



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

September 11, 2017

Mr. Bryan C. Hanson
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

**SUBJECT: THREE MILE ISLAND NUCLEAR POWER PLANT, UNIT 1 –
TEMPORARY INSTRUCTION 2515/191 INSPECTION REPORT
05000289/2017010**

Dear Mr. Hanson:

The enclosed report documents the inspection results, which were discussed on July 27, 2017, with Mr. Thomas Haaf, Plant Manager, and other members of your staff. An exit was conducted with Mr. Jeff Goldman, Regulatory Assurance Manager via telephone on August 15, 2017, to discuss the final results of the inspection. The results of this inspection are documented in the enclosed report.

The inspection examined activities conducted under your license as they relate to the implementation of mitigation strategies and spent fuel pool instrumentation orders (EA-12-049 and EA-12-051) and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans, your compliance with the Commission's rules and regulations, and with the conditions of your operating license. Within these areas, the inspection involved examination of selected procedures and records, observation of activities, and interviews with plant personnel.

Based on the results of this inspection, no violations of NRC requirements were identified.

B. Hanson

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This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Anne E. DeFrancisco, Acting Chief
Technical Support and Assessment Branch
Division of Reactor Projects

Docket No. 50-289
License No. DPR-50

Enclosure:
Inspection Report 05000289/2017010
w/Attachment: Supplementary Information

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SUBJECT: THREE MILE ISLAND NUCLEAR POWER PLANT, UNIT 1 –
 TEMPORARY INSTRUCTION 2515/191 INSPECTION REPORT
 05000289/2017010, DATED SEPTEMBER 11, 2017

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No. 50-289

License No. DPR-50

Report No. 05000289/2017010

Licensee: Exelon Generation Company, LLC (Exelon)

Facility: Three Mile Island, Unit 1 (TMI)

Location: Middletown, PA

Dates: July 24 to July 27, 2017

Inspectors: F. Arner, Senior Reactor Analyst, Division of Reactor Safety (DRS)
A. Patel, Acting Senior Reactor Analyst, DRS
D. Werkheiser, Senior Reactor Inspector, DRS
C. Lally, Project Engineer, Division of Reactor Projects

Approved by: Anne E. DeFrancisco, Acting Chief
Technical Support and Assessment Branch
Division of Reactor Projects

Enclosure

SUMMARY

Inspection Report 05000289/2017010; 07/24/2017 – 07/27/2017; Three Mile Island Nuclear Generating Station, Unit 1; Temporary Instruction (TI) 2515/191, Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans.

The inspection covered a one week inspection by two senior reactor analysts, a senior reactor inspector, and a project engineer. No findings were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

REPORT DETAILS

4. OTHER ACTIVITIES

40A5 Other Activities

TI 2515/191 – Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans

The objective of TI 2515/191, “Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans,” is to verify: (1) that licensees have adequately implemented the mitigation strategies as described in the licensee’s Final Integrated Plan (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16183A025) and the NRC’s plant safety evaluation (ADAMS Accession No. ML17025A409); (2) that the licensees installed reliable water-level measurement instrumentation in their spent fuel pools (SFPs); and (3) that licensees have implemented emergency preparedness enhancements as described in their site-specific submittals and NRC safety assessments, including dose assessment capability, enhancements to ensure that staffing is sufficient, and that communications can be maintained during beyond-design-basis external events.

The team verified that plans for complying with NRC Orders EA-12-049, “Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design Basis External Events,” (ADAMS Accession No. ML12054A735) and EA-12-051, “Order Modifying Licenses With Regard to Reliable Spent Fuel Pool Instrumentation,” (ADAMS Accession No. ML12056A044) were in place and were being implemented by Exelon. The team also verified that Exelon had implemented staffing and communications plans provided in response to the March 12, 2012, request for information letter and dose assessment information provided per COMSECY-13-0010, “Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned,” dated March 27, 2013 (ADAMS Accession No. ML12339A262).

The team discussed the plans and strategies with Exelon personnel, reviewed documentation, completed a tabletop exercise involving a beyond design basis event leading to an extended loss of offsite power and, where appropriate, performed plant walk downs to verify that the strategies could be implemented as stated in Exelon’s submittals and the NRC staff prepared safety evaluation. For most strategies, this included verification that the strategy was feasible, procedures and/or guidance had been developed, training had been provided to plant staff, and required equipment had been identified and staged. Specific details of the team’s inspection activities are described in the following sections. Documents reviewed for each section of this report are listed in the Attachment.

