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June 16, 2015

AEP-NRC-2015-22
10 CFR 50.4

Docket Nos.: 50-315
50-316

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Units 1 and 2
Compliance with March 12, 2012, NRC Order Regarding Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

Reference:

1. Letter from E. J. Leeds and M. R. Johnson, U. S. Nuclear Regulatory Commission (NRC), to All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012, Agencywide Documents Access and Management System (ADAMS) Accession No. ML12054A736.

2. Letter from J. P Gebbie, Indiana Michigan Power Company (I&M), to NRC, "Donald C. Cook Nuclear Plant Unit 1, Compliance with March 12, 2012, NRC Order Regarding Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," AEP-NRC-2014-89, dated December 16, 2014, ADAMS Accession No. ML14353A004.

3. Letter from J. S. Bowen, NRC, to L. J. Weber, I&M, "Donald C. Cook Nuclear Plant - Units 1 and 2 - Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC Nos. MF0766 and MF0767)," dated January 24, 2014, ADAMS Accession No. ML13337A366.

4. Letter from J. Boska, NRC, to L. J. Weber, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 - 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. MF0766, MF0767, MF0761, and MF0762)," dated August 13, 2014, ADAMS Accession No. ML14209A122.

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5. Letter from J. P. Gebbie, I&M, to NRC, "Donald C. Cook Nuclear Plant Unit 2. 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)," AEP-NRC-2015-13, dated February 25, 2015, ADAMS Accession No. ML15058A032.

In response to events at the Fukushima Dai-ichi nuclear power plant, the U. S. Nuclear Regulatory Commission (NRC) issued Order, EA-12-049 (Reference 1) to all power reactor licensees, including Indiana Michigan Power Company (I&M), the licensee for the Donald C. Cook Nuclear Plant (CNP) Unit 1 and Unit 2. The order directed licensees to develop, implement, and maintain guidance and strategies to restore or maintain core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. The order also directed licensees to report when full compliance with the requirements stated in the order was achieved. I&M reported compliance with the requirements of the order for CNP Unit 1 via Reference 2. This letter reports compliance with the requirements of the order for CNP Unit 2.

Enclosure 1 to this letter provides an affirmation regarding the information contained herein. Enclosure 2 provides a description of CNP Unit 2 compliance with Order EA-12-049.

Enclosure 3 provides responses to the NRC Open Items, Confirmatory Items, and Audit Items identified in the Interim Staff Evaluation transmitted by Reference 3 and the NRC Audit Report transmitted by Reference 4. Responses to some of the NRC Open Items, Confirmatory Items, and Audit Items in Enclosure 3 of this letter were provided for Unit 1 via Enclosure 3 of Reference 2. To facilitate NRC review and provide a concise licensing basis, the responses provided in Enclosure 3 of this letter apply to both Unit 1 and Unit 2, and therefore supersede the responses to the NRC Open Items, Confirmatory Items, and Audit Items provided for Unit 1 in Enclosure 3 of Reference 2.

Enclosure 4 provides an updated status of the Unit 2 Open Items Shown as "In Progress" in the February 2015 Overall Integrated Plan update transmitted by Reference 5.

This letter contains no new or revised regulatory commitments. Should you have any questions, please contact Mr. Michael K. Scarpello, Regulatory Affairs Manager, at (269) 466 2649.

Sincerely,

Joel P. Gebbie
Site Vice President

JRW/amp

Enclosures:

1. Affirmation
2. Donald C. Cook Nuclear Plant Unit 2 Compliance with U. S. Nuclear Regulatory Commission Order EA-12-049
3. Responses to Interim NRC Staff Evaluation Items and NRC Audit Items
4. Status of Overall Integrated Plan Unit 2 Open Items Shown as "In Progress" in February 2015 OIP Update

c: J. P. Boska, NRC Washington, DC
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Enclosure 1 to AEP-NRC-2015-22

AFFIRMATION

I, Joel P. Gebbie, being duly sworn, state that I am Site Vice President of Indiana Michigan Power Company (I&M), that I am authorized to sign and file this document with the U. S. Nuclear Regulatory Commission on behalf of I&M, and that the statements made and the matters set forth herein pertaining to I&M are true and correct to the best of my knowledge, information, and belief.

Indiana Michigan Power Company

Joel P. Gebbie
Site Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 16 DAY OF June, 2015

Danielle Burgoyne
Notary Public

My Commission Expires 04-04-2018

DANIELLE BURGOYNE
Notary Public, State of Michigan
County of Berrien
My Commission Expires 04-04-2018
Acting in the County of Berrien

Enclosure 2 to AEP-NRC-2015-22

Donald C. Cook Nuclear Plant Unit 2 Compliance with U. S. Nuclear Regulatory Commission Order EA-12-049

References for this enclosure are identified in Section 5.

1. Introduction

In response to U.S. Nuclear Regulatory Commission (NRC) Order EA-12-049 (Reference 1), Indiana Michigan Power Company (I&M) developed an Overall Integrated Plan (OIP) (Reference 2) describing diverse and flexible mitigation strategies (FLEX) for responding to beyond-design-basis external events at the Donald C. Cook Nuclear Plant (CNP). As required by the order, I&M has submitted OIP status updates at six month intervals. The current Unit 2 strategies are described in a CNP FLEX Program document.

The order requires that licensees complete full implementation of the strategies no later than the second refueling outage after submittal of the OIP. The order also requires that licensees report when full compliance has been achieved. The NRC staff has requested that the compliance report be submitted within 60 days of commencing unit startup from the outage in which implementation of the strategies is required. I&M is hereby reporting that full compliance with the order was achieved on April 16, 2015, prior to commencing the CNP Unit 2 startup on April 22, 2015, from the second refueling outage after submittal of the OIP.

2. Open Item Resolution

Enclosure 3 of this letter provides responses to the NRC Open Items, Confirmatory Items, and Audit Items identified in the Interim Staff Evaluation transmitted by Reference 3 and the NRC Audit Report transmitted by Reference 4. Responses to some of the NRC Open Items, Confirmatory Items, and Audit Items in Enclosure 3 of this letter were provided for Unit 1 via Enclosure 3 of Reference 5. To facilitate NRC review and provide a concise licensing basis, the responses provided in Enclosure 3 of this letter apply to both Unit 1 and Unit 2, and therefore supersede the responses to the NRC Open Items, Confirmatory Items, and Audit Items provided for Unit 1 in Enclosure 3 of Reference 5.

Table 2 of Enclosure 2 to the most recent OIP status update (Reference 6) identified 18 Unit 2 Open Items which were designated as "In Progress" (i.e. not in "Completed" or "NA" status). Enclosure 4 to this letter shows the status of those 18 Open Items on the Unit 2 compliance date (i.e. when the Unit 2 compliance with NRC Order EA-12-049 was achieved on April 16, 2015.)

3. Milestone Schedule Status

The following table lists the milestones identified in the most recent OIP status update (Reference 6) that are applicable to Unit 2, and reflects the status of the milestone on the Unit 2 compliance date.

Unit 2 Milestone Schedule	
Milestone	**Activity Status**
Submit 60-Day Status Report	Complete
Submit OIP	Complete
Submit Six-Month Updates:	
Update 1	Complete
Update 2	Complete
Update 3	Complete
Update 4	Complete
Walk-throughs or Demonstrations	Complete
Perform Staffing Analysis	Complete
Modifications:	
Modifications Evaluation	Complete
Unit 2 Design Engineering	Complete
Unit 2 Implementation Outage	Complete
Storage:	
Storage Design Engineering	Complete
Storage Implementation	Complete
FLEX Equipment:	
Procure On-Site Equipment	Complete
Develop Strategies with Regional Response Center	Complete
Procedures:	
Pressurized Water Reactor Owners Group (PWROG) issues nuclear steam system supply-specific guidelines. (Modes 1-4)	Complete
PWROG issues nuclear steam system supply-specific guidelines. (Modes 5 & 6)	Complete - PWROG guidelines for Mode 5 & 6 were issued in December 2014. Site specific Mode 5 and 6 FLEX Support Guidelines (FSGs) were issued independent of the PWROG guidelines. The site specific FSGs were credited for CNP Unit 2 compliance with EA-12-049.
Create Site-Specific FSGs – Unit 2	Complete

Unit 2 Milestone Schedule	
Milestone	**Activity Status**
Create Maintenance Procedures	Initial testing of FLEX equipment was completed by the Unit 2 compliance date. Procedures for subsequent maintenance activities are to be issued as needed to support performance of the maintenance activity within its specified interval.
Training:	
Develop Training Plan	Complete
Training Complete	Complete
Unit 2 FLEX Implementation	Complete
Full Site FLEX Implementation	Complete
Submit Completion Report	Complete with this Submittal

4. ORDER EA-12-049 COMPLIANCE ELEMENTS SUMMARY

CNP Unit 2 compliance with Order EA-12-049 was achieved using the guidance in Nuclear Energy Institute (NEI) document NEI 12-06 (Reference 7) which has been endorsed by the NRC (Reference 8). The significant compliance elements have been addressed as described below.

STRATEGIES – COMPLETE

CNP Unit 2 strategies are in compliance with Order EA-12-049. The strategies are documented in the CNP FLEX Program FSG (PMP-4027-FSG-003). Enclosure 3 to this letter provides responses to the Open Items, Confirmatory Items, and Audit Items identified by the NRC in References 3 and 4 regarding these strategies.

MODIFICATIONS – COMPLETE

The plant modifications required to support the FLEX strategies for CNP Unit 2 have been implemented in accordance with the station design control process such that the associated systems and components are fully capable of supporting the FLEX strategies.

EQUIPMENT PROCURED, AND MAINTENANCE & TESTING COMPLETE

All Phase 2 equipment required to implement the FLEX strategies for CNP Unit 2 has been procured and received at CNP, and required initial testing and/or performance verification of the equipment has been completed. The equipment is available for use and continued availability of the equipment and connection points is controlled by the CNP Technical Requirements Manual. In accordance with the CNP FLEX Equipment

Program, periodic maintenance and testing is to be conducted through the use of the CNP Preventative Maintenance program.

PROTECTED STORAGE – COMPLETE

All Phase 2 equipment required to implement the FLEX strategies for CNP Unit 2 is stored in locations within the Owner Controlled Area. Equipment is located both inside and outside the Protected Area (PA). A storage building has been constructed outside the PA in accordance with a CNP Engineering Change, and provides protection from the applicable site hazards. Storage facilities have been placed within the PA in accordance with CNP Engineering Changes, and provide protection from the applicable site hazards. Debris removal equipment has been staged outdoors, outside the PA, with redundant equipment stored in separate locations to assure the required equipment will survive the applicable site hazards. The equipment required to implement the FLEX strategies for CNP Unit 2 is verified to be stored in its required locations by the CNP FSG for FLEX equipment inventory, which requires periodic inventory of the equipment.

PROCEDURES – COMPLETE

FSGs for CNP Unit 2 have been developed and, where appropriate, have been integrated with existing procedures. The FSGs have been validated per the applicable NEI guidance and are available for use in accordance with the site procedure control program.

TRAINING – COMPLETE

As part of Unit 1 compliance, training was conducted for the general site population, and function-specific training was conducted for Operations Personnel, key Emergency Response Organization personnel, and Maintenance personnel in accordance with an approved FLEX training program, and prepared in accordance with the Systematic Approach to Training process. For Unit 2 compliance, "gap" training has been conducted for Operations personnel and key Emergency Response Organization personnel to address FLEX strategy changes.

STAFFING – COMPLETE

The staffing assessment for CNP (Reference 9) was completed in accordance with the alternative to the 10 CFR 50.54(f) request for information regarding Near-Term Task Force Recommendation 9.3. The alternative was approved by the NRC (Reference 10). The CNP staffing assessment did not identify any changes to be made to the CNP Emergency Plan. The NRC has reviewed the CNP staffing assessment and concluded that the assessment was adequate (Reference 11).

NATIONAL STRATEGIC ALLIANCE FOR FLEX EMERGENCY RESPONSE (SAFER) RESPONSE CENTERS – COMPLETE

I&M has established a contract with Pooled Equipment Inventory Company (PEICo) and has joined the SAFER Team Equipment Committee for off-site facility coordination. PEICo has been confirmed to be ready to support CNP with Phase 3 equipment stored in the National SAFER Response Centers in accordance with the site specific SAFER Response Plan.

VALIDATION – COMPLETE

I&M has completed a review which documented consistency of the CNP Unit 2 FLEX procedure validation actions with those prescribed in the NEI document titled "FLEX Validation Process." The review determined that there are adequate resources for simultaneous implementation of FLEX strategies at both units within the required constraints identified for Phases 1 and 2.

FLEX PROGRAM DOCUMENT – ESTABLISHED

CNP FLEX program documents have been developed, reviewed, and issued.

5. References

1. Letter from E. J. Leeds and M. R. Johnson, U. S. Nuclear Regulatory Commission (NRC), to all power reactor licensees and holders of construction permits in active or deferred status, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012, Agencywide Documents Access and Management System (ADAMS) Accession No. ML12054A736.

2. Letter from J. P. Gebbie, Indiana Michigan Power Company (I&M), to NRC, "Donald C. Cook Nuclear Plant - Unit 1 and Unit 2, 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)," AEP NRC-2013-13, dated February 27, 2013, ADAMS Accession No. ML13101A381.

