the access to the HRA until it is locked/secured and prevents unauthorized entry into the HRA by verifying individuals seeking access to the HRA are authorized on the radiation work permit (RWP).

Contrary to the above, on November 9, 2022, GE Hitachi Nuclear Energy failed to establish positive controls over an entry to a posted HRA. Specifically, during the NRC tour of the WEP building, the licensee failed to assign and brief an attendant per procedures WI-27-105-01 and WI-27-105-15, and as a result the licensee failed to maintain positive control over the posted HRA. (VIO 0500018/2022002-01)

The inspectors informed the significance determination using example 6.3.d.3 of the NRC Enforcement Policy, dated January 14, 2022, regarding the failure to implement procedures, where the failure has a low safety significance and the licensee administrative requirement/limit issues example in the NRC Enforcement Manual, Appendix E, "Minor Violations – Examples," regarding the control of high radiation limits where conditions exceed NRC regulatory limits. Additionally, the inspectors informed the significance determination using the general screening criteria in section 6.0 of IMC 0612, Appendix E, "Examples of Minor Issues," which describes the failure of one radiological barrier to be of minor significance. The inspectors noted that this issue involved a failure of multiple radiological barriers, including failure to follow procedures WI-27-105-01 and WI-27-105-15, failure of radiation protection supervision oversight, and failure to provide adequate instructions to workers of the area hazards, therefore the issue is considered of more than minor significance.

The inspectors noted that while the building was posted as an HRA, the waste processing room nor the area around the tank were posted or identified as having HRA conditions. Further, until the inspectors queried the licensee, the higher dose areas were not briefed. The inspectors were briefed to radiation work permit 2022-09 with a dose rate limit of 100 mrem/hr. This RWP did not allow entry into HRA conditions. While no actual entries to HRA conditions occurred, the inspectors noted that the above examples are failures to provide adequate instructions to workers of radiological hazards.

5.3 Conclusions

The inspectors concluded that the licensee conducted its radiation control program in accordance with license conditions and regulatory requirements, with one exception of more than minor significance. The inspectors identified one Severity Level IV violation in the HRA controls area of occupational radiation exposure.

The licensee monitored occupational exposures, and the results for 2021 - to date in 2022 were less than regulatory limits. The licensee continued to conduct annual radiological surveys within each of the shutdown reactor structures as required by the three licenses, and the licensee reported the results to the NRC in an annual report.

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

6.1 Inspection Scope

The inspectors reviewed the licensee's effluent and environmental monitoring program for the facility. The objectives of this portion of the inspection effort were to ensure that discharges of radioactive materials were adequately quantified and evaluated, and to ensure that the radiological effluent and environmental program requirements were effectively implemented.

6.2 Observations and Findings

a. Radioactive Waste Treatment

The WEP is designed to receive, transfer, store, process, and dispose of aqueous radioactive waste liquids generated at the VNC. The evaporation process separates radioactive products from the liquid by boiling the liquid in a closed tank. The steam effluent is condensed in a separate chamber to relatively pure water while the radioactive products remain in the evaporator to eventually be transferred to drums for solidification and/or disposal. The inspectors conducted a walkdown of the waste evaporator plant and compared system operations to applicable operating procedures. The plant systems were not in service at the time of the inspection.

The inspectors observed the status of the equipment in the building. The 30,000-gallon storage tank was out of service due to an annulus leak. The inspectors observed the ozone/ultraviolet system where process liquids containing organics were processed. A licensee representative indicated that this system was rarely used since the liquid wastes did not normally contain organic material. The inspectors observed the locations where the water was sampled prior to final evaporation and where the gaseous effluent was monitored prior to release. Licensee representatives discussed how the evaporation plant equipment worked and how air and water samples were collected.

The inspectors reviewed recent water and air sample results collected from the waste evaporator plant's liquid and effluent release points and discussed the results with the licensee's staff. The air samples were collected from the outlet of the exhaust air filters, while the water samples were collected from the monitor tanks prior to release to the atmosphere as steam. The sample results were less than the procedural action levels.

b. Effluent and Environmental Monitoring

Licenses DR-10 and DPR-1 for the EVESR and VBWR, respectively, require the licensee to maintain records showing the radioactivity released or discharged into the air or water beyond the effective control of the licensee as measured at the point of such release or discharge. At the time of the inspection, the licensee had established and implemented effluent and environmental monitoring programs in accordance with the instructions provide in the Environmental Monitoring Manual, revision 6, and procedure 7.2, Radioactive Effluent Control, revision 13. Section 3.1 of the Environmental Monitoring Manual requires the licensee to submit the results from the previous year to the NRC by May 1st of each calendar year. The inspectors reviewed the 2021 results (ML22068A248) and discussed the results with licensee staff.

