UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD, SUITE 102
KING OF PRUSSIA, PA 19406-1415

November 18, 2022

Mr. Kelly Trice
President
Holtec Decommissioning International, LLC
Krishna P. Singh Campus
1 Holtec Blvd.
Camden, NJ 08104

SUBJECT: HOLTEC DECOMMISSIONING INTERNATIONAL, LLC, PILGRIM NUCLEAR POWER STATION - NRC INSPECTION REPORT NO. 05000293/2022003

Dear Mr. Trice:

On September 30, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection under Inspection Manual Chapter 2561, “Decommissioning Power Reactor Inspection Program,” at the permanently shutdown Pilgrim Nuclear Power Station (PNPS). On-site focused topical inspections were conducted on August 22 – August 25, 2022. Additional inspection activities (in office reviews) were conducted remotely during the inspection period. The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and the conditions of your license. The inspection consisted of observations by the inspectors, interviews with site personnel, a review of procedures and records, and plant walk-downs. The results of the inspection were discussed with Mr. John Moylan, Site Vice President, and other members of your staff on October 20, 2022, and are described in the enclosed report.

One NRC-identified violation of NRC requirements of very low safety significance (Severity Level IV) is documented in this report. Because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating the violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest the subject or severity of this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region I; and the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

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

Current NRC regulations and guidance are included on the NRC's website at www.nrc.gov; select **Radioactive Waste**; **Decommissioning of Nuclear Facilities**; then **Regulations, Guidance and Communications**. The current Enforcement Policy is included on the NRC's Website at www.nrc.gov; select **About NRC**, **Organizations & Functions**; **Office of Enforcement**; **Enforcement documents**; then **Enforcement Policy** (Under 'Related Information'). You may also obtain these documents by contacting the Government Printing Office (GPO) toll-free at 1-866-512-1800. The GPO is open from 8:00 a.m. to 5:30 p.m. EST, Monday through Friday (except Federal holidays).

No reply to this letter is required. Please contact Harold (Harry) Anagnostopoulos of my staff at 610-337-5322 if you have any questions regarding this matter.

Sincerely,

Anthony M. Dimitriadis

Digitally signed by Anthony M. Dimitriadis
Date: 2022.11.18 15:01:11 -05'00'

Anthony Dimitriadis, Chief
Decommissioning, ISFSI, and Reactor Health Physics Branch
Division of Radiological Safety and Security

Docket No. 05000293
License No. DPR-35

Enclosure: Inspection Report 05000293/2022003 w/Attachment

cc w/encl: Distribution via ListServ

SUBJECT: HOLTEC DECOMMISSIONING INTERNATIONAL, LLC, PILGRIM NUCLEAR POWER STATION - NRC INSPECTION REPORT NO. 05000293/2022003 DATED NOVEMBER 18, 2022

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DATE	11/07/2022		11/17/2022					

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U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Inspection Report No.	05000293/2022003
Docket No.	05000293
License No.	DPR-35
Licensee:	Holtec Decommissioning International, LLC (HDI)
Facility:	Pilgrim Nuclear Power Station (PNPS)
Location:	Plymouth, Massachusetts
Inspection Period:	July 1, 2022 to September 30, 2022
Topical Inspection Dates:	August 22, 2022 to August 25, 2022
Inspectors:	Harold Anagnostopoulos, Senior Health Physicist Decommissioning, ISFSI, and Reactor Health Physics Branch Division of Radiological Safety and Security Katherine Barnes, Health Physicist (in training) Decommissioning, ISFSI, and Reactor Health Physics Branch Division of Radiological Safety and Security
Approved By:	Anthony Dimitriadis, Chief Decommissioning, ISFSI, and Reactor Health Physics Branch Division of Radiological Safety and Security

EXECUTIVE SUMMARY

Holtec Decommissioning International, LLC (HDI)
Pilgrim Nuclear Power Station (PNPS)
NRC Inspection Report No. 05000293/2022003

An announced routine decommissioning inspection was completed at Pilgrim Nuclear Power Station (PNPS) on September 30, 2022. On-site focused topical inspections using three inspection procedures were conducted on August 22 – August 25, 2022. Additional inspection activities were conducted remotely during the inspection period. The inspection included an evaluation of the site's internal and external dosimetry programs, a review of the Radiological Environmental Monitoring (REMP) program, an assessment of the treatment / handling of radioactive wastes, and reviews of efforts to release and demolish two onsite buildings. The inspection consisted of observations by the inspectors, interviews with site personnel, a review of procedures and records, and plant walk-downs. The U.S Nuclear Regulatory Commission's (NRC) program for overseeing the safe decommissioning of a shutdown nuclear power reactor is described in Inspection Manual Chapter (IMC) 2561, "Decommissioning Power Reactor Inspection Program."