3. Letter from J. S. Bowen, NRC, to L. J. Weber, I&M, "Donald C. Cook Nuclear Plant - Units 1 and 2 - Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC Nos. MF0766 and MF0767)," dated January 24, 2014, ADAMS Accession No. ML13337A366.

4. Letter from J. Boska, NRC, to L. J. Weber, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 - 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. MF0766, MF0767, MF0761, and MF0762)," dated August 13, 2014, ADAMS

5. Letter from J. P Gebbie, I&M, to the NRC, "Donald C. Cook Nuclear Plant Unit 1, Compliance with March 12, 2012, NRC Order Regarding Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," AEP-NRC-2014-89, dated December 16, 2014, ADAMS Accession No. ML14353A004.

6. Letter from J. P. Gebbie, I&M, to the NRC, "Donald C. Cook Nuclear Plant Unit 2. 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)," AEP-NRC-2015-13, dated February 25, 2015, ADAMS Accession No. ML15058A032

7. Nuclear Energy Institute Document 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0, dated August 2012, ADAMS Accession No. ML12242A378.

8. NRC 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 Interim Staff Guidance," Revision 0, dated August 29, 2012, ADAMS Accession No. ML12229A174.

9. Letter from J. P. Gebbie, I&M, to NRC, "Donald C. Cook Nuclear Plant, Units 1 and 2 - Phase 2 On-Shift Staffing Assessment Report Requested by U. S. Nuclear Regulatory Commission Letter, 'Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident' dated March 12, 2012," AEP-NRC-2014-40, dated May 23, 2014.

10. Letter from P. S. Tam, NRC, to L. J. Weber, I&M, "Review of 60-Day Response to Request for Information Regarding Recommendation 9.3 of the Near-Term Task Force Related to the Fukushima Dai-ichi Nuclear Power Plant Accident (TAC Nos. ME8683 and ME8684)," dated June 8, 2012, ADAMS Accession Number ML12145A640.

11. Letter from M. Halter, NRC, to L. J. Weber, I&M, "Response Regarding Licensee Phase 2 Staffing Submittals Associated with Near-Term Task Force Recommendation 9.3 Related to the Fukushima Dai-Ichi Nuclear Power Plant Accident (TAC Nos. MF4310, MF4311, MF4312, MF4313, MF4321, MF4322, MF4323, MF4324, MF4325, MF4326, and MF4327)," dated September 29, 2014, ADAMS Accession Number ML14262A296.

Responses to Interim NRC Staff Evaluation Items and NRC Audit Items

Notes:

The abbreviations used in this enclosure are defined on the last two pages of the enclosure.

A "1/2" designation at the beginning of a procedure number indicates that there are separate procedures for Unit 1 and Unit 2. A "12" designation indicates that the procedure applies to both Unit 1 and Unit 2.

NRC Reference:

ISE OI 3.2.1.8.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Core Sub-Criticality - Confirm 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 reactor coolant system under natural circulation conditions potentially involving two-phase flow.

I&M Response to NRC ISE Item:

CNP complies with the clarifications provided in the January 8, 2014 letter from the NRC endorsing the approach proposed by the PWROG in their August 15, 2013 letter. Site specific analysis CN-FSE-13-13-R, Revision 1, "D.C. Cook Unit 1 and Unit 2 (AEP/AMP) Reactor Coolant System (RCS) Inventory Control and Long-Term Subcriticality Analysis to Support the Diverse and Flexible Coping Strategy (FLEX)," addresses Westinghouse RCP seal leakage crediting the low leakage SHIELD® modification. As described in the response to ISE CI 3.2.1.2.A, the low leakage SHIELD® modification has been completed for the Unit 1 and Unit 2 RCPs. Consistent with CN-FSE-13-13-R, RCS boration is required by procedure 1/2-OHP-4027-FSG-5, "Initial Assessment and FLEX Equipment Staging," to commence within 16 hours and must be completed within 24 hours of an ELAP. Additionally, 1/2-OHP-4027-FSG-5 requires that four loop SG cooling be maintained for at least one hour after the completion of RCS Boration. Westinghouse LTR-FSE-13-66, "Response to NRC Audit Question 16 Regarding the FLEX Integrated Plan Submittal for D.C. Cook Units 1 and 2," further describes the CNP specific FLEX analysis supporting compliance with the PWROG boron mixing approach and the NRC endorsement. Note that the 1/2-OHP-4027-FSG-5 requirement that four loop SG cooling be maintained for at least one hour after the completion of RCS Boration assures adequate boron mixing. Therefore, four loop cooling need not be maintained for 25 hours as indicated in LTR-FSE-13-66.

NRC Reference:

ISE OI 3.2.3.A

NRC ISE Item as stated in ISE dated January 24, 2014:

ISE OI 3.2.3.A Containment Functions Strategies - Verify containment pressure and temperature response based on using conventional RCP seals.

I&M Response to NRC ISE Item:

The Unit 1 and Unit 2 RCP seals were upgraded to the Generation 3 SHIELD® low leakage design during the fall 2014 refueling outage and the spring 2015 refueling outage, respectively. As described in the response to ISE CI 3.2.1.2.A, I&M is crediting the installation of the Generation 3 SHIELD® seals in its FLEX strategies in accordance with the four conditions identified in the NRC's endorsement letter from J. Davis, NRC, to J. A. Gresham, Westinghouse Electric Company, LLC, dated May 28, 2014 (ADAMS Accession No. ML14132A128).

The CNP containment temperature and pressure response analyses following a postulated ELAP are documented in Westinghouse documents CN-SCC-13-004, "D.C. Cook ELAP Containment Environment Analysis," and DAR-SCC-14-001, "ELAP Containment Environment GOTHIC Analysis Design Report for the D.C. Cook Unit 1 and Unit 2 Nuclear Plant." These analyses included cases in which the Generation 3 SHIELD® low leakage seals were credited. The analyses demonstrated that containment pressure would remain below the design limit. I&M has determined that the containment temperatures would not prevent the FLEX credited components from performing their functions required by the FLEX strategies (EQ Evaluations EQER 2015-001 and EQER 2015-002).

NRC Reference:

ISE OI 3.2.4.7.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Water Sources- Perform an analysis of the tornado hazards to demonstrate that ISE OI 3.2.4.7.A factors such as separation distances, shielding by robust structures, and relative orientation would allow the strategy of supplying water to the TDAFW from the CSTs or the FWSTs to be successful, considering tornado borne missiles.

I&M Response to NRC ISE Item:

The CSTs, rather than the FWSTs, are credited as the primary TDAFW pump suction source for the Phase 1 FLEX strategy. An overall CST and survivability report (Document No. 51-9225061, Revision 3) was prepared to address the concerns identified in ISE OI 3.2.4.7.A. The survivability report integrated and summarized the results of other assessments and analyses, including a meteorological and intervening structures assessment, a hydraulic analysis of CST FLEX coping capability, missile impact analyses, a tornado wind load and differential pressure assessment, and a detailed finite element model missile impact analysis performed to determine the possibility and extent of penetration of the CSTs for missiles that could not be eliminated from consideration via a manual calculation.

As documented in the CST survivability report, there is reasonable assurance that the tanks would remain available as a sufficient TDAFW pump suction source during and after a tornado-generated high wind and missile hazard event. Specific aspects of this conclusion are as follows:

- The CSTs can withstand the wind and pressure drop from the postulated beyond-design-basis tornado.

- The availability of the CSTs, with respect to tornado missiles, considering attributes that include, but are not limited to, separation of the Unit 1 and Unit 2 tanks.

- Both CSTs may be impacted by tornado missiles from a single event. However, the CSTs would not be penetrated by tornado missiles in the lower or middle sections of the tank. Penetration(s) above these sections would not compromise the ability of the tank to provide adequate water inventory for the TDAFW pump for the duration of Phase 1 of the FLEX response.

- The large bore (nominal pipe size > 2 inches) penetrations on each CST, including the TDAFW pump suction piping penetrations, are protected by intervening structures and are not credible tornado-borne missile targets.

- There are two nominal one-inch penetrations located within one foot of the bottom of each tank that are in the same quadrant as the large bore penetrations and are also protected by intervening structures.

- There are two nominal 3/4-inch penetrations located within two feet of the bottom of each tank that are not protected by intervening structures. However, even if compromised by a tornado missile, these two penetrations will not threaten the inventory needed for the FLEX Phase 1 coping period.

NRC Reference:

ISE OI 3.2.4.10.B

NRC ISE Item as stated in ISE dated January 24, 2014:

Battery Duty Cycle - Verify approach used to qualify the station batteries duty cycle to 12 hours.

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

Battery Duty Cycle -The licensee is seeking to extend battery life to 12 hours using load shed procedures. The NRC needs to review battery data that demonstrates satisfactory performance over this long period of time."

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

CNP has not adopted the NEI position paper on extended battery duty cycles and NRC endorsement (ADAMS Accession No. ML13241A188). Provide battery data.

I&M Response to NRC ISE Item:

Calculation 12-E-S-250D-FLEX-001 verified the 250v battery 12-hour coping time for an ELAP event in conjunction with a battery deep load shed. The FLEX strategy run-time for batteries 1AB, 1CD, 1N, 2AB, 2CD, and 2N was calculated in accordance with the methodology of IEEE-485-2010, "IEEE Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications." The results of the calculation show that the batteries meet the acceptance criteria of maintaining at least a 5% margin with respect to installed 250v battery cell size for a 12-hour deep load shed duty cycle. The calculation complies with NEI position paper titled "Battery Life Issue" (ADAMS Accession No. ML13241A186) which has been endorsed by the NRC as noted above.

NRC Reference:

ISE CI 3.1.1.2.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Deployment of FLEX Equipment - Review the potential for soil liquefaction that might impede vehicle movement following a seismic event.

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

Deployment of FLEX Equipment - The licensee needs to demonstrate that the deployment path from staging area B to staging area A will not be adversely affected by effects such as soil liquefaction in a seismic event.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Provide liquefaction study.

I&M Response to NRC ISE Item:

A FLEX haul path evaluation was performed which qualitatively evaluated the potential for liquefaction of soils beneath the haul path for FLEX equipment from the FLEX Storage Building to the point of deployment within the PA. The evaluation used beyond design basis ground motion response spectra. The evaluation determined estimated haul path settlements of up to three inches, which may slow traffic but should not impair transport vehicles from proceeding to the power block area.

The evaluation was subsequently revised to include the haul path from Staging Area B and the north side of the Independent Spent Fuel Storage Installation area, to the main plant access road. The revised evaluation therefore encompasses the entire path from Staging Area B to Staging Area A in the PA. The revised evaluation determined that the conclusion of the original evaluation (settlements may slow traffic but should not impair transport vehicles from proceeding to the power block area) remained valid.

NRC Reference:

ISE CI 3.1.1.2.B

NRC ISE Item as stated in ISE dated January 24, 2014:

Deployment of FLEX Equipment - Confirm final design features of the new storage building including the susceptibility to the loss of ac power. Reliance on ac power, if any, to deploy equipment is to be evaluated.

I&M Response to NRC ISE Item:

The FLEX building door is a horizontal opening door. In the event that the normal source of electrical power is lost, the door can be opened by a hand crank, or by use of the installed motor powered by a portable generator.

NRC Reference:

ISE CI 3.1.1.3.A

NRC ISE Item as stated in Interim Staff Evaluation dated January 24, 2014:

Procedural Interface Consideration (Seismic) – Confirm FLEX support guidelines (FSGs) provide operators with direction on how to establish alternate monitoring and control capabilities.

I&M Response to NRC ISE Item:

1/2-OHP-4027-FSG-4, "ELAP Power Management," provides direction on how to maintain monitoring and control capabilities. This guideline would be entered from 1/2-OHP-4023-ECA-0.0 if it is determined that AC power will not be restored within the four-hour SBO coping window. 1/2-OHP-4027-FSG-4 provides guidance to shed loads from the DC buses to extend battery availability and maintain the capability to supply power to critical instrumentation and vital components. Guidance is provided to restore AC electrical power to DC bus battery chargers, CR instrumentation, and other control capabilities using FLEX electrical equipment.

1/2-OHP-4027-FSG FSG-7, "Loss of Vital Instrumentation or Control Power," provides guidance for alternate monitoring and control capabilities. This guideline would be entered from the following:

- 1/2-OHP-4023-ECA 0.0 if an ELAP is in progress and DC bus voltage is depleted or required vital instruments cannot be energized.
- 1/2-OHP-4027-FSG-4 if all DC power is lost.

FSG-7 provides guidance to control AFW flow and SG pressure, and establish local monitoring of key parameters. The local monitoring of reactor core cooling and containment parameters would be performed at the CR instrument racks using a readout cart with batteries, test box, cables and readout meters in accordance with 1/2-IHP-4027-FSG-711, "Control Room Instrument Rack Readout Data Acquisition During Extended Loss of AC Power."

NRC Reference:

ISE CI 3.1.1.4.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Offsite Resources - Confirm identification of offsite staging areas, access routes and methods of delivery of equipment to the site.

