



August 27, 2015

ULNRC-06240

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

10 CFR 2.202

Ladies and Gentlemen:

**DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
RENEWED FACILITY OPERATING LICENSE NPF-30
FIFTH 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)**

- References:
1. Letter dated March 12, 2012 from E. J. Leeds and M. R. Johnson, USNRC, to Adam C. Heflin, Callaway Plant, Union Electric Company, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession Number ML12054A736)
 2. NRC Interim Staff Guidance JLD-ISG-2012-01, Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, Revision 0, August 29, 2012 (ADAMS Accession Number ML12229A174)
 3. ULNRC-05924, "Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated October 29, 2012
 4. ULNRC-05962, "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," dated February 28, 2013

5. ULNRC-06024, "First 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)," dated August 29, 2013
6. ULNRC-06087, "Second 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)," dated February 26, 2014
7. ULNRC-06135, "Third 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)," dated August 28, 2014
8. ULNRC-06184, "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)," dated February 26, 2015

On March 12, 2012, the U. S. Nuclear Regulatory Commission (NRC) issued the order identified above as Reference 1 to Union Electric Company (dba Ameren Missouri) for Callaway Plant. Reference 1 was immediately effective and directs Ameren Missouri to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 required submission of an initial status report 60 days following issuance of final interim staff guidance from the NRC (Reference 2) and an Overall Integrated Plan pursuant to Section IV, Condition C. Reference 3 provided Ameren Missouri's initial status report regarding mitigation strategies. Reference 4 provided Ameren Missouri's Overall Integrated Plan.

Section IV, Condition C.2 of Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," provides direction regarding the content of the status reports. References 5, 6, 7 and 8 provided Ameren Missouri's first, second, third, and fourth six-month status reports. The enclosure to this letter provides Ameren Missouri's fifth six-month status report pursuant to Section IV, Condition C.2 of Reference 1.

This letter does not contain new commitments.

If you have any questions concerning the content of this letter, please contact Scott Maglio, Regulatory Affairs Manager, at 573-676-8719.

I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,

Executed on: Aug 27, 2015



Timothy E. Herrmann
Vice President, Engineering

Enclosure: Ameren Missouri's Fifth Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Event

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cc: Mr. Marc L. Dapas
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

Senior Resident Inspector
Callaway Resident Office
U.S. Nuclear Regulatory Commission
8201 NRC Road
Steedman, MO 65077

Mr. L. John Klos
Project Manager, Callaway Plant
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop O-8B1
Washington, DC 20555-2738

Mr. Eric Leeds
Director, Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Stop 0-13H16M
Washington, DC 20555-0001

Mr. Jack Davis
Director, Mitigation Strategies Directorate
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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Missouri Public Service Commission

Ameren Missouri's Fifth Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

1 Introduction

Ameren Missouri developed an Overall Integrated Plan (OIP) (Reference 1) for the Callaway Plant, documenting the diverse and flexible strategies (FLEX), in response to NRC Order Number EA-12-049 (Reference 2). This enclosure provides an update of milestone accomplishments since submittal of the last status report (Reference 16), including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any. Refer to Section 8 of this enclosure for a list of References.

2 Milestone Accomplishments

The following milestones have been completed since the development of the OIP, and are current as of July 31, 2015.

- Submittal of the fifth six-month status report (this submittal)
- FLEX Strategy Evaluation
- Modifications Evaluation
- PWROG issues NSSS-specific guidelines
- Install Off-site Delivery Station (if necessary)
- Develop Training Plan
- N-1 Walkdown

3 Milestone Schedule Status

The following table provides an update to Attachment 2 of the OIP. The table provides the activity status of each item, and indicates whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed. The milestone target completion dates have been revised based on approval of the relaxation request discussed in Section 5. Italicized text denotes that a Milestone was updated since the last six-month status update (Reference 16).