List of Violations

One Severity Level IV non-cited violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR) 20.1703(c)(1), was identified for HDI's failure to assess the potential airborne radioactivity in the Drywell on the 23-foot elevation while using respiratory protection during radiological work activities. Specifically, a survey was required by HDI procedures and was necessary to ensure that personnel were not exposed to unexpected levels of airborne radioactivity while working and removing respiratory protection in that area. However, because the violation was determined to be of very low safety significance, and was entered into Pilgrim's corrective action program, (PIL-05330), this violation is being treated as an NCV consistent with Section 2.3.2.a of the NRC Enforcement Policy.

REPORT DETAILS

1.0 Background

On June 10, 2019, Entergy Nuclear Operations, Inc. (ENOI) certified cessation of power operations and the permanent removal of fuel from the PNPS reactor vessel (ADAMS Accession Number: ML19161A033). This met the requirements of 10 CFR 50.82(a)(1)(i) and 50.82(a)(1)(ii). On June 11, 2019, the NRC notified PNPS that the NRC would no longer perform its oversight activities in accordance with the Operating Reactor Assessment Program per IMC 0305 and that oversight would be conducted under the provisions outlined in IMC 2561 "Decommissioning Power Reactor Inspection Program" (ADAMS Accession No. ML19162A033). On August 27, 2019, an amendment was issued transferring the license from ENOI to Holtec International, LLC., (HDI) (ADAMS Accession No. ML19235A050). On December 14, 2021, HDI notified the NRC of the permanent removal of all spent fuel assemblies from the spent fuel pool, with their placement in dry storage within the ISFSI II cask storage pad (ADAMS Accession No. ML21348A748).

At the time of the inspection, PNPS was in the active decommissioning phase with no fuel in the spent fuel pool, as described in IMC 2561.

2.0 Decommissioning Performance and Status Review

2.1 Inspection Procedures (83750, 83801, 84750)

a. Inspection Scope

The inspectors reviewed the internal and external dosimetry aspects of the radiation protection program.

The inspectors examined the material condition of the whole-body counter and observed the conduct of routine performance testing of the instrument. The inspectors reviewed the results of the most recent routine annual calibration of the instrument and all internal exposure evaluations conducted since June 1, 2020. The inspectors observed the conduct of routine performance checks on a selection of portal radiation monitors and also examined the equipment, supplies, and facilities that were available for the collection, storage, processing, and handling of in-vitro bioassay samples.

The inspectors reviewed the 2021 and 2022 National Voluntary Laboratory Accreditation Program (NVLAP) accreditations for whole body radiation and extremity dosimeters used at the Pilgrim site. Additionally, the inspectors reviewed all external dosimetry discrepancy reports and/or evaluations that were performed since June 1, 2020, including the results of the routine external whole body dosimeter-to-electronic whole body dosimeter mismatch comparisons.

The inspectors conducted a detailed review of the radiological survey plan for the unrestricted release of the Operations and Maintenance (O&M) building and its associated warehouse. This included a comprehensive review of survey documentation and several meetings with Pilgrim staff. The inspectors also conducted a review of the radiological survey plan for the Trash Compaction Facility (TCF) prior to its demolition and conducted a walk-down of the accessible portions of the TCF.

