

Samuel L. Belcher
Senior Vice President and Chief Operating Officer

February 26, 2015
L-15-002

10 CFR 2.202

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-001

SUBJECT:

Beaver Valley Power Station, Unit Nos. 1 and 2
Docket No. 50-334, License No. DPR-66
Docket No. 50-412, License No. NPF-73
Davis-Besse Nuclear Power Station
Docket No. 50-346, License No. NPF-3
Perry Nuclear Power Plant
Docket No. 50-440, License No. NPF-58
FirstEnergy Nuclear Operating Company's (FENOC's) Fourth Six-Month Status Report
in Response to 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) (TAC Nos. MF0841, MF0842, MF0961, and MF0962)

On March 12, 2012, the Nuclear Regulatory Commission (NRC or Commission) issued an order (Reference 1) to FENOC. Reference 1 was immediately effective and directs FENOC to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2) and an overall integrated plan pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document Nuclear Energy Institute (NEI) 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the FENOC initial status report regarding mitigation strategies. Reference 5 provided the FENOC overall integrated plan for Beaver Valley Power Station (BVPS), Unit Nos. 1 and 2, Davis-Besse Nuclear Power Station (DBNPS), and Perry Nuclear Power Plant (PNPP). Reference 6 provided a revision to the PNPP OIP.

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the

content of the status reports. The purpose of this letter is to provide the fourth six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The attached reports for BVPS, DBNPS, and PNPP (Attachments 1, 2, and 3, respectively) provide an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

This letter contains no new regulatory commitments. If you have any questions regarding this report, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at 330-315-6810.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 26, 2015.

Respectfully,



Samuel L. Belcher

Attachments:

1. Beaver Valley Power Station Fourth Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events
2. Davis-Besse Nuclear Power Station Fourth Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events
3. Perry Nuclear Power Plant Fourth Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

References:

1. NRC Order Number EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012
2. NRC Interim Staff Guidance 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, Revision 0, dated August 29, 2012
3. NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0, dated August 2012

4. FirstEnergy Nuclear Operating Company's (FENOC's) Initial Status Report in Response to 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 October 26, 2012
5. FirstEnergy Nuclear Operating Company's (FENOC's) Overall Integrated Plan in Response to 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 February 27, 2013
6. FirstEnergy Nuclear Operating Company's (FENOC's) Revision of Overall Integrated Plan for Perry Nuclear Power Plant in Response to 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 September 25, 2014.

cc: Director, Office of Nuclear Reactor Regulation (NRR)
NRC Region I Administrator
NRC Region III Administrator
NRC Resident Inspector (BVPS)
NRC Resident Inspector (DBNPS)
NRC Resident Inspector (PNPP)
NRC Project Manager (BVPS)
NRC Project Manager (DBNPS)
NRC Project Manager (PNPP)
Ms. Jessica A. Kratchman, NRR/JLD/PMB, NRC
Director BRP/DEP (without Attachments)
Site BRP/DEP Representative (without Attachments)
Utility Radiological Safety Board (without Attachments)

Attachment 1
L-15-002

Beaver Valley Power Station Fourth Six-Month Status Report for the Implementation of
Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation
Strategies for Beyond-Design-Basis External Events
Page 1 of 8

1 Introduction

FirstEnergy Nuclear Operating Company (FENOC) developed an Overall Integrated Plan (OIP) for Beaver Valley Power Station, Unit Nos. 1 and 2 (Reference 1 in Section 8), documenting the diverse and flexible strategies (FLEX), in response to Reference 2. This attachment provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2 Milestone Accomplishments

The following milestone(s) have been completed since July 31, 2014 and are current as of January 31, 2015.

- Update 3 was submitted
- Completed the Phase 2 Staffing Study
- Completed the security barrier pipe penetration modification
- Completed the training plan for the site

3 Milestone Schedule Status

The following provides an update to Attachment 2 of the OIP. It provides the activity status of each item and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

The revised milestone target completion dates do not impact the order implementation date.

Milestone	Target Completion Date	Activity Status (as of 1/31/15)	Revised Target Completion Date
Submit FLEX Integrated Implementation Plan	02/28/13	Complete	
6 Month NRC Status Updates	08/28/16	Started	
<i>Update 1</i>	08/28/13	Complete	
<i>Update 2</i>	02/28/14	Complete	
<i>Update 3</i>	08/28/14	Complete	
<i>Update 4</i>	02/27/15	Started	
<i>Update 5</i>	08/28/15	Not Started	
<i>Update 6*</i>	02/28/16	Not Started	
<i>Update 7*</i>	08/28/16	Not Started	
Complete FLEX Strategy Review	March-2013	Complete	
Validation	February-2015	Started	September-2015
<i>Walk-throughs or Demonstrations</i>	February-2015	Started	September-2015
Complete Staffing Analysis	November-2014	Complete	
<i>Submit NEI 12-01 Phase 1 Staffing Study</i>	April-2013	Complete	
<i>Submit NEI 12-01 Phase 2 Staffing Study</i>	November-2014	Complete	
Complete Plant Modifications	November-2016	Started	
<i>Target plant modifications</i>	April-2013	Complete	
Unit 1 Modifications complete	November-2016	Started	
<i>Complete 1R22 outage modifications</i>	November-2013	Complete	
<i>Complete on-line modifications</i>	September-2016	Started	
<i>Complete 1R23 outage modifications</i>	May-2015	Started	
<i>Complete 1R24 outage modifications*</i>	November-2016	Started	
Unit 2 Modifications complete	November-2015	Started	
<i>Complete 2R17 outage modifications</i>	May-2014	Complete	
<i>Complete on-line modifications</i>	August-2015	Started	
<i>Complete 2R18 outage modifications</i>	November-2015	Started	
FLEX Storage Complete	October-2015	Started	
<i>Complete Building Design</i>	December-2014	Started	March-2015
<i>Commence Construction</i>	January-2015	Not Started	March-2015
<i>Complete Construction</i>	October-2015	Not Started	
River (UHS) Access Complete	October-2014	Complete	
<i>Fence & Gate Modification Design</i>	February-2014	Complete	
<i>New Fence & Gate Construction</i>	August-2014	Complete	
<i>Security Barrier Pipe Penetrations Design</i>	March-2014	Complete	
<i>Security Barrier Pipe Penetration Construction</i>	October-2014	Complete	
On-site FLEX Equipment	October-2015	Started	
<i>Confirm FLEX Equipment Requirements</i>	November-2013	Complete	
<i>FLEX Equipment Ordered</i>	April-2015	Started	
<i>FLEX Equipment Delivered</i>	October-2015	Started	
Off-site FLEX Equipment	October-2015	Started	
<i>Develop Strategies with RRC***</i>	June-2015	Started	
<i>Phase 3 Site Access Strategies in Place</i>	June-2015	Started	
<i>Complete Near Site Staging Location (as needed)</i>	October-2015	Not Started	