The licensee's effluent monitoring program included gaseous and liquid effluents. Airborne effluents were continuously monitored at four operating building discharge stacks. Three other stacks remained idle during 2021. Liquid effluents included industrial wastewater, sanitary wastewater, and stormwater runoff. The licensee's records indicate that all releases were within the action level limits established in the Environmental Monitoring Manual and site procedures.

The licensee's environmental monitoring program included groundwater monitoring, stream sediment sampling, vegetation sampling, air sampling, and gamma radiation monitoring. At the time of the inspection, the licensee was sampling 10 monitoring wells on either a quarterly or annual basis. One sediment sample was collected from a local

stream downgradient from the industrial wastewater and sanitary wastewater retention basins. Vegetation was measured at two locations at the site boundary. In addition, environmental air sampling was conducted at four stations generally located in the four quadrants around the site. Finally, gamma radiation monitoring was conducted at 20 locations around the site. The inspectors noted that the 2021 sample results were less than the respective action levels as presented in the Environmental Monitoring Manual and site procedures.

To demonstrate compliance with the dose limits specified in 10 CFR 20.1101(d) and 10 CFR 20.1301(a), the licensee calculated the public doses at the site boundary using the COMPLY computer code as allowed by Regulatory Guide 4.20, Constraint on Releases of Airborne Radioactive Materials to the Environment for Licensees Other Than Power Reactors. The inspectors reviewed some of the licensee's input parameters into the COMPLY code. Based on the data collected during 2021, the dose at the property line from all gaseous emissions was calculated to be 0.5 millirem per year, a calculated dose that was well below the annual limit of 100 millirem per year specified in 10 CFR 20.1301(a).

The inspectors observed the operation of one of four environmental air sampling stations. The air sampler at that station was in service during the tour. The licensee's representative described the operation and calibration requirements for the air sampler. The inspectors provided the licensee with potential design enhancements to reduce the potential of rain damage to the filter element.

6.3 Conclusions

The licensee collected and analyzed all required effluent and environmental monitoring samples, and no sample result exceeded the regulatory or procedural limits. Site operations had a negligible effect on public doses during 2021.

7 **Exit Meeting Summary**

On November 9, 2022, the NRC inspectors presented the final inspection results to Mr. Charles Pedley, 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

C. Pedley, VNC Site Manager
J. Smyly, Environmental Health and Safety Manager
D. Heckman, Regulatory Affairs and Licensing Lead
K. Zanotto, Facilities Manager
J. Ayala, Project Management
D. Demore, Interim Radiation Safety Officer

INSPECTION PROCEDURES

IP 71801 Decommissioning Performance and Status Review at Permanently Shutdown Reactors
IP 69002 Class III Research and Test Reactors
IP 37801 Safety Reviews, Design Changes, and Modifications at Permanently Shutdown Reactors
IP 40801 Problem Identification and Resolution at Permanently Shutdown Reactors
IP 64704 Fire Protection Program at Permanently Shutdown Reactors
IP 83750 Occupational Radiation Exposure at Permanently Shutdown Reactors
IP 84750 Radioactive Waste Treatment, and Effluent and Environmental Monitoring

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

0500018/2022002-01	VIO	Failure to positively control an unlocked posted high radiation area to demonstrate compliance with 10 CFR 20.1601(a).
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Closed

None

Discussed

None

LIST OF ACRONYMS

ADAMS	Agency Documents Access and Management Systems
CFR	<i>Code of Federal Regulations</i>
CR	Condition Report
EVESR	Empire State Atomic Development Associates Incorporated Vallecitos Experimental Superheat Reactor
GEH	GE Hitachi Nuclear Energy Americas, LLC
GETR	General Electric Test Reactor
HRA	high radiation area
LPSDAR	Limited Post-Shutdown Decommissioning Activities Report
MW	megawatt
NRC	U.S. Nuclear Regulatory Commission
NOV	Notice of Violation
RWP	Radiation Work Permit

VBWR	Vallecitos Boiling Water Reactor
VIO	Violation
VNC	Vallecitos Nuclear Center
WEP	Waste Evaporator Plant