I&M Response to NRC ISE Item:

I&M has identified the South Bend Airport as the single Staging Area C for equipment from either the Memphis or Phoenix NSRC facility. The South Bend Airport is approximately 20 air miles from CNP.

The primary route from Staging Area C to CNP is north onto US-31, then northwest via Niles Road (M-139), then west onto Linco Road. The plant entrance is on Red Arrow

Highway, less than one mile south of the Linco Road intersection with Red Arrow Highway.

The secondary route from Staging Area C to CNP is west on US-20, then north onto Walnut Road/Hamilton Trail in Indiana, which turns into Cleveland Road in Michigan; then west on Lemon Creek Road from Cleveland Road to Red Arrow Highway. The plant entrance is on Red Arrow Highway approximately two miles north of the Lemon Creek Road intersection with Red Arrow Highway.

Air delivery to the site from Staging Area C to CNP would be used if no viable ground path can be identified.

NRC Reference:

ISE CI 3.1.2.2.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Deployment of FLEX Equipment - Confirm whether the fuel oil tanks and fuel oil transfer sites would be inundated by a flood.

I&M Response to NRC ISE Item:

The Train A, CD FOST, and the Train B, AB FOST, are both below ground tanks. Technical Specification Surveillance Requirement 3.8.3.1 requires that at least 46,000 gallons of fuel oil to be maintained in each FOST when the associated EDG is required to be operable. Projected fuel oil usage for FLEX equipment is not expected to exceed 232 gallons per hour. Therefore, one FOST contains sufficient fuel oil for greater than eight days of continuous use. Since the CNP FLEX strategies are expected to transition from Phase 2 to Phase 3 no later than 72 hours after the event, one FOST would provide sufficient fuel capacity.

Calculation MD-12-FLOOD-006-N, "Surge and Seiche, Cook Nuclear Plant Flood Hazard Re-evaluation," demonstrates that surge and seiche levels of Lake Michigan will remain below the current lakeside seawall level. Therefore, flooding of the plant site and inundation of the EDG FOSTs is not expected. Additional margin is available since the grade elevation is approximately 609 ft. for the FOSTs, and each FOST has a fill connection protruding approximately 18 in. above grade elevation.

NRC Reference:

ISE CI 3.2.1.1.A

NRC ISE Item as stated in ISE dated January 24, 2014 and NRC Audit Report dated August 13, 2014:

Computer Code- Use of the NOTRUMP code for the ELAP 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.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Similar to SE #5 below, see discussion there.

I&M Response to NRC ISE Item:

See the response to Audit Item SE #5.

NRC Reference:

ISE CI 3.2.1.2.A

NRC ISE Item as stated in ISE dated January 24, 2014 and NRC Audit Report dated August 13, 2014:

Reactor Coolant Pump Seals - Confirm applicable analysis and relevant seal leakage testing data, which justifies that (1) the integrity of the associated O-rings will be maintained at the temperature conditions experienced during the ELAP event, and (2) the seal leakage rate of 21 gpm/seal used in the ELAP is adequate and acceptable.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Verify that the installed RCP seal leakoff flow rotometers have enough resistance to flow to continue to use 21 gpm for seal leakage in an ELAP.

I&M Response to NRC ISE Item:

The Unit 1 and Unit 2 RCP seals were upgraded to the Generation 3 SHIELD® equipped low leakage design during the fall 2014 refueling outage and the spring 2015 refueling outages, respectively. I&M is crediting the installation of the Generation 3 SHIELD® seals in its FLEX strategies in accordance with the four conditions identified in the NRC's endorsement letter from J. Davis, NRC, to J. A. Gresham, Westinghouse Electric Company, LLC, dated May 28, 2014. That NRC letter endorsed Westinghouse Technical Report TR-FSE-14-1-P and supplemental information provided by Westinghouse letters dated March 19, 2014, and April 22, 2014

(ADAMS Accession Nos. ML 14084A497 and ML 14129A353, respectively). The May 28, 2014 NRC letter documented the staff's conclusion that the Westinghouse Technical Report and supplemental information is acceptable for use in ELAP evaluations for NRC Order EA-12-049 subject to four limitations and conditions. Each of these four limitations and conditions is restated below followed by a description of CNP Unit 1 and Unit 2 compliance.

(1) *Credit for the SHIELD® seals is only endorsed for Westinghouse RCP Models 93, 93A, and 93A-1. Additional information would be needed to justify use of SHIELD® seals in other RCP models.*

CNP Unit 1 and Unit 2 compliance: The CNP Unit 1 and Unit 2 RCPs are Model 93AS. The "S" designation refers to the presence of a spool piece between the pump and the motor that facilitates seal inspection and replacement. The seal package for Model 93A RCPs is identical to that for Model 93AS. Therefore CNP Unit 1 and Unit 2 comply with this limitation/condition.

(2) *The maximum steady-state reactor coolant system (RCS) cold-leg temperature is limited to 571 °F during the ELAP (i.e., the applicable main steam safety valve setpoints result in an RCS cold-leg temperature of 571 °F or less after a brief post-trip transient). Nuclear power plants that predict higher cold-leg temperatures shall demonstrate the following:*

a. *The polymer ring and sleeve 0-ring remain at or below the temperature to which they have been tested, as provided in TR-FSE-14-1-P, Revision 1; or,*

b. *The polymer ring and sleeve 0-ring shall be re-tested at the higher temperature.*

CNP Unit 1 and Unit 2 compliance: The maximum steady-state RCP seal temperature during an ELAP response is expected to be the T_{cold} corresponding to the lowest SG safety relief valve setting of 1065 pounds psig. This corresponds to a T_{cold} value of 556°F to 557°F. Therefore CNP Unit 1 and Unit 2 comply with this limitation/condition.

(3) *The maximum RCS pressure during the ELAP (notwithstanding the brief pressure transient directly following the reactor trip comparable to that predicted in the applicable analysis case from WCAP-17601-P) is as follows: For Westinghouse Models 93 and 93A-1 RCPs, RCS pressure is limited to 2250 psia; for Westinghouse Model 93A RCPs, RCS pressure is to remain bounded by Figure 7.1-2 of TR-FSE-14-1-P, Revision 1.*

CNP Unit 1 and Unit 2 compliance:. Normal Unit 1 and Unit 2 operating pressures are 2085 psig and 2235 psig, respectively. Assuming a plant cooldown is initiated at the maximum allowed time of eight hours following the ELAP and the cooldown and depressurization is completed within two hours, it is evident that the plant pressure would remain bounded by Figure 7.1-2 of TR-FSE-14-1-P, Revision 1, which shows a limit of 2250 psig for the first 24 hours. Therefore, CNP Unit 1 and Unit 2 comply with this limitation/condition.

(4) *Nuclear power plants that credit the SHIELD® seal in an ELAP analysis shall assume the normal seal leakage rate before SHIELD® seal actuation, and a constant seal leakage rate of 1.0 gallon per minute for the leakage after SHIELD® seal actuation.*

CNP Unit 1 and Unit 2 compliance: A constant Westinghouse SHIELD® RCP seal package leak rate of 1 gpm per RCP was assumed in the applicable analysis, CN-FSE-13-13-R. Assumption of the normal seal leakage rate until SHIELD® seal actuation occurred would result in a small volume of additional leakage that would have an inconsequential effect on the analysis results. Therefore, CNP Unit 1 and Unit 2 meet the intent of this limitation/condition.

NRC Reference:

ISE CI 3.2.1.2.B

NRC ISE Item as stated in ISE dated January 24, 2014 and NRC Audit Report dated August 13, 2014:

Reactor Coolant Pump Seals - The low-leakage seals are not currently credited in the FLEX strategies. Testing and qualification of SHIELD is ongoing. I&M is closely following the re-design of SHIELD and will modify analyses and FLEX strategies, as needed, based on the conclusions of the SHIELD modification program. Confirm FLEX strategies are appropriately modified if low-leakage seals are credited.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Confirm which RCP seal leakage model will be used , and show its validity

I&M Response to NRC ISE Item:

Unit 1 and Unit 2 RCP seals were upgraded with Generation 3 SHIELD® equipped low leakage design RCP seals during the fall 2014 refueling outage and the spring 2015 refueling outage respectively. I&M is crediting the installation of the Generation 3 SHIELD® seals in its FLEX strategies in accordance with the four conditions identified in the NRC's endorsement letter from J. Davis, NRC, to J. A. Gresham, Westinghouse Electric Company, LLC, dated May 28, 2014. That NRC letter endorses Westinghouse Technical Report TR-FSE-14-1-P and supplemental information provided by Westinghouse letters dated March 19, 2014, and April 22, 2014. The response to ISE CI 3.2.1.2.A describes compliance with the May 28, 2014 NRC letter for CNP Unit 1 and Unit 2.

I&M affirms that the installation of low-leakage seals does not adversely affect any other aspects of mitigation strategy or result in significant changes to the strategy that could affect conclusions that the NRC staff has made (e.g., cooldown initiation timing, terminus, etc.). This affirmation is based on CNP site-specific Westinghouse Calculation Note CN-FSE-13-13-R. This Calculation Note provides for FLEX implementation using Generation 3 SHIELD® equipped (low leakage) Westinghouse RCP seals. As documented in CN-FSE-13-13-R, acceptable analysis results are achieved using the Generation 3 SHIELD® equipped RCP seals. The CNP FLEX implementation strategies credit the Westinghouse RCP seals equipped with Generation 3 SHIELD® RCP seals.

NRC Reference:

ISE 3.2.1.2.C

NRC ISE Item as stated in ISE dated January 24:

Reactor Coolant Pump Seals - If the seals are changed to the newly designed Generation 3 SHIELD seals, or non-Westinghouse seals, the acceptability of the use of the newly designed Generation 3 SHIELD seals, or non-Westinghouse seals should be addressed. Confirm that the RCP seal leakage rates used in the ELAP analysis have been acceptably justified.

I&M Response to NRC ISE Item:

Unit 1 and Unit 2 RCP seals were upgraded with Generation 3 SHIELD® equipped low leakage design RCP seals during the fall 2014 refueling outage and the spring 2015 refueling outage, respectively. I&M is crediting the installation of the Generation 3 SHIELD® seals in its FLEX strategies in accordance with the four conditions identified in the NRC's endorsement letter from J. Davis, NRC, to J. A. Gresham, Westinghouse Electric Company, LLC, dated May 28, 2014. That NRC letter endorses Westinghouse Technical Report TR-FSE-14-1-P and supplemental information provided by Westinghouse letters dated March 19, 2014, and April 22, 2014. The response to ISE CI 3.2.1.2.A describes compliance with the May 28, 2014 NRC letter for CNP Unit 1 and Unit 2.

NRC Reference:

ISE CI 3.2.1.3.A

NRC ISE Item as stated in ISE dated January 24, 2014 NRC Audit Report dated August 13, 2014:

Decay Heat - Confirm the input parameters used to develop the decay heat model.

I&M Response to NRC ISE Item:

This Audit Item is addressed by the response to NRC Question 12 in Attachment 1 to Westinghouse LTR-LIS-13-521, "Response to D. C. Cook Units 1 and 2 NRC AQ 12 in Support of the FLEX Integrated Plan Submittal," as follows.

The Westinghouse NSSS calculations in WCAP-17601-P were performed using the ANS 5.1 1979 + 2 sigma decay heat model, and assumed the reactor is initially operating at 100% power (the NOTRUMP reference case core power is 3723 MWt). Implementation of this model includes fission product decay heat resulting from the fission of U-235, U-238, and Pu-239, actinide decay heat from U-239 and Np-239, and a power history of three 540-day cycles separated by two 20-day outages that bounds initial condition 3.2.1.2 (1) of NEI 12-06, Section 3.2.1.2 (the minimum assumption that the reactor has been operated at 100% power for at least 100 days prior to event initiation).

The response to NRC AQ 11 includes information regarding the decay heat used in the Mode 1 through Mode 4 RCS inventory control, and Mode 5 and Mode 6 BA precipitation control calculations in CN-FSE-13-13-R.

NRC Reference:

ISE CI 3.2.1.4.A

NRC ISE Item as stated in ISE dated January 24, 2014 NRC Audit Report dated August 13, 2014:

Parameters and Assumptions- Confirm that the important plant parameters and assumptions used in the final site-specific analyses reflect the final FLEX support guidelines.

I&M Response to NRC ISE Item:

The response to ISE CI 3.2.1.4.A is addressed by the response to NRC Audit Question AQ 11. As noted in the response to AQ 11, Table 11-1 in Attachment 1 to Westinghouse letter LTR-FSE-13-65, "Response to NRC Audit Questions 11 and 46 Regarding the FLEX Integrated Plan Submittal for D.C. Cook Units 1 and 2," provides a comparison of the CNP specific parameters with the parameters used in the NOTRUMP analysis in WCAP-17601-P. The important CNP specific parameters have been incorporated into the CNP FSGs.

NRC Reference:

ISE CI 3.2.1.5.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Monitoring Instrumentation - Confirm whether there is a need for containment temperature monitoring after completion of containment evaluations using the GOTHIC code.