Milestone	Target Completion Date	Activity Status (as of 1/31/15)	Revised Target Completion Date
Procedures Complete	October-2016	Started	
<i>PWROG issues NSSS-specific guidelines</i>	June-2013	Complete	
<i>Issue Beaver Valley Unit 2 FLEX Support Guideline (FSG)*</i>	October-2015	Started	
<i>Issue Beaver Valley Unit 1 FSG*</i>	October-2016	Started	
<i>Issue Maintenance Procedures</i>	December-2014	Started	October-2015
Training Complete	September-2016	Started	
<i>Develop Training Plan</i>	December-2014	Complete	
<i>Implement Unit 2 Training*</i>	September-2015	Started	
<i>Implement Unit 1 Training*</i>	September-2016	Started	
Submit Completion Report	January-2017**	Not Started	

* Milestones added as a result of relief/relaxation for Unit 1 (Reference 4)

** Submittal of completion report occurs after end of refueling outage.

*** Regional Response Center (RRC) is now called National SAFER Response Center (NSRC)

4 Changes to Compliance Method

The following changes to the compliance method as documented in the OIP (Reference 1) are being made. The changes do not impact compliance with Nuclear Energy Institute (NEI) 12-06.

- Phase 3 Indefinite Coping (OIP page 70 of 172): In the OIP, Phase 3 indefinite coping was based on placing one train of residual heat removal equipment in service to achieve cold shut down conditions. The Phase 3 indefinite coping strategy has been revised to remain on the secondary heat sink. A water quality analysis was performed that confirms adequate steam generator heat transfer capability to remove decay heat for 72 hours using the Ohio River as the makeup source. FENOC has designated water purification units from the National Strategic Alliance for FLEX Emergency Response (SAFER) Response Center (NSRC) as required for Phase 3 indefinite coping. Phase 3 key parameter instrumentation remains powered from portable 480 volts alternating current (VAC) generators, the same as in Phase 2.
- Storage Facility Location and Method (OIP pages 20 through 21 of 172): The storage facility location was changed from one hardened storage facility inside the protected area (PA) for all equipment as described in the OIP, to a hardened facility outside the PA for N equipment and commercial warehouse outside the PA for the +1 equipment. Because the new storage location is located adjacent to an existing major deployment route between the plant and the river, overall deployment times are not significantly impacted. While deployment time to locations inside the plant are increased by a few minutes, deployment times to the river are reduced by a few minutes. Actual deployment times will be confirmed during strategy validation in accordance with industry guidance.

- Mobile Chiller (OIP page 48 of 172): The OIP lists as yet undetermined connection points for mobile chillers to cool containment. Containment cooling, and therefore, these connection points are not required per calculation 100080-DMC-3687, "Containment Temperatures following an Extended Loss of All Alternating Current Power (ELAP) in support of FLEX Mitigating Strategies." Containment parameters do not challenge containment integrity for at least seven days, post event. Containment cooling and depressurization will be via purge or venting as appropriate during recovery.
- Spent Fuel Pool (SFP) Cooling Secondary Connections Points (OIP pages 52 through 58 of 172): The OIP describes two secondary connection points on each unit (one at the train A SFP heat exchanger and one at the train B SFP heat exchanger.) Only one secondary connection point will be installed on each unit (at the train A SFP heat exchanger.)
- 480 VAC Portable Generator Connection Points (OIP pages 64 through 69 of 172): The OIP describes the use of breakers installed in the safety-related motor control center as the electrical isolation to the connection points. This remains true for the Unit 1 secondary connection point. The Unit 1 primary and both Unit 2 connection points will use a fused disconnect switch, versus a breaker, as the electrical isolation.
- 4160 VAC Portable Generator Connection Points (OIP pages 70 through 73 of 172): The OIP describes installed connection points for the 4160 VAC portable generator. Since remaining on the secondary heat sink is the basis for indefinite coping, 4160 VAC power is no longer required for mitigation. Repowering a 4160 VAC bus is part of recovery actions, versus mitigation. The 4160 VAC portable generators are still available from the NSRC, but no connection points will be installed. Generators can be hard wired to a 4160 VAC bus via the installed emergency diesel generator leads or by another method, if needed. Additionally, connection points in the river water/service water systems and appropriate diesel driven pumps from the NSRC are included to access the ultimate heat sink as part of recovery to residual heat removal.
- Diesel Driven Air Compressor (OIP page 73 of 172): The OIP lists as yet undetermined connection points for a portable diesel air compressor. Since the instrument air system is not safety related, it is not assumed to remain intact. Therefore, repressurizing the system with a portable compressor may not be possible, and these connection points are no longer required. Air operated valves (AOVs) that must be operated during mitigation have back up nitrogen or alternative means of operation that does not require the instrument air system. AOVs that need to be opened during recovery can be opened via portable nitrogen bottle and test connections and blocked open with a suitable blocking device.

