



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

January 11, 2016

Mr. Bryan C. Hanson  
President and Chief  
Nuclear Officer  
Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: THREE MILE ISLAND NUCLEAR STATION, UNIT 1 - REPORT FOR THE  
AUDIT REGARDING IMPLEMENTATION OF MITIGATING STRATEGIES AND  
RELIABLE SPENT FUEL POOL INSTRUMENTATION RELATED TO  
ORDERS EA-12-049 AND EA-12-051 (TAC NOS. MF0803 AND MF0866)

Dear Mr. Hanson:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" and Order EA-12-051, "Issuance of Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation," (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12054A736 and ML12054A679, respectively). The orders require holders of operating reactor licenses and construction permits issued under Title 10 of the *Code of Federal Regulations* Part 50 to submit for review, Overall Integrated Plans (OIPs) including descriptions of how compliance with the requirements of Attachment 2 of each order will be achieved.

By letter dated February 28, 2013 (ADAMS Accession No. ML13059A299), Exelon Generation Company, LLC (Exelon, the licensee) submitted its OIP for Three Mile Island Nuclear Station, Unit 1 (TMI), in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, and August 28, 2015 (ADAMS Accession Nos. ML13241A035, ML14063A221, ML14241A251, ML15058A264, and ML15243A088, respectively), the licensee submitted its first five six-month updates to the OIP. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049 in accordance with NRC Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the TMI interim staff evaluation (ISE) (ADAMS Accession No. ML13225A552) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13063A540), the licensee submitted its OIP for TMI, in response to Order EA-12-051. By letter dated June 26, 2013 (ADAMS Accession No. ML13176A470), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 24, 2013, August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, and August 28, 2015 (ADAMS Accession Nos. ML13205A305, ML13241A036, ML14059A228, ML14241A300, ML15058A255, and ML15243A104, respectively), the licensee submitted its RAI responses and first five six-month updates to the OIP. The NRC staff's review to date led to the issuance of the TMI ISE and RAI

dated November 13, 2013 (ADAMS Accession No. ML13308C188). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

The ongoing audits allow the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted and updated information, audit information provided on ePortals, and preliminary Overall Program Documents/Final Integrated Plans while identifying additional information necessary for the licensee to supplement its plan and staff potential concerns.

In support of the ongoing audit of the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at TMI from August 10 - 13, 2015, per the audit plan dated July 9, 2015 (ADAMS Accession No. ML15183A434). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies and SFPI orders. The onsite activities included detailed analysis and calculation discussions, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, review of staging and deployment of offsite equipment, and review of installation details for SFPI equipment.

The enclosed audit report provides a summary of the activities for the onsite audit portion. Additionally, this report contains an attachment listing all open audit items currently under NRC staff review.

B. Hanson

- 3 -

If you have any questions, please contact me at 301-415-3204 or by e-mail at John.Hughey@nrc.gov.

Sincerely,

A handwritten signature in black ink that reads "John D. Hughey". The signature is written in a cursive style with a large, sweeping initial "J".

John D. Hughey, Project Manager  
Orders Management Branch  
Japan Lessons-Learned Division  
Office of Nuclear Reactor Regulation

Docket No.: 50-289

Enclosure:  
Audit report

cc w/encl: Distribution via Listserv



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

AUDIT REPORT BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO ORDERS EA-12-049 AND EA-12-051 MODIFYING LICENSES  
WITH REGARD TO REQUIREMENTS FOR  
MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS  
AND RELIABLE SPENT FUEL POOL INSTRUMENTATION  
EXELON GENERATION COMPANY, LLC  
THREE MILE ISLAND NUCLEAR STATION, UNIT 1  
DOCKET NO. 50-289

BACKGROUND AND AUDIT BASIS

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" and Order EA-12-051, "Issuance of Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation," (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12054A736 and ML12054A679, respectively). Order EA-12-049 directs licensees to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities in the event of a beyond-design-basis external event (BDBEE). Order EA-12-051 requires, in part, that all operating reactor sites have a reliable means of remotely monitoring wide-range SFP levels to support effective prioritization of event mitigation and recovery actions in the event of a BDBEE. The orders require holders of operating reactor licenses and construction permits issued under Title 10 of the *Code of Federal Regulations* Part 50 to submit for review, Overall Integrated Plans (OIPs) including descriptions of how compliance with the requirements of Attachment 2 of each order will be achieved.

By letter dated February 28, 2013 (ADAMS Accession No. ML13059A299), Exelon Generation Company, LLC (Exelon, the licensee) submitted its OIP for Three Mile Island Nuclear Station, Unit 1 (TMI), in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, and August 28, 2015 (ADAMS Accession Nos. ML13241A035, ML14063A221, ML14241A251, ML15058A264 and ML15243A088, respectively), the licensee submitted its first five six-month updates to the OIP. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all

Enclosure

licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049 in accordance with NRC Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the TMI interim staff evaluation (ISE) (ADAMS Accession No. ML13225A552) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13063A540), the licensee submitted its OIP for TMI, in response to Order EA-12-051. By letter dated June 26, 2013 (ADAMS Accession No. ML13176A470), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 24, 2013, August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, and August 28, 2015 (ADAMS Accession Nos. ML13205A305, ML13241A036, ML14059A228, ML14241A300, ML15058A255, and ML15243A104, respectively), the licensee submitted its RAI responses and first five six-month updates to the OIP. The NRC staff's review to date led to the issuance of the TMI ISE and RAI dated November 13, 2013 (ADAMS Accession No. ML13308C188). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

The ongoing audits allow the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted and updated information, audit information provided on ePortals, and preliminary Overall Program Documents (OPDs)/Final Integrated Plans (FIPs) while identifying additional information necessary for the licensee to supplement its plan and address potential staff concerns.