Callaway Milestone Schedule			
Activity	Original Target Date	Activity Status	Revised Target Completion Date
Submit Overall Integrated Implementation Plan	February-2013	Complete	
6 Month Status Updates			
Update 1	August-2013	Complete	
Update 2	February-2014	Complete	
Update 3	August-2014	Complete	
Update 4	February-2015	Complete	
<i>Update 5</i>	<i>August-2015</i>	<i>Complete</i>	
Update 6	February-2016	Not Started	
FLEX Strategy Evaluation	April-2013	Complete	
Perform Staffing Analysis	December-2013	Started	November-2015
Modifications			
Modifications Evaluation	April-2013	Complete	
Engineering and Implementation	November-2014	Started	May-2016
<i>N-1 Walkdown</i>	<i>April-2013</i>	<i>Complete</i>	
Design Engineering	March-2014	Started	<i>October-2015</i>
Unit 1 Implementation Outage	November-2014	Not Started	May-2016
On-site FLEX Equipment			
Purchase	June-2013	Started	December-2015
Procure	December-2013	Started	April-2016
Off-site FLEX Equipment			
<i>Develop Strategies with National SAFER Response Center (NSRC)</i>	<i>November-2013</i>	<i>Started</i>	<i>October 2015</i>
Install Off-site Delivery Station (if necessary)	September-2014	Complete	
Procedures			
PWROG issues NSSS-specific guidelines	June-2013	Complete	
Create Callaway FSG (Note 1)	April-2014	Started	<i>May-2016</i>
Create Maintenance Procedures	June-2014	Not Started	<i>May-2016</i>
Training			
Develop Training Plan	April-2014	Complete	
Implement Training	May-2014	Started	May-2016
Submit Completion Report	November-2014	Not Started	July-2016

Note 1: The Callaway FLEX Support Guidelines (FSG) have been created. The FSG's are awaiting final approval just prior to FLEX implementation.

4 Changes to Compliance Method

The following changes have been made to Ameren Missouri's Overall Integrated Plan (OIP) (Reference 1) since submittal of the fourth Six-Month Status Report (Reference 16).

4.1 Modes 5-6 Strategies

Ameren Missouri has further refined our Mode 5 – 6 Shutdown ELAP Strategy due to concerns that the Refueling Water Storage Tank (RWST) is not missile hardened. The strategy is being revised to utilize the new 500,000 gallon Hardened Condensate Storage Tank (HCST) as a water source and the Boric Acid Batching Tank (BABT) as the boron source for make-up to the Boric Acid Tanks (BATs). The BABT was evaluated and determined to meet Expedited Seismic Evaluation Program (ESEP) requirements for their use in our FLEX mitigating strategies.

4.2 New Hardened Condensate Storage Tank Update

Ameren Missouri is constructing a new Hardened Condensate Storage Tank (HCST) that will meet FLEX and Expedited Seismic Evaluation Process (ESEP) requirements. The new 500,000 gallon HCST will provide at least thirty (30) hours of protected water source for the safety function of core cooling. This is a change from the 72 hours reported in the third six-month update submittal via ULNRC-06135 (Reference 13). The new HCST will not replace the current CST since the CST is the design basis source of water for the Auxiliary Feedwater Pumps. The design of the new HCST will utilize Regulatory Guide 1.76 Revision 1 for wind loading design criteria. Regulatory Guide 1.76 Revision 1 is the latest NRC approved standard for design-basis tornado and design-basis tornado-generated missiles that a nuclear power plant should be designed to withstand.

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

In Reference 4, Ameren Missouri formally requested relief from the requirement of Section IV.A.2 of the Order (EA-12-049) regarding full implementation no later than two (2) refueling cycles after submittal of the Overall Integrated Plan. NRC approval of the requested relief was received in Reference 5, relaxing full Order implementation for Callaway Plant until the completion of the spring 2016 refueling outage. The milestone schedule in Section 3 has been updated for consistency with the approved schedule relief. No additional relief is requested herein.

6 Open Items from Overall Integrated Plan and Interim Safety Evaluation

The following tables provide a summary of the open items documented in the OIP or the Interim Safety Evaluation (ISE) and the status of each item. Statuses that are ***bolded and italicized*** indicate changes in the status from the previous submittal.