5 Need for Relief/Relaxation and Basis for the Relief/Relaxation

Relief/relaxation of the Reference 2 requirement for completion of full implementation for Beaver Valley Power Station Unit No. 1 until the completion of the fall of 2016 refueling outage for reactor coolant pump shutdown seal installation was granted on May 20, 2014 (Reference 4). No relief/relaxation is required at this time for Beaver Valley Power Station Unit No. 2.

6 Open Items from Overall Integrated Plan and Interim Staff Evaluation

The following tables provide a summary of the open items documented in the OIP or the Interim Staff Evaluation (ISE) (Reference 3) and the status of each item.

Overall Integrated Plan Open Item	Status
OI 1. Finalize the location of the FLEX storage building. The deployment routes, distances, and times provided in this report are bounded for the currently proposed locations but will be updated as necessary.	Complete. (Described in February-2014 status report) Update: The plans for the storage facility have been changed as described in Section 4 above.
OI 2. Perform containment evaluation based on the boundary conditions described in Section 2 of NEI 12-06. Based on the results of this evaluation, required actions to ensure maintenance of containment integrity and required instrument function will be developed.	Complete. The conclusion of the calculation, using MAAP-DBA, is that containment pressure and temperature remain well below design limits for at least seven days. Based on the results of the calculation, no other actions are required.
OI 3. Modify the RWST [refueling water storage tank] at each unit to protect it from tornado missiles or identify a borated source that is protected from tornados and can be utilized to provide core cooling when steam generators are not available.	Complete. (Described in February-2014 status report)

Interim Staff Evaluation Open Item	Status
3.2.1.6.A Verify that the TDAFW [turbine driven auxiliary feedwater] pump exhaust stacks are adequately protected from tornado missile hazards.	Started.
3.2.1.8.A Verify resolution of the generic concern associated with the modeling of the timing and uniformity of the mixing of a liquid boric acid solution injected into the RCS [reactor coolant system] under natural circulation conditions potentially involving two-phase flow.	Complete. (Described in February-2014 status report)

ISE Confirmatory Item	Status
3.1.1.4.A Confirm that primary and secondary staging areas for the RRC [regional response center] equipment have been selected and will meet the requirements of the applicable site response plan.	Started.
3.1.2.4.A Confirm that the primary and secondary staging areas have been identified and that the plan for the use of offsite resources will comply with NEI 12-06, Section 6.2.3.4 regarding the need to evaluate for flooding hazard. This confirmation should include a description of the methods to be used to deliver the equipment to the site.	Started.
3.1.3.1.A Confirm that the location of the storage and protection building for FLEX equipment has been identified. Confirm that the FLEX storage building is designed to withstand tornado missiles at a level equal to, or greater than, the plant's tornado missile design basis.	Started.
3.1.3.4.A Confirm that the licensee's plan for the use of offsite resources would provide reasonable assurance that the plan will comply with NEI 12-06, Section 7.3.4 regarding high wind hazards.	Started.
3.1.4.4.A Confirm that the licensee's plan for the use of offsite resources would provide reasonable assurance that the plan will comply with NEI 12-06 Section 8.3.4 regarding snow, ice and extreme cold hazards.	Started.
3.2.1.1.A Confirm that the licensee has verified that reliance on the NOTRUMP code for the ELAP [extended loss of AC power] analysis of Westinghouse plants is limited to the flow conditions prior to reflux condensation initiation. This includes specifying an acceptable definition for reflux condensation cooling.	Started.
3.2.1.1.B Confirm that the application of the WCAP-17601 analysis simulating the ELAP transient is properly established.	Started.
3.2.1.2.A Confirm that, if the licensee continues to credit SHIELD shutdown seals, as planned, (e.g., 1 gallon per minute leakage/seal) in the ELAP analyses for the RCS response, then the impacts of the Westinghouse 10 CFR Part 21 report, "Notification of the Potential Existence of Defects Pursuant to 10 CFR Part 21," dated July 26, 2013	Started.

ISE Confirmatory Item	Status
(ADAMS Accession No. ML13211A168) on the use of the low seal leakage rate in the ELAP analysis are addressed.	
3.2.1.2.B Confirm that if the seals are changed, the acceptability of the seals used is addressed, and the RCP seal leakage rates for use in the ELAP analysis are justified.	Started.
3.2.2.A Since the RWSTs are not currently fully protected against tornado missiles, confirm that the licensee has completed their review to determine whether or not the RWST will need to be further protected against missile hazards.	Complete. (Described in February-2014 status report)
3.2.2.B Confirm that opening doors provides adequate ventilation for SFP [spent fuel pool] area.	Started.
3.2.3.A Confirm that containment evaluations for all phases are performed based on the boundary conditions described in Section 2 of NEI 12-06. Based on the results of this evaluation, confirm that required actions to ensure maintenance of containment integrity and required instrument function have been developed.	Complete. See OI 2 above.
3.2.4.2.A Confirm that the licensee has clarified why the Integrated Plan stated the maximum temperature of the Unit 1/Unit 2 AFW [auxiliary feedwater] pump rooms would reach 115.9/112.3 degrees Fahrenheit (°F), respectively, while Calculation 8700-DMC-2312, described during the audit process, indicated that the maximum temperature would reach 142.9°F.	Started.
3.2.4.2.B Confirm that the licensee has provided an analysis or calculation to demonstrate that the dissipation of heat generated by the batteries via natural circulation will be adequate to maintain the temperatures in the battery rooms within acceptable levels.	Started.
3.2.4.2.C Confirm that the licensee has addressed how hydrogen concentration in the battery rooms will be limited to acceptable levels.	Started.
3.2.4.6.A Confirm that the licensee has completed a review of Unit 1 AFW room and developed any plans required to maintain a suitable environment.	Started.
3.4.A Confirm that the licensee has fully addressed considerations (2) through (10) of NEI 12-06, Section 12.2, Minimum Capability of Off-Site Resources, which requires each site to establish a	Started.