In support of the ongoing audit of the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at TMI from August 10 - 13, 2015, per the audit plan dated July 9, 2015 (ADAMS Accession No. ML15183A434). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies and SFPI orders. The onsite activities included detailed analysis and calculation discussions, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, review of staging and deployment of offsite equipment, and review of installation details for SFPI equipment.

Following the licensee's declarations of order compliance, the NRC staff will evaluate the OIPs, as supplemented; the resulting site-specific OPDs/FIPs; and, as appropriate, other licensee submittals based on the requirements in the orders. For Order EA-12-049, the staff will make a safety determination using the Nuclear Energy Institute (NEI) developed guidance document NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," issued in August 2012 (ADAMS Accession No. ML12242A378), as endorsed by NRC Japan Lessons-Learned Directorate (JLD) interim staff guidance (ISG) JLD-ISG-2012-01, "Compliance with Order EA-12-049, 'Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events'" (ADAMS Accession No. ML12229A174). For Order EA-12-051, the staff will make a safety determination using the NEI developed guidance document NEI 12-02, Revision 1, "Industry Guidance for Compliance with NRC Order

EA-12-051, 'To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12240A307), as endorsed, with exceptions and clarifications, by NRC ISG JLD-ISG-2012-03, "Compliance with Order EA-12-051, 'Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12221A339), as providing one acceptable means of meeting the order requirements. Should the licensee propose an alternative strategy for compliance, additional staff review will be required to evaluate the alternative strategy in reference to the applicable order.

### AUDIT ACTIVITIES

The onsite audit was conducted at the TMI facility from August 10, 2015, through August 13, 2015. The NRC audit team staff was as follows:

<b>Title</b>	<b>Team Member</b>	<b>Organization</b>
Team Lead/Project Manager	John Hughey	NRR/JLD
Technical Support – Electrical	Matthew McConnell	NRR/JLD
Technical Support – Reactor Systems	Joshua Miller	NRR/JLD
Technical Support – Reactor Systems	Laura Okruhlik	NRR/JLD
Technical Support – SFPI	Khoi Nguyen	NRR/JLD
Technical Support – Balance of Plant	Michael Levine	NRR/JLD
Observer	William Cook	Region I/SRA
Observer	Justin Heinly	TMI Resident Inspector

The NRC staff executed the onsite portion of the audit per the three part approach discussed in the July 9, 2015, plan, to include conducting a tabletop discussion of the site's integrated mitigating strategies compliance program, a review of specific technical review items, and discussion of specific program topics. Activities that were planned to support the above included detailed analysis and calculation discussions, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

### AUDIT SUMMARY

#### 1.0 Entrance Meeting (August 10, 2015)

At the onsite audit entrance meeting, the NRC staff audit team introduced itself followed by introductions from the licensee's staff. The NRC audit team provided a brief overview of the audit's objectives and anticipated schedule.

#### 2.0 Integrated Mitigating Strategies Compliance Program Overview

Per the audit plan and as an introduction to the site's program, the licensee provided a presentation to the NRC audit team describing the site's strategies to meet the NRC orders. The licensee presented a review of its strategy to maintain core cooling,

containment, and SFP cooling in the event of a BDBEE, and the plant modifications being done in order to implement the strategies. Also reviewed were the design and location of the storage facilities for the FLEX equipment, the interface with the National Strategic Alliance for FLEX Emergency Response (SAFER), and the SFPI modification.

### 3.0 Onsite Audit Technical Discussion Topics

Based on the audit plan, and with a particular emphasis on the Part 2, "Specific Technical Review Items," the NRC staff technical reviewers conducted interviews with licensee technical staff, site walk-downs, and detailed document review for the items listed in the plan. Results of these technical reviews and any additional review items needed from the licensee are documented in the audit item status table in Attachment 3, as discussed in the Conclusion Section below.

#### 3.1 Reactor Systems Technical Discussions and Walk-Downs

The NRC staff met with licensee staff to discuss the amount of leakage from the reactor coolant pump (RCP) seals and the timing of the injection of borated water into the reactor coolant system (RCS), and the availability of water sources. The NRC staff reviewed the analyses and flow calculations along with applicable procedures, including the plant parameters that will be monitored to indicate the potential for reactor core damage. On November 12, 2015, subsequent to the TMI onsite audit, the NRC issued an endorsement letter regarding the Flowserve technical white paper regarding RCP seal performance (ADAMS Accession No. ML15310A094). The open items listed in Attachment 3 to this report include a confirmation from the licensee that the TMI RCP seal installations conform to the endorsed Flowserve white paper.

The NRC staff also walked down the licensee's strategies and reviewed plant procedures for implementing the core cooling and makeup strategies. The NRC staff also reviewed TMI's modeling of an extended loss of alternating current (ac) power (ELAP) event and its ability to mitigate the event, including the computer code used for the ELAP analysis and input parameters assumed to generate the results of the analysis. The NRC staff also reviewed TMI's strategy to rely on pre-installed equipment and piping to implement the RCS FLEX strategy. This approach is an alternative to the guidance in NEI 12-06 with regard to the use of portable equipment during Phase 2.

The NRC staff identified that the TMI ELAP RCS analysis relied on the main steam lines remaining intact following a BDBEE. However, the main steam lines are routed through the TMI turbine building (TB) which is not designed as a safety-related structure. The integrity of the main steam lines located in the TB must be demonstrated in order to validate the primary strategies developed to provide a BDBEE mitigation capability for TMI. Therefore, the NRC staff requested that TMI perform an analysis demonstrating that the main steam lines will maintain integrity following a BDBEE. This request is included in the list of audit open items in Attachment 3 to this report.