Overall Integrated Plan Open Item	Status
<p>OI1 The RWST will need to be missile protected to credit its use in FLEX strategies.</p>	<p><i>Closed</i> <i>The RWST will not be used as a credited source of borated water in our mitigating strategies; therefore the RWST does not require missile protection to support FLEX mitigation strategies.</i></p> <p>For MODES 1-4, missile protection of the RWST is not a concern from a FLEX strategy standpoint since the RWST is not required as a Reactor Coolant System (RCS) make-up & boration source. The Boric Acid Tanks (BATs) provide sufficient make-up volume to maintain sub-cooling (natural circulation removing decay heat removal via the Steam Generators) and sub-criticality of the reactor core. Low leakage Reactor Coolant Pump (RCP) seals will limit RCS leakage to less than or equal to 1 gpm/RCP (4 gpm/total). Assuming a maximum unidentified RCS leakage of 1 gpm, the total RCS leakage is 5 gpm.</p> <p><i>Ameren Missouri has revised our Mode 5 – 6 Shutdown ELAP Strategy due to concerns that the RWST is not missile protected or does not meet ESEP requirements. The revised strategy will utilize the new 500,000 gallon Hardened Condensate Storage Tank (HCST) as a water source and the Boric Acid Batching Tank (BABT) as our boron source for make-up to the Boric Acid Tanks (BATs).</i></p>
<p>OI2 GOTHIC analysis needs to be performed to demonstrate that Containment pressure and temperature remain at acceptable levels and that instrumentation EQ requirements will be maintained.</p>	<p>Started.</p> <p>The Gothic Analysis for all modes of operation has been performed. Containment pressure and temperature remain at acceptable levels. The results of the Instrumentation EQ Analysis are currently under review.</p>

Overall Integrated Plan Open Item	Status
<p>OI3 An analysis will need to be performed to demonstrate acceptable SFP cooling pump performance with the SFP in boil-off.</p>	<p>Closed. The Spent Fuel Pool Cooling Pumps will not be repowered. SFP cooling will be maintained by continued makeup and boil-off using the Phase 2 portable equipment.</p>
<p>OI4 For non-Class 1E instrumentation that will be repowered using a temporary battery, an analysis will need to be performed to determine battery life and frequency of replacing battery</p>	<p>Closed. Ameren Missouri has determined that the non-Class 1E instrument racks will not be re-powered via a temporary battery. The required instrument readings will be obtained via portable instruments.</p>
<p>OI5 The current CST and CST pipe chase are non-seismic. Callaway may pursue the construction of a new seismically qualified and missile protected CST. Current FLEX strategies rely on the existing CST tank. Future evaluation is required to determine the impact on FLEX strategies should the new CST be constructed.</p>	<p>Started. Ameren Missouri is constructing a new Hardened Condensate Storage Tank (HCST) that is seismically qualified and missile protected. Relaxation of Order requirements regarding the date of full implementation was requested (Reference 4) and has been approved (Reference 5). FLEX Support Guidelines (FSG) are being developed for use of the new HCST.</p>
<p>OI6 The method for isolating accumulators during RCS inventory control has not been finalized</p>	<p>Closed. The method for isolating accumulators during RCS inventory control has been finalized. Step 1 of FSG-10, "Passive RCS Injection Isolation (Rev. 0)," determines if isolation of Safety Injection (SI) Accumulators is desired. If the Steam Generators will be depressurized below 220 psig, then the SI accumulators are isolated by closure of their discharge isolation valves (if power is available from FLEX 480 VAC Generator) or vented to the containment atmosphere. Callaway Energy Center calculation, BB-180 Rev. 0 Add. 5 "Minimum Steamline Pressure to Prevent Accumulator Nitrogen Injection," establishes the site specific value for the Westinghouse Owners Group Emergency Response Guidelines Setpoint O.07 that is used in the Emergency Operating Procedures (i.e., ECA-0.0, "Loss of All AC Power," Step 17, Rev. 019). The site calculation takes into consideration the potential for nitrogen expansion/SI accumulator pressure increase from heat sources within the containment building (i.e., RCS).</p>

Overall Integrated Plan Open Item	Status
<p>OI7 The method for repowering the SFP cooling pumps has not been finalized.</p>	<p>Closed. The SFP Cooling Pumps will not be repowered. SFP cooling will be maintained by continued makeup and boil-off using the Phase 2 portable equipment.</p>
<p>OI8 The Westinghouse RCP SHIELD® Seal issue has not been resolved.</p>	<p>Closed. This issue has been resolved. NRC Endorsement of TR-FSE-14-1-P, RCP SHIELD Seal is documented in NRC Letter from Mr. Jack Davis, Director, Mitigating Strategies Directorate to Mr. James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company LLC, dated May 28, 2014 (ML14132A128). (Reference 14)</p>

