

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

INSPECTION REPORT

Inspection No. 05000320/2010008  
Docket No. 05000320  
License No. DPR-73  
Licensee: GPU Nuclear, Inc.  
Facility: Three Mile Island Station, Unit 2  
Location: Middletown, PA 17057-0791  
Inspection Dates: February 22, 2010  
April 20 - 22, 2010  
  
Inspector: Laurie A. Kauffman  
Health Physicist  
Decommissioning Branch  
Division of Nuclear Materials Safety  
  
Approved By: Judith A. Joustra, Chief  
Decommissioning Branch  
Division of Nuclear Materials Safety

## EXECUTIVE SUMMARY

GPU Nuclear, Inc.  
NRC Inspection Report No. 05000320/2010008

The Three Mile Island Nuclear Station, Unit 2 (TMI-2) has been permanently shutdown since March 1979 and has been in post-defueled monitored storage (PDMS) since December 1993. No ongoing decommissioning or dismantlement activities are being conducted at TMI-2. The licensee plans to actively decommission TMI-2 in parallel with the decommissioning of Three Mile Island Nuclear Station, Unit 1 (TMI-1) after that unit has been permanently shutdown. FirstEnergy/GPU Nuclear, Inc. (GPUN) sold its electric generator to Siemens Energy, Inc. in 2009. In January 2010, FirstEnergy/GPUN mobilized Siemens personnel to remove the generator.

A routine announced safety inspection was conducted on February 22, 2010 and April 20 – 22, 2010, at TMI-2 by a Region I inspector. The inspection included a review of operations and management oversight, maintenance, corrective action program implementation, and plant support activities while in SAFSTOR status. Specifically, the scope of the inspection included: (1) an evaluation of the condition and operational status of structures, systems and components important to the safe storage of radioactive material; (2) a review of the quality assurance and audit program; (3) a review of the implementation and adequacy of the radiation protection program, including a review of the electric generator removal from the turbine building; (4) an evaluation of the licensee's controls and processes regarding the TMI-2 liquid and gaseous radioactive effluents; (5) an evaluation of the radioactive waste management and transportation programs; and (6) follow up of corrective actions related to a Non-Cited Violation (NCV), failure to perform audits of the radioactive waste management program according to Technical Specification (TS) 6.5.3.1, that was identified during the previous NRC inspection. [See NRC Inspection Report Number 05000320/2009007, dated July 24, 2009, for details. ADAMS Accession Numbers ML092050557 (cover letter) and ML092050569 (inspection report)]

Within the scope of this inspection, no safety concerns or violations were identified.

### **Organization and Management Control**

The licensee's organization was adequate to support PDMS activities. Management oversight of the PDMS program was adequate for the activities conducted.

### **Safety Reviews, Design Changes, and Modifications**

The licensee submitted the Biennial 10 CFR 50.59 Report, dated February 15, 2010, in accordance with TMI-2 TS 6.8.1.4 and 10 CFR 50.59 requirements.

### **Self-Assessment, Auditing, and Corrective Action Programs**

The licensee maintained an adequate audit program and effectively utilized the established corrective action program to self-identify, evaluate, and correct issues and problems. Condition reports were properly prioritized and corrective actions were tracked in accordance with approved procedures.

### **Decommissioning Performance and Status Reviews at Permanently Shutdown Reactors (PSRs)**

No dismantlement or decommissioning activities were performed since the previous inspection.

**Maintenance and Surveillance**

The licensee effectively implemented the preventive maintenance and surveillance program and associated procedures.

**Occupational Radiation Exposure**

Implementation and oversight of the PDMS program was effective for the storage of radioactive material. The licensee provided adequate controls to limit exposures of workers to external sources of radiation. Posting and labeling of radioactive materials and radiation areas complied with regulatory requirements. Radiological controls and dose estimates were effective to achieve dose goals. Implementation of the occupational exposure control program associated with the TMI-2 PDMS activities and the electric generator removal project was adequate.