### 3.2 Electrical Technical Discussions and Walk-Downs

The NRC staff reviewed the calculations regarding battery life and FLEX generating sizing in addition to walking down the procedure steps for electrical load shedding. The NRC staff also walked down the main control room, emergency feedwater room, atmospheric dump valve room and battery rooms to evaluate strategies for hydrogen control and temperature control due to heat generating electrical equipment. The NRC staff reviewed the isolation and interactions of electrical power sources regarding the protection of Class 1E equipment from faults in portable FLEX equipment and the design elements that ensure multiple electrical sources do not attempt to simultaneously power electrical buses. The NRC staff also walked down panels used for load shedding to evaluate feasibility and timing. Lastly, the NRC staff conducted a walk-through of portable FLEX diesel generator (DG) procedures, to include power pathways, areas where manual actions are required, and electrical isolation.

The NRC staff also reviewed TMI's strategy to rely on pre-installed equipment, including FLEX DGs, to implement the FLEX strategies. This approach is an alternative to the guidance in NEI 12-06 with regard to the use of portable equipment during Phase 2. During the onsite audit, the NRC staff identified that the pre-installed FLEX DGs lacked an alternate electrical connection point as described in NEI 12-06, Rev. 0, Section 3.2.2. The NRC staff is reviewing additional information provided by the licensee in the course of the on-going audit process regarding the provision of an alternate electrical connection point for the pre-installed FLEX DGs.

### 3.3 SFPI Technical Discussions and Walk-Downs

The NRC staff walked down instrument, transmitter, electronics, and display locations for the SFP level instrumentation, along with the associated cable runs. In addition, the NRC staff noted that the licensee had completed design calculations and drawings detailing the installation of the SFPI components, as well as the associated calibration, maintenance, and test procedures.

### 3.4 FLEX Equipment Storage Configuration Discussion Areas and Walk-Downs

The TMI, Unit 2 screen house is a tornado-hardened seismic Class I structure that is being modified to be used as the FLEX equipment storage facility (FSF). The FSF will store FLEX equipment including deployment trucks, debris removal equipment, long-term water supply portable pumps/hoses, and a FLEX portable DG/cables. The FLEX equipment stored in the FSF will be protected from seismic, tornado missile, high wind, and extreme temperature hazards. Procedures are being developed to direct pre-flood preparatory actions to move some equipment from the building if a flood is predicted in order to provide mitigation capability for more severe flood events.

The TMI FSF storage configuration conforms to the FLEX equipment storage guidance in NEI 12-06, Rev. 0, with one outstanding issue identified by the NRC staff related to the flood hazard. Per the TMI severe flood mitigation strategy, FLEX equipment will be relocated to the TMI training center located across the Susquehanna River from the TMI facility which may be isolated by the flood. However, no procedural guidance is in place



to pre-plan and direct the means by which the FLEX equipment will be relocated to the TMI site within the timeframe in which it may be needed. Therefore, the NRC staff has requested that TMI provide the procedure/administrative controls that will be used to deploy FLEX equipment to the TMI site from the TMI training center. This request is included in the list of audit open items in Attachment 3 to this report.

Additional long-term water supply submersible FLEX pumps will be stored in the TMI, Unit 1, screen house, which is a tornado-hardened seismic Class I structure. The pumps will be deployed within the screen house if needed. This FLEX storage configuration conforms to the guidance in NEI 12-06, Rev. 0.

Per the TMI mitigating strategies, various FLEX equipment is pre-installed and stored in pre-existing structures. These strategies are proposed alternatives to the guidance of NEI 12-06, Rev. 0, regarding storage of FLEX equipment and the use of pre-installed equipment rather than portable equipment.

The FLEX N and N+1 RCS makeup pumps have electric motors and are pre-installed on the 322-foot elevation in the control building. While the pre-installation of the pumps and associated FLEX piping is an alternative to the guidance to use portable equipment, the control building is a seismic Class 1 structure and provides protection from all applicable hazards. Therefore, this configuration conforms to the FLEX equipment storage guidance in NEI 12-06, Rev. 0.

The N and N+1 FLEX once-through steam generator (OTSG) feedwater (FW) pumps and N and N+1 FLEX DGs with re-fillable diesel fuel tanks are pre-installed and stored in the TMI TB. The TB is a non-safety related structure and storage of the above FLEX equipment in the TB is an alternative to the guidance in NEI 12-06, Rev. 0. Therefore, Exelon must demonstrate that the TB structure will reasonably protect the pre-installed FLEX equipment from the effects of all BDBEES applicable to the TMI site. The NRC staff requested that TMI perform an analysis demonstrating that the TB structure will reasonably protect the stored FLEX equipment and associated pre-installed piping and cables following a BDBEE and remain safely accessible to TMI personnel.

The TMI TB is also credited as the protected location for the diesel fuel re-fill connection piping used to re-supply the FLEX DG fuel tanks located in the same area as the DGs. Therefore, the TB structural analysis must also address the protection and accessibility of the diesel fuel re-fill piping connection and hose deployment paths to the FLEX DG fuel tanks.

The request for analyses confirming the protection and accessibility of FLEX equipment in the TMI TB and associated deployment paths, including the diesel fuel re-supply piping connection and hoses, is included in the list of audit open items in Attachment 3 to this report.