1. Mitigation Strategies for Beyond-Design Basis External Events

a. Inspection Scope

The team examined Exelon’s established guidelines and implementing procedures for the beyond-design-basis mitigation strategies. The team assessed how the Exelon staff coordinated and documented the interface/transition between existing off-normal and emergency operating procedures with the newly developed mitigation strategies.

The team selected a number of mitigation strategies and conducted plant walk downs with licensed operators and responsible plant staff to assess: the adequacy and completeness of the procedures; familiarity of operators with the procedure objectives and specific guidance; staging and compatibility of equipment; and the practicality of the operator actions prescribed by the procedures, consistent with the postulated scenarios.

The team verified that a preventive maintenance program had been established for the Diverse and Flexible Coping Strategies (FLEX) portable equipment and that periodic equipment inventories were in place and being conducted. Additionally, the team examined the introductory and planned periodic/refresher training provided to the Operations and Three Mile Island staff most likely to be tasked with implementation of the FLEX mitigation strategies. The team also reviewed the introductory and planned periodic training provided to the Emergency Response Organization personnel.

Assessment

Based on samples selected for review, the inspectors verified that Exelon satisfactorily implemented appropriate elements of the FLEX strategy as described in the plant specific submittal(s) and the associated safety evaluation (ADAMS Accession No. ML17025A409) and determined that Exelon was in compliance with NRC Order EA-12-049.

The team verified that Exelon satisfactorily:

- Developed and issued FLEX Support Guidelines (FSGs) to implement the FLEX strategies for postulated external events;
- Integrated their FSGs into their existing emergency operating procedures and off-normal procedures such that entry into and departure from the FSGs are clear when using existing plant procedures;
- Protected FLEX equipment from site-specific hazards;
- Developed and implemented adequate testing and maintenance of FLEX equipment to ensure their availability and capability;
- Trained their staff to assure personnel proficiency in the mitigation of beyond-design-basis events, and;
- Developed procedures to ensure that the necessary off-site FLEX equipment will be available from off-site locations.

The team verified that inspector observations identified during the inspection were entered into Exelon's corrective action program, where appropriate.

b. Findings

No findings were identified.

2. Spent Fuel Pool Instrumentation

a. Inspection Scope

Assessment

Based on samples selected for review, the team determined that Exelon satisfactorily installed and established appropriate operating and maintenance controls for the SFP instrumentation as described in the plant specific submittals and the associated safety evaluation. The team determined that Exelon was in compliance with NRC Order EA-12-051.

The team verified that Exelon satisfactorily:

- Installed the SFP instrumentation sensors, cabling, and power supplies to provide physical and electrical separation as described in the plant specific submittals and safety evaluation;
- Installed the SFP instrumentation display in the accessible location, and environmental conditions as described in the plant specific submittals;
- Trained their staff to assure personnel proficiency with the maintenance, testing, and use of the SFP instrumentation; and,
- Developed and issued procedures for maintenance, testing, and use of the reliable SFP instrumentation.

The team verified that issues identified during the inspection were entered into Exelon's corrective action program.

b. Findings

No findings were identified.

3. Staffing and Communication Request for Information

a. Inspection Scope

Through discussions with plant staff, review of documentation, and plant walk downs, the team verified that Exelon had implemented required changes to staffing, communications equipment, and facilities to support an extended loss of all AC power (ELAP) scenario as described in Exelon's staffing assessment and the NRC safety evaluation. The team also verified that Exelon had implemented dose assessment (including releases from SFPs) capability using site-specific dose assessment software, as described in Exelon's dose assessment submittal.

Assessment

The team reviewed information provided in Exelon's dose assessment submittal and in response to the NRC's March 12, 2012, request for information letter (ML12053A340), and verified that Exelon satisfactorily implemented enhancements pertaining to Near-Term Task Force Recommendation 9.3, response to a large scale natural emergency event that results in an ELAP and impedes access to the site.

The team verified the following:

- Exelon satisfactorily implemented required staffing changes to support an ELAP scenario;
- Emergency preparedness communications equipment and facilities were sufficient for dealing with an ELAP scenario, and;
- Exelon implemented dose assessment capabilities (including releases from SFPs) using Three Mile Island's site-specific dose assessment software and approach.