Interim Safety Evaluation Open Item	Status
<p>3.2.1.2.B – RCP Seal O-Ring Integrity and Leakage Rate Additional review of the licensee's applicable analysis and relevant Reactor Coolant Pump (RCP) seal leakage testing data is needed to justify that (1) the integrity of the associated 0-rings will be maintained at the temperature conditions experienced during the ELAP event, and (2) the seal leakage rate used in the ELAP is adequate and acceptable.</p>	<p>Complete This issue has been resolved. NRC Endorsement of TR-FSE-14-1-P, RCP SHIELD Seal is documented in NRC Letter from Mr. Jack Davis, Director, Mitigating Strategies Directorate to Mr. James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company LLC, dated May 28, 2014 (ML14132A128). (Reference 14)</p>
<p>3.2.1.2.D – RCP Seal Leakage Rate The acceptability of the use of the selected seals and the RCP seal leakages rates in the ELAP analysis must be justified.</p>	<p>Complete This issue has been resolved. NRC Endorsement of TR-FSE-14-1-P, RCP SHIELD Seal is documented in NRC Letter from Mr. Jack Davis, Director, Mitigating Strategies Directorate to Mr. James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company LLC, dated May 28, 2014 (ML14132A128). (Reference 14)</p>

Interim Safety Evaluation Open Item	Status
<p>3.2.1.3.A – Specify Key Parameters</p> <p>During the NRC audit process the licensee was requested to provide the following information: If the ANS 5.1-1979 + 2 sigma model is used in the ELAP analysis, specify the values of the following key parameters used to determine the decay heat: (1) initial power level, (2) fuel enrichment, (3) fuel burnup, (4) effective full power operating days per fuel cycle, (5) number of fuel cycles, if hybrid fuels are used in the core, and (6) fuel characteristics based on the beginning of the cycle, middle of the cycle, or end of the cycle. Address the adequacy of the values used. If the different decay heat model is used, describe the specific model and address the acceptability of the model and the analytical results.</p>	<p>Started.</p> <p>Ameren Missouri <i>is working with our NSSS provider and</i> will provide the requested information.</p>
<p>3.2.1.8.B Boric Acid Mixing</p> <p>The Pressurized-Water Reactor Owners Group submitted to the NRC a position paper, dated August 15, 2013, which provides test data regarding boric acid mixing under single-phase natural circulation conditions and outlined applicability conditions intended to ensure that boric acid addition and mixing would occur under conditions similar to those for which boric acid mixing data is available.</p> <p>During the audit process, the licensee informed the NRC staff of its intent to abide by the generic approach discussed above; however, the NRC staff concluded that the August 15, 2013, position paper was not adequately justified and that further information is required.</p>	<p>Started.</p> <p>The NRC has subsequently endorsed the position paper with some clarifications (Reference 9). Ameren Missouri will evaluate the clarifications and include needed information in the Final Integrated Plan (FIP), if needed.</p>

Interim Safety Evaluation Open Item	Status
<p>3.2.4.9.A Fuel Oil Quality</p> <p>Information is needed regarding plans for assuring and maintaining fuel oil quality.</p>	<p>Complete.</p> <p>All trailer mounted diesel-driven equipment housed inside the Hardened Storage Building (HSB) will be individually equipped with a trailer mounted automatic fuel oil purification system that maintains the quality of the fuel oil inside the trailer's tank. After the ELAP, the only "guaranteed" source of fuel-oil (besides what is stored inside the HSB) will be the Emergency Diesel Fuel Oil Storage Tanks (TJE01A & B). Existing sampling requirements for TEJ01A/B are delineated in Diesel Fuel Oil Testing Program as required by T/S S/R 3.8.3.3. FSG-44, FLEX Diesel Fuel Strategy, has been developed to provide direction for supplying diesel fuel for FLEX response equipment during an ELAP event. This FSG provides guidance for obtaining diesel fuel oil from the Emergency Diesel Day Tanks (TJE02 A/B), as well as the Emergency Diesel Fuel Oil Storage Tanks (TJE01A & B). Instructions for obtaining fuel from other non-robust diesel fuel tanks are also included in this FSG in the event the tank survives the event.</p>
<p>3.4.A Offsite Resource Capabilities</p> <p>Details are needed to demonstrate the minimum capabilities for offsite resources will be met per NEI 12-06 Section 12.2.</p>	<p>Complete</p> <p>The National Safer Response Centers (NSRC) in Memphis, TN., and Phoenix, AR., are operational. Ameren Missouri has a contract with NSRC to provide Phase 3 FLEX portable equipment. The NRC Staff Assessment of the NSRCs is documented in NRC Letter from Mr. Jack Davis, Director Mitigating Strategies Directorate to Mr. Joseph E. Pollock, Vice President, Nuclear Operations, Nuclear Energy Institute, dated September 26, 2014 (ML14265A107). The Staff Assessment evaluated all the items listed in NEI 12-06, Section 12.2. (Reference 15).</p>

