

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Inspection No. 15000010/2011001
Docket No. 15000010
Georgia License No. GA-1434-1
Licensee: Hopewell Designs, Inc.
Location: 5940 Gateway Drive
Alpharetta, Georgia 30004
Inspection Dates: December 4, and 13, 2011;
January 9, March 14, and May 3, 2012 (telephone exit)
Followup Information Received: January 5, 2012
Inspectors: Kathy Modes
Senior Health Physicist
Decommissioning Branch
Division of Nuclear Materials Safety
Craig Gordon
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John Nicholson
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Approved By: Marc S. Ferdas, Chief
Decommissioning Branch
Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

Hopewell Designs, Inc.
NRC Inspection Report No. 15000010/2011001

Hopewell Designs, Inc. (HDI) is licensed by the State of Georgia to install, relocate, repair, and service instrument calibrators/gamma irradiators. HDI requested reciprocity from the NRC to perform licensed activities at three sites in NRC jurisdiction.

On December 4, 2011, an unannounced safety inspection was conducted at the Shearon Harris Plant (Shearon Harris) in New Hill, North Carolina to review HDI's activities related to installation and source loading of a calibrator. On December 5, 2011, a HDI field service engineer performed a similar source loading activity at Susquehanna Steam Electric Station (SSES) in Berwick, Pennsylvania, but encountered difficulty in completing the loading activity due to problems with movement of the shield drawer. On December 13, 2011, an announced follow-up safety inspection was conducted at SSES to review the event. Subsequently, HDI conducted a lessons learned review of the SSES event, modified the shield drawer, and revised their source loading procedures. An unannounced safety inspection of HDI's main office in Alpharetta, Georgia was conducted on January 9, 2012, to review HDI's lessons learned report and modifications to the shield drawer and observe demonstrations of their newly revised source loading procedure. On March 14, 2012, an announced safety inspection was conducted at the Millstone Power Station (Millstone) in Groton, Connecticut to observe HDI perform a source loading using HDI's new operating procedure and equipment.

This inspection was conducted pursuant to the Inspection Manual Chapter (IMC) 2800 and Inspection Procedure (IP) 87122. The IP Focus Elements 03.01 through 03.07 were reviewed. The inspectors interviewed HDI, Shearon Harris, SSES, and Millstone personnel, and reviewed records and procedures.

Based on the results of this inspection, no violations or findings of safety significance were identified.

REPORT DETAILS

I. Organization and Radiation Protection Program

a. Inspection Scope

Hopewell Designs, Inc. (HDI) is licensed by the State of Georgia to install, relocate, repair, and service instrument calibrators/gamma irradiators. HDI's Georgia Agreement State license does not authorize the possession of radioactive material. HDI arranges to have the radioactive sources shipped from the source manufacturer directly to HDI's client's facility. HDI field service engineers assemble and load instrument calibrator/gamma irradiators at their client's facilities. HDI requested reciprocity from the NRC to perform licensed activities at three sites in NRC jurisdiction.

On December 4, 2011, an unannounced safety inspection was conducted at the Shearon Harris Plant (Shearon Harris) in New Hill, North Carolina to review HDI's activities related to installation and source loading of a calibrator. On December 5, 2011, a HDI field service engineer performed a similar source loading activity at Susquehanna Steam Electric Station (SSES) in Berwick, Pennsylvania, but encountered difficulty in completing the loading activity due to problems with movement of the shield drawer. On December 13, 2011, an announced follow-up safety inspection was conducted at SSES to review the event. Subsequently, HDI conducted a lessons learned review of the SSES event, modified the shield drawer, and revised their source loading procedures. An announced safety inspection of HDI's main office in Alpharetta, Georgia was conducted on January 9, 2012, to review HDI's lessons learned report and modifications to the shield drawer, and observe demonstrations of their newly revised source loading procedure. On March 14, 2012, an announced safety inspection was conducted at the Millstone Power Station (Millstone) in Groton, Connecticut to observe HDI perform a source loading using the HDI's new operating procedure and equipment.