**Effluent, Environmental Monitoring and Radioactive Waste and Transportation**

The licensee effectively implemented and maintained the radioactive effluent controls program, the radiological environmental monitoring program, and the radiation protection program.

## **REPORT DETAILS**

### **1.0 Background**

GPUN retains the license for TMI-2 and maintains the facility. Metropolitan Edison Company (MetEd), Jersey Central Power & Light Company (JCP&L), and Pennsylvania Electric Company (Penelec) jointly own TMI-2. GPUN, Met Ed, JCP&L, and Penelec are wholly owned subsidiaries of FirstEnergy Corp.

As part of the sale of TMI-2, GPUN entered into an agreement with AmerGen (now Exelon) for TMI-2 services. Under this agreement and as a contractor subject to GPUN's ultimate direction and control, Exelon provides all services, materials and equipment required to maintain TMI-2 in PDMS. Services provided by Exelon include maintenance and surveillance activities and implementation of the activities required in the Safety Analysis Report, Technical Specifications, and the GPUN PDMS Quality Assurance (QA) Plan (PDMS QA Plan).

### **2.0 Organization and Management Controls**

#### **a. Inspection Scope (Inspection Procedures (IP) 36801)**

The inspector evaluated any recent organization, management and staffing changes with respect to the PDMS QA program outlined in the PDMS QA Plan.

#### **b. Observations and Findings**

There were no organizational structure changes since the previous inspection. However, in June 2009, the Senior PDMS Manager, responsible for TMI-2 PDMS activities, had retired and a replacement had been named. During discussions with the current PDMS Manager regarding the PDMS program and evaluations of the implementation of the program, the inspector determined that the current PDMS Manager demonstrated an adequate understanding of the PDMS program and the TMI-2 plant. In January 2010, FirstEnergy announced that the PDMS Senior Specialist and Senior Licensing Engineer, who were responsible for implementing TMI-2 PDMS activities, were scheduled to retire in March 2010. FirstEnergy also announced that one of the two FirstEnergy responsible engineers, who maintained oversight of the PDMS program, was transferring to another position within the FirstEnergy organization in March 2010. During the inspection, the inspector noted that a new FirstEnergy responsible engineer had been named in early April 2010 and that the remaining FirstEnergy responsible engineer will also transfer to another position within the FirstEnergy organization by the end of June 2010. In order to assure knowledge transfer, the licensee employed the recently retired PDMS Senior Specialist as a consultant to assist with the implementation of the PDMS program. The effectiveness of these management and staff changes will be reviewed during the next inspection.

c. Conclusions

The licensee's organization was adequate to support PDMS activities. Management oversight of the PDMS program was adequate for the activities conducted. No findings of safety significance were identified.

**3.0 Safety Reviews, Design Changes, and Modifications**

a. Inspection Scope (IP 37801)

The inspector reviewed the Biennial 10 CFR 50.59 Report, dated February 15, 2010 to verify the implementation of TMI-2 Technical Specifications (TS) 6.8.1.4 and 10 CFR 50.59 requirements.

b. Observations and Findings

There were no structures, systems, or components in TMI-2 that perform a safety function as a result of the non-operating and defueled status of the TMI-2 plant.

c. Conclusions

The licensee submitted the Biennial 10 CFR 50.59 Report, dated February 15, 2010 in accordance with TMI-2 TS 6.8.1.4 and 10 CFR 50.59 requirements. No findings of safety significance were identified.

**4.0 Self-Assessment, Auditing, and Corrective Action Programs**

a. Inspection Scope (IP 40801)

The inspector reviewed the licensee's program for identifying, resolving, and preventing issues that could impact safety or the quality of decommissioning activities. The inspector reviewed the procedures describing the corrective action program and reviewed several issue reports (IRs), action reports (ARs), and the associated corrective actions. The inspector discussed with cognizant personnel the tracking, current status, and closure of the selected IRs and ARs. The inspector reviewed the PDMS QA Plan, and the June 2009 Nuclear Oversight (NOS) audit report (Re-Audit NOSA-TMI-09-13 (AR929279)). The inspector evaluated the corrective actions related to NCV 05000320/2009007-01, failure to perform audits of the radioactive waste management program according to TS 6.5.3.1, that was identified during the previous NRC inspection.

b. Observations and Findings

The inspector reviewed several IRs, ARs, and the associated corrective actions and determined that the priority for addressing issue reports and implementation of corrective actions was adequate and based upon safety significance. Corrective actions were established to address identified issues, and were being tracked to closure using the licensee's corrective action program (CAP). No adverse trends or safety concerns were identified.