### 3.5 Other Technical Discussion Areas and Walk-Downs

- a. The NRC staff reviewed the licensee's plans to ensure adequate communications, lighting, personnel access, and equipment access, to successfully implement the strategies. The staff interviewed plant personnel responsible for these areas, and observed lighting and communication needs during plant walkdowns.
- b. The NRC staff reviewed Revision 2 of the TMI SAFER Response Plan dated August 6, 2015. The initial fly or drive decision checklist, drive times, route options and helicopter company contact information are provided in Chapter 4 of the plan. The SAFER equipment staging areas and locations were noted as being documented in Appendix 5C of the plan. Chapter 6 contains the site interface procedure and Chapter 7 provides the Phase 3 equipment list.
- c. The NRC staff walked down the FLEX strategies for core cooling, RCS inventory, SFP makeup and FW flow to the OTSGs. The TMI FLEX strategy utilizes pre-installed FLEX pumps and piping as an alternative to the guidance in NEI 12-06, Rev. 0. During the onsite audit, the NRC staff identified that FLEX flowpaths lacked diversity as described in NEI 12-06, Rev. 0, Section 3.2.2 and Table D-1. The NRC staff is reviewing additional information provided by the licensee in the course of the on-going audit process regarding the establishment of diverse FLEX connection points and flowpaths.
- d. During the onsite audit the NRC staff reviewed the reasonable protection provisions for FLEX water sources, including the condensate storage tanks (CSTs). The licensee is preparing additional analyses to confirm that the CSTs are reasonably protected from all BDBEE hazards as described in Attachment 3 to this report.
- e. The NRC staff walked down the licensee's strategy for providing forced, once-through ventilation to ensure reliability and personnel habitability for the FLEX equipment that is pre-installed in the TB.
- f. The NRC staff walked down the licensee's strategy for ventilating the control room envelope, battery rooms, atmospheric dump valve room, and emergency feedwater room to ensure equipment reliability and personnel habitability.
- g. The NRC staff walked down the FLEX equipment deployment paths and reviewed Exelon Technical Position Paper, TPP 2494447-03, "TMI-1 FLEX Debris Removal Plan," September 2, 2015. The plan evaluates the expected debris impact on the plant exterior FLEX equipment staging areas and deployment paths. The plan also identifies the debris removal equipment stored in the FSF as well as primary and alternate deployment paths. The submersible FLEX pumps stored and deployed in the seismic Class 1 Unit 1 screen house is also identified as an alternate long-term water supply intake location.
- h. The NRC staff identified that the development of the FLEX maintenance and testing program is in progress. The licensee issued corrective action item ATI-01620407-53 in the TMI corrective action program to track development and completion of the

FLEX maintenance and testing program to include consideration of shelf life and acceptance criteria, manufacture recommendations and plant practices, as well as consideration of the Electric Power Research Institute preventative maintenance templates. The associated audit item was closed to TMI corrective action item ATI-01620407-53.

- i. The NRC staff noted that FLEX overview and specific FLEX strategy, equipment, and procedure training for Auxiliary Operators and Licensed Operators has been completed. Training in progress to be completed prior to compliance includes Emergency Operations training, ELAP and simulator based training, including simulator training incorporating RCP seal leakage. Emergency Response Organization (ERO) training is in progress, including FLEX ERO technical training. Specific FLEX task and procedure performance training has been identified and designated for recurring, periodic training on a 2-year schedule. These training tasks were confirmed to be listed on the long-range training plan. In addition, corrective action item ATI- 1620407-60 was generated in the TMI corrective action program to address ERO training.

#### 4.0 Exit Meeting (August 13, 2015)

The NRC audit team conducted an exit meeting with licensee staff following the closure of onsite audit activities. The NRC staff highlighted items reviewed and noted that the results of the onsite audit trip will be documented in this report. The audit items remaining open and the information needed for closure were also discussed with the licensee. Significant open items include the following:

- The N and N+1 FLEX OTSG FW pumps and N and N+1 FLEX DGs with re-fillable diesel fuel tanks are pre-installed and stored in the TMI TB. The TB is a non-safety related structure and storage of the above FLEX equipment in the TB is an alternative to the guidance in NEI 12-06, Rev. 0. Therefore, Exelon must demonstrate that the TB structure will reasonably protect the pre-installed FLEX equipment from the effects of all BDBEES applicable to the TMI site. The NRC staff requested that TMI perform an analysis demonstrating that the TB structure will reasonably protect the stored FLEX equipment and associated pre-installed piping and cables following a BDBEE and remain safely accessible to TMI personnel.
- The NRC staff identified that the TMI ELAP RCS analysis relied on the main steam lines remaining intact following a BDBEE. However, the main steam lines are routed through the TMI TB, which is not designed as a safety-related structure. The integrity of the main steam lines located in the TB must be demonstrated in order to validate the primary strategies developed to provide a BDBEE mitigation capability for TMI. Therefore, the NRC staff requested that TMI perform an analysis demonstrating that the main steam lines will maintain integrity following a BDBEE.

A complete list of audit open items is listed in Attachment 3 of this report.

## CONCLUSION

The NRC staff completed all three parts of the July 9, 2015, onsite audit plan. In addition to the list of NRC and licensee onsite audit staff participants in Attachment 1, Attachment 2 provides a list of documents under review during the on-going audit process.

In support of the continuing audit process as the licensee proceeds towards orders compliance for this site, Attachment 3 provides the status of all open audit review items that the NRC staff is evaluating in anticipation of issuance of a combined safety evaluation (SE) for both the Mitigation Strategies (MS) and SFPI orders. The five sources for the audit items referenced below are as follows:

- a. ISE Open Items (OIs) and Confirmatory Items (CIs)
- b. Audit Questions (AQs)
- c. Licensee-identified OIP OIs
- d. SFPI RAIs
- e. Additional SE needed information

The attachments provide audit information as follows:

- a. Attachment 1: List of NRC staff and licensee staff audit participants
- b. Attachment 2: List of documents under review
- c. Attachment 3: MS/SFPI SE Audit Items currently under NRC staff review  
(licensee input needed, as noted)

While this report notes the completion of the onsite portion of the audit per the audit plan dated July 9, 2015, the ongoing audit process continues, as per the letters dated August 28, 2013, and March 26, 2014, to all licensees and construction permit holders for both orders.

Additionally, while Attachment 3 provides a list of currently open items, the status and progress of the NRC staff's review may change based on licensee plan changes, resolution of generic issues, and other NRC staff concerns not previously documented. Changes in the NRC staff review will be communicated in the ongoing audit process.