Interim Safety Evaluation Confirmatory Item	Status
3.1.1.2.A – CST Seismic Hazard Because the current CST is unprotected from seismic hazard, the licensee is planning to install a new CST. Verification of installation is necessary.	Started The new Hardened Condensate Storage Tank (HCST) is scheduled to complete by the end of Refuel 21 (RF21)
3.1.1.2.B – Electrical Power for FLEX Equipment Deployment Information is needed regarding whether or not electrical power will be required to move or deploy FLEX equipment from storage.	Complete Electrical Power will not be required to move or deploy FLEX equipment from storage.

Interim Safety Evaluation Confirmatory Item	Status
<p>3.1.2.A – RWST and UHS Flood Levels</p> <p>Licensee stated that UHS and refueling water storage tank (RWST) are below flood levels but the licensee needs to address potential consequences such as debris in the UHS or access to RWST. In addition, the staff noted that the deployment of FLEX equipment and associated procedural interfaces may be impacted by the UHS and RWST being below the design-basis flood level.</p>	<p>Started</p> <p>The RWST is not credited as a water source for any FLEX mitigating strategy. Therefore, the RWST being below the design-basis flood level will have no impact on FLEX equipment deployment and associated procedural interfaces.</p> <p>For MODES 1-4, the RWST being located below the maximum plant site flood level of Elevation 840.16 ft. mean sea level (MSL) is not a concern from a FLEX strategy standpoint since the RWST is not required as a Reactor Coolant System (RCS) make-up and boration source. The Boric Acid Tanks (BATs) provide sufficient make-up volume to maintain sub-cooling (natural circulation removing decay heat removal via the Steam Generators) and sub-criticality of the reactor core. Low leakage Reactor Coolant Pump (RCP) seals will limit RCS leakage to less than or equal to 1 gpm/RCP (4 gpm/total). Assuming a maximum unidentified RCS leakage of 1 gpm, the total RCS leakage is 5 gpm.</p> <p><i>Ameren Missouri has revised our Mode 5 – 6 Shutdown ELAP Strategy due to concerns that the RWST is not missile protected or does not meet ESEP requirements. The revised strategy will utilize the new Hardened Condensate Storage Tank (HCST) as a water source and the Boric Acid Batching Tank (BABT) as our boron source for make-up to the Boric Acid Tanks (BATs).</i></p> <p>The impact of the UHS being below flood level is still being evaluated. Ameren Missouri will provide the requested information in a later submittal.</p>

<p align="center">Interim Safety Evaluation Confirmatory Item</p>	<p align="center">Status</p>
<p>3.1.3.3.A - The licensee did not provide information with regard to procedural interface considerations as they relate to tornados.</p>	<p>Started.</p> <p>The following will be included in the Ameren Missouri Final Integrated Plan (FIP):</p> <p>Tornados are generally fast moving events and over quickly. OTO-ZZ-00012, Severe Weather, provides instructions to prepare the plant for severe weather conditions and a potential station blackout. Ameren Missouri has identified multiple deployment routes for the FLEX portable equipment in the event of damage to the deployment routes. Ameren Missouri has also developed FLEX Support Guideline FSG-5, Initial Assessment and Flex Equipment Staging, to provide guidelines to establish clear access routes and for the deployment of the portable FLEX Equipment.</p>
<p>3.2.1.A – Potential Nitrogen Injection from Accumulators into RCS</p> <p>The licensee needs to confirm that adverse quantities of nitrogen from accumulators will not be injected into the RCS during an ELAP event using an acceptable methodology that accounts for the potential for heat transfer from the containment building to the contents of the accumulator.</p>	<p>Complete.</p> <p>Step 1 of FSG-10, “Passive RCS Injection Isolation (Rev. 0),” determines if isolation of Safety Injection (SI) Accumulators is desired. If the Steam Generators will be depressurized below 220 psig, then the SI accumulators are isolated by closure of their discharge isolation valves (if power is available from FLEX 480 VAC Generator) or vented to the containment atmosphere. Callaway Energy Center calculation, BB-180 Rev.0 Add. 5 “Minimum Steamline Pressure to Prevent Accumulator Nitrogen Injection,” establishes the site specific value for the Westinghouse Owners Group Emergency Response Guidelines Setpoint O.07 that is used in the Emergency Operating Procedures (i.e., ECA-0.0, “Loss of All AC Power,” Step 17, Rev. 019). The site calculation takes into consideration the potential for nitrogen expansion/SI accumulator pressure increase from heat sources within the containment building (i.e., RCS).</p>