The inspectors reviewed the Offsite Dose Calculation Manual (ODCM), with a particular emphasis on recent changes to the manual and changes to the REMP. The inspectors reviewed the Annual Radiological Environmental Operating Report and the Annual Radioactive Effluent Release Report for calendar year 2021. The inspectors discussed sampling methods and sampling equipment that is used in REMP sampling with the appropriate staff. The inspectors reviewed the conduct and results of the radiological groundwater protection program initiative monitoring at the Pilgrim site, including and observation of groundwater well sampling.

b. Observations and Findings

The inspectors found the whole-body counter to be adequately calibrated and observed a performance test that yielded reasonable results. The inspectors noted that one of the detectors in the whole-body counter had failed during the recent calibration and that the calibration vendor had configured the instrument to operate without the “gut detector” (one of two detectors in total). The inspectors identified that, although this mode of operation might be technically adequate for most postulated intakes of radioactive material, operation without the gut detector reduces the capabilities to assess internal exposures via the ingestion pathway. The inspectors determined that such exposures are feasible. The inspectors also noted that there were few qualified and proficient operators for the whole-body counter on-site, and that HDI did not have an established plan for whole-body counting if the unit on the Pilgrim site became inoperable. HDI wrote issue report PIL-05119 to document and evaluate these observations.

In addition, the inspectors determined that the existing plans for the collection of in-vitro urine (and potentially fecal) bioassay samples were inadequate. Plans to use facilities and equipment that are available for routine employment drug screening were inappropriate, and unnecessarily limited the capabilities to conduct a timely assessment of potential internal dose (as full 24-hour urine void samples could not be collected). No appropriate materials were on-hand and on-site for the collection of fecal samples. HDI wrote issue report PIL-05118 to document and evaluate these observations.

The inspectors found that both extremity and whole-body dosimeters were calibrated and processed by a vendor that was NVLAP accredited, as required.

The inspectors identified technical concerns related to radiation surveys in their initial review of the “Disposition Survey Plan and Final Report of the Operations and Maintenance Building with Warehouse, Release Record 2022-02.” This prompted a series of meetings, to obtain additional information and to clearly understand how the building structure and contents were surveyed and released for disposal as non-radioactive industrial waste. As a consequence, HDI performed a revision to the report resulting in the inspectors being able to gain a reasonable assurance that the building was evaluated, surveyed, demolished, and released in accordance with regulatory requirements.

The inspectors held a meeting onsite with HDI Pilgrim staff to gain a common understanding and establish coordination for the subsequent scheduling of building demolition activities, and the review of radiological survey plans and reports prior to the demolition.

The inspectors then reviewed the “Disposition Survey Plan #2022-05, PNPS Trash Compactor Facility (TCF)” and found it to be adequate. The inspectors reviewed the “Trash Compactor Facility, Disposition and Data Report Summary” and found it to be adequate with one exception. The report documented the collection of four samples of soil-like material (“sediment”) on the roof of the facility. Cesium-137 (Cs-137) was detected in all four of the samples. HDI evaluated this material and initially determined that it was present as a result of the global fall-out of Cs-137 from historical atmospheric nuclear weapons testing and the Chernobyl nuclear accident. The inspectors challenged the technical validity of this conclusion and requested additional reference information to support this initial conclusion. HDI wrote issue report PIL-05257, re-evaluated the information posed by the inspectors’ probing questions, and determined that the ballast and soil-like material on the roof would be removed and held for proper radioactive disposal. HDI agreed that, following removal, the remaining areas of the roof membrane would be re-surveyed to verify that it meets regulatory criteria for unrestricted release and disposal.

Violation

The inspectors identified one Severity Level IV non-cited violation of 10 CFR 20.1703(c)(1) for HDI’s failure to perform radiological air samples to assess the potential airborne radioactivity in the drywell on the 23-foot elevation while using respiratory protection in this area.

Specifically, in the period between August 12 to August 24, 2020, HDI did not perform radiation surveys, loose surface contamination surveys, and radiological air samples of the 23-foot elevation of the drywell (a posted High Radiation Area and High Contamination Area) while personnel were performing work wearing respiratory protection and while other personnel were doffing air-fed protective suits in the area. As a result, six contract workers received unplanned intakes of radioactive material.

Between August 12 and August 24, 2020, HDI performed the removal of 145 control rod drives (CRDs) from the reactor, as part of the facility decommissioning. The CRDs were unbolted and removed from the under-side of the reactor vessel, and then removed from the drywell. Although the work was performed by contract workers, radiological oversight responsibility was performed by HDI radiation protection staff and their radiation protection contractors.

The CRD removal was performed in a posted High Radiation Area (HRA) and a High Contamination Area (HCA). Personnel performing the work under the reactor vessel (“under-vessel”) wore a plastic air-fed suit (“Delta suit”) to provide protection from water, radioactive contamination, and any potential airborne radioactivity in the area. Workers exited the under-vessel area, had their suits decontaminated and then removed in a special area on the 23-foot elevation of the drywell. Radiation protection personnel who supported the under-vessel work on the 23-foot elevation of the drywell wore Powered Air Purifying Respirators.