Attachments:

1. NRC and licensee staff onsite audit participants
2. Audit documents under review
3. MS/SFPI audit items currently under NRC staff review

### Onsite Audit Participants

#### NRC Staff:

John Hughey	NRR/JLD/JOMB
Khoi Nguyen	NRR/JLD/JERB
Matthew McConnell	NRR/JLD/JERB
Michael Levine	NRR/JLD/JCBB

Joshua Miller	NRR/JLD/JERB
Laura Okruhlik	NRR/JLD/JERB
William Cook	Region I/SRA
Justin Heinly	Resident Inspector

#### TMI Staff:

Ray Brown	FLEX Project Manager
Bill McSorley	FLEX Lead Responsible Engineer
Pat Mullens	FLEX Engineer
Earl Showalter	SFPI Lead Responsible Engineer
Bob Brady	FLEX Operations Lead
John Blair	FLEX Operations
Stu Brantley	FLEX Operations
Ed Carreras	Training Manager
Brad Shumaker	Emergency Planning Manager
Rich Gerner	Security Representative
Jim Randisi	Auxiliary Operator
Frank Waple	Control Room Operator
Barry Thurston	Corporate Support
Becky Montagnola	Administration Support

## Documents Under Review

- Calculation No. C-1101-202-E620-471, "TMI-1 Cycle-Specific Shutdown Margin Verification During Emergency Cooldown," Rev. 1.
- Calculation No. C-1101-212-5360-020, "BWST [borated water storage tank] Gravity Feed During Loss of DHR [decay heat removal]," Rev. 0.
- Calculation No. C-1101-213-5450-010, "An Analysis of the Potential for Nitrogen Gas Entrainment in the RCS During Core Flood Discharge," Rev. 0.
- Calculation No. C-1101-251-E410-002, "Spent Fuel Pool Gravity Feed After Loss of DHR," Rev. 0.
- Calculation No. C-1101-734-E420-009, "TMI-1 Extending Battery Life to 6 hours under ELAP," Rev. 0.
- Calculation No. C-1101-852-5360-004, "Two Hour Backup Instrument Air system As-Built Capacity Calculation and Evaluation," Rev. 3.
- Calculation No. C-1101-919-E410-001, "FLEX Feedwater System Hydraulic Evaluation," Rev. 1.
- Calculation No. C-1101-919-E410-003, "Turbine Building Structural Analysis Model for BDBEE," Rev. 0.
- Calculation No. C-1101-919-E410-011, "Turbine Building Structural Analysis for BDBEE," Rev. 0.
- Calculation No. C-1101-919-E420-009, "FLEX Electrical Performance Analysis (ETAP)" Rev. 0.
- Drawing No. 1E-919-21-001, "FLEX Overview, Diesel Generator and Fuel Oil," Rev. 1a.
- Drawing No. 1E-919-21-002, "FLEX Overview Electrical Power Distribution," Rev. 1a.
- Drawing No. 1E-919-21-003, "FLEX Overview Feedwater Supply," Rev. 1a.
- Drawing No. 1E-919-21-004, "FLEX Overview Reactor Coolant and Spent Fuel Makeup," Rev. 1a.
- Drawing No. 1E-919-21-005, "FLEX Overview Long Term Water Supply," Rev. 1a.
- CC-TM-118-1001, "TMI Diverse and Flexible Coping Strategy (FLEX) Program Document," Rev. 0p.
- ER-TM-TSC-0016, "RCS and SFP Heatup and Inventory Boiloff Following Loss of Active Decay Heat Removal," Rev. 5.
- OP-TM-919-906, "FSG-4 – DC Load Management For Extended Loss of AC Power," Rev. 0 – Draft.
- OP-TM-919-907, "FSG-7 – Alternate Monitoring of Essential Instrumentation," Rev. 0 – Draft.
- Design Analysis No. TM-FLEX-001, "Core Cooling Analysis for FLEX," Rev. 0.
- Design Analysis No. TM-FLEX-002, "Reactor Building Pressure Analysis for FLEX," Rev. 2.
- TMI SAFER Response Plan: "SAFER Response Plan for Three Mile Island Nuclear Station," Rev. 2, August 6, 2015.

**Three Mile Island – Unit 1  
Mitigation Strategies/Spent Fuel Pool Instrumentation Safety Evaluation Audit Items:**

**Audit Items Currently Under NRC Staff Review, Requiring Licensee Input As Noted**

<b>Audit Item Reference</b>	<b>Item Description</b>	<b>Licensee Input Needed</b>
ISE OI 3.2.1.1.B	Provide the analysis supporting the licensee's mitigation strategy (WCAP-17792-P) for NRC staff review; identify the specific calculation(s) in WCAP-17792-P considered applicable to demonstrating the feasibility of the proposed strategy, and justify the applicability of the calculation(s) relied upon in WCAP-17792-P to TMI-1.	The integrity of the main steam lines located in the TB must be demonstrated in order to validate the primary strategies developed to provide a BDBEE mitigation capability for TMI. Therefore, the NRC staff requested that TMI perform an analysis demonstrating that the main steam lines will maintain integrity following a BDBEE.
ISE OI 3.2.1.1.C	As applicable, provide additional analyses for core cooling, RCS makeup, and shutdown margin that are relied upon, but not included in WCAP-17792-P.	Closure of this item is dependent on results of the main steam line integrity analysis requested under item OI 3.2.1.1.B.
ISE OI 3.2.4.7.A	The licensee appears to use a probabilistic approach to reach a conclusion that at least one of the three tanks depended on for RCS makeup will survive an ELAP event. NEI 12-06 guidance does not include this option. Provide further justification for this alternate approach.	Licensee to provide technical evaluation/analyses for NRC staff review.