ISE Confirmatory Item	Status
means to ensure the necessary resources will be available from off-site.	

7 Potential Interim Staff Evaluation Impacts

FENOC is making changes to the compliance method as documented in the OIP (Reference 1). Although the planned changes do not impact compliance with NEI 12-06, there is a potential impact on the ISE. The impact may affect the following sections: (1) Section 3.1.1.1, Protection of FLEX Equipment – Seismic Hazard; (2) Section 3.1.2.1, Protection of FLEX Equipment – Flooding Hazard; (3) Section 3.1.2.2, Deployment of FLEX Equipment – Flooding Hazard; (4) Section 3.1.3.1, Protection of FLEX Equipment – High Wind Hazard; (5) Section 3.2.2, SFP Cooling Strategies; (6) Section 3.2.3, Containment Functions Strategies; (7) Section 3.2.4.2, Ventilation – Equipment Cooling; and (8) Section 3.2.4.8, Electrical Power Sources/Isolations and Interactions.

8 References

The following references support the updates to the OIP described in this attachment.

1. FirstEnergy Nuclear Operating Company's (FENOC's) Overall Integrated Plan in Response to 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 February 27, 2013.
2. NRC Order Number EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012.
3. Beaver Valley Power Station, Units 1 and 2 – Interim Staff Evaluation Related To Overall Integrated Plan In Response To Order EA-12-049 (Mitigation Strategies), dated January 29, 2014.
4. NRC Letter, Beaver Valley Power Station, Unit 1 – Relaxation of the Schedule Requirements for Order EA-12-049 "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events" (TAC No. MF0841), dated May 20, 2014.

Attachment 2
L-15-002

Davis-Besse Nuclear Power Station Fourth Six-Month Status Report for the
Implementation of Order EA-12-049, Order Modifying Licenses with Regard to
Requirements for Mitigation Strategies for Beyond-Design-Basis External Events
Page 1 of 8

1 Introduction

FirstEnergy Nuclear Operating Company (FENOC) developed an Overall Integrated Plan (OIP) for Davis-Besse Nuclear Power Station (Reference 1 in Section 8), documenting the diverse and flexible strategies (FLEX), in response to Reference 2. This attachment provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2 Milestone Accomplishments

The following milestone(s) have been completed since July 31, 2014 and are current as of January 31, 2015.

- Update 3 was submitted
- Confirmed FLEX Equipment Requirements

3 Milestone Schedule Status

The following provides an update to Attachment 2 of the OIP. It provides the activity status of each item and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

The revised milestone target completion dates do not impact the order implementation date.

Milestone	Target Completion Date	Activity Status (as of 1/31/15)	Revised Target Completion Date
Submit FLEX Integrated Implementation Plan	02/28/13	Complete	
6 Month NRC Status Updates	02/28/16	Started	
<i>Update 1</i>	08/28/13	Complete	
<i>Update 2</i>	02/28/14	Complete	
<i>Update 3</i>	08/28/14	Complete	
<i>Update 4</i>	02/27/15	Started	
<i>Update 5</i>	08/28/15	Not Started	
<i>Update 6</i>	02/28/16	Not Started	
Validation	April-2016	Not Started	
<i>Walk-throughs or Demonstrations</i>	April-2016	Not Started	
Complete Staffing Analysis	October-2015	Not Started	
<i>Submit NEI 12-01 Phase 2 Staffing Study</i>	October-2015	Not Started	
Complete Plant Modifications	April-2016	Started	
<i>Target plant modifications</i>	May-2013	Complete	
Modifications complete	April-2016	Started	
<i>Complete 1R18 outage modifications</i>	June-2014	Complete*	
<i>Complete on-line modifications</i>	January-2016	Started	
<i>Complete 1R19 outage modifications</i>	April-2016	Started	
<i>Complete Communications Modifications</i>	April-2016	Started	
<i>Complete SFP Level Indication Modifications</i>	April-2016	Started	
FLEX Storage Complete	April-2016	Started	
<i>Complete Building Design</i>	March-2015	Started	June-2015
<i>Commence Construction</i>	June-2015	Not Started	
<i>Complete Construction</i>	April-2016	Not Started	
On-site FLEX Equipment	February-2016	Started	
<i>Confirm FLEX Equipment Requirements</i>	October-2014	Complete	
<i>FLEX Equipment Ordered</i>	October-2015	Started	
<i>FLEX Equipment Delivered</i>	February-2016	Started	
Off-site FLEX Equipment	February-2016	Started	
<i>Develop Strategies with RRC***</i>	October-2015	Started	
<i>Phase 3 Site Access Strategies in Place</i>	October-2015	Not Started	
<i>Complete Near Site Staging Location (as needed)</i>	February-2016	Not Started	
Procedures Complete	April-2016	Started	
<i>PWROG issues NSSS-specific guidelines</i>	August-2013	Complete	
<i>Issue Davis-Besse FLEX Strategy Guidelines</i>	June-2015	Started	April-2016
<i>Issue Maintenance Procedures</i>	April-2016	Not Started	
Training Complete	April-2016	Not Started	
<i>Develop Training Plan</i>	September-2015	Started	
<i>Implement Training</i>	April-2016	Not Started	
Submit Completion Report	June-2016**	Not Started	

* Modifications are targeted for 1R19 and on-line; none targeted for 1R18.