As each CRD was removed from the reactor vessel, it was lowered by a special handling machine and the contractors used an air-operated tool to remove the “spud end” and inner filter of the drive. These components exhibited dose rates ranging from 2 Roentgens per hour (R/hr) to 70 R/hr (with associated high loose surface contamination levels). The CRD and handling machine were then pulled from the under-vessel area, through the 23-foot elevation of the drywell, and into the 23-foot elevation of the reactor building (where a

contamination area called the “bullpen” was established for the handling of contaminated materials). At this location, the CRD was moved into a shielded handling cart so that the CRD could be packaged and moved to a waste container in the reactor building truck lock. These activities posed a significant potential to spread high levels of loose surface contamination and to generate airborne radioactivity.

On August 13, two under-vessel workers were found to have radioactive contamination on their person after removal of their Delta suits. Follow-up internal dosimetry assessments via whole body counting indicated that these workers experienced an intake of radioactive material. The dose estimates for these exposures were determined to be very low. In response to these unplanned intakes, radiation protection modified the process for the removal of the Delta suits to have the wearer face a different direction (away from the direction of expected area air flow). This proved to be ineffective in that additional unplanned intakes were repeated for four additional workers between August 19, and August 21, 2020.

The inspectors reviewed documents, interviewed personnel, and identified that: the CRD handling machine and the CRD transfer cart exhibited very high levels of loose surface contamination during the work, and that air samples taken under-vessel and in the “Bullpen” of the reactor building showed indications of elevated airborne radioactivity (although not at a level requiring a posting as airborne radioactivity area). In addition, Delta suit decontamination (prior to removal) was not comprehensive, was not assessed for effectiveness before suit removal, and occurred in the same physical location as the suit removal. The inspectors concluded that these deficiencies resulted in six personnel contamination events and the resultant unplanned intakes of radioactive material.

Title 10 CFR 20.1703(c)(1) states in part: “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.”

HDI procedure P-EN-RP-140, “Radiation Protection Job Coverage Surveys”, step 5.5[6](a) states: “Perform air sample survey of the work area as follows… in contaminated areas, when hands-on work is being performed…[and] at the start or work when respiratory protection is worn…”

Contrary to the above, between August 12 and August 24, 2020 HDI did not implement a program of air sampling on the 23-foot elevation of the drywell, where personnel were working and wearing respiratory protection, and in areas where personnel were being decontaminated and were removing their respiratory protection. As a consequence, the potential for very high loose-surface contamination levels and the potential for the generation of airborne radioactivity were not assessed. These conditions lead to six personnel receiving unplanned intakes of radioactive material.

This violation was determined to be a Severity Level IV violation using Section 6.3.d of the NRC Enforcement Policy, dated January 14, 2022, regarding the failure to implement procedures, which has a low safety significance as all unplanned intakes of radioactive material resulted in very low exposures (less than 10 millirem).

HDI entered the issue in its corrective action program as PIL-05330. Immediate corrective actions included a verification that on-going work (currently, in 2022) did not exhibit the same deficiencies.

Because the licensee placed the deficiency into its corrective action program, and the violation was not willful or repetitive, this violation is being treated as a non-cited violation (NCV) consistent with Section 2.3.2.a of the NRC Enforcement Policy **(NCV 05000293/2022003-01, Failure to perform radiological air samples)**.

c. Conclusions

One Severity Level IV NCV of 10 CFR 1703 (c)(1) was identified.