<b>Audit Item Reference</b>	<b>Item Description</b>	<b>Licensee Input Needed</b>
ISE CI 3.1.1.1.A	<p>The licensee stated that protection of associated portable equipment from external hazards would be provided in structures that will be constructed to meet the requirements of NEI 12-06 Section 11. However, the licensee did not specify the type of configuration, how FLEX equipment would be secured, or how stored equipment and structures would be protected from all external hazards.</p>	<p>The TMI FLEX equipment storage configuration is an alternative to the guidance in NEI 12-06, Rev. 0. The NRC staff has requested that TMI provide an analysis demonstrating that the TB structure will reasonably protect the stored FLEX equipment and associated pre-installed piping and cables following a BDBEE and remain safely accessible to TMI personnel.</p> <p>The TB structural analysis must also address the protection and accessibility of the diesel re-fill piping connection and hose deployment paths to the FLEX DG fuel tanks.</p> <p>Per the TMI severe flood mitigation strategy, FLEX equipment will be relocated to the TMI training center located across the Susquehanna River from the TMI facility which may be isolated by the flood. However, no procedural guidance is in place to pre-plan and direct the means by which the FLEX equipment will be relocated to the TMI site within the timeframe in which it may be needed. Therefore, the NRC staff has requested that TMI provide the procedure/administrative controls that will be used to re-deploy the FLEX equipment to the TMI site that was re-located to the TMI training center.</p>



<b>Audit Item Reference</b>	<b>Item Description</b>	<b>Licensee Input Needed</b>
ISE CI 3.2.1.A	The licensee needs to confirm that the transition to the backup feedwater system will occur without a significant interruption of feedwater to the steam generators.	The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.
ISE CI 3.2.1.2.A	The 1A and 1B ES motor control center (MCC) will be energized using the FLEX diesel generators as described in Safety Functions Support section and the FLEX RCS makeup pump will be started within 4 hours. The analysis to confirm the timeline is not yet complete.	Closure of this item is dependent on results of the main steam line integrity analysis requested under item OI 3.2.1.1.B.
ISE CI 3.2.1.2.B	Information should be provided to justify that the procedures are effective to keep the RCS temperatures within the limits of the seal design temperatures, and address the adequacy of the seal leakage rate (2 gallons per minute (gpm)/seal) used in the ELAP analysis.	Closure of this item is dependent on results of the main steam line integrity analysis requested under item OI 3.2.1.1.C.
ISE CI 3.2.1.2.C	For plants such as TMI-1 that credit low leakage seals to maintain the initial maximum leakage rate of 2 gpm/seal for the ELAP analyses of the RCS response, a discussion of the information (including seal leakage testing data) should be provided to justify the use of 2 gpm/seal in the ELAP analysis.	Licensee to confirm consistency with Flowserve RCP seal technical white paper endorsed by the NRC on November 12, 2015 (ADAMS Accession No. ML15310A094).

<b>Audit Item Reference</b>	<b>Item Description</b>	<b>Licensee Input Needed</b>
ISE CI 3.2.1.4.A	<p>The licensee did not provide any further description of specific initial key plant parameters specified in NEI 12-06, Sections 3.2.1.2 and 3.2.1.3 except the assumption regarding SSCs [structures, systems and components], and the items from the sequence of events (SOE) Attachment 1A. The licensee did not provide the initial conditions used in the RCS and SFP calculations used in the TMI Training and Reference Manual, ER-TM-TSC-0016, the TMI.</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>
ISE CI 3.2.1.6.A	<p>During the ELAP and LUHS [loss of ultimate heat sink] beyond-design-basis external event, the licensee has identified that times to complete actions in the Events Timeline are based on operating judgment, the conceptual designs, and the current supporting analyses. The TMI mitigation strategy is not based upon the PWROG [Pressurized Water Reactor Owners Group] WCAP-17601-P ELAP mitigation strategy. In the audit process, the licensee stated that the current SOE is for the seismic event only and that another SOE would be developed for the flood event. Based on the information provided by the licensee, it is not possible to determine the validity of the time constraints provided in the preliminary sequence of events timeline for all hazards. The final timelines will be validated once detailed designs are completed and procedures are developed. The results will be provided in a future 6-month update.</p>	<p>Licensee to provide SOE timeline validation information.</p>

Audit Item Reference	Item Description	Licensee Input Needed
ISE CI 3.2.1.9.A	<p>The licensee stated that the FLEX diesel generators (FX-Y-1A &amp; B), fuel storage tank (FX-T-2), and FLEX MCC will be located north of the turbine pedestals on the turbine building 322-foot elevation. The FLEX diesel generators and FLEX MCC will be designed for operation if subjected to twice the Safe Shutdown Earthquake (SSE), as part of the “augmented approach.” Protective barriers will be installed to ensure this equipment remains functional following a tornado. Feasibility analysis has been completed which shows that the turbine building should be adequate to support these loads during an SSE. Further analysis is being performed to determine if any structural modifications are necessary to support that conclusion.</p>	<p>Closure of this item is dependent on the results of the TMI TB structural analysis requested under item CI 3.1.1.1.A.</p>
ISE CI 3.2.1.9.B	<p>The Integrated Plan table titled, “PWR [pressurized-water reactor] Portable Equipment Phase 2,” lists two diesel-driven pumps. The second table titled, “PWR Portable Equipment Phase 3,” lists several pumps to be obtained from the RRC [NSRC – National SAFER Response Center]. The licensee did not discuss how the operator actions are modeled in the ELAP to determine the required flow rates of the portable pumps listed in the “PWR Portable Equipment Phase 3,” or justify that the capacities of each of the above discussed pumps are adequate to maintain core cooling during phases 2 and 3 of ELAP.</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>