The team verified that issues identified during the inspection were entered into Exelon's corrective action program.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On July 27, 2017, the team debriefed the inspection results to Mr. Thomas Haaf, Plant Manager, and other members of the Three Mile Island staff. An exit was conducted with Mr. Jeff Goldman, Regulatory Assurance Manager via telephone on August 15, 2017, to discuss the final results of the inspection. The team verified that no proprietary information was retained by team members or documented in this report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

**SUPPLEMENTARY INFORMATION
KEY POINTS OF CONTACT**

Licensee Personnel

E. Callan, Site Vice President
T. Haaf, Plant Manager
J. Goldman, Regulatory Assurance Manager
B. Wunderly, Site Engineering Director
J. Dullinger, Site Operations Director
T. Orth, Site Work Management Director
L. Florey, Site Training Director
J. Popielarski, Site Maintenance Director
M. Malinen, Senior Manager Operations Support
P. Brady, Nuclear Engineering Manager
C. Smith, Operations Support Manager
B. McSorley, Design Engineer
R. Shacklett, Programs Engineer
J. Sinopoli, Programs Engineer
J. Lyter, Corporate Operations
S. Pierson, Corporate Operations
S. Edelman, Senior ALARA Specialist
M. Fitzwater, Regulatory Assurance Engineer
D. Viola, Radiation Protection Instructor
D. Williams, Operations Shift Manager

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened and Closed

None

Discussed

None

LIST OF DOCUMENTS REVIEWED

Procedures

CC-TM-118-1001, TMI Diverse and Flexible Coping Strategy (FLEX) and Spent Fuel Pool Instrumentation Program Document, Revision 3
EP-AA-110-200, Dose Assessment, Revision 8
EP-AA-110-200-F-01, Dose Assessment Input Form, Revision B
EP-AA-110-201, On-Shift Dose Assessment, Revision 3
EP-AA-110-201-F-01, On-Shift Dose Assessment Input Sheet, Revision B
EP Aid 47, Portable Back-up Main Control Room (MCR) Satellite Communication System Operation, Revision 0
EP Aid 48, Portable TSC/OSC Satellite Communication System Operation, Revision 0
EP Aid 49, Handheld Radio/Battery Deployment – 9.3 Communication, Revision 0
OP-AA-108-112, Plant Status and Configuration, Revision 10
OP-TM-AOP-002, FLOOD, Revision 14A
OP-TM-AOP-003, Earthquake, Revision 7
OP-TM-AOP-004, Tornado/High Winds, Revision 7
OP-TM-AOP-020, Loss of Station Power, Revision 24
OP-TM-AOP-035, Loss of Spent Fuel Cooling, Revision 9
OP-TM-EOP-012, Station Blackout, Revision 4
OP-TM-220-901, Emergency Power Supply for Pressurizer Heaters, Revision 6

OP-TM-244-901, Containment Isolation, Revision 4
 OP-TM-322-901, Emergency Vent of Main Generator Hydrogen, Revision 1
 OP-TM-811-912, Startup, Operation and Shutdown of FX-P-3A or FX-P-3A when
 Taking Suction from the River, Revision 7
 OP-TM-861-901, Diesel Generator EG-Y-1A Emergency Operations, Revision 18
 OP-TM-919-201, FX-Y-1AB Performance Testing, Revision 2
 OP-TM-919-901, Energize 1P and 1S 480V SWGR from FX-Y-1A or FX-Y-1B, Revision 2
 OP-TM-919-902, Energize 1C ESV MCC from FX-Y-1A or FX-Y-1B, Revision 1
 OP-TM-919-903, Energize 1A ESV, 1A Radwaste, and 1B Radwaste MCC's from FX-Y-1A or
 FX-Y-1B, Revision 2
 OP-TM-919-906, FSG-4 – DC Load Management for Extended Loss of AC Power, Revision 2
 OP-TM-919-907, FSG-7 Alternate Monitoring of Essential Instrumentation, Revision 1
 OP-TM-919-911, FSG-1 – High Pressure RCS Makeup Using FX-P-1A or FX-P-1B, Revision 5
 OP-TM-919-922, FSG-6 – Makeup From Raw Water Sources, Revision 6
 OP-TM-919-924, Pre-Operational Lineup for FX-P-2A or FX-P-2B, Revision 2
 OP-TM-919-931, Fill FX-T-3 or FX-T-4 using DF-P-1C or DF-P-1D, Revision 3
 OP-TM-919-944, Flex Ventilation of Turbine and Intermediate Buildings Revision 1
 OP-TM-919-954, FSG-5 – Initial Assessment and FLEX Equipment Staging, Revision 2
 OP-TM-919-955, Connection to SAFER Equipment, Revision 2