** Submittal of completion report occurs after end of refueling outage.

*** Regional Response Center (RRC) is now called National SAFER Response Center (NSRC)

4 Changes to Compliance Method

The following changes to the compliance method as documented in the OIP (Reference 1) are being made. The changes do not impact compliance with Nuclear Energy Institute (NEI) 12-06.

The following discussion details two significant changes to the coping strategies planned for the Davis-Besse Nuclear Power Station OIP:

- Change Phase 2 Strategy for Maintaining Containment Integrity in Modes 5 and 6 from Containment Air Cooler (CAC) Operation to Venting (OIP pages 49 through 54 of 130): For an event that occurs in Modes 5 and 6, boiling of the reactor coolant system (RCS) may challenge containment pressure and temperature design limits due to moderate steam release into the containment atmosphere. The stated mitigation plan was to restore CAC operation to remove the heat rejected to containment. The heat removal from containment would mitigate the containment pressurization. The revision to the mitigation strategy is that containment will be vented to preclude overpressurization. This strategy is consistent with industry benchmarking and FLEX Frequently Asked Question 2013-10. Additionally, venting removes pressure, which facilitates gravity draining more effectively than the CAC, which reduces the pressure in containment by removing heat and allows dedicating the limited borated water inventory for RCS replenishment rather than utilizing this water inventory for spray to reduce containment pressure. The vent path will allow a controlled release and allow restoration of containment integrity when containment pressure relief is no longer required.
- Change Phase 2 Strategy for Maintaining RCS Inventory Control in Modes 5 and 6 from Clean Waste Receiver Tank (CWRT) to Spent Fuel Pool (SFP) as Source of Borated Water for Gravity Fill (OIP pages 8 through 9 and page 38 of 130): FENOC identified two sources of borated water in response to OIP Open Item 2, the borated water storage tank (BWST) and the CWRT. However, these two sources cannot be credited for Phase 2 RCS replenishment by gravity drain in Modes 5 and 6 for all events. The SFP has been identified as an additional borated water source that is robustly protected from the high wind event. This supports its use for RCS replenishment by gravity drain in Phase 2 following a high wind event.

The BWST inventory cannot be credited for mitigation following a high wind or tornado event and the CWRT, the credited borated water source following a high wind event, cannot be credited to provide gravity drain replenishment of the RCS due to its configuration. FENOC is currently evaluating the use of the SFP as a robust source of borated water for makeup to the RCS in Modes 5 or 6 prior to restoration of 480 volts alternating current (VAC) power via FLEX mitigation strategies. Analyses are still in progress to verify that this source can provide an

adequate RCS makeup inventory while also ensuring that an adequate inventory is maintained in the SFP for both cooling and shielding.

5 Need for Relief/Relaxation and Basis for the Relief/Relaxation

FENOC expects to comply with the order implementation date. Relief/relaxation is not required at this time.

6 Open Items from Overall Integrated Plan and Interim Staff Evaluation

The following tables provide a summary of the open items documented in the OIP or the Interim Staff Evaluation (ISE) and the status of each item.

Overall Integrated Plan Open Item	Status
OI 1. Finalize locations for FLEX storage buildings. Deployment routes, distances and times contained in the submittal are bounded for the currently proposed locations but will be updated as necessary.	Started.
OI 2. Finalize the strategy for providing a protected source of borated water to support FLEX strategies.	Complete. (Described in August-2014 status report) Update: The plans for the borated water source are being changed as described in Section 4 above.
OI 3. Determine if a mobile boration unit and/or water purification unit is required to support the FLEX strategies.	Complete. (Described in August-2014 status report)

Interim Staff Evaluation Open Item	Status
3.2.1.2.A Verify the following with respect to reactor coolant pump (RCP) seals: (1) the DBNPS [Davis-Besse Nuclear Power Station] plant condition during an ELAP [extended loss of all alternating current power] is bounded by the seal leakage test conditions with respect to relevant parameters. (2) the pop-open failure mechanism resulting from hydraulic instability that is discussed in WCAP-16175-P and WCAP-17601-P would not occur or would be bounded by the assumed leakage rate. (3) a basis for the assumed leakage rate of 2 gpm [gallons per minute] is justified in light of recommendations for a larger value of leakage for similarly designed RCPs and seals discussed	Started.

Interim Staff Evaluation Open Item	Status
<p>in WCAP-16175-P and WCAP-17601-P.</p> <p>(4) the modeling of the pressure-dependence of the seal leakage rate is justified.</p> <p>(5) the seal design performance under stresses induced by the cooldown of the RCS [reactor coolant system] is justified.</p>	
<p>3.2.1.4.A Verify that any industry-identified gaps and recommendations applicable to the generically developed mitigating strategies proposed for DBNPS are addressed (e.g., those documented in WCAP-17792-P (transmittal letter located at ADAMS Accession No. ML14037A237) and the appropriate revision of the PWROG's [Pressurized Water Reactors Owners Group] Core Cooling Management Interim Position Paper).</p>	Started.
<p>3.2.1.6.B Verify that a revised sequence of events that is consistent with the final ELAP analyses is developed.</p>	Started.
<p>3.2.1.8.A Verify resolution of the generic concern associated with the modeling of the timing and uniformity of the mixing of a liquid boric acid solution injected into the RCS under natural circulation conditions potentially involving two-phase flow.</p>	Started.