<b>Audit Item Reference</b>	<b>Item Description</b>	<b>Licensee Input Needed</b>
ISE CI 3.2.2.A	<p>The licensee stated that initial SFP cooling calculations were used to determine the fuel pool timelines and that formal calculations will be performed to validate this information during development of the detailed design. The licensee also stated that these strategies utilize a vent path for steam, and that the effects of this steam on other systems and equipment will be evaluated, and the results will be provided in a future 6-month update.</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>
ISE CI 3.2.4.3.A	<p>The licensee specified that a strategy for extreme cold, snow and ice events is being developed. Preliminary plans include the use of heat tracing for some piping and tanks, e.g. the borated water storage tank, and minimum flow paths or steam heating in other situations (e.g. the CSTs). The final plans will be reviewed when complete.</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>
AQ 2	<p>A review was conducted of Exelon's plans for the development of mitigating strategies with respect to the procedural interface considerations for seismic hazards associated with large internal flooding sources that are not seismically-robust and do not require ac power, the use of ac power to mitigate ground water in critical locations, or the existence of non-seismically robust downstream dams, but it was determined that there was insufficient information in the plans to conclude that there is reasonable assurance that these aspects of the requirements of Order EA-12-049 and NEI 12-06, Section 5.3.3, Consideration 2-4, will be met. Please provide a discussion of these considerations in the appropriate six-month update.</p>	<p>Closure of this item is dependent on the results of the TMI TB structural analysis requested under item CI 3.1.1.1.A and associated post-BDBEE FLEX equipment access evaluations.</p>

<b>Audit Item Reference</b>	<b>Item Description</b>	<b>Licensee Input Needed</b>
AQ 13	The integrated plan for TMI-1 did not provide any information regarding how decay heat rates were determined in the analyses for reactor core and spent fuel pool cooling. Please identify how decay heat was modeled for these analyses and provide justification for its adequacy.	The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.
AQ 19	The FLEX emergency feedwater pumps and two diesel generators and fuel tanks are located in the turbine building, which is a non-seismic Class 1 building. As noted on page 11 of the submittal, the pumps are only designed for the flood condition. It is not clear if these pumps will be available in a seismic event due to their location. Please clarify the availability of these pumps during a seismic event, including accessibility of any instrumentation and controls needed to support their operation, and identify how makeup to the steam generators would be provided for such an event. If the FLEX emergency feedwater pumps are credited for a seismic event, please provide adequate justification. Please clarify whether the diesel generators and fuel tanks located in a protected enclosure in the turbine building (reference page 37 of submittal) will be adequately protected from damage from beyond-design-basis external events (e.g., seismic, tornado, etc.). Please further clarify whether access to the protected enclosure could be restricted by damage to non-seismic structures and equipment.	Closure of this item is dependent on the results of the TMI TB structural analysis requested under item CI 3.1.1.1.A.

<b>Audit Item Reference</b>	<b>Item Description</b>	<b>Licensee Input Needed</b>
AQ 20	<p>Since the FLEX emergency feedwater pumps and the emergency RCS charging pumps are permanently installed they do not appear to qualify for portable status per NEI 12-06. The rationale for having portable equipment is that it can be stored or located in such a way that it is protected from all of the external events listed in NEI 12-06 (seismic, flooding, high wind, extreme cold and heat). The FLEX emergency feedwater pumps do not appear to be protected from seismic events. A justification is needed related to how these two permanently installed systems qualify as FLEX equipment under NEI 12-06, Section 3.1.2.12. Also, a discussion of how these two systems and their respective power supplies are any more survivable than the normally-installed plant equipment is needed. Please discuss this issue.</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>
AQ 40	<p>Provide a discussion on the diesel fuel oil supply (e.g., fuel oil storage tank volume, supply pathway, etc.) for the diesel-driven FLEX pumps and generators and how continued operation to ensure core and spent fuel pool cooling is maintained indefinitely (i.e., Phase 2 and 3). Also, explain how fuel quality will be assured if stored for extended periods of time. The staff also requests the licensee provide a refueling strategy for the diesel-driven FLEX equipment, to include fuel consumption estimates for the FLEX diesel driven FW pumps taking suction from the UHS [ultimate heat sink], and the time for refueling, and how the fuel will be provided.</p>	<p>Licensee to provide technical FLEX fuel oil supply and quality plan for NRC staff review.</p>

<b>Audit Item Reference</b>	<b>Item Description</b>	<b>Licensee Input Needed</b>
AQ 51	Please clarify whether a single FLEX pump will be used to provide cooling flow to multiple destinations (e.g., the reactor core, steam generators, and the spent fuel pool). If so, please confirm that the FLEX pump can supply adequate flow and clarify whether the pumped flow will be split and simultaneously supplied to all destinations or whether the flow will be alternated between them. If simultaneous flow will be used, then clarify how the flow splits will be measured and controlled (i.e., whether control exists for the total flow on a common line or on lines to individual destinations) to ensure that adequate flow (i.e., sufficient but not excessive) reaches each destination.	The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.
AQ 56	The licensee plans to secure the main generator seal oil pump when the hydrogen pressure decreases to 15 psig. The staff requests the licensee to explain why the pressure decrease is stopped at 15 psig and the main generator is not purged with CO2. The licensee is also requested to describe the consequences of securing the seal oil pump with 15 psi, of hydrogen remaining in the generator casing.	The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.
AQ 59	The licensee's strategy for RCS injection includes using water from the spent fuel pool. The staff requests the licensee provide an evaluation of the consequences on the spent fuel pool using this strategy and the consequential actions required by the operators to maintain adequate spent fuel pool cooling.	The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.