I&M Response to NRC ISE Item:

The Unit 1 and Unit 2 RCP seals were upgraded to the Generation 3 SHIELD® equipped low leakage design during the fall 2014 refueling outage and the spring 2015 refueling outage, respectively. As described in the response to ISE CI 3.2.1.2.A, I&M is crediting the installation of the Generation 3 SHIELD® seals in its FLEX strategies in accordance with the four conditions identified in the NRC's endorsement letter from J. Davis, NRC, to J. A. Gresham, Westinghouse Electric Company, LLC, dated May 28, 2014.

The CNP containment temperature analyses following a postulated ELAP are documented in Westinghouse documents CN-SCC-13-004, "D.C. Cook ELAP Containment Environment Analysis," and DAR-SCC-14-001, "ELAP Containment Environment GOTHIC Analysis Design Report for the D.C. Cook Unit 1 and Unit 2 Nuclear Plant." I&M has determined that the containment temperature would not prevent the FLEX credited components from performing their functions required by the FLEX strategies (EQ Evaluations EQER 2015-001, EQER 2015-002). Additionally, containment parameters are normally monitored in conjunction with 1/2-OHP-4023-ECA-0.0, "Loss of all AC Power."

NRC Reference:

ISE CI 3.2.1.6.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Sequence of Events (SOE) Timeline - In the event that the CSTs are unavailable during the initial phase following an ELAP, confirm that alternate sources of water can be aligned to feed the TDAFW pumps before the SGs run dry.

I&M Response to NRC ISE Item:

I&M has determined that the CSTs would remain available as a water supply for the TDAFW pumps during an ELAP and applicable external events. The following provides the basis for this conclusion.

1. The ability of the Unit 1 and Unit 2 CSTs to provide adequate cooling water during beyond design basis tornado wind loading was evaluated in calculation SD-140415-001, "Beyond Design Basis Assessment of the CST for Tornado Wind Load." The analysis shows that the tank components meet all the stress limits except for the stiffening ring located at the junction of the tank shell and the tank roof, which will experience compressive buckling stresses above the allowable. The compression zone of the tank shell is above the 94% water level. This localized effect is inconsequential and will not affect the overall integrity of the tank. Therefore it is judged that the tank will remain intact and will hold adequate inventory.

2. The response to ISE OI 3.2.4.7.A addresses concerns regarding tornado generated missiles.

3. The response to ISE CI 3.2.4.7.B addresses concerns regarding seismic events.

4. Extreme cold would not impact CST availability. The CSTs and interconnecting piping outside the Auxiliary Building are insulated and considered adequately protected from extremes of hot and cold weather. Within the Phase 1 timeframes, the volume and initial temperature of the CST contents and associated piping would preclude the significant loss of heat that would result in freezing upon loss of all AC power.

NRC Reference:

ISE CI 3.2.1.6.B

NRC ISE Item as stated in ISE dated January 24, 2014 and NRC Audit Report dated August 13, 2014:

SOE Timeline - Confirm that the revised SOE timeline reflects the change in strategy of not taking credit for low leakage seals and the new site specific boration analysis.

I&M Response to NRC ISE Item:

Unit 1 and Unit 2 RCP seals were upgraded with Generation 3 SHIELD® equipped low leakage design RCP seals during the fall 2014 and spring 2015 refueling outages, respectively. I&M is crediting the installation of the Generation 3 SHIELD® seals in its FLEX strategies in accordance with the four conditions identified in the NRC's endorsement letter from J. Davis, NRC, to J. A. Gresham, Westinghouse Electric Company, LLC, dated May 28, 2014. That NRC letter endorses Westinghouse Technical Report TR-FSE-14-1-P and supplemental information provided by Westinghouse letters dated March 19, 2014, and April 22, 2014. The response to ISE CI 3.2.1.2.A describes compliance with the May 28, 2014 NRC letter for CNP Unit 1. The updated SOE timeline provided in the Final Integrated Plan, to be issued within 60 days of the NRC Order EA-12-049 compliance date for CNP Unit 2, will reflect credit for low leakage seals and the site specific boration analysis.

NRC Reference:

ISE CI 3.2.1.7.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Cold Shutdown and Refueling - Confirm licensee will follow NEI's position paper and the NRC endorsement letter (ADAMS Accession No. ML13267A382).

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

Cold Shutdown and Refueling-The licensee stated that they would follow NEI's position paper and the NRC endorsement letter (ADAMS Accession No. ML13267A382). This requires, among others, that the licensee revise the shutdown risk process and procedures to incorporate use of the FLEX equipment. The revision of these procedures was not yet available for NRC review.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Shutdown risk process and procedures which incorporate use of the FLEX equipment.

I&M Response to NRC ISE Item:

CNP procedure PMP-4100-SDR-001, "Plant Shutdown Safety and Risk Management" controls the management and assessment of shutdown and outage risk. This procedure has been revised to be consistent with the recommendations provided in the NEI position paper: "Shutdown / Refueling Modes" as endorsed by the NRC in the letter from Jack R. Davis (NRC) to Joseph E. Pollock (NEI) dated September 30, 2013 (ADAMS Accession No. ML13267A382).

NRC Reference:

ISE CI 3.2.2.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Spent Fuel Pool Cooling Strategies - Confirm that makeup piping to the SFP is robust and will survive an ELAP event.

I&M Response to NRC ISE Item:

The SFP make up strategy is described in procedure 12-PMP-4027-FSG-003, "FLEX Program." The source of water for this strategy is Lake Michigan, using a portable FLEX Lift Pump and hoses to supply water to the SFP connection points. Procedure 1/2-OHP-4027-FSG-1101, "Alternate SFP Makeup Equipment Deployment," provides instruction for connecting a hose to provide makeup to the single, common SFP. One of the available connection points is a monitor spray nozzle installed via a clamp to either an I-beam or a handrail. This connection point does not use any installed piping.

NRC Reference:

ISE CI 3.2.4.2.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Ventilation, Equipment Cooling - Confirm that functionality of all ELAP coping equipment such as for example the TDAFW pumps and the FLEX boric acid pumps and supporting equipment such as electrical panels which are located in areas with low ventilation is not compromised including the adequacy of the ventilation provided in the battery rooms to protect the batteries from the effects of extreme high and low temperatures.

I&M Response to NRC ISE Item:

a) TDAFW Pump Room

High Temperatures:

Procedure 12-OHP-4027-FSG-501, "Flex Equipment Staging," directs personnel to open the doors to the affected TDAFW Pump Room. This will increase the volume of air available to dissipate heat. The FSG also directs personnel to install a temporary portable ventilation fan with an exhaust duct routed out of the room and outside the hallway to the Turbine Building. The nominal fan capacity is 6,700 cfm. The flow path will exhaust heated air out of the TDAFW Pump Room.

An exhaust fan capacity of 6,700 cfm is judged to be adequate to exhaust hot air from the room to the general area in the turbine building with margin to account for the normal cooling being unavailable. The engineering judgment considers that the heat load (20,517 BTU/hr) from calculation MD-12-HV-018-N, "Auxiliary Feed Water Pump Room and Hallway Heat Load Calculation," can be characterized as sensible heat. The sensible heat load and required air volume to keep temperature constant at various temperature differences between entering air and room air can be calculated. The sensible heat in a heating or cooling process of air (heating or cooling capacity) can be expressed as:

$h_s = 1.08\ q\ dt$

where

h_s = sensible heat (Btu/hr)
q = air volume flow (cfm)
dt = temperature difference (^oF)

Therefore: 20,517 = 1.08 (6,700) dt
And dt = 2.8°F

This rise in temperature inside the TDAFW Pump Room would not preclude personnel entry to perform FLEX strategy related activities or adversely impact the pumps or supporting equipment.

Low Temperatures:

It is expected that the initial temperature in the TDAFW Pump Room would be approximately 104°F. Since operation of the TDAFW pump involves steam flow through the turbine and associated piping, the reasonably expected low outside temperatures would not have an adverse effect on the TDAFW pumps or supporting equipment during implementation of the FLEX strategy.

b) Spent Fuel Operating Deck Area

The components of concern in the Spent Fuel Operating Deck Area are the beyond-design-basis level instruments installed pursuant to NRC Order EA-12-051, "Order Modifying Licenses With Regard to Reliable Spent Fuel Pool Instrumentation." The environmental temperature concerns for these instruments were addressed in the response to RAI #6(a) transmitted by the letter from J. P. Gebbie, I&M, to the NRC, dated February 27, 2014, "Donald C. Cook Nuclear Plant Units 1 and 2, Six Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)," (ADAMS Accession No. ML14063A041). As stated in that response, the level instruments are certified to function properly during and after exposure to temperatures from -10 to +55 degrees Celsius (14 to 131°F).

c) Other Critical Areas

BA Rooms

High Temperatures:

There would be no additional heat input to the BA Rooms room from internal sources during initial implementation of the FLEX strategies. Additionally, the primary concern in the BA Rooms would be low temperature resulting in boric acid precipitation. Therefore, high outside temperatures would not be expected to result in an adverse effect on the BA Rooms or supporting equipment.

Low Temperatures:

The principal credited borated water sources are the BASTs. The BASTs are normally maintained at 105°F minimum by automatically controlled immersion heaters. The BA concentration solubility limit is 53°F at the specified weight percent (6550 ppm). The BASTs are located within the center of the Auxiliary Building. The initial fluid temperatures, and the location of the BASTs and their associated piping inside a building that would be temperature-controlled prior to the ELAP, would preclude the significant loss of heat required for BA precipitation upon loss of all AC power within the timeframes assumed for the use of the BAST contents in the FLEX strategies.

Additionally, the loss of the ventilation system has been shown to significantly slow the cooldown of the Auxiliary Building, maintaining the Auxiliary Building temperatures in the area of the BASTs above the operability limit of 63°F. Therefore, due to the loss of building ventilation during ELAP there is little cooling of the systems and piping containing BA during the timeframes considered until Phase 3 power enables restoration of ventilation.

Battery Rooms

The effects of high and low temperatures of the credited batteries are addressed by the response to NRC AQ 29.

Control Room

The effects of loss of ventilation on CR equipment are addressed by the response to NRC AQ 36.

NRC Reference:

ISE CI 3.2.4.2.B

NRC ISE Item as stated in ISE dated January 24, 2014:

Ventilation, Equipment Cooling – Confirm that adequate ventilation is provided in the battery rooms to limit the potential hydrogen buildup during battery charging to less than the hydrogen combustibility limits.

I&M Response to NRC ISE Item:

For Unit 1, the FLEX, Phase 2, N strategy provides power to both the battery charger and the battery room fan for the AB Train, CD Train, and N Train batteries. If the N+1 strategy is used, the AB Train and CD Train batteries would not produce hydrogen because the chargers would not be powered. The N+1 strategy provides power to both the N Train battery charger and the N Train battery room fan. The Phase 2 power supplies would remain available in Phase 3. Therefore, hydrogen buildup would not be a concern.

For Unit 2, the FLEX, Phase 2, N strategy provides power to both the battery charger and the battery room fan for the AB Train and CD Train batteries, and the N Train battery charger but not the N Train Battery room fan. If the N+1 strategy is used, the AB Train and CD Train batteries would not produce hydrogen because the chargers would not be powered. The N+1 strategy provides power to the N Train battery charger, but not the N Train battery room fan.

Although the Unit 2 N Train battery room fan would not be powered for either the N strategy or the N+1 strategy during Phase 2, calculation MD-12-HV-022-N, "N-Train Battery Room Hydrogen Analysis and Maximum Temperature During Normal Plant Operation," shows that, even with no ventilation, it would take at least 65 hours for the hydrogen concentration in the battery room to reach 2%. The Phase 3, NSRC 4kV generators would arrive on site within approximately 24 hours, and could be used to repower the N Train battery room fan.

NRC Reference:

ISE CI 3.2.4.4.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Communications- Confirm that upgrades to the site's communication system have been completed.

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

Communications- This is to confirm upgrades to the site communications systems as stated in a CNP letter dated February 13, 2013 (ADAMS Accession No. ML 13071A347). Some upgrades have been completed, but some are still in progress. For example, the Emergency Offsite Facility does not yet have the uninterruptible power supply (it is scheduled to be installed by September 30, 2014).

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Complete remaining communications upgrades.

I&M Response to NRC ISE Item:

Upgrades to the site communication systems have been completed as described in the updated Communications Assessment Implementation Timeline submitted by the letter from J. P. Gebbie, I&M, to the NRC, "Donald C. Cook Nuclear Plant Units 1 and 2, Update to Communications Assessment Implementation Actions and Timeline - Fukushima Dai-ichi Near-Term Task Force Recommendation 9.3, 'Emergency Preparedness,'" dated December 16, 2014 (ADAMS Accession No. ML14352A250).

NRC Reference:

ISE CI 3.2.4.6.A

NRC ISE Item as stated in ISE dated January 24, 2014 and NRC Audit Report dated August 13, 2014:

Personnel Habitability – Confirm that the FLEX validation process will address personnel accessibility and habitability concerns based on site specific evaluations.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

See SE #8 below for necessary resolution.

Response to NRC ISE Item:

The limiting habitability concern is local manual operation of SG PORVs during the response to an ELAP. An evaluation was performed to determine if personnel can safely access the Steam Stop Enclosures and locally manually operate the valves. The evaluation utilized an existing SBO calculation, and the guidance in the CNP program that addresses thermal hazards to personnel. The evaluation concluded that conditions in the Steam Stop Enclosure would allow access for manual operation of the SG PORVs.