This inspection was conducted pursuant to the Inspection Manual Chapter (IMC) 2800 and Inspection Procedure (IP) 87122. The IP Focus Elements 03.01 through 03.07 were reviewed. The inspectors interviewed HDI, Shearon Harris, SSES, and Millstone personnel, and reviewed records and procedures.

b. Observations and Findings

Shearon Harris Nuclear Plant

On December 4, 2011, an unannounced safety inspection was conducted of HDI at Shearon Harris. Upon arrival onsite the NRC inspector was informed by the NRC senior resident inspector that the source installation had been performed by HDI field service engineers on December 3, 2011, and that documentation of acceptance testing and turnover to plant staff was under final review by Shearon Harris personnel.

The inspector interviewed senior plant health physics (HP) staff and security staff involved in the HDI work preparations relative to installation of the instrument calibrator device. They provided details of their coordination efforts with HDI on receipt of sources, control of sources and instrumentation during transfer to the storage (laboratory) area, and observation of HDI field service engineers while working with sources.

According to Shearon Harris personnel, all HDI work activities were closely monitored in accordance with plant protocols. This included monitoring area radiation exposure levels, determining personnel doses, and ensuring that HDI field service engineers were escorted by site security throughout the installation procedure. Final surveys were performed after the installation was completed. The inspector noted that the instrument calibrator showed proper labeling of the newly installed sources; and a review of HDI's radiation measurements indicated radiation levels at or just above background on contact with each side of the device, and <1000 dpm/100 sq.cm removable contamination.

Susquehanna Steam Electric Station (SSES)

On December 5, 2011, HDI had arranged to be on-site at SSES to conduct a source transfer into their instrument calibrator. The instrument calibrator was received at SSES's warehouse, outside of the plant's protected area, to facilitate the work activities. During the initial attempt to lower the source from the transfer shield into the calibrator, the lead shield drawer in the bottom of the transfer shield could not be opened. Typically this shield drawer is opened approximately two inches in order to lower the source down into the calibrator. The HDI field service engineer directed a SSES effluents technician to use additional tooling in order to provide additional manual pressure to open the shield drawer. During this subsequent attempt, the shield drawer was withdrawn about five inches; leaving only about one and one-half inches of lead remaining in the transfer shield. The electronic dosimeters worn by the HDI field service engineer and the SSES effluents technician immediately alarmed indicating unexpected high dose rates. The SSES HP technicians directed the shield drawer to be reinserted, which immediately occurred, returning the dose rates back to normal. It was determined that the exposure time was approximately three seconds.

The review group consisting of the HDI field service engineer, SSES HP supervisor, two SSES HP technicians and the SSES effluents technician, stopped the work activity and reviewed the radiological exposure status of the workers performing the installation. Based on their electronic dosimeters (ED), peak dose rates and whole body doses were 8 R/hr and 6.4 mrem for the SSES effluents technician and 2 R/hr and 3.3 mrem for the HDI field service engineer.

With the source in the transfer shield, the HDI field service engineer recommended moving forward to attempt the same work activity in order to place the source into a safer configuration inside the instrument calibrator. The HDI field service engineer remarked that there could be a problem if the unit is struck and the transfer shield toppled over. The engineer explained that the transfer shield was resting vertically on top of the instrument calibrator and the risk of the heavy load remaining in this configuration was deemed to be unsafe by the HDI field service engineer. The HDI field

service engineer was instructed by SSES personnel to stop work, and move to a low radiation area to discuss the problem before proceeding. The HDI field service engineer with the SSES personnel discussed the options and in accordance with HDI's emergency procedure, HDI field service engineer obtained concurrence from SSES personnel to proceed with the source load operation. The shield drawer was opened approximately two inches and the source was loaded into the calibrator without further incident. Immediately after the source load operation was successfully completed, SSES management was informed of the shield drawer problem and the remainder of the installation was suspended.

On December 13, 2011, two NRC inspectors performed an announced inspection to review the December 5, 2011 source loading event, interviewed SSES personnel involved in the event, and reviewed procedures, shipping papers, radiation surveys, work orders, radiation work permits, and licensing documents associated with the event. In addition, the inspectors reviewed the level of security controls in effect while the source was located outside of the protected area. The NRC has documented its review of SSES's actions in NRC Inspection Report Nos. 50000387/2012002 and 50000388/2012002 dated May 2, 2012 (ADAMS Accession No. ML12123A026).