Calculation

C-1101-734-E420-009, TMI-1 Extending Battery Life to 6 Hours under ELAP, Revision 0
 C-1101-919-E420-009, FLEX Electrical Performance Analysis (ETAP), Revision 0

Completed Surveillance

B.5.b Semi-Annual Checks (FLEX) - 0485196, performed January 20, 2017
 Functional Test of Fixed Satellite Systems (B5B/FLEX) - 04384858, performed
 December 22, 2016 and May 16, 2017
 Functional Test of Bullhorns (FLEX) - 04389729, performed March 6, 2017
 Functional Test of Iridium Phones (FLEX) - 04389909, performed April 19, 2017
 FX-Y-4, Loaded Run (FLEX), performed April 26, 2017
 OP-TM-919-201, FX-Y-1AB Performance Testing, 1/30/2017
 ST 1303-13.3, RSD Equipment Readiness Check, performed June 2, 2017

Condition Reports (*NRC Identified)

| | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|
| 04035424* | 04035429* | 04035434* | 04035436* | 04035750* | 04035763* |
| 04035826* | 04035887* | 04035889* | 04035890* | 04035895* | 04036075* |
| 04036374* | 04037504* | 01496242 | 04036084 | 04035424 | 04035750 |

Drawings

1E-919-21-001, FLEX Overview Diesel Generator & Fuel Oil, Revision 2
 1E-919-21-002, FLEX Overview Electrical Power Distribution, Revision 4
 1E-919-21-005, FLEX Overview Long Term Water Supply, Revision 2
 302-101, Condensate Flow Diagram, Revision 71

Modifications

ECR 15-00031, FLEX Modifications to Red Page Phone System, Revision 1
 ECR 16-00067, FLEX Diesel Electrical Bus Bar Load Limit, Revision 0
 ECR 13-00070, FLEX Electrical Power Supply, Revision 1
 ECR 13-00084, Instrumentation Calibration Sheets SF-LI-1219A and SF-LI-1219B, Revision 0
 ECR 13-00208, FLEX Design Specification, Revision 7
 ECR 13-00310, FLEX Ventilation Plan, Revision 0
 ECR 14-00478, Fukushima- Phase 2 EP Communications, Revision 1

Miscellaneous

Exelon Generation Company, LLC Response to NRC Request for Information Regarding the Capability to Perform Offsite Dose Assessment during an Event Involving Multiple Release Sources, letter dated June 27, 2013 (RS-13-105)
 Report of Full Compliance with March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated June 29, 2016 (ML16183A025)
 Supplemental Information - Final Integrated Plan in Response to the Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events (Order No. EA-12-049), dated December 1, 2016
 TODI 5971-2014-078, TMI-1 FLEX Diesel Generator Load Information, Revision 0
 TPP 2494447-01, FLEX On-Site Communication Plan, dated August 26, 2015
 TPP 2494447-04, FLEX Equipment Fuel Supply Plan Technical Position Paper, Revision 2
 TPP 2494447-05, FLEX Off-Site Communication Plan, dated August 26, 2015

Work Orders

| | | | | | |
|---------|---------|---------|---------|---------|---------|
| 4193009 | 4384858 | 4385196 | 4389729 | 4389909 | 4389952 |
| 4580327 | 4636475 | | | | |

LIST OF ACRONYMS

| | |
|-------|---|
| ADAMS | Agencywide Documents Access and Management System |
| ELAP | Extended Loss of all AC Power |
| FLEX | Diverse and Flexible Coping Strategies |
| FSG | FLEX Support Guidelines |
| NRC | Nuclear Regulatory Commission, U.S. |
| SFP | Spent Fuel Pool |
| TI | Temporary Instruction |