Additionally, the following factors would also facilitate operator access:

- Once the RCS cool down is completed, the resulting drop in heat load can be expected to improve the environment in the Steam Stop Enclosure.
- Specialized personal protective equipment, provided as part of the FLEX implementation, will enhance the operator's ability to perform the required function in the expected Steam Stop Enclosure environment.

EVALUATION DETAILS

Required Operator Actions :

In order to establish manual control of the SG PORVs, an operator would enter a Steam Stop Enclosure, climb a permanently installed ladder, and cross a platform. The operator would open the two PORVs in that Steam Stop Enclosure and then exit the room. Once the same operation is completed in the opposite Steam Stop Enclosure, the initial operation of these valves would be completed and the plant would be in a cooldown mode. At the direction of CR personnel, it may be necessary for the operator to re-enter the room to adjust the PORV position. As with the initial opening of the SG PORVs, this is expected to be accomplished by manual operation of the PORV handwheel(s). Operators are expected to leave the Steam Stop Enclosures when not actually operating the PORV. It is anticipated that initial entry to open the valves, and/or re-entry to adjust the valves would take no longer than 10 minutes for each entry.

Expected Environmental Conditions:

The acceptability of the Steam Stop Enclosure environment for responding to an SBO was evaluated in an existing calculation which considered a 150°F temperature in the enclosure. The calculation had been prepared to identify dominant areas of concern during an SBO and provide reasonable assurance that the necessary equipment could be operated given the expected environmental conditions. The calculation was utilized for the ELAP evaluation because conditions under an SBO bound the ELAP for the first four hours. The primary difference between the SBO event and ELAP, as it relates to SG PORV operation, is that the SBO evaluation is limited to a four-hour coping period, while the intermittent SG PORV operation for an ELAP is not limited to a specific duration by the FLEX strategies.

Operators are expected to initiate the ELAP response cooldown within eight hours. However, operator experience on the simulator shows that the plant cooldown is typically started within approximately 30 minutes of the event. Operators must complete the cooldown within two hours of initiation. This is well within the four-hour time frame assessed for the SBO event. Therefore, the calculation which determined the 150°F expected temperature to be acceptable for SBO responses may be considered to bound the expected ELAP response. The acceptability of the 150°F expected temperature for the intermittent SG PORV manual operation is also consistent with the CNP program addressing thermal hazards to personnel.

NRC Reference:

ISE CI 3.2.4.7.B

NRC ISE Item as stated in ISE dated January 24, 2014:

Water Sources - Confirm if permanently installed non-safety related equipment used in FLEX response guidelines will survive the postulated events.

I&M Response to NRC ISE Item:

Core Cooling Function

The CNP FLEX strategies credit the survivable volume of both CSTs to supply water to the TDAFW pumps. After the CST inventory is expended, a Phase 2 portable FLEX Lift Pump will be used to supply water to the suction to the TDAFW pump from Lake Michigan. This will maintain secondary cooling as the MODE 1-4 credited strategy until NSRC equipment enables completion of the RCS cooldown and depressurization using the RHR system.

The CSTs are classified as Seismic Class 2 components. Although not required to be a Seismic Class I structure, the CST was designed as such to insure the structural integrity of the refueling water tank. The response to ISE OI 3.2.4.7.A addresses concerns regarding tornado borne missiles and tornado wind loading for the CST.

The CSTs are not considered susceptible to adverse impact due to design basis flooding as the site would not be flooded due to a Lake Michigan seiche. Calculation MD-12-FLOOD-006-N confirms that the height of the probable maximum surge and seiche, including one standard deviation in the recurrence, is lower than the seawall.

SFP Cooling

The source of water for the SFP makeup strategy is Lake Michigan, using a FLEX Lift Pump and the necessary hoses to supply water to the SFP connection points. There is one common SFP at CNP. Two lift pumps and two sets of hoses would be available from storage in the FLEX storage building which is protected from the applicable site external hazards One of two possible connection paths for SFP makeup uses hoses supplying a monitor spray nozzle mounted with a clamp to either an I-beam or a handrail, and does not use installed piping. Therefore, the survivability of permanently installed non-safety related equipment is not a concern.

Containment Cooling

The CNP containment temperature and pressure response analyses following a postulated ELAP are documented in Westinghouse documents CN-SCC-13-004, "D.C. Cook ELAP Containment Environment Analysis," and DAR-SCC-14-001, "ELAP Containment Environment GOTHIC Analysis Design Report for the D.C. Cook Unit 1 and Unit 2 Nuclear Plant." These analyses demonstrate that containment pressure would remain below the design limit. I&M has determined that the containment temperature would not prevent the FLEX credited components from performing their functions required by the FLEX strategies.

Cold Weather Protection

The response to NRC Audit Question AQ 21 addresses concerns regarding cold weather protection.

NRC Reference:

ISE CI 3.2.4.8.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Electrical Power Sources - Confirm the sizing basis for the FLEX generators and their ability to start the planned individual loads identified in the FLEX strategies in Phases 2 and 3.

I&M Response to NRC ISE Item:

The Unit 1 and Unit 2 FLEX generator sizing calculations are summarized in the following Tables 1 and 2.

Table 1 Unit 1 FLEX Phase 2 and 3 Generator Load Calculation Summary					
Generator	**Rating kW**	**Calculated Load kW**	**80% Motor Starting Voltage met?**	**Margin kW**	**Reference**
Phase 2 500kW "N" Generator	500	390	Yes	110	Calculation 1-E-S-600V-FLEX-001
Phase 2 350kW "N+1" Generator	350	143	Yes	207	Calculation 1-E-S-600V-FLEX-002
Phase 2 250kW FLEX Generator for BA Pump*	250	98*	Yes	152	Calculation 12-E-S-480-FLEX-001
Phase 3 NSRC 4 kV Generator	2000	2027**	Yes	**	Calculation 1-E-S-4KV-FLEX-001

* The FLEX BA Pump Generator may be used to provide power to both unit's BA Pumps simultaneously. Therefore the load for powering two pumps is shown.
** The sizing calculation is based on powering all loads simultaneously. However, the load options are procedurally controlled such that the generator rating would not be exceeded.

Table 2 Unit 2 FLEX Phase 2 and 3 Generator Load Calculation Summary					
Generator	**Rating kW**	**Calculated Load kW**	**80% Motor Starting Voltage met?**	**Margin kW**	**Reference**
Phase 2 500kW "N" Generator	500	351	Yes	149	Calculation 2-E-S-600V-FLEX-001
Phase 2 350kW "N+1" Generator	350	113	Yes	237	Calculation 2-E-S-600V-FLEX-002
Phase 3 NSRC 4 kV Generator	2000	1973	Yes	27	Calculation 2-E-S-4KV-FLEX-001

NRC Reference:

ISE CI 3.2.4.9.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Fuel Consumption Data - Confirm that sufficient fuel is available on-site for operation of FLEX equipment considering the as procured equipment fuel consumption rates and duration of operation before fuel needs to be replenished from off-site sources.

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

Fuel Consumption Data -The licensee should have procedures which direct the refueling of the portable diesel-powered equipment at appropriate intervals from onsite fuel supplies, and provide direction for obtaining fuel from offsite before the onsite supplies are used up.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Provide overall refueling strategy.

I&M Response to NRC ISE Item:

A fuel consumption study was conducted which estimated the total run time with available on-site fuel to be approximately 344 hours or approximately 14 days. It was assumed that all major on-site diesel powered FLEX equipment was running continuously at full load. This assumption provides significant conservatism because the FLEX strategies do not require all equipment running simultaneously.

Procedure 1/2-OHP-4027-FSG-5 provides direction to commence diesel driven equipment refueling per 12-OHP-4027-FSG-511, "FLEX Equipment Refueling Operation." Procedure 1/2-OHP-4027-FSG-5 also provides follow up actions to consult with the Site Emergency Director to obtain diesel fuel from offsite sources before the onsite supplies are used up. Procedure 12-OHP-4027-FSG-511 provides direction to: 1) move diesel fuel from the underground emergency diesel FOSTs to the mobile fuel mules, and 2) from the mobile fuel mules to various FLEX equipment diesel engine fuel tanks.

NRC Reference:

ISE CI 3.2.4.10.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Load Shedding - Confirm DC load profile, final load shedding approach including the actions necessary to complete each load shed, the equipment location (or location where the required action needs to be taken), the time to complete each action and identify which functions are lost *as a result of shedding each load and any impact on defense-in-depth strategies and redundancy.*

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

DC Load Shedding -The licensee is revising the procedures for DC load shedding in order to shed additional loads. The NRC will review the final analysis and procedures.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Analysis and procedures for DC load shedding

I&M Response to NRC ISE Item:

Calculation 12-ES-250D-FLEX-001, "250VDC Battery Deep Load Shed (DLS) Analysis," has been issued along with the procedures for ELAP power management (1/2-OHP-4027-FSG-4) which performs the DC bus deep load shedding actions consistent with the analysis assumptions. The procedures identify which loads to shed, and consequently which functions are lost. Additionally, labels have been installed in the plant to identify the DC loads which will remain powered during the deep load shed.

NRC Reference:

ISE CI 3.4.A

NRC ISE Item as stated in ISE dated January 24, 2014:

Off-Site Resources – Review how conformance with NEI 12-06, Section 12.2 guidelines 2 through 10 is being accomplished.

I&M Response to NRC ISE Item:

NEI 12-06 requirements are restated below in under lined italic text, followed by text describing how those requirements have been implemented.

<u>12.2 MINIMUM CAPABILITIES OF OFF-SITE RESOURCES</u>

<u>Each site will establish a means to ensure the necessary resources will be available from off-site. Considerations that should be included in establishing this capability include:</u>

2) *Off-site equipment procurement, maintenance, testing, calibration, storage, and control.*

Implementation:
SAFER uses and aligns with EPRI recommended maintenance templates and the PRPs which require equipment in the program be maintained in a serviceable, deployable condition.

The SAFER team uses the PIM program which has warehouse storage and maintenance procedures to ensure that detailed storage and maintenance requirements are implemented.

The PIM program identifies items having limited shelf life or operating life or cycles, and institutes program controls to procure and/or install items for which shelf life has expired.

The PIM program is responsible for maintaining the equipment in a serviceable condition and is responsible for initiating nonconformance reports to document deficiencies affecting equipment.

3) *A provision to inspect and audit the contractual agreements to reasonably assure the capabilities to deploy the FLEX strategies including unannounced random inspections by the Nuclear Regulatory Commission.*

Implementation:
The NSRCs are responsible for supporting:
- Annual internal independent Quality Assurance audits
- Nuclear Procurement Issues Committee audits
- NRC inspections

4) *Provisions to ensure that no single external event will preclude the capability to supply the needed resources to the plant site.*

Implementation:
There are two, redundant NSRCs established with five sets of generic equipment stored at each (Memphis and Phoenix). There are also diverse delivery methods:
- Air or ground transport to Staging Area C from NSRC
- Delivery to Staging Area B from Staging Area C or directly from NSRC
- Air or ground transport to Staging Area B

5) *Provisions to ensure that the off-site capability can be maintained for the life of the plant.*

Implementation:
The SAFER Response Plan for CNP will remain active for the life of the plant. Participation contracts are in place with mechanisms to continually renew.

The Memorandum of Understanding with the South Bend Airport will be programmatically reviewed every two years to validate the capability of Staging Area C.

Communications with state and county officials is covered by plant procedures that will be in place (or equivalent) for the life of the plant.

6) *Provisions to revise the required supplied equipment due to changes in the FLEX strategies or plant equipment or equipment obsolescence.*

Implementation:
Changes to FLEX strategies or connection points at the plant will be programmatically controlled.

Changes to NSRC equipment due to equipment obsolescence will be controlled by the SAFER organization through PIM.

The SAFER equipment committee will consider equipment obsolescence or evolving strategies and ensure that the NSRCs continue to be able to support the nuclear industry.

7) *The appropriate standard mechanical and electrical connections need to be specified.*

Implementation:
Mechanical and electrical connections for off-site equipment are specified and controlled by AREVA document 51-9199717, "Regional Response Center Equipment Technical Requirements".

Plant interface connections will be programmatically controlled.

Plant modifications are not needed for connection of the Phase 3 generators and pumps. Tools and equipment for connection of NSRC generators and pumps have been procured or fabricated and staged for deployment. Procedures for deployment and connection have been issued

8) *Provisions to ensure that the periodic maintenance, periodic maintenance schedule, testing, and calibration of off-site equipment are comparable/consistent with that of similar on-site FLEX equipment.*

Implementation:
The SAFER equipment is maintained under the PEICo maintenance, testing, and calibration program. SAFER has developed Maintenance Instructions in accordance with the EPRI templates for the Phase 3 equipment, vendor recommendations, and the PRPs which require equipment in the program to be maintained in a serviceable, deployable condition.

9) *Provisions to ensure that equipment determined to be unavailable/non-operational during maintenance or testing is either restored to operational status or replaced with appropriate alternative equipment within 90 days.*

Implementation:
Off-site equipment is controlled and maintained by SAFER at the NSRCs. A PIM process is in place for notification of equipment out of service and development of a recovery plan. This will include replacing the equipment or making equivalent equipment available within 90 days.