HDI headquarters in Alpharetta, Georgia

On January 9, 2012, an unannounced safety inspection was performed at HDI's headquarters office and fabrication facility in Alpharetta, Georgia.

HDI's Radiation Safety Officer/President reviewed the SSES event and completed a lessons learned report. The lesson learned report identified that HDI needed to modify the transfer shield. The modification involved installation of a bracket to limit the travel of the shield drawer so it cannot be extracted beyond the open position. The inspector was able to view the newly modified transfer shield with the bracket. The inspector determined that this corrective action appeared reasonable to address the cause of the event. HDI also revised their on-site loading procedures (for the 103 and 105 units). HDI performed a dry run of the newly revised procedures. No concerns were identified when the inspector observed HDI perform the revised step-by-step procedures and equipment using two dummy sources. The inspector also determined that HDI properly implemented their operating and emergency procedures during the event. HDI owns three transfer shields and the inspector reviewed documentation and verified that all three shields had been modified. The inspector also verified that each HDI technician had been appropriately briefed on the SSES event, and been trained on the newly revised procedures.

The inspector also reviewed the last two years of exposure records and noted the highest whole body exposure for 2010 was 44 mrem and the highest whole body exposure for 2011, as of October 2011, was 39 mrem.

Millstone Power Station

On March 14, 2012, the inspector performed an announced safety inspection at Millstone. The inspector was informed that dry runs of the source loading had been performed on March 13, and a pre-job brief with HDI and Millstone personnel was conducted earlier on March 14. In addition, Millstone completed a high radiological risk review for the source loading.

On March 15, 2012, the inspector observed HDI load two sources into Millstone's instrument calibrator. Millstone HP personnel directly monitored the work. Four HP technicians were stationed outside the building along each exterior wall to monitor dose rates. The building was posted as a high radiation area during the source loading operation. An HP technician was inside with the HDI field service engineers monitoring dose rates. The Millstone HP shift supervisor was also on hand in the building observing the source loading.

The HDI personnel were monitored for radiological exposure during the installation with EDs. After completion of the source loading, the ED results indicated one HDI field service engineer had received approximately 3 mrem to the head and 3 mrem to the chest. The other HDI field service engineer received approximately 0.4 mrem to the head and 0.5 mrem to the chest.

Wipes of the remote handling tools and the empty shipping casks were analyzed on site by Millstone's HP technicians and did not indicate any contamination. The inspector noted that no unusual or unexpected dose rates were measured during the source loading; and HDI appropriately implemented their procedures. The inspector observed that the bracket that had been installed to limit the travel distance of the transfer shield drawer worked as expected.

c. Conclusions

Based on the results of this inspection, no findings of safety significance were identified.

II. Exit Meeting

An exit meeting was held by telephone on May 3, 2012 with Robert O. Rushton, HDI's President/Radiation Safety Officer, to discuss the results of the inspection.

PARTIAL LIST OF PERSONS CONTACTED

HDI personnel

*Robert. O. Rushton, President/Radiation Safety Officer
Dave Schettler, Business Development/Sales manager
Paul Sullivan, Service Engineer

Shearon Harris Personnel

John Jenkins, HP Supervisor
Michael Parker, HP Manager

SSES Personnel

S. Peterkin, Radiation Protection Manager
G. Merenich, Health Physics Instrument Foreman
J. Adelsberger, Health Physics Instrument Lead Technician
R. Batman, Senior Effluents Technician
G. Farrell, Security Officer-Level II
D. Skiro, Security Officer-Level II
J. Paciotti, Security Manager

Millstone Personnel

Kirk Miles, HP Supervisor

* Individual(s) present at exit telephone call

DOCUMENTS REVIEWED

Registry of Radioactive Sealed Sources and Devices safety evaluation of Hopewell Designs G10 Instrument Calibrator and Gamma Irradiator

Georgia Radioactive Materials License, Hopewell Designs, Inc. License. No. GA 1434-1

NRC Form 241, "Report of Proposed Activities In Non-Agreement States, Areas of Exclusive Federal Jurisdiction, or Offshore Waters" (reciprocity agreement) for Hopewell Designs to perform source load at Shearon Harris between 11/30 – 12/7/11