ISE Confirmatory Item	Status
<p>3.1.1.1.A Confirm that the diesel-driven service water pumps have deployment and storage plans developed in accordance with the provisions of NEI [Nuclear Energy Institute] 12-06.</p>	Started.
<p>3.1.1.2.A Confirm that the routes that plant operators will have to access to deploy and control the strategy will only require access through seismically robust structures.</p>	Started.
<p>3.1.1.2.B Confirm that, if power is required to operate the storage building doors, either power supplies will be available to operate the doors or the doors will be equipped with manual overrides to permit manual door opening.</p>	Not Started.
<p>3.1.1.3.A Confirm that guidance is provided for critical actions to perform until alternate indications can be connected and on how to control critical equipment without associated control power.</p>	Not Started.
<p>3.1.1.4.A Confirm the RRC [regional response center] local staging area, evaluation of access</p>	Not Started.

ISE Confirmatory Item	Status
routes, and method of transportation to the site.	
3.1.2.A Confirm that the licensee has identified the warning time and persistence of the external flooding hazard.	Started.
3.1.2.2.A Confirm that the licensee plans to conform to deployment consideration 1 and 2 of NEI 12-06, Section 6.2.3.2.	Not Started.
3.1.3.1.A Confirm that the chosen storage locations are sufficiently separated in distance and axially from the typical tornado path as compared to the local tornado data for tornado width.	Complete. (Described in August-2014 status report)
3.2.1.1.A Confirm that reliance on the RELAP5/MOD2-B&W code in the ELAP analysis for Babcock and Wilcox plants is limited to the flow conditions prior to boiler-condenser cooling initiation.	Started.
3.2.1.1.B Confirm that the licensee has: (1) Identified the specific analysis case(s) from WCAP-17792-P that are being referenced as the basis for demonstrating the acceptability of the mitigating strategies for DBNPS, and (2) Provided justification that the analyses from WCAP-17792-P that are being credited for DBNPS are adequately representative of the actual plant design, FLEX equipment, and planned mitigating strategies.	Started.
3.2.1.1.C Confirm the continuity of natural circulation by demonstrating the adequacy of the modeling of operator actions associated with primary-to-secondary heat transfer.	Started.
3.2.1.2.B Confirm that either: (1) closure of valve MU38 will not be credited in the ELAP analysis for DBNPS, or (2) procedures to close valve MU38 prior will be implemented to provide assurance that its closure can be credited in the ELAP analysis.	Not Started.
3.2.1.3.A Confirm the basis for the decay heat modeling assumptions present in the analysis credited for DBNPS in WCAP-17792-P, which was not available to the staff during the audit.	Started.
3.2.1.3.B Confirm that the cooldown directed by the DBNPS mitigating strategy is consistent with the capability of the atmospheric vent valves.	Not Started.
3.2.1.6.A Confirm licensee's hydraulic analysis supports that injecting borated water into the RCS	Started.

ISE Confirmatory Item	Status
within 6 hours after the event is initiated will maintain subcriticality.	
3.2.1.8.B Confirm adequate shutdown margin for ELAP scenarios: (1) with the highest applicable reactor coolant system leakage, and (2) with no reactor coolant system leakage. In addition, confirm that core reload calculation procedures would ensure that these shutdown margin calculations remain bounding for future fuel cycles.	Started.
3.2.1.8.C Confirm that adequate RCS venting capability exists to support the ELAP mitigating strategy for DBNPS.	Started.
3.2.3.A Confirm that the containment pressure and temperature after an event initiated in Modes 1 through 4 will stay at acceptable levels during Phases 1, 2, and 3 and that no additional installed equipment or operator actions are required to maintain containment integrity.	Started.
3.2.4.4.A Confirm that upgrades to the site's communications systems have been completed.	Started.
3.2.4.8.A Clarify the discrepancy between the Integrated Plan stated size of the Phase 2 FLEX 480v [volt] portable DGs [diesel generators] (500kW [kilowatt]) and the stated size of the Phase 2 FLEX 480v portable DGs in response to the sizing audit question (600kW).	Started.
3.4.A Confirm that the licensee has fully addressed considerations (2) through (10) of NEI 12-06, Section 12.2, Minimum Capability of Off-Site Resources, which requires each site to establish a means to ensure the necessary resources will be available from off-site.	Not Started.

7 Potential Interim Staff Evaluation Impacts

FENOC is making changes to the compliance method as documented in the OIP (Reference 1). Although the planned changes do not impact compliance with NEI 12-06, there is a potential impact on the ISE. The impact may affect the following sections: (1) Section 3.2.1, RCS Cooling and Heat Removal, and RCS Inventory Control Strategies; (2) Section 3.2.1.7, Cold Shutdown and Refueling; and (3) Section 3.2.3, Containment Functions Strategies.

8 References

The following references support the updates to the OIP described in this attachment.

1. FirstEnergy Nuclear Operating Company's (FENOC's) Overall Integrated Plan in Response to 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 February 27, 2013.
2. NRC Order Number EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012.

Attachment 3
L-15-002

Perry Nuclear Power Plant Fourth Six-Month Status Report for the Implementation of
Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation
Strategies for Beyond-Design-Basis External Events
Page 1 of 7

1 Introduction

FirstEnergy Nuclear Operating Company (FENOC) developed an Overall Integrated Plan (OIP) for Perry Nuclear Power Plant (Reference 1 in Section 8), documenting the diverse and flexible strategies (FLEX), in response to Reference 2. Revision 1 of the OIP (Reference 4) was issued in September 2014. This attachment provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2 Milestone Accomplishments

The following milestone(s) have been completed since July 31, 2014 and are current as of January 31, 2015.