10) *Provisions to ensure that reasonable supplies of spare parts for the off-site equipment are readily available if needed. The intent of this provision is to reduce the likelihood of extended equipment maintenance (requiring in excess of 90 days for returning the equipment to operational status).*

Implementation:
Off-site equipment is maintained by SAFER at the NSRCs. The SAFER organization maintains a minimum inventory of spare parts in accordance with vendor recommendations.

NRC audit Item Reference:

AQ 11

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

Review of the licensee's plan regarding the use of the thermal hydraulic analyses contained in WCAP 17601 for identifying the time constraints associated with implementing the FLEX strategies does not contain sufficient information to provide reasonable assurance that the licensee's plan will conform to the guidance in NEI 12-06 sections 1.3 and 3.2.1.7 because no detailed comparison of the CNP plant specific parameters with the parameters used in NOTRUMP analysis in WCAP 17601-P has been provided.

I&M Response to NRC Audit Item:

A CNP site-specific analysis was developed using the NOTRUMP program. Table 11-1 in Attachment 1 to Westinghouse letter LTR-FSE-13-65 provides a point by point description of the application of the PWROG analysis, contained in WCAP-17601-P, to the CNP site specific analysis contained in CN-FSE-13-13-R. Letter LTR-FSE-13-65 also specifically addresses the applicability of WCAP-17601-P Section 3.1 recommendations.

NRC Reference:

AQ 14

NRC Audit Item as stated in NRC Audit Report dated August 13, 2014:

The licensee's plan regarding sequence of events (SOE) of the ELAP analysis does not contain sufficient information to provide reasonable assurance that the plan conforms to NEI 12-06 *section 3.2.1.7(6) because a) SOE indicates no time constraint for completing the boration and b) no technical basis for sizing the flow rate for the FLEX boric acid injection pump was provided.*

The licensee is requested to provide the timeline which results in adequate boration to prevent recriticality and to provide the basis for sizing the boric acid injection flow rate.

Response to NRC Audit Item:

The CNP Site Specific ELAP subcriticality analysis calculations are contained in Westinghouse document CN-FSE-13-13-R. This analysis assumes operator response to commence RCS cooldown within eight hours of an ELAP. The RCS cooldown to reduced temperature and pressure is assumed to complete in the next two hours. The assumed RCS boration (at 25 gpm and 1500 psia) starts within 16 hours of the ELAP and completes with the required RCS Boration injected within 24 hours of the ELAP. The FLEX BA Pumps are rated for 26 gpm at 1550 psig. The CN-FSE-13-13-R analysis assumes RCP seal performance crediting the SHIELD® installation.

NRC Reference:

AQ 21

NRC Audit Item as stated in NRC Audit Plan dated May 21, 2014:

NEI 12-06, rev. 0, as endorsed by JLD-ISG-2012-01, rev. 0, in Section 3.2.2,guideline (12) states that Plant procedures/guidance should consider loss of heat tracing effects for equipment required to cope with an ELAP. Alternate steps, if needed, should be identified to supplement planned action. Heat tracing is used at some plants to ensure cold weather conditions do not result in freezing important piping and instrumentation systems with small diameter piping. Procedures/guidance should be reviewed to identify if any heat traced systems are relied upon to cope with an ELAP. For example, additional condensate makeup may be supplied from a system exposed to cold weather where heat tracing is needed to ensure control systems are available. If any such systems are identified, additional backup sources of water not dependent on heat tracing should be identified.

The licensee plan did not address the loss of heat tracing in the integrated plan. The licensee screened in for extreme cold, ice and snow and thus there is a need for the licensee to address loss of heat tracing effects on FLEX strategies. The licensee is requested to provide a discussion on the effects of the loss of heat tracing in regards to the effects on installed plant equipment required to cope with an ELAP such as for example outdoor water storage tanks and the boric acid storage tank and supply piping, including alternate steps, if needed, to supplement planned actions.

I&M Response to NRC Audit Item:

NEI 12-06 Section 3.2.2, guideline (12) states that heat tracing is used at some plants to ensure cold weather conditions do not result in freezing important piping and instrumentation systems with small diameter piping.

Core Cooling

Phase 1: The Phase 1 FLEX strategies would provide core cooling using the SGs. SG cooling would be provided by operation of the TDAFW Pump taking suction from one or both units' CSTs. Availability of the TDAFW pump and associated discharge injection flowpath to the SGs is credited for Phase 1 response. Manual SG PORV operation is credited for cooling the SGs. The Phase 1 strategy is assumed to last 12 hours.

Extreme cold is not expected to impact CST availability. The CSTs and interconnecting piping outside the Auxiliary Building are insulated and adequately protected from extremes of hot and cold weather. The volume and initial temperature of the CST contents and associated piping would preclude the significant loss of heat required for freezing upon loss of all AC power within the Phase 1 timeframes. The TDAFW pump and SG PORVs are located inside buildings and contain steam and water at elevated temperatures.

Phase 2: The Phase 2 FLEX strategies would continue to provide core cooling using the SGs. However, an alternate cooling source would need to be aligned to maintain secondary inventory makeup when the CST is depleted or becomes unavailable. The credited strategy is to provide makeup to the SGs using a FLEX lift pump delivering ultimate heat sink water from the CW system intake forebay to the TDAFW pump suction. When the FLEX lift pump is deployed in Phase 2, 327 gpm at 300 psia can be delivered to the SG feed ring.

The ultimate heat sink (Lake Michigan) is assumed to be available as the cooling water source. Lake Michigan is not susceptible to large scale freezing. The piping which would be used is not small diameter and would require flow rates that would be expected to preclude freezing.

NEI 12-06 also requires that the potential for frazil ice formation be addressed. Lake Michigan has the potential for developing frazil ice. Frazil ice is a surface and sub-surface phenomena associated with large bodies of water under extremely cold, windy and turbulent conditions. This results in emulsified ice crystals in the surface and subsurface of the large water body. The CNP intake structure and forebay connect to Lake Michigan through three large intake tunnels with intake cribs mounted on the lake bottom. The intake cribs are significantly below the lake surface. During an ELAP event, the CW, ESW and NESW pumps will all be stopped. Under the drastically reduced flow rates considered during ELAP, the forebay acts as a stilling well. Communication with Lake Michigan maintains the water supply while shielding the forebay from the adverse effects of surface freezing and frazil ice production. Based on the construct and design of the lake intake structures and CW system forebay, reasonable assurance exists that induction of frazil ice will not be a concern.

Phase 3: The Phase 3 equipment includes two generators supplied from the NSRC for each unit. These generators will repower 4kV RCP busses 1A and 2A. This allows repowering

Train B 4kV safety related motors, 600vac buses, related 120vac lighting and low voltage electrical distribution circuits. Among the Train B loads that can be repowered are 4kV safety related pumps such as the CCW pumps, the RHR pumps, the MDAFW pumps, and the ESW pumps. If an ESW pump is not available, the West ESW pump discharge strainer lid will be removed and replaced with a temporary lid equipped with hose connections to accept discharge of the NSRC large raw water pump. This provides the system connection into the ESW pump discharge piping system. Lake Michigan water would be pumped from the CW system intake forebay to the NSRC high volume raw water pump suction using two NSRC high flow, low discharge pressure, floating lift pumps.

Lake Michigan may be assumed to be available based on the considerations described above. The large system volumes and flow rates of the ESW, CCW, and RHR systems, and the indoor location of the affected portions of these systems, provide reasonable assurance that freezing would not be a concern.

RCS Boration/Inventory Control

Phase 1, 2, and 3: In Mode 5 with the SGs unavailable or in Mode 6, core cooling and RCS boration/inventory control would initially be available by gravity draining the RWST to the RCS, and subsequently by using a portable makeup pump for RCS feed and bleed. Similar to the CST, extreme cold is not expected to impact RWST availability. The RWSTs and interconnecting piping outside the Auxiliary Building are insulated and adequately protected from extremes of hot and cold weather. The volume and initial temperature of the RWST contents and associated piping would preclude the significant loss of heat required for freezing upon loss of all AC power within the Phase 1 and Phase 2 timeframes. The Technical Specification upper limit on RWST boron concentration, 2600 ppm, is below the solubility limit at 32°F. Therefore, boron precipitation would not be a concern.

The other credited systems and components are located inside the Auxiliary Building and the Containment. The large mass and interior volume of the buildings is expected to retain heat for a period sufficient to prelude concerns regarding freezing and boron precipitation.

NRC Reference:

AQ 28

NRC Audit Item as stated in NRC Audit Report dated August 13, 2014:

The licensees' plans for equipment maintenance and testing which endorses the EPRI industry program for maintenance which is currently under development does not provide reasonable assurance that guidance and strategies developed and implemented under them will conform to the guidance of NEI 12-06, Section 11.5 with respect to maintenance and testing.

Please provide details of the EPRI industry program for maintenance and testing of FLEX electrical equipment such as batteries, cables, and diesel generators.

I&M Response to NRC Audit Item:

I&M has developed PMP-4027-FSG-002, "FLEX Equipment Program." This program provides the guidance to ensure the FLEX Equipment and SFP Level Instrumentation are maintained to the guidance provided in NEI 12-06 and NEI 12-02. The program describes:

- Ownership and responsibilities,
- Planned and unplanned unavailability tracking and source data,
- Preventive maintenance and testing of equipment.

The FLEX Equipment Program ensures the equipment is maintained to the standards of NEI 12-06, which endorses the guidance of INPO AP 913, "Equipment Reliability Process," and the EPRI associated bases to define site specific maintenance and testing. For example, the 500kW, 350kW, and 250kW generators have preventative maintenance tasks for monthly, semi-annual, and bi-annual checks. The planned preventative maintenance activities for cables include inspection and testing which follows the industry recommended practices.

The TRM provides requirements for the availability of the FLEX equipment and connection points, and the Spent Fuel Pool level instruments in accordance with NEI 12-06 section 11.5.3 and NEI 12-02 section 4.3. .

NRC Audit Item Reference:

AQ 29

NRC Audit Item as stated in NRC Audit Plan dated May 21, 2014:

Provide information on the adequacy of the ventilation provided in the battery room to protect the batteries from the effects of extreme high and low temperatures.

Response to NRC Audit Item:

The minimum design temperature for the Train AB and Train CD batteries is 60°F, and the minimum design temperature for the Train N batteries is 45°F. The maximum design temperature for all three battery trains is 90°F. As discussed in IEEE Standard 484, "Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications," lead acid batteries are typically rated at 77°F. The standard also states that low temperatures may decrease battery capacity, while prolonged high temperatures may shorten battery life and increase maintenance cost. The potential battery temperature effects for each FLEX phase is discussed below.

Phase 1

An ELAP event would result in loss of the normal power sources for the battery chargers. A deep load shed would then be performed to assure that the Train A, Train B, and Train N 250 v batteries maintain adequate voltage for at least 12 hours. The lower discharge rate at higher temperatures will cause less life reducing damage; and lower discharge rate at lower temperatures will not challenge the battery capacity. The specific considerations for abnormally high temperatures and for abnormally low temperatures are described below.

High Temperatures

The extreme high temperature may be assumed to be 110°F. This is reasonable because;

- The bulk electrical heat input to the Auxiliary Building HVAC system is significantly reduced, and
- Records indicate that the highest temperature recorded for Bridgman, Michigan was at 103°F in July 1999.

Using the calculation described in Annex H of IEEE Standard 450, "Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications," a 15-year rated battery at a temperature of 107°F for one month would result in a degradation of approximately 2% of its overall battery life expectance. Therefore, the ability of the batteries to supply the deeply reduced load for the 12 hours assumed for Phase 1 would not be affected.

Low Temperatures

The potential effects of low temperatures on the Train AB, Train CD and Train N batteries were considered in the calculation demonstrating the Phase 1 battery capabilities (calculation 12-E-S-250D-FLEX-001). The calculation assumptions for low temperature are based on minimum room temperatures of 60°F for the Train AB and Train CD batteries, and 45°F for the Train N battery. These minimum temperatures are detailed in calculation MD-12-HV-026-N, CD Battery Room Steady State Station Blackout Transient Temperatures," and calculation MD-12-HV-029-N, "N Battery Room Station Blackout Temperature Analysis,"

The Unit 1 Train AB battery has >65% margin and Unit 2 Train AB battery has >10% margin based on calculation 12-E-S-250D-FLEX-001. Document DB-12-SBO, "Design Basis Document for Station Blackout," demonstrates the Train CD battery room temperature is more limiting than the Train AB battery room temperature.

The Unit 1 Train CD battery has >5% margin and Unit 2 Train CD battery has >28% margin based on calculation 12-E-S-250D-FLEX-001. Calculation MD-12-HV-026-N, "CD Battery Room Steady State Station Blackout Transient Temperatures," Figure 8-1 and Figure 8-3 show that the temperature decrease rate after four hours would be less than 0.7°F/hr. This rate would not increase because the temperature differential between the battery rooms and their surroundings would continue to decrease. A 0.7°F/hr. decrease rate during the additional eight hours of Phase 1 would not challenge the battery performance.

