UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

January 31, 2022

Mr. Trevor L. Orth
Site Decommissioning Director
Three Mile Island Nuclear Station, Unit 1
2625 River Road
Middletown, PA 17057

SUBJECT: EXELON GENERATION CO., LLC, THREE MILE ISLAND NUCLEAR STATION, UNIT 1, - NRC INSPECTION REPORT NOS. 05000289/2021002 AND 07200077/2021001

Dear Mr. Orth:

On December 31, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection under Inspection Manual Chapter (IMC) 2561, “Decommissioning Power Reactor Inspection Program," and IMC 2690, “Inspection Program for Storage of Spent Reactor Fuel and Reactor Related Greater-Than- Class C Waste at Independent Spent Fuel Storage Installations and for 10 CFR Part 71 Transportation Packagings” at the permanently shutdown Three Mile Island Nuclear Station, Unit 1 (TMI-1). On-site inspections were performed September 2, September 8-10, November 5, November 11-12, November 17-18, and November 27-December 3, 2021. Additional inspection activities (in office reviews) were conducted remotely as a consequence of the COVID-19 public health emergency (PHE) 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 you and members of your staff on January 6, 2022, and are described in the enclosed report.

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

In accordance with 10 CFR 2.390 of the NRC’s "Rules of Practice," a copy of this letter, its enclosure(s), 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 Steve Hammann, at 610-337-5399, if you have any questions regarding this matter.

Sincerely,

Anthony M. Dimitriadis

Digitally signed by Anthony M. Dimitriadis
Date: 2022.01.31 14:06:03 -05'00'

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

Docket Nos.: 05000289 and 07200077
License No.: DPR-50

Enclosure:
Inspection Report Nos.: 05000289/2021002 and 07200077/2021001

cc w/ encl: Distribution via ListServ

EXELON GENERATION CO., LLC THREE MILE ISLAND NUCLEAR STATION, UNIT 1 - NRC INSPECTION REPORT NOS. 05000289/2021002 and 07200077/2021001, DATED JANUARY 31, 2021.

DOCUMENT NAME: https://usnrc.sharepoint.com/teams/Region-I-Decommissioning-Branch/Inspection Reports/Inspection Reports - Draft/TMI U1 inspection 2021002.docx
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NAME	SHammann/sh		ADimitriadis/ad					
DATE	01/20/2022		01/31/2022					

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U.S. NUCLEAR REGULATORY COMMISSION
REGION 1

Inspection Report

Inspection Nos.	05000289/2021002 and 07200077/2021001
Docket Number(s):	05000289 and 07200077
License Number(s):	DPR-50
Licensee:	Exelon Generation Co., LLC (Exelon)
Facility:	Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Location:	Middletown, PA 17057
Inspection Dates:	July 1, 2021 to December 31, 2021
Inspectors:	Stephen Hammann, Senior Health Physicist Decommissioning, ISFSI, and Reactor HP Branch Division of Radiological Safety and Security, Region I
	Elizabeth Andrews, Health Physicist Decommissioning, ISFSI, and Reactor HP Branch Division of Radiological Safety and Security, Region I
	Jeff Kulp, Senior Reactor Inspector Engineering Branch 1 Division of Operating Reactor Safety, Region I
	Marlone Davis, Senior Transportation and Storage Safety Inspector Inspection and Oversight Branch Division of Fuel Management, Nuclear Material Safety and Safeguards
	Matt Learn, Transportation and Storage Safety Inspector Inspection and Oversight Branch Division of Fuel Management, Nuclear Material Safety and Safeguards
Approved By:	Anthony Dimitriadis, Chief Decommissioning, ISFSI, and Reactor HP Branch Division of Radiological Safety and Security, Region I

EXECUTIVE SUMMARY

Exelon Generation Co., LLC
Three Mile Island Unit 1
NRC Inspection Report Nos. 05000289/2021002 and 07200077/2021001

A routine announced safety inspection of TMI-1 was completed on December 31, 2021. The inspection was performed from July 1, 2021, to December 31, 2021 and focused on decommissioning activities and the safe operation of the Independent Spent Fuel Storage Installation (ISFSI) program. On-site inspections were performed September 2, September 8-10, November 5, November 11-12, November 17-18, and November 27-December 3, 2021. The inspection included a review of occupational exposure, fire protection, radiological effluent releases and environmental monitoring, decommissioning status, and of the Independent Spent Fuel Storge Installation (ISFSI). The inspection consisted of observations by the inspectors, interviews with site personnel, a review of procedures and records, and plant walk-downs. The NRC's 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." The NRC’s program for overseeing the safe operation of dry storage of spent fuel at an ISFSI is described in IMC 2690, “Inspection Program for Storage of Spent Reactor Fuel and Reactor Related Greater-Than- Class C Waste at Independent Spent Fuel Storage Installations and for 10 CFR Part 71 Transportation Packagings.”