Audit Item Reference	Item Description	Licensee Input Needed
AQ 64	<p>The table titled, "PWR Portable Equipment Phase 2," lists two diesel driven-pumps. The pumps have flow rates and required head of 240 gpm and 250 psid [pounds per square inch differential], and 600 gpm and 245 psid, respectively. The second table titled, "PWR Portable Equipment Phase 3," cites a positive displacement high pressure pump with the specifications of 1000-3000 psi shutoff head and 60 gpm capacity and three low pressure pumps of 300 psi shutoff head and 2500 gpm max flow, 500 psi shutoff head and 500 gpm max flow, and 150 psi shutoff head and 5000 gpm max flow. Specify the required times for the operator to realign each of the above discussed pumps and confirm that the required times are consistent with the results of the ELAP analysis. Discuss how the operator actions are modeled in the ELAP to determine the required flow rates of the portable pumps, and justify that the capacities of each of the above discussed pumps are adequate to maintain core cooling during phases 2 and 3 of ELAP.</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>
OIP OI 9	<p>A portable refueling vehicle with a large diesel oil bladder will be available on site to support refilling our portable equipment diesel tanks. An additional means (river makeup is available) of delivering condensate may also be developed; details to be provided in a future 6-month update.</p>	<p>Licensee to provide technical evaluation for NRC staff review.</p>
OIP OI 13	<p>A plan will be developed to re-supply borated water to the borated water storage tank or SFP.</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>



<b>Audit Item Reference</b>	<b>Item Description</b>	<b>Licensee Input Needed</b>
SE 2	<p>a. Discuss the design of the suction strainers used with FLEX pumps taking suction from raw water sources, including perforation dimension(s) and approximate surface area.</p> <p>b. Provide reasonable assurance that the strainers will not be clogged with debris (accounting for conditions following flooding, severe storms, earthquakes or other natural hazards), or else that the strainers can be cleaned of debris at a frequency that is sufficient to provide the required flow. In the response, consider the following factors:</p> <p>i. The timing at which FLEX pumps would take suction on raw water relative to the onset and duration of the natural hazard.</p> <p>ii. The timing at which FLEX pumps would take suction on raw water relative to the timing at which augmented staffing would be available onsite.</p> <p>iii. Whether multiple suction hoses exist for each FLEX pump taking suction on raw water, such that flow interruption would not be required to clean suction strainers.</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>

Audit Item Reference	Item Description	Licensee Input Needed
SE 3	<p>Discuss all areas where local manual actions are credited in FLEX strategies (e.g., steam generator (SG) atmospheric dump valves, auxiliary feedwater flow control, making connection points, control room, etc.)</p> <p>Can operators safely enter these areas to complete necessary actions during extreme hot and cold hazard during an ELAP (heat, cold, humidity, etc.)? Are these actions feasible based on ELAP conditions and time constraint restrictions?</p> <p>Will sufficient lighting be available to complete tasks (e.g., portable lighting, headlamps, flashlights, etc.)?</p> <p>Is communication with the control room possible based on noise in area of local manual actions?</p> <p>Will portable ventilation be established? When will it be established?</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>
SE 4	<p>Identification of FLEX pump (RCS makeup, FW, and SFP makeup) connection points and diverse flowpaths. Confirmation that the connection points are reasonably protected from all applicable, external hazards and will remain accessible when needed during an ELAP event.</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>
SE 6	<p>Verify that appropriate human factors are applied for the implementation of the FLEX strategies.</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>

Audit Item Reference	Item Description	Licensee Input Needed
SE 14	<p>The licensee needs to confirm that the temperature and pressure within containment, other areas within the plant (i.e., electrical switchgear room), and atmospheric dump valve rooms will not exceed the qualification of electrical equipment that is being relied upon as part of the FLEX strategy. The licensee needs to ensure that the qualification of the required electrical equipment remains bounding during the entire duration of the event (i.e., indefinitely).</p>	<p>The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.</p>
SE 18	<p>Clarify MSIV [main steam isolation valve] behavior during ELAP at TMI. Understand that MSIVs are motor-operated and that the operator cabling may not be qualified during seismic event. Understand position of MSIVs during different scenarios. Open MSIVs implies potential for cross-tied SG pressure. Closed MSIVs implies potential for independent pressures in SGs. Obviously this could influence RCS loop temperatures and flows for cases where asymmetry may arise.</p> <p>Also, because of potential inability to close MSIVs if electrical power unavailable to valve operator, confirm whether downstream piping is robust to turbine stop valves, or whether there is potential for uncontrolled cooldown that must be addressed. This situation could arise if downstream steam lines or connected piping is non-robust in one or more ELAP scenarios.</p>	<p>Closure of this item is dependent on results of the main steam line integrity analysis requested under item OI 3.2.1.1.B.</p>

<b>Audit Item Reference</b>	<b>Item Description</b>	<b>Licensee Input Needed</b>
SE 20	The licensee's strategy relies on a single connection point for the Phase 2 DGs to provide power to the TMI 480 V electrical distribution system. Please address the guidance in NEI 12-06 regarding multiple FLEX electrical connection points.	The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.
SE 21	The licensee needs to provide an analysis that shows that staging the N and N+1 Phase 2 FLEX DGs in close proximity to one another does not reduce the reliability of either Phase 2 FLEX DG to perform its required function (i.e., a catastrophic failure on one Phase 2 FLEX DG will not adversely impact the other FLEX DG or its associated equipment (cabling, connections, etc.)).	The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.
SE 22	How will seismic water sources (e.g. condensate storage tanks CO-T-1A / 1B) be protected from the impact of a seismic or tornado event on other connected tanks?	The NRC staff is reviewing information provided by the licensee in the course of the on-going audit process.

B. Hanson

- 3 -

If you have any questions, please contact me at 301-415-3204 or by e-mail at John.Hughey@nrc.gov.

Sincerely,

*/RA/*

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Office of Nuclear Reactor Regulation

Docket No.: 50-289

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