The Unit 1 and Unit 2 Train N batteries have >11% margin based on calculation 12-E-S-250D-FLEX-001. The temperature for the Train N batteries is lower than the temperature for the Train AB and Train CD batteries, and is compensated with a larger temperature correction factor (1.25 for the Train N batteries vs 1.15 for the Train AB and Train CD batteries). This temperature correction effectively requires more battery capacity to supply the loads at the expected temperatures. MD-12-HV-029-N, "N Battery Room Station Blackout Temperature Analysis," Figure 8-1 and 8-2 show that the temperature decrease rate after four hours would be less than 1°F/hr. This rate would not increase because the temperature differential between the battery rooms and their surroundings would continue to decrease. A 1°F/hr. decrease rate during the additional eight hours of Phase 1 would not challenge the battery performance.

Phase 2

In Phase 2, N strategy will use a portable generator to reenergize the 600 volt AC buses 11D and 11B (21D and 21B) which would restore power to the associated battery chargers and room fans. The fans would draw air as designed through the battery rooms and the room temperatures would trend toward the ambient air temperature of the auxiliary building interior, which would not be expected to change rapidly.

If the N+1 strategy is implemented during Phase 2, a different electrical strategy using a different portable generator will be used to supply power to the CRIDs and will not re-power the AB and CD battery chargers. The Unit 1 and Unit 2 Train N battery chargers and the Unit 1 room fans would be powered during the N+1 strategy. Again, the fans would draw air as designed through the battery rooms and the room temperatures would trend toward the ambient air temperature of the auxiliary building interior, which would not be expected to change rapidly.

Phase 3

In Phase 3, the NSRC generators would be deployed to supply the Train B 4kV electrical buses, and associated loads. However, the Phase 2 portable generators would also remain available to power the battery room fans as described above.

NRC Reference:

AQ 36

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

Room Conditions for Personnel Habitability and Equipment Functionality - The licensee was still working on room analyses, which will result in some specific operator actions to be placed in FSG-5. The NRC will review the final analyses and procedural actions.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Room analyses for personnel habitability and equipment functionality.

I&M Response to NRC Audit Item:

Currently, CR instrumentation cabinet doors are opened as a 30-minute time-credited-action in the procedure for responding to loss of all AC power (1/2-OHP-4023-ECA-0.0). The applicable procedure step is designed to open the cabinet doors as soon as possible. Vital instrument cooling is assured if the cabinet doors are opened within 30 minutes from loss of all AC power. This action ensures adequate instrument cabinet cooling during the four-hour SBO response.

Since the postulated ELAP exceeds four hours, the evaluation described below was performed to determine what actions would be needed to provide adequate CR ventilation during the FLEX Phase 1 and Phase 2 response. Based the evaluation, the FSG for FLEX equipment staging (12-OHP-4027-FSG-501) directs installation of temporary fans similar to the fire protection program based response for loss of CR ventilation. The sketch provided at the end of this response shows the approximate fan locations.

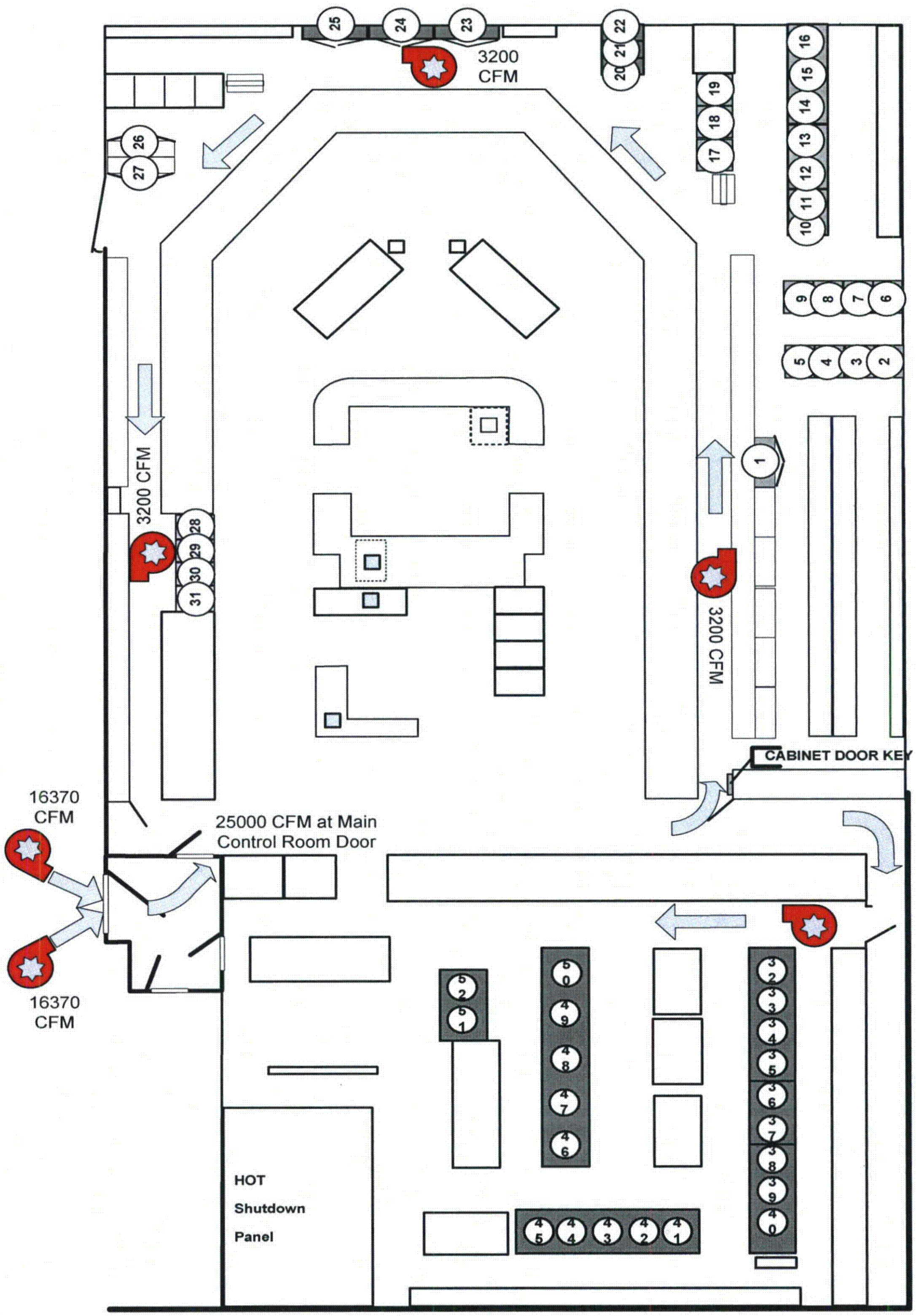
EVALUATION

The acceptability of this action was determined by qualitatively extrapolating the results of the calculation for CR temperatures during a postulated fire event. This calculation used a GOTHIC model and showed a nominal 117°F maximum resultant CR temperature with a similar temporary fan flow rate. The GOTHIC time transient model served to verify that adequate time existed to install and energize the temporary fans. The following simplified steady state computation validates that the CR temperature of 117°F is reasonable given a 104°F turbine building temperature.

Delta T = Q / (cfm x 1.08)

333,000 btu/hr / (23943 x 1.08) = 12.8°F.

From other calculations, the SBO bounding heat load in the CR is 125,343 btu/hr, which is much less than the 330,000 btu/hr assumed in the calculation for CR temperatures during a postulated fire event. This SBO heat load reflects equipment powered by the station batteries and is a conservative representation for longer term loss of power events. With this reduced heat load, the temperature rise over the temperature of the Turbine Building and Auxiliary Building (each of which includes a portion of the CR) is less than 5°F. Therefore, even considering elevated outside temperatures up to 110°F, the CR temperature would remain bounded by the 117°F previously evaluated in the calculation for CR temperatures during a postulated fire event.


3200 CFM
3200 CFM
3200 CFM
16370 CFM
16370 CFM
25000 CFM at Main Control Room Door
CABINET DOOR KEY
HOT Shutdown Panel

NRC Reference:

AQ 42

NRC Audit Item: as stated in NRC Audit Report dated August 13, 2014:

The licensee's strategy includes plans to make up to the steam generators through the normal feedwater system with raw water. Will there be strainers for the raw water sufficient to remove debris which might impede flow through the feedwater ring nozzles (J nozzles) in the steam generators?

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Need to see calculation CN-SEE-13-7 and Westinghouse Calculation CN-SEE-11-13-16, Revision 0-A.

I&M Response to NRC Audit Item:

The applicable Westinghouse documents are CN-CDME-13-7, Revision 0, "Supporting Chemistry Calculations for Alternate Cooling Source Usage during Extended Loss of All A.C. Power at D.C. Cook Units 1 and 2," CN-SEE-II-13-16, Revision 0, "D.C. Cook Units 1 and 2 FLEX Alternate Cooling Impact Evaluation," and DAR-SEE-II-14-15, Revision 0, "Evaluation of Alternate Coolant Sources for Responding to a Postulated Extended Loss of All AC Power at the D.C. Cook Nuclear Power Plant."

Mechanisms which could potentially impede the flow of water through the SGs have been addressed as follows.

Drawing water from a body of natural water introduces the possibility of drawing in debris. However, the suction source for the raw water that would be used for the TDAFW pumps when the CST is no longer available is Lake Michigan water in the CW system forebay. Without the CW pumps in operation, the forebay would act as a stilling well in which debris would tend to either sink to the bottom or float to the surface. The deployment procedure (1/2-OHP-4027-FSG-301, "Alternate Low Pressure Feedwater Equipment Deployment") for the lift pump used to supply the TDAFW pump directs operators to lower the lift pump suction hose and strainer into the forebay such that the strainer is at least 24 inches below the surface. This action plus the relatively stagnant water in the forebay provides assurance that significant quantity of debris would not be drawn into the suction hose.

The effects of precipitates have been evaluated in CN-SEE-II-13-16. As documented therein, the reduction in heat transfer capability as a result of the maximum volume of precipitate plating out on the SG tubes would not adversely impact the ability to remove the required decay and sensible heat. Also feedwater ring nozzle (J nozzle) plugging was determined not to be a limiting concern.

Calculations contained in CN-CDME-13-7 evaluated alternate cooling sources to the SGs and determined that the limiting makeup time durations resulting from potential SG corrosion and precipitation due to the credited water source (Lake Michigan), significantly exceeds the 72-hour

Phase 3 Regional Response Center projected FLEX equipment deployment time. Deployment of the Phase 3 equipment would allow transitioning the unit from SG cooling to the RHR system for decay heat removal.

DAR-SEE-II-14-15 documents the conclusion that success paths for SG cooling would be available, including those from the CST and Lake Michigan. These sources would not compromise system integrity or equipment performance that would preclude maintaining the plant in a safe condition for a period that bounded the Phase 3 projected FLEX equipment deployment time from the NSRC.

NRC Reference:

AQ 48

NRC Audit Item as stated in NRC Audit Report dated August 13, 2014:

The equipment listed in the OIP for Phase 2 shows two high pressure FLEX electrically driven pumps rated at 10 gpm which are used for boration of the RCS. Provide the justification that only two pumps meet the intent of the N+1 criterion.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Licensee stated they will have 3 high pressure boric acid FLEX pumps and 3 FLEX generators to power the pumps (confirm in August 2014 6 month update).

I&M Response to NRC Audit Item:

The electrically driven high pressure BA FLEX pumps are rated at 26 gpm at 1550 psig. Since the required RCS makeup flow rate per unit is 25 gpm at 1500 psia (per CN-FSE-13-13-R), one high pressure BA FLEX pump is needed to provide the necessary RCS makeup flow to each unit. Three high pressure BA FLEX pumps will be maintained available to fulfill the N+1 criterion. This is a change to the mitigation strategies in the original OIP.

The FLEX equipment includes two 250 kW portable DGs dedicated to power the high pressure BA FLEX pumps. As described below, maintaining two portable FLEX DGs fulfills the N+1 criterion. This is a change to the mitigation strategies in the original OIP.

As stated in the August 2014 six-month OIP update (transmitted by letter from J. P. Gebbie, I&M, to the NRC dated August 27, 2014), one 250 kW DG is capable of powering two FLEX BA Pumps. Therefore, two FLEX BA Pumps and one 250 kW DG will provide N capability for the site, and one additional FLEX BA Pump and one additional 250 kW DG will provide N+1 capability for the site.

NRC Reference

AQ 53

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

Personnel Habitability for Operation of Steam Generator (SG) Power Operated Relief Valves (PORVs) -The licensee is developing an analysis of habitability requirements for the local operation of the PORVs. SG PORVs. The NRC will review the final analysis.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Provide engineering evaluation to demonstrate that personnel can safely access the Steam Stop Enclosures and locally operate the SG PORVs.

I&M Response to NRC Audit Item:

See the response to ISE CI 3.2.4.6.A for a discussion of habitability issues for operation of the SG PORVs.