3.0 Exit Meeting Summary

On October 20, 2022, the inspectors presented the inspection results to Mr. John Moylan, Site Vice President, and other members of the HDI staff. No proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

J. Moylan - Site Vice President
J. McDonough - Decommissioning Manager
D. Noyes - Senior Compliance Manager
M. Lawson - Radiation Protection Manager
M. Thornhill - Certified Health Physicist
A. Steward - RP Supervisor
B. Clow - ALARA Engineer

ITEMS OPEN, CLOSED, AND DISCUSSED

None

LIST OF DOCUMENTS REVIEWED

6.3-061, "Special Radiological Survey Techniques", Revision 31
Airborne Radioactivity Calculation Forms, all available relative to the control rod drive removal project between 8/12/2020 and 8/24/2020
"Annual Radioactive Effluent Release Report", Pilgrim Nuclear Power Station, for 2021, dated 5/10/2022
"Annual Radiological Environmental Operating Report", Pilgrim Nuclear Power Station, for 2021, dated 5/10/2022
Calibration report for the Canberra FastScan WBC System at the Holtec Pilgrim Nuclear Power Station, Mirion Services, dated 5/25/2022
Certificate, NVLAP Accreditation, for code 100518-0, 1/1/2021 to 12/31/2021
Certificate, NVLAP Accreditation, for code 100518-0, 1/1/2022 to 12/31/2022
"Disposition Survey Plan #2022-05, PNPS Trash Compactor Facility (TCF), (no date)
"Disposition Survey Plan and Final Report of the Operations and Maintenance Building with Warehouse, Release Record 2022-02", signed 1/21/2022
Dose assessments for "slot #" 979, 69, 133 (August of 2020)
"Evaluation of OSLD:ED Dose Discrepancies – 2020", dated 3/4/2021
"Evaluation of OSLD:ED Dose Discrepancies – 2021", dated 3/18/2022
Issue Reports (IR) PIL-01958, 05125, 05130, 04906, 04912, 04913, 5059
Log, "2020 CRD RP Log", from 8/3/2020 to 8/31/2020
Log, "RP Supervisor Log Account for CRD Removal Project", from 8/12/2020 to 8/24/2020
List, "Summary of Internal Dosimetry Results for the CDR Removal Project", between 8/13/2020 and 12/2/2020
P-EN-RP-121, "Radioactive Material Control", Revision 20
P-EN-RP-140, "Radiation Protection Job Coverage Surveys", Revision 00
P-EN-RP-202, "Dosimetry Monitoring", Revision 14
P-EN-RP-203, "Dose Assessment", Revision 11
P-EN-RP-206, "Dosimetry Program Quality Assurance", Revision 08
P-EN-RP-208, "Whole Body Counting / In-Vitro Bioassay", Revision 09
P-EN-RP-210, "Controlled Area Monitoring Program", Revision 02
"Pilgrim Nuclear Power Station Offsite Dose Calculation Manual", Revision 15 & 16
PNPS ODCM Change Summary Matrix for the ODCM Revision 15

Process Applicability Determination Form (PAD) for the Offsite Dose Calculation Manual (ODCM), Revision 16
Radiological Engineering Evaluation, “Evaluation of Performance of Primary and Secondary Dosimetry Devices”, 11-004
Radiological Engineering Evaluation, “Individual and Aggregate OSLD:ED Discrepancy Evaluations”, 13-023
Radiological Engineering Evaluation, “Primary Dosimetry Background Subtract Program”, 17-027
Radiological Survey Forms, all available relative to the control rod drive removal project between 8/10/2020 and 8/31/2020
Radiological Work Permit In-Progress Review, RWP 2020-135, “Drywell – CRD Removal and Under-Vessel Work”, dated 8/17/2020
“Radiation Protection Department Calendar Year 2021 Self Assessment Report”, dated 3/31/2022
“Pilgrim Nuclear Power Station 2020 Radiation Protection Program Annual Report”, dated 2/10/2021
Spreadsheet, Pilgrim Groundwater Tritium Results, dated 8/19/2022
“Trash Compactor Facility Disposition and Data Summary Report”, signed on 9/29/2022

LIST OF ACRONYMS USED

ADAMS	Agency-wide Document and Access Management System
ALARA	As Low As Reasonably Achievable
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CRD	Control Rod Drive
Cs-137	Cesium-137
ENOI	Entergy Nuclear Operations, Inc
GPO	Government Printing Office
HCA	High Contamination Area
HDI	Holtec Decommissioning International, LLC
HRA	High Radiation Area
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Issue Report
NCV	Non-cited Violation
NRC	U.S. Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
ODCM	Offsite Dose Calculation Manual
O&M	Operations and Maintenance
PNPS	Pilgrim Nuclear Power Station
R/hr	Roentgens per hour
REMP	Radiological Environmental Monitoring Program
RP	Radiation Protection
RWP	Radiological Work Permit
TCF	Trash Compactor Facility