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

1.0 Background

On September 26, 2019, Exelon sent a letter [Agency Documentation and Management System (ADAMS) Accession Number ML19269E480] to the NRC certifying the permanent cessation of power operations and certifying that the fuel had been permanently removed from the reactor vessel. This met the requirements of 10 Code of Federal Regulations (CFR) 50.82(a)(1)(i) and 50.82(a)(1)(ii). TMI-1 is currently in the SAFSTOR phase of decommissioning as described in IMC 2561.

2.0 SAFSTOR Performance and Status Review

a. Inspection Scope [Inspection Procedures (IP) 64704, 71801, 83750, 84750]

The inspectors interviewed personnel, reviewed documentation and performed plant walkdowns to determine if the licensee maintained a fire protection program (FPP) to address the potential for fires that could cause the release or spread of radioactive materials. The inspectors reviewed the fire protection plan and a sample of the implementation procedures to ensure compliance with the plan, to ensure that they reflected the current decommissioning status of the facility, and to ensure they were being properly implemented. The inspectors walked down the fire service pumps to examine their physical condition to determine if they were effectively maintained, and walked down several fire areas to determine if they were as described in the site's pre-fire plans. The inspectors reviewed surveillances and testing of fire protection equipment to determine if they were performed on a regular basis.

The inspectors observed activities, reviewed documentation, and interviewed site personnel associated with occupational radiation exposure to verify adequate protection of worker health and safety. The inspectors conducted a site tour to check and verify radiological postings and locked high radiation doors and gates. The inspectors observed radiation protection (RP) technicians performing job coverage and surveys to determine if implementation of radiological work controls, training and skill level, and instrumentation were sufficient for the activities being performed. The inspectors reviewed radiation work permits, and As Low As Reasonably Achievable (ALARA) work plans to determine if radiation work activities were pre-planned effectively to limit worker exposure. The inspectors reviewed the site dosimetry program and radiological dose records to verify compliance with the regulations.

The inspectors reviewed activities and documentation associated with effluent and environmental monitoring to determine if the licensee effectively controlled, monitored, and quantified releases of radioactive materials in liquid, gas, and particulate forms to the environment. The inspectors accompanied a chemistry technician specialist during the collection of environmental air and water samples to ensure adherence with site procedures. The inspectors also walked down several environmental dosimetry locations and effluent release systems to determine if the physical condition was maintained and as described in the site program. The inspectors also reviewed the annual radiological effluent release and annual radiological environmental reports, several effluent release permits, and the Off-Site Dose Calculation Manual (ODCM).

The inspectors reviewed the site's organization and staffing levels to determine if they were adequate for the scope of work being performed and reviewed training matrices for several individuals to determine if staff had been trained in accordance with site

programs. The inspectors evaluated the status of decommissioning to determine if the licensee had conducted activities in accordance with regulatory and licensee requirements and reviewed documents and Exelon submittals associated with the site decommissioning trust fund.

b. Observations and Findings

The inspectors determined that Exelon maintained the FPP within NRC requirements and the fire protection plan to minimize the potential for radiological releases in the event of a fire at the plant. The inspectors verified fire protection and detection systems, suppression systems, barriers, and fire water supply systems had been maintained and appropriately tested and were in a state of operational readiness. The inspectors verified staffing and training of the on-site incipient fire brigade was adequate and agreements were appropriately established with the local fire department to be the primary responder for onsite fires.

The inspectors verified that ALARA plans, work in progress, and post job reviews were performed as needed and were effective in limiting worker exposure and occupational dose was acceptable for the scope of the radiological activities performed. The inspectors determined that RP staff effectively controlled work activities, survey records were clear and complete, and RP technicians used appropriate instruments for the surveys. The inspectors verified that technician training and qualifications were up-to-date. The inspectors also determined that the site dosimetry program was adequate and worker exposures were within regulatory limits.

The inspectors verified that effluent releases to the environment had been properly controlled, monitored, and quantified as required by NRC regulations. The inspectors verified that the annual radiological effluent and the annual environmental reports demonstrated that calculated doses were below regulatory dose criteria of 10 CFR 50, Appendix I. Additionally, the inspectors verified effluent sampling equipment and area radiation monitors were checked, calibrated, and maintained as specified in the ODCM.