- Update 3 was submitted
- Completed staffing analysis
- Developed FLEX training plan

3 Milestone Schedule Status

The following provides an update to Attachment 2 of the OIP (Reference 1). It provides the activity status of each item and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

The following milestones are deleted based upon Revision 1 of the Perry Nuclear Power Plant (PNPP) OIP (Reference 4):

- Develop SAMG Training Plan
- Implement SAMG Training

The following milestone is added based upon Revision 1 of the PNPP OIP:

- Install FLEX Lake Water Pumps in the Emergency Service Water Pump House

The revised milestone target completion dates do not impact the order implementation date.

Milestone	Target Completion Date	Activity Status (as of 1/31/15)	Revised Target Completion Date
Submit FLEX Integrated Implementation Plan	02/28/13	Complete	
6 Month Status Updates	02/27/15	Started	
<i>Update 1</i>	08/01/13	Complete	
<i>Update 2</i>	02/28/14	Complete	
<i>Update 3</i>	08/28/14	Complete	
<i>Update 4</i>	02/27/15	Started	
FLEX Strategy Review	May-2013	Complete	
Validation	April-2015	Started	
<i>Walk-throughs or Demonstrations</i>	April-2015	Started	
Complete Staffing Analysis	October-2014	Complete	
Complete Plant Modifications	April-2015	Started	
<i>Target plant modifications</i>	May-2013	Complete	
<i>Complete on-line modifications</i>	January-2015	Started	March-2015
<i>Complete 1R15 outage modifications</i>	April-2015	Started	
FLEX Storage	January-2015	Started	April-2015
<i>Complete Unit 2 Aux Building for storage and Use</i>	January-2015	Started	April-2015
<i>Convert Diesel Building for storage and use</i>	January-2015	Started	April-2015
<i>Convert ESW Pumphouse building Unit 2 areas for storage and use</i>	January-2015	Started	March-2015
Lake (UHS) Access	April-2015	Started	
<i>Install FLEX Lake Water Pumps in the Emergency Service Water Pump House</i>	N/A	Started	April-2015
On-site FLEX Equipment	January-2015	Started	March-2015
<i>Ordered</i>	October-2014	Started	February-2015
<i>Delivered</i>	January-2015	Started	March-2015
Off-site FLEX Equipment	March-2015	Started	April-2015
<i>Develop Strategies with RRC**</i>	January-2015	Started	April-2015
<i>Complete Near Site Staging Location (as needed)</i>	March-2015	Started	
<i>Phase 3 Site Access Strategies in Place</i>	November-2014	Started	February-2015
Procedures	April-2015	Started	
<i>Implement EPG/SAG Rev 3 Guidance</i>	April-2015	Started	
<i>Create Perry FSG</i>	October-2014	Started	April-2015
<i>Implement Perry FSG</i>	April-2015	Started	
<i>Define Maintenance Strategy</i>	April-2015	Started	
Training	March-2015	Started	April-2015
<i>Develop EOP Training Plan</i>	January-2014	Complete	
<i>Implement EOP Training</i>	March-2015	Started	April-2015
<i>Develop FLEX Training Plan</i>	August-2014	Complete	
<i>Implement FLEX Training</i>	March-2015	Started	
Submit Completion Report	June-2015*	Not Started	

* Submittal of completion report occurs after end of refueling outage.

** Regional Response Center (RRC) is now called National SAFER Response Center (NSRC)

4 Changes to Compliance Method

There are no changes to the compliance method as documented in the OIP (Reference 4).

5 Need for Relief/Relaxation and Basis for the Relief/Relaxation

FENOC expects to comply with the order implementation date. Relief/relaxation is not required at this time.

6 Open Items from Overall Integrated Plan and Interim Staff Evaluation

The following tables provide a summary of the open items documented in the OIP or the Interim Staff Evaluation (ISE) (Reference 3) and the status of each item.

Overall Integrated Plan Open Item	Status
N/A	N/A

Interim Staff Evaluation Open Item	Status
3.2.1.7.A FENOC has not indicated their intent to follow the provisions of the NRC-endorsed NEI position paper on Shutdown/Refueling Modes that describes how licensees will develop and maintain an appropriate plan for mitigating strategies capability in all plant modes (ADAMS Accession Nos. ML13273A514 and ML13267A382). FENOC should either confirm that PNPP will follow the endorsed guidance, or provide an alternate approach acceptable to the NRC staff.	Complete. (Described in February-2014 status report)

ISE Confirmatory Item	Status
3.1.1.3.A FENOC indicated that the gravity discharge system passively performs the mitigation of groundwater intrusion. It was not clear how the passive portion of this system will maintain groundwater elevation below the 590 foot elevation with no pumping power when the flood level around the plant may be at the 620 foot elevation. The licensee needs justification for groundwater mitigation during flooding conditions.	Complete. (Provided in December-2014 site audit)
3.1.1.4.A With regard to offsite resources, the licensee will develop a plan that will address the logistics for equipment transportation, area set up, and other needs for ensuring the equipment and commodities to sustain the site's coping strategies.	Complete. (Provided in December-2014 site audit)