The inspector evaluated the corrective actions relative to NCV 05000320/2009007-01, failure to perform audits of the radioactive waste management program according to TS 6.5.3.1. The inspector noted that NOS had revised the audit plan to include the radioactive waste management and transportation programs and had performed an audit, (Re-Audit NOSA-TMI-09-13 (AR929279)), according to the TMI-2 PDMS QA Plan and TS 6.5.3.1. The Re-Audit NOSA-TMI-09-13 report was thorough, well balanced, and sufficiently detailed to identify strengths and weaknesses related to selected aspects of the TMI-2 PDMS QA Plan. The NOS identified areas for improvement within the radioactive waste management and transportation programs and within selected areas of the TMI-2 PDMS program. Where deficiencies and program improvements were identified, the NOS issued IRs as required by the CAP. The inspector reviewed these IRs and noted that the issues identified were of low safety significance. The inspector reviewed the associated corrective actions and determined that the priority for addressing issue reports and implementation of corrective actions was adequate based upon safety significance. No adverse trends or safety concerns were identified.

c. Conclusions

The licensee maintained an adequate audit program and effectively utilized the established corrective action program to self-identify, evaluate, and correct issues and problems. Condition reports were properly prioritized and corrective actions were tracked in accordance with approved procedures. No findings of safety significance were identified.

## 5.0 Decommissioning Performance and Status Reviews

a. Inspection Scope (IP 71801)

The inspector reviewed the licensee's current decommissioning status with respect to the TMI-2 PDMS QA Plan.

b. Observations and Findings

The licensee plans to actively decommission TMI-2 in parallel with the decommissioning of TMI-1 after that unit has been permanently shutdown.

c. Conclusions

No dismantlement or decommissioning activities were performed since the previous inspection. No findings of safety significance were identified.

## 6.0 Maintenance and Surveillance

a. Inspection Scope (IP 62801)

The inspector reviewed the licensee's preventive maintenance (PM) and surveillance test (ST) program for structures, systems, and components important for maintaining the safe storage of radioactive material and the implementation of primary containment isolation requirements, TS 3/4.1, *Containment Systems*. Specifically, the inspector

evaluated the licensee's implementation of the maintenance program associated with the annual reactor building entry ST. The inspector reviewed selected STs, including the high efficiency particulate absolute (HEPA) filter dioctyl phthalate (DOP) tests for the reactor building breather, reactor building purge, fuel handling building, auxiliary building, and service building. Additionally, the inspector reviewed selected STs for the ventilation heater, the containment isolation airlocks, and the quarterly containment isolation valves. The inspector also toured plant areas and discussed aspects of the STs with individuals cognizant of the performance of the above systems and components.

b. Observations and Findings

The reactor building entry ST included activities such as: visual inspections for water intrusion, structural integrity and material condition of structures and components in containment. The results of the ST indicated that no significant water intrusion was evident in containment and that the material condition of components remained unchanged since the previous ST.

The inspector verified that the maintenance and surveillance program for selected systems and components had been conducted in accordance with the TS requirements and established procedures. From a review of the STs, the inspector noted that the results of the preventative maintenance and routine surveillances were complete and were within the acceptable tolerance limits.

c. Conclusions

The licensee effectively implemented the preventive maintenance and surveillance program and associated procedures. No findings of safety significance were identified.