The inspectors determined the site had adequate staffing for the current phase of decommissioning and that training programs were being maintained. The inspectors verified activities were performed in accordance with site programs and procedures. The inspectors noted that site activities, including the dry cask loading campaign and the status of the trust fund were consistent with the schedule in the post shutdown decommissioning activities report.

c. Conclusions

No violations of safety significance were identified.

3.0 Independent Spent Fuel Storage Installation

3.1 Review of 10 CFR 72.212 (b) Evaluations

a. Inspection Scope (IP 60856)

The inspectors reviewed documents, interviewed staff, and performed site walkdowns to evaluate the licensee's compliance with the requirements of 10 CFR 72.212.

The inspectors reviewed the licensee's written evaluations to determine if they were in accordance with 10 CFR 72.212(b)(5), 10 CFR 72.104 and if the conditions set forth in the Certificate of Compliance (CoC) had been met prior to use. The inspectors reviewed the Exelon 72.212 report to determine if applicable reactor site parameters, such as fire and explosions, tornadoes, wind-generated missile impacts, seismic qualifications, lightning, flooding and temperature, had been evaluated for acceptability with bounding values as specified in the Final Safety Analysis Report (FSAR) and the NRC Safety Evaluation Report (SER).

The inspectors also reviewed the 50.59 evaluations to determine if the licensee evaluated whether activities related to storage of spent fuel under the general license involved a change in the facility technical specifications (TS) or required a license amendment for the facility in accordance with 10 CFR 50.59(c). The reactor emergency plan, quality assurance program, training program, and RP program were reviewed to determine if there was no decrease in effectiveness and if changes were made that required prior NRC approval.

b. Observations and Findings

The licensee is utilizing the NAC MAGNASTOR Cask System for the storage of spent fuel at the onsite ISFSI. The review of the NAC MAGNASTOR Cask System was based on NRC-issued CoC No. 1031, Amendment 9, and its associated SER, and NAC MAGNASTOR FSAR Revision 12. The review of the Part 50 facility site-specific parameters utilized the Defueled Safety Analysis Report and other applicable plant-specific design and licensing basis information.

The inspectors verified that the licensee's written evaluations were in accordance with 10 CFR 72.212(b)(5), and confirmed the conditions set forth in the CoC, and 72.104 had been met prior to use. The inspectors verified that applicable reactor site parameters, had been evaluated for acceptability with bounding values specified in the FSAR and the NRC SER. The inspectors determined 50.59 evaluations had been performed as required by the regulations. The inspectors also determined there was no decrease in effectiveness to the emergency plan, quality assurance program, training program, and radiation protection program.

c. Conclusions

No violations of safety significance were identified.

3.2 Pre-Operational Testing of an ISFSI

a. Inspection Scope (IP 60854)

On September 9-10, 2021, the inspectors observed a dry run of welding activities on a mock MAGNASTOR transportable storage canister (TSC). The inspectors observed key welding activities, including: (1) hydrogen gas purge and monitoring; (2) lid-to-shell welding; (3) vent port cover welding; (4) closure ring welding; (5) port cover welding; and (6) associated nondestructive examinations. Specific to liquid penetrant examination, the inspectors observed procedural compliance of dwell times associated with: (1) weld

surface pre-cleaning and drying; (2) penetrant application; (3) penetrant removal; (4) developer application; and (5) final weld interpretations. The inspectors reviewed welding certifications and weld performance qualifications to verify that the welders were properly trained and qualified to perform the required weld activities. The inspectors also attended pre-job briefings for the activities.

On November 5, 2021, the inspectors observed a dry run of cask processing on a mock TSC. The inspectors observed key processing activities, including: (1) hydrostatic testing; (2) vacuum drying; and (3) helium backfill. Radiation protection measures and foreign material exclusion activities were also simulated, as required. The inspectors also attended pre-job briefings for these activities.