NRC Reference:

SE #1

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

RCS venting in support of mitigating strategies for RCS makeup and boration.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

The generic FSG-8 issued by the PWROG states that the vessel head vent should be used before using the pressurizer PORV, but the CNP FSG-8 switches the order. As the vessel head vents were designed to be used in this type of situation, justify this deviation from the generic guidelines. Also, ECA-0.0 does not appear to require injection of water into the RCS prior to reaching reflux cooling. The intent is to avoid reflux cooling if possible.

I&M Response to NRC Audit Item:

CNP site-specific calculation CN-FSE-13-13-R shows that Unit 1 is not expected to need venting/letdown of the RCS to complete boration during an ELAP response. Although not credited in the calculation, the FSG for Alternate RCS Boration (1-OHP-4027-FSG-8) provides instructions for use of the reactor vessel head vents as the primary method of RCS venting and the pressurizer PORV as the contingency method in accordance with Westinghouse vendor-specific guidelines.

Calculation CN-FSE-13-13-R shows that Unit 2 is expected to need venting/letdown of the RCS to complete boration during an ELAP response. The FSG for Alternate RCS Boration (2-OHP-4027-FSG-8) provides instructions for use of the reactor vessel head vents as the primary method of RCS venting and the pressurizer PORV as the contingency method in accordance with Westinghouse vendor–specific guidelines

RCS boration is required by procedure 1/2-OHP-4027-FSG-5 to commence within 16 hours of an ELAP. CN-FSE-13-13-R demonstrates that this will preclude reflux cooling.

NRC Reference:

SE #2

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

Resolution of Westinghouse Nuclear Safety Advisory Letter (NSAL) 14-1 - NSAL -14-1 indicates there may be higher leakage from the reactor coolant pump (RCP) seals during an extended loss of ac power (ELAP) than was previously analyzed. The license is working to resolve this issue. The NRC will review the final resolution.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Resolution of NSAL 14-1. See also CI 3.2.1.2.A.

I&M Response to NRC Audit Item:

NSAL 14-1 applies to plants that have applied the WCAP-10541 RCP seal leakoff line leak rate of 21 gpm for licensing purposes. CNP Unit 1 and Unit 2 RCP seals were upgraded with Generation 3 SHIELD® equipped low leakage design RCP seals during the fall 2014 refueling outage and the spring 2015 refueling outage, respectively. I&M is crediting the installation of the Generation 3 SHIELD® seals in its FLEX strategies in accordance with the four conditions identified in the NRC's endorsement letter from J. Davis, NRC, to J. A. Gresham, Westinghouse Electric Company, LLC, dated May 28, 2014. That NRC letter endorses Westinghouse Technical Report TR-FSE-14-1-P and supplemental information provided by Westinghouse letters dated March 19, 2014, and April 22, 2014. The response to ISE CI 3.2.1.2.A describes compliance with the May 28, 2014 NRC letter for CNP Unit 1 and Unit 2, including the condition/limitation regarding assumed RCP seal leakage rate.

NRC Reference:

SE #5

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

Accuracy of the NOTRUMP Computer Code - Westinghouse used the NOTRUMP computer code to develop certain timelines for operator actions in an ELAP event (see WCAP-17601-P for example). NRC simulations using the TRACE code indicate some differences, which may be significant enough to affect the timeline for operator actions. The pressurized water reactor owner's group (PWROG) is working with the NRC on a resolution, which may be applicable to all PWRs.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

PWROG project PA-ASC-1274 should provide resolution on the accuracy of the NOTRUMP code and the ability to predict the time that reflux cooling starts.

I&M Response to NRC Audit Item:

PWROG project PA-ASC-1274 was established to provide resolution of the NRC questions/concerns regarding the accuracy of the NOTRUMP computer code and the ability to appropriately predict the time that reflux cooling starts following a postulated ELAP event. The PWROG project deliverables were formally issued via PWROG project letter OG-14-339, "PWR Owners Group, Transmittal of PWROG-14064-P, Revision 0, 'Application of NOTRUMP Code Results for PWRs in Extended Loss of AC Power Circumstances,' For Information Only (PA-ASC-1274)," dated September 26, 2014.

This project letter had a Position Paper attached as PWROG-14064-P, Revision 0, "Application of NOTRUMP Code Results for Westinghouse Designed PWRs in Extended Loss of AC Power Circumstances, PWROG ASC Committee, PA-ASC-1274," dated September 2014.

The summary paragraph from the Position Paper (PWROG-14064-P) pertaining to NOTRUMP & TRACE computer code differences states:

"To summarize, the comparison of results from the NOTRUMP and TRACE computer codes for the parameters of interest show that the NOTRUMP predicted results agree well or are conservative with respect to the TRACE predicted results. The comparison shows that NOTRUMP provides a conservative estimate of the required time when the primary make-up pumps are required for an ELAP event as compared to TRACE. Therefore, it is concluded that NOTRUMP is acceptable for simulation of the ELAP event within the constraints listed herein with regards to reflux cooling and boron mixing."

I&M therefore considers that PWROG-14064-P resolves the NRC FLEX concerns regarding differences between the NOTRUMP and TRACE computer codes pertaining to the onset of reflux cooling.

Regarding the discussion in the Position Paper about the application of restrictions on the use of NOTRUMP, it is noteworthy that the content of such statements pertains to the use of generic analyses work documented in WCAP-17601 and WCAP-17792 as the sole basis for a plant's FLEX strategies. This is not the case for CNP since plant-specific analyses have been performed (e.g., CN-FSE-13-13-R) showing RCP make-up analyses with the SHIELD® design RCP seals (i.e., "low leakage" or "shutdown" seals). Thus, the restrictions discussed in the Position Paper such as the 17-hour RCS make-up implementation requirement presented in Table 1 on Page 4-3 of the Position Paper do not apply to CNP for two reasons:

(1) CNP Unit 1 and Unit 2 RCP seals were upgraded with Generation 3 SHIELD® equipped low leakage design RCP seals during the fall 2014 and spring 2015 refueling outages respectively. As described in the response to ISE CI 3.2.1.2.A, I&M is crediting the installation of the Generation 3 SHIELD® seals in its FLEX strategies in accordance with the four conditions identified in the NRC's endorsement letter from J. Davis, NRC, to J. A. Gresham, Westinghouse Electric Company, LLC, dated May 28, 2014. That NRC letter endorses Westinghouse Technical Report TR-FSE-14-1-P and supplemental information provided by Westinghouse letters dated March 19, 2014, and April 22, 2014.

(2) The CNP-specific analysis states that RCS make-up is required to commence no later than 16 hours, if Generation 3 SHIELD® RCP seals are assumed, to ensure single phase natural circulation is maintained, and full RCS Boration must be completed within 24 hours of the ELAP. The strategy for CNP Unit 1 and Unit 2 ensures single phase natural circulation.

Consistent with CN-FSE-13-13-R, RCS boration is required by procedure 1/2-OHP-4027-FSG-5 to commence within 16 hours and must be completed within 24 hours of an ELAP. Additionally, 1/2-OHP-4027-FSG-5 requires that four loop SG cooling be maintained for at least one hour after the completion of RCS Boration. The one-hour requirement assures adequate boron mixing in the RCS.

NRC Reference:

SE #8

"Item Description" as stated in NRC Audit Report dated August 13, 2014:

Validation and Verification - The licensee was developing procedures for validation and verification of the revised plant procedures and the new FSG's, which are different from the NEI guidance in this area. The NRC will review those procedures.

"Licensee Input Needed" as stated in NRC Audit Report dated August 13, 2014:

Validation and Verification procedures which also address human factors concerns.

I&M Response to NRC Audit Item:

The CNP procedure for FSG maintenance (PMP-4027-FSG-001) provides verification and validation guidance for addressing human factor concerns when developing or revising FSGs. I&M has conducted reviews which documented consistency of the CNP Unit 1 and Unit 2 FLEX validation actions with those prescribed in the NEI document titled "FLEX Validation Process." The reviews determined that there would be adequate resources for simultaneous implementation of FLEX strategies at both units within the required constraints identified for Phases 1 and 2, and included consideration of personnel accessibility and environmental factors. I&M plans to follow the NEI guidance for validation of future FSGs and changes.

Abbreviations Used in this Enclosure	
%	percent
AC, ac	Alternating Current
ADAMS	Agencywide Document Access Management System
AFW	Auxiliary Feedwater
AQ	Audit Question
BA	Boric Acid
BAST	Boric Acid Storage Tanks
BDBEE	Beyond Design Basis External Event
BTU/hr	British Thermal Units per hour
CCW	Component Cooling Water
cfm	cubic feet per minute
CNP	Donald C. Cook Nuclear Plant
CR	Control Room
CRID	Control Room Instrumentation Distribution
CST	Condensate Storage Tank
CW	Circulating Water
DC	Direct Current
DG	Diesel Generator
DLS	deep load shed
EDG	Emergency Diesel Generator
ELAP	extended loss of alternating current power
EPRI	Electric Power Research Institute
ESW	Essential Service Water
EQ	Environmental Qualification
°F	Degrees Fahrenheit

FLEX	diverse and flexible mitigation strategies
FOST	Fuel Oil Storage Tank
FSG	FLEX Support Guideline
ft.	foot/feet
FWST	Fire Water Storage Tank
gpm	Gallons Per Minute
HVAC	Heating , ventilation, and air-conditioning
I&M	Indiana Michigan Power
IEEE	Institute of Electrical Electronic Engineers
in.	inch
ISE	Interim Staff Evaluation
kV	kilovolt
kW	kilowatt
MC	Moisture Content
MDAFW	Motor Driven Auxiliary Feedwater
MWe	Megawatt-electric
MWt	Megawatt-thermal
NEI	Nuclear Energy Institute
NESW	Non-Essential Service Water
NRC	U. S. Nuclear Regulatory Commission
NSRC	National SAFER Response Center
NSSS	Nuclear Steam Supply System
OIP	Overall Integrated Plan
PA	Protected Area
PEICo	Pooled Equipment Inventory Corporation
PIM	Pooled Inventory Management
PORV	Power Operated Relief Valve
PRPs	PIM Rules and Procedures
psia	Pounds per Square Inch - absolute
psig	Pounds per Square Inch - gage
PWR	pressurized water reactor
PWROG	Pressurized Water Reactor Owners Group
RAI	Request for Additional Information
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RHR	Residual Heat Removal
RWST	Refueling Water Storage Tank

SAFER	Strategic Alliance for FLEX Emergency Response
SBO	Station Blackout
SFP	Spent Fuel Pool
SG	Steam Generators
SOE	Sequence of Events
TDAFW	Turbine Driven Auxiliary Feedwater
TRM	Technical Requirements Manual
V	volt
VDC	Volt Direct Current

Enclosure 4 to AEP-NRC-2015-22

Status of OIP Unit 2 Open Items Shown as "In Progress" in February 2015 OIP Update

Overall Integrated Plan (OIP) Open Items		
Pending Action	**OIP Open Item**	**Status**
1	Completion of diverse and flexible mitigation strategies (FLEX) equipment storage facilities	Complete outside Protected Area (PA) Complete inside PA
2	Perform final validation of timing requirement to route alternate suction source to Turbine Driven Auxiliary Feed Water (TDAFW) pump as Level B Time Sensitive Action per U. S. Nuclear Regulatory Commission approved guidance.	Complete
3	Implement administrative controls program for FLEX related equipment.	Complete
5	Complete detailed load shedding and battery duration analysis of Train A and Train B 250 Volt direct current batteries to validate final FLEX implementation strategy, including required procedure changes.	Analysis: Complete Procedures: Complete
6	Modification to TDAFW pump suction piping from Essential Service Water (ESW) system to provide connection point from alternate sources.	Complete
7	Complete detailed load shedding and battery duration analysis of N-Train battery to validate final FLEX implementation strategy, including required procedure changes.	Analysis: Complete Procedures: Complete
8	Develop FLEX strategy guides and associated procedure revisions to implement FLEX mitigation strategies.	Complete
11	Modification to connect portable diesel generator (DG) to 600 Volt alternating current (Vac) bus 21D.	Complete
13	Modification to connect portable DG to motor control center (MCC) ABD-B to provide alternate power supply to N-Train battery charger.	Complete
14	Modification to place a new hose connection in the motor driven AFW discharge line in the east main steam stop enclosure.	Complete
15	Modification of bus T21A/D not needed. 4 kilovolt leads will be fabricated and stored to allow connection of an external 4160 Vac three-phase portable DG to the load side of breaker 2-2A2.	Complete
16	Modification to replace Reactor Coolant Pump seals with Westinghouse SHIELD low leakage seals.	Complete

Overall Integrated Plan (OIP) Open Items		
Pending Action	**OIP Open Item**	**Status**
17	Modification adding a portable boron addition pump powered by a dedicated portable DG.	Complete
21	Modify Chemical and Volume Control System charging header to allow connection of portable pump for boron addition and Reactor Cooling System makeup.	Complete
23	Modify boric acid transfer pump (BATP) suction header to add connection points.	Complete
24	Modify BATP discharge header to add connection points.	Complete
29	Fabricate a tool to provide large volume Phase 3 raw water tie-in to ESW supporting component cooling water cooling for Residual Heat Removal.	Complete
30	Modify 600 Vac MCC circuit breakers to provide Phase 2 electrical power connections to close Safety Injection accumulator discharge valves.	Complete