## 7.0 Occupational Radiation Exposure

a. Inspection Scope (IP 83750)

The inspector reviewed the licensee's occupational exposure control program associated with the removal of the electric generator from the turbine building. The inspector reviewed procedure RP-AA-300, *Radiological Survey Procedure*, and the survey records of the cooler dome, the rotor and the stator, which are the largest components of the generator. The inspector also reviewed the radiological survey results for selected components of the electric generator, such as the generator hood, generator shaft, blade rings, end bells, bearing covers, air baffles, and gland brackets.

The inspector evaluated the implementation of the occupational exposure control program associated with the TMI-2 PDMS activities and the implementation of primary containment isolation requirements, TS 3/4.1, *Containment Systems*. Specifically, the inspector conducted direct observations of the licensee's implementation of the annual reactor building entry ST and an evaluation of the associated As Low As Reasonable Achievable (ALARA) report. The inspection consisted of interviews with responsible individuals and field observations of radiological postings and signs in the radiologically controlled area (RCA).

b. Observations and Findings

On February 22, 2010, the inspector observed the licensee's activities related to the removal of the electric generator from the TMI-2 turbine building. The generator was removed in sections from the TMI-2 turbine building deck to a transporter. Some of the larger components of the generator included the cooler dome, the rotor and the stator.

The inspector noted that the licensee had wrapped the rotor with a weather protective cover and placed the rotor onto a transporter for transfer to its final destination. The inspector reviewed the radiological survey records and noted that the direct frisk results were less than the minimum detectable activity (MDA), 60 corrected counts per minute (ccpm), and the large area wipe results were less than MDA/wipe, 60 corrected counts per minute/large area wipe (ccpm/wipe). No detectable radioactivity above background, which ranged from 50 to 150 cpm, was identified. No adverse trends or safety concerns were identified.

The inspector observed the licensee conduct direct frisk surveys and collect large area wipes of selected accessible areas of the stator. The direct frisk results were less than MDA and the large area wipe results were less than MDA/wipe. The inspector conducted side-by-side direct frisk surveys of selected accessible areas of the stator using a Ludlum Model 14-C (Serial Number 235126) with a Ludlum Model 44-9 pancake probe, calibrated June 9, 2009. No detectable radioactivity above background was identified. No adverse trends or safety concerns were identified.

The inspector also reviewed the radiological survey results for selected components of the electric generator, such as the cooler dome, generator hood, generator shaft, blade rings, end bells, bearing covers, air baffles, and gland brackets. All results were less than background and MDA.

From April 20 through 22, 2010, the inspector verified that the licensee posted the RCA for dose rates and radioactive material. The radiological postings were readily visible, well-maintained, and reflected radiological conditions. The inspector observed the licensee's implementation of the reactor building entry ST. The reactor building entry ST included activities such as: radiation level and airborne activity surveys; radiological surveys and wipes; and analysis of the surveys and wipes. The results of the surveys indicated that radiological conditions in containment were stable. The ALARA report contained a summary of the estimated doses and a detailed evaluation of the reactor building entry. The actual dose total was significantly less than the dose goal (396 mrem) for the entry. The associated radiation work permit was commensurate with the radiological significance of the task and included exposure control measures for the safe implementation of the ST.

c. Conclusions

Implementation and oversight of the PDMS program was effective for the storage of radioactive material. The licensee provided adequate controls to limit exposures of workers to external sources of radiation. Posting and labeling of radioactive materials and radiation areas complied with regulatory requirements. Radiological controls and dose estimates were effective to achieve dose goals. Implementation of the



occupational exposure control program associated with the TMI-2 PDMS activities and the electric generator removal project was adequate. No findings of safety significance were identified.

## **8.0 Effluent, Environmental Monitoring and Radioactive Waste and Transportation**

### **a. Inspection Scope (IPs 84750 and 86750)**

The inspector reviewed the radioactive effluent control program and the site radiological environmental monitoring program. The evaluation included a review of the annual radioactive effluent release report for 2009, the annual radiological environmental operating report for 2009, and the associated analytical results for each program. The inspector also reviewed the data for the TMI-2 vent sampling procedures, the TMI-2 sump release permit procedures, and the supporting radioactive liquid and radioactive gaseous effluent release permits and data, from June 2009 through April 2010. The inspector reviewed the radioactive waste management and transportation programs to determine whether the licensee properly processed, packaged, stored, and shipped radioactive materials.