ISE Confirmatory Item	Status
3.1.2.1.A During the audit, the licensee was requested to provide the elevations of FLEX equipment that will be deployed or staged across the site. In response, the licensee stated that the flooding re-analysis will need to be reviewed to determine the potential impacts. Confirm the location of FLEX equipment that will be deployed or staged is finalized with that consideration.	Complete. This item pertained to OIP, Revision 0, which included the plan to build a new FLEX storage building. The strategies in OIP, Revision 1, utilize existing buildings for storage.
3.2.1.1.A Benchmarks must be identified and discussed which demonstrate that Modular Accident Analysis Program (MAAP) is an appropriate code for the simulation of an ELAP [extended loss of AC power] event at PNPP, Unit 1, consistent with the NRC endorsement of the industry position paper on MAAP (ADAMS Accession No. ML13275A318).	Started.
3.2.1.1.B Confirm that the collapsed reactor pressure vessel level remains above Top of Active Fuel and the reactor coolant system cool down rate is within technical specifications limits.	Started.
3.2.1.1.C Confirm that MAAP is used in accordance with Sections 4.1, 4.2, 4.3, 4.4, and 4.5 of the June 2013 position paper.	Started.
3.2.1.1.D Confirm that, in using MAAP, the licensee identifies and justifies the subset of key modeling parameters cited from Tables 4-1 through 4-6 of the "MAAP Application Guidance, Desktop Reference for Using MAAP Software, Revision 2" (Electric Power Research Institute Report 1020236).	Started.
3.2.1.2.A Calculations prepared in support of the licensee's Integrated Plan determined the required Phase 1 flow rate needed to stabilize boil-off, using suppression pool water, was well within the RCIC [reactor core isolation cooling] System injection capacity of 700 gallons per minute. The licensee indicated that further information regarding the specific assumptions and calculations for quantification of inventory losses are captured in proprietary analysis used for Integrated Plan preparation. The licensee should demonstrate adequate RCIC capacity.	Started.
3.2.1.3.A The licensee stated that Boiling Water Reactor Owners Group Emergency Procedure Guideline/Severe Accident Guideline, Revision 3, would allow the temperature limit of the suppression pool to be exceeded. The licensee should demonstrate why exceeding this temperature limit is	Started.

ISE Confirmatory Item	Status
acceptable for PNPP.	
3.2.3.A Confirm that containment response calculation is completed, commensurate with the level of detail contained in GE Hitachi Report NEDC-33771P/NEDO-33771, Revision 1, "GEH Evaluation of FLEX Implementation Guidelines," ADAMS Accession No. ML130370742.	Started.
3.2.3.B The licensee should provide results from the successful completion of the evaluations and possible modifications which demonstrate that the Suppression Pool Cleanup pump and piping are seismically "robust".	Started.
3.2.4.2.A It is not clear that (1) the assumed temperatures of the various critical rooms, e.g., RCIC Room and Control Room, are adequately evaluated for the potentially high temperature that may occur in these areas or that (2) time critical actions are not required to be taken to maintain equipment functionality or personnel habitability limits. Confirm that these analyses/evaluations are completed.	Started.
3.2.4.2.B The licensee provided insufficient information on monitoring temperatures and hydrogen concentration levels in the battery rooms to ensure temperature and hydrogen concentration level are within acceptable level. Confirm that battery room temperature and hydrogen concentration remain acceptable.	Started.
3.2.4.4.A Confirm that the proposed communications upgrades in the licensee's communications assessment are completed as planned.	Complete. (Provided in December-2014 site audit)
3.2.4.7.A The licensee should confirm that the quality of water injected into the reactor pressure vessel supports and maintains acceptable long term core cooling.	Complete. This item pertained to OIP, Revision 0, which included the plan to draw lake water from the barge slip area through dry hydrants. This strategy was changed in OIP, Revision 1.
3.2.4.8.A During the audit process, the licensee indicated that the basis for the minimum bus voltage for Division 1 and Division 2 battery systems is the coil voltage required to operate the 4160 volt ac breakers (diesel generator output breakers) on the divisional busses and operation of Automatic	Started.

ISE Confirmatory Item	Status
Depressurization System SRV [safety relief valve] solenoids. Confirm that the battery loading analyses considers the appropriate minimum voltage.	
3.2.4.8.B The applicable electrical drawing(s) provided during the audit process were not legible. The licensee should provide a legible copy of electrical drawings for NRC staff review.	Complete. (Provided in December-2014 site audit)
3.2.4.8.C During the audit, the licensee indicated a total load of 429 kilowatts for the FLEX diesel generator which does not appear to match the total sum of all the loads provided during the audit. The licensee should explain and/or resolve this discrepancy.	Complete. This item pertained to OIP, Revision 0. The load and total kilowatts for the load changed in OIP, Revision 1.
3.2.4.9.A With respect to refueling of deployed equipment, PNPP is currently evaluating the feasibility of either procuring a fuel trailer (trailer mounted tank with on-board pump mechanism), or mounting a fuel tank within the bed of a heavy-duty truck, with appropriate pumping mechanisms. The licensee should provide a description of the final plans for refueling once these evaluations are complete.	Started.
3.2.4.10.A The licensee should provide the battery dc load profile with the required loads for the mitigating strategies to maintain core cooling, containment, and spent fuel pool cooling.	Started.
3.2.4.10.B The licensee should provide the final load shedding procedure for review when it is completed.	Started.
3.4.A The licensee did not address considerations 2 through 10 of NEI 12-06, Section 12.2, regarding offsite resources. This information should be confirmed and documented.	Started.

7 Potential Interim Staff Evaluation Impacts

FENOC made changes to the compliance method as documented in the original OIP (Reference 1). These changes were provided in Revision 1 of the OIP (Reference 4). No additional changes were made since the issuance of Revision 1. Although the changes made in Revision 1 did not impact compliance with NEI 12-06, there was an impact on the ISE (Reference 3). There are no additional potential impacts on the ISE at this time.

8 References

The following references support the updates to the OIP described in this attachment.

1. FirstEnergy Nuclear Operating Company's (FENOC's) Overall Integrated Plan in Response to 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 February 27, 2013.
2. NRC Order Number EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012.
3. Perry Nuclear Power Plant, Unit 1 – Interim Staff Evaluation Relating To Overall Integrated Plan In Response To Order EA-12-49 (Mitigation Strategies), dated January 22, 2014.
4. FirstEnergy Nuclear Operating Company's (FENOC's) Revision of Overall Integrated Plan for Perry Nuclear Power Plant in Response to 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 September 25, 2014.