On November 11-12, 2021, the inspectors observed a dry run of the transfer and transport activities of a mock TSC. The inspectors observed key activities, including: (1) transfer and stack-up of the loaded TSC from the MAGNASTOR transfer cask (MTC) to the vertical concrete cask (VCC); (2) removal of the TSC from the VCC; (3) transfer of the VCC to the transport vehicle; (4) transport of the VCC to the ISFSI pad along the heavy haul path; and (5) placement of the VCC on the ISFSI pad. Radiation protection personnel controlled the area and performed surveys throughout the dry run, and the inspectors attended pre-job briefings for these activities

On November 18, 2021, the inspectors observed a dry run of the spent fuel pool operations. The inspectors observed key in-pool operations, including: (1) pressure test of the annulus seals; (2) lifting the TSC/MTC and placement in the spent fuel pool; (3) selecting a dummy fuel assembly and insertion into several basket locations; (3) placing the MTC lid onto the MTC; and (4) lifting the TSC/MTC out of the spent fuel pool and transfer to the cask decontamination pit. Radiation protection personnel controlled the area and performed surveys throughout the dry run. The inspectors also attended pre-job briefings for these activities.

Inspectors observed the performance of all the activities listed above to determine if procedure use, communication, and coordination of ISFSI activities met established regulatory requirements, CoC requirements, and adherence with site procedures. Also, the inspectors also observed pre-job briefings listed above to assess the licensee's ability to identify critical steps of the evolution, potential failure scenarios, and human performance tools to prevent errors. The inspectors' observations of the dry runs were conducted to determine if TMI was properly prepared to load spent fuel into the ISFSI.

b. Observations and Findings

Through direct observations and independent evaluation, the inspectors verified the licensee's development, implementation, and preoperational testing activities to safely load spent fuel from the spent fuel pool into a dry cask storage system and to transfer the loaded dry cask storage system to the ISFSI pad. The inspectors verified that the licensee fulfilled all test acceptance criteria and all identified deficiencies were resolved before receipt of fuel at the ISFSI. The inspectors independently verified the licensee's readiness to load spent fuel into the ISFSI.

c. Conclusions

No violations of safety significance were identified.

3.3 **Operation of an ISFSI**

a. Inspection Scope (IP 60855)

On November 27 - December 3, 2021, the inspectors observed and evaluated Three Mile Island's loading of TSC #0001, the first of 46 casks to be loaded during the site's ISFSI campaign. The inspectors also reviewed the licensee's planned activities associated with long-term operation and monitoring of the ISFSI.

The inspectors observed fuel assemblies loaded into the TSC, which included a review of fuel selection and fuel loading verification. The inspectors observed a heavy lift of the TSC out of the spent fuel pool and subsequent cask decontamination activities. The inspectors also observed TSC processing operations, including: (1) lid-to-shell welding; (2) hydrostatic testing; (3) vacuum drying; (4) pump down; (5) helium backfill; and (6) radiation survey activities. The inspectors observed a heavy lift of the cask out of the cask decontamination pit, stack-up and download activities. The inspectors observed these activities to determine compliance with NRC regulations, CoC requirements, and adherence with site procedures.

The inspectors performed a walkdown of the heavy haul path and toured the ISFSI pad to assess the material condition of the pad and to determine if transient combustibles were stored on the ISFSI pad or in the vicinity of the heavy haul path.

The inspectors reviewed corrective action reports and the associated follow-up actions that were generated prior to and during the campaign to ensure that issues were entered into the corrective action program, prioritized, and evaluated commensurate with their safety significance.

b. Observations and Findings

The inspectors verified the licensee's procedures and plans for controlling radiological activities, loading fuel, processing the canister, and transporting the fuel to the ISFSI pad were effective in meeting all regulatory and CoC requirements and in accordance with site procedures. The inspectors determined all activities had been performed safely and workers were trained and qualified for the activities being performed. The inspectors verified that pre-job briefs identified critical steps of the evolutions and identified potential failure scenarios. The inspectors verified that the material condition of the heavy haul path was adequate and confirmed that transient combustible material entry into the ISFSI pad was controlled in accordance with site procedures.

c. Conclusions

No violations of safety significance were identified.

4.0 Exit Meeting Summary

On January 6, 2021, the inspectors presented the inspection results to Mr. Trevor Orth, Site Decommissioning Director, and other members of Exelon's staff. No proprietary information was retained by the inspectors or documented in this report.