NRC Form 241, "Report of Proposed Activities In Non-Agreement States, Areas of Exclusive Federal Jurisdiction, or Offshore Waters" (reciprocity agreement) for Hopewell Designs to perform source load at SSES on 12/5-6/11

NRC Form 241, "Report of Proposed Activities In Non-Agreement States, Areas of Exclusive Federal Jurisdiction, or Offshore Waters" (reciprocity agreement) for Hopewell Designs to perform source load at Millstone on 3/12-15/12

Susquehanna Steam Electric Station – NRC integrated Inspection Report 05000387/2011005 and 05000388/2011005 dated February 14, 2012

Documents Obtained at Shearon Harris:

Hopewell Designs Inc.'s Radiological Survey Record dated December 3, 2011

Hopewell Designs Inc.'s Factory and Site Acceptance Test Procedure for Box Calibrators dated December 3, 2011

Documents Obtained at SSES:

Condition Report Nos.: 1501308, 1504974, 1504245, 1504255, 1504258, 1504260, 1504321, 1504408, 1504468, 1504508

REVISS Services Shipment No: SO-11004 paperwork, 11/30/11 to SSES 12/5/11

Hopewell Designs Inc. Procedure SLOS-105 R2, On-site Source Loading Procedure

Radiation Work Permits (RWP):

2011-0004, General Entry into areas >100 mr/hr but <1000 mr/hr

2011-0005, HP surveys and job coverage for work not requiring a job specific RWP

Health Physics Pre-Job Tailboard Checklist, December 5, 2011, Transfer Source to new HPI Irradiator

Work Order, PCWO 1385729, Install new Hopewell Designs, Model BX-3 Calibrator, in the HP Instrument Lab.

Work Instruction ID 1385729

Radiation Surveys: source Type B shipping cask receipt

Documents Obtained from HDI:

Hopewell Designs, Inc. - BX3 Box Calibrator Installations Lessons Learned dated: January 5, 2012

Hopewell Designs, Inc. Procedures:

BX3 Box Calibrator Installations - ALARA Review; SLOS-103 On-Site Source Load BX3-2-2600 702 dated: July 5, 2011

BX3-2-2600 Irradiators - On-Site Source Loading Procedure #SLOS-103 R1 dated: January 3, 2012

Risk Analysis for On-Site Source Loading Procedure #SLOS-105 R3 dated: January 3, 2012

SSES Procedures:

NDAP-QA-0002, Rev. 27, Procedure Program and Procedure Change Process

NDAP-QA-0019, Rev. 2, Conduct and Control of Supplemental Personnel at Susquehanna Plant

NDAP-QA-0320, Rev. 13, Special, Infrequent or Complex Test/Evolutions

NDAP-QA-0621, Rev. 6, Control of Sealed Sources

NDAP-QA-0626, Rev. 26, Radiologically Controlled Area Access and Radiation Work Permit (RWP) System

NDAP-QA-0648, Rev. 21, Purchase, Receipt and Shipment of Radioactive Material

NDAP-QA-1191, Rev. 13, ALARA Program and Policy

NDAP-QA-1901, Rev. 12, Susquehanna Station Work Management Process

HP-AL-400, Rev. 15, RWP ALARA Reviews and Evaluations

HP-HI-089, Rev. 11, Health Physics Pre-Job Tailboard Checklist

HP-TP-310, Rev. 38, Barricading, Posting and Labeling

HP-TP-320, Rev. 22, Radiation Work Permits

Millstone Procedure:

BX3-2-2600 Irradiators On-Site Source Loading (Procedure #SLOS-103, R1) VPROC RPM11-001 dated March 1, 2012

LIST OF ACRONYMS USED

| | |
|----------------|------------------------------------|
| ALARA | As Low As Reasonably Achievable |
| ED | Electronic dosimeters |
| HDI | Hopewell Designs, Inc. |
| HP | Health Physics |
| IMC | Inspection Manual Chapter |
| IP | Inspection Procedure |
| Millstone | Millstone Power Station |
| mrem | millirem |
| mr/hr | milliroentgen per hour |
| SSES | Susquehanna Steam Electric Station |
| RPM | Radiation Protection Manager |
| RWP | Radiation Work Permit |
| Shearon Harris | Shearon Harris Nuclear Plant |