### **b. Observations and Findings**

The inspector verified that the licensee collected and analyzed the TMI-2 vent and sump samples within the required frequencies and that the sample collection was conducted in accordance with associated procedures. The annual effluent and environmental monitoring reports demonstrated that all calculated doses were well below regulatory dose criteria of 10 CFR 50, Appendix I. No radioactive waste shipments were conducted from June 2009 through April 2010.

### **c. Conclusions**

The licensee effectively implemented and maintained the radioactive effluent controls program, the radiological environmental monitoring program, and the radiation protection program. No findings of safety significance were identified.

## **Exit Meeting Summary**

On April 22, 2010, the inspector presented the preliminary inspection results to Mr. Casey, Responsible Engineer, FirstEnergy and other members of your organization, and members of the Exelon management and staff. The inspector confirmed that proprietary information was not provided or examined during the inspection.

## **PARTIAL LIST OF PERSONS CONTACTED**

C. Baker, Manager Chemistry/Environmental/RadWaste, Exelon  
R. Campbell, Work Management, Exelon  
M. Casey, Responsible Engineer, FirstEnergy  
M. Croushore, Radiation Protection/Shipping Specialist, Exelon  
E.A. Curry, PDMS Consultant, Shaw  
D. Divittore, Radiation Protection Manager, Exelon  
T. Dupes, Senior Health Physicist, Exelon  
M. Ford, PDMS Manager, Exelon  
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D. Neff, Regulatory Assurance, Manager, Exelon  
W. Noll, Senior Vice President, Exelon  
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L. Weir, Manager, Nuclear Oversight, Exelon  
E. Schmeichel, NOS Auditor, Exelon  
M. Sweigert, Radwaste Engineer, Exelon  
D. Deiter, Senior Health Physicist, Exelon

## **INSPECTION PROCEDURES USED**

36801	Organization, Management, and Cost Controls at Permanently Shutdown Reactors (PSRs)
37801	Safety Reviews, Design Changes, and Modifications at PSRs
40801	Self Assessment and Corrective Action at PSRs
62801	Maintenance and Surveillance at PSRs
71801	Decommissioning Performance and Status Reviews at PSRs
83750	Occupational Radiation Exposure
84750	Radioactive Waste Treatment and Effluent and Environmental Monitoring
86750	Solid Radioactive Waste Management and Transportation

## **ITEMS OPEN, CLOSED, AND DISCUSSED**

Opened, Closed and Discussed – None

## **LIST OF ACRONYMS USED**

ADAMS	Agencywide Documents Access and Management System
ALARA	as low as reasonably achievable
AR	action report
CAP	corrective action program
ccpm	corrected counts per minute
DAW	dry active waste
DOP	dioctyl phthalate
GPUN	GPU Nuclear, Inc.
HEPA	high efficiency particulate absolute
HRA	high radiation area

IP	Inspection Procedure
IR	issue report
JCP&L	Jersey Central Power & Light Company
LHRA	locked high radiation area
MDA	minimum detectable activity
MetEd	Metropolitan Edison Company
NCV	Non-Cited Violation
NOS	Nuclear Oversight
NOSA	Nuclear Oversight Audit
NRC	Nuclear Regulatory Commission
PDMS	Post-Defueling Monitored Storage
PDMS QA Plan	PDMS Quality Assurance (QA) Plan
Penelec	Pennsylvania Electric Company
PM	preventive maintenance
PSR	Permanently Shutdown Reactor
QA	quality assurance
RCA	radiologically controlled area
ST	surveillance test
TMI-1	Three Mile Island Station, Unit 1
TMI-2	Three Mile Island Station, Unit 2
TS	technical specification
VHRA	very high radiation area