PARTIAL LIST OF PERSONS CONTACTED

T. Orth, Site Decommissioning Director
C. Smith, Regulatory Assurance Manager
E. Carreras, Operations Manager
J. Gregory, Manager, ISFSI Projects
R. Holmes, Senior Manager RP/Chem/Environmental
S. Minnick, Senior Manager Projects
P. Mullens, ISFSI Engineering Lead
G. Rodriguez, CAP/EP Specialist
K. Bissinger, Fire Marshal
W. McSorley, Fire Protection Engineer
J. Troiano, Engineering

State of Pennsylvania
S. Acker, Director Nuclear Safety Division

ITEMS OPEN, CLOSED, AND DISCUSSED

None

LIST OF DOCUMENTS REVIEWED

Audits and Reports

2020 Annual Radiological Effluent Release Report
2020 Annual Radiological Environmental Operating Report
Three Mile Island Nuclear Station, Units 1 and 2, Annual Radiological Groundwater Protection Program Report, 1 January through 31 December 2020
Three Mile Island Unit No. 1 Permanently Defueled Fire Hazards Analysis Report, Rev. 30

Procedures and Programs

30076-OP-11, MAGNASTOR VCC Contingency Repair, Revision 0
30076-OP-12, MAGNASTOR TSC Loading Preparations, Revision 1
30076-OP-13, MAGNASTOR TSC Loading, Closure, and Processing, Revision 0
30076-OP-14, MAGNASTOR TSC Transfer and Transport, Revision 1
30076-OP-15, MAGNASTOR Contingency Plans, Revision 0
30076-OP-16, MAGNASTOR System Unloading, Revision 0
CY-TM-170-2001, Rev. 2, Releasing Radioactive Liquid Waste
CY-TM-170-2012, Rev. 3, Releasing Radioactive Gaseous Effluents Reactor Building Purges – TMI -1
OP-AA-201-001, Rev. 8, Fire Marshall Tours
OP-AA-201-004, Rev. 17, Fire Prevention for Hot Work
OP-AA-201-009, Rev. 26, Control of Transient Combustible Material
OP-DC-201-007, Rev. 2, Fire Protection System Impairment Control
OP-TM-201-003, Rev. 1, Incipient Fire Brigade Drills
RP-AA-203, Rev. 6, Exposure Control and Authorization
RP-AA-210, Rev. 32, Dosimetry Issue, Usage, and Control
RP-AA-220, Rev. 16, Bioassay Program
RP-AA-400, Rev. 19, ALARA Program
RP-AA-401, Rev. 28, Operational ALARA Planning and Controls
RW-AA-100, Rev. 12, Process Control Program for Radioactive Wastes
TQ-DC-105, Rev. 01, Training and Qualification at a Decommissioning Facility

Corrective Action Documents
AR 04369213, 04391433, 4449136, 04405601, 04445145, 04454189, 04454193, 04454380, 04458937, 04458941, 04461212, 04463266, 04463267, 04463450, 04464351

Miscellaneous
30076-WP-07, Disposition of Foreign Material Contained within TMI-1 Fuel Assemblies NJ08VD and NJ00LL, Revision 0
ALARA Plan Number 21-004
AP 21-004, ISFSI Magnastor
Decommission SAC Meeting Minutes, TM-21-02
Fire Drill No. 2021-4a, Attachments 1-3, OP-TM-201-003
Gas Permit Post-Release Data G202111012-594-C, G-20211019-595-C
Generic Fitness-for-Duty and Behavior Observation Content Document
Generic Plant Access Training Content Document
Generic Radiation Worker Training Lesson Plan
Liquid Permit Post Release Data L-20210914-1043-B, L-20210920-1045-B
Radiation Work Permit 21-001, 00910, 00911
RP Training Matrices
Three Mile Island Unit 1, Organization Chart
Three Mile Island Nuclear Station Pre-Fire Plan, AB-FA-2 and AB-FA-4

Work Orders and Completed Surveillances
WO 05153891-01, Visually Inspect AB/FHB FS Instruments
WO 05187135-01, FS-P-2 Monthly Test
WO 05194384-01, Fire Extinguishers Inspection Part A
WO 05201633-01, Perform Fire Marshall Tour
WO Task 05189304-05: CPS Helium Totalizer Troubleshooting, Revision 0

LIST OF ACRONYMS USED

ADAMS	Agency Documentation and Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
CoC	Certificate of Compliance
Exelon	Exelon Generation Co., LLC
FPP	Fire Protection Program
FSAR	Final Safety Analysis Report
IMC	Inspection Manual Chapter
IP	Inspection Procedure
ISFSI	Independent spent fuel storage installation
MTC	MAGNASTOR transfer cask
NRC	U.S. Nuclear Regulatory Commission
PHE	Public Health Emergency
RP	Radiation Protection
SER	Safety Evaluation Report
TMI-1	Three Mile Island, Unit 1
TSC	Transportable Storage Cannister