<p align="center">Interim Safety Evaluation Confirmatory Item</p>	<p align="center">Status</p>
<p>3.2.1.B – Effect of failure of NSR portion of TDAFP recirculation line</p> <p>The licensee needs to confirm that the potential failure of nonsafety-related portions of the turbine-driven auxiliary feedwater pump recirculation header piping would not (1) adversely affect the quantity of condensate required for secondary makeup or (2) result in adverse accumulation of water in the CST pipe chase or other areas of the plant.</p>	<p>Started</p> <p>Ameren Missouri is revising the FSGs to provide direction to isolate recirculation flow back to the CST. The construction of the new Hardened Condensate Storage Tank will minimize the loss of auxiliary feedwater from the turbine-driven AFW pump recirculation header piping.</p> <p><i>A Time Sensitive Action is being added to our Sequence of Events Timeline to realign the turbine-driven auxiliary feedwater pump recirculation from the CST to the HCST within three (3) hours of the depletion of water from the CST. This will ensure an adequate quantity of condensate grade water for secondary makeup.</i></p>
<p>3.2.1.1.A – Use of NOTRUMP Computer Code</p> <p>Reliance on 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.</p>	<p>Complete.</p> <p>Ameren Missouri has used generic plant ELAP analyses performed with the NOTRUMP computer code to support the mitigating strategy in its Overall Integrated Plan (OIP). The use of NOTRUMP was limited to the thermal-hydraulic conditions before reflux condensation initiates. The initiation of reflux condensation cooling is defined when the one-hour centered moving average (CMA) of the flow quality at the top of the SG U-tube bend exceeds 0.1 in any one loop.</p>
<p>3.2.1.2.C – RCP SHEILD SEAL Part 21 Report</p> <p>Further information is required to assess address the impacts of the Westinghouse 10 CFR Part 21 report, “Notification of the Potential Existence of Defects Pursuant to 10CFR Part 21,” dated July 26, 2013 (ADAMS Accession No. ML 13211A168) on the use of the low seal leakage rate in the ELAP analysis.</p>	<p>Complete.</p> <p>This issue has been resolved. NRC Endorsement of TR-FSE-14-1-P, RCP SHIELD Seal is documented in NRC Letter from Mr. Jack Davis, Director Mitigating Strategies Directorate to Mr. James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company LLC, dated May 28, 2014 (ML14132A128). (Reference 14)</p>

<p align="center">Interim Safety Evaluation Confirmatory Item</p>	<p align="center">Status</p>
<p>3.2.1.5.A – Potential effect of containment harsh conditions of needed instrumentation</p> <p>The Integrated Plan did not address whether instrumentation credited in the ELAP analysis for automatic actuations and for indications required for the operators to take action are reliable and accurate in the containment harsh conditions. The licensee responded to this question in the audit process by pointing out that the licensee's self-identified open item related to the containment environment (01 2) addresses this issue. The licensee also stated that Westinghouse will be asked to perform a GOTHIC analysis of the containment to demonstrate that acceptable temperature and pressure levels will not be exceeded.</p>	<p>Started.</p> <p>The Gothic Analysis for all modes of operation has been performed. Containment pressure and temperature remain at acceptable levels. The results of the Instrumentation EQ Analysis are currently under review.</p>
<p>3.2.1.6.A – Validation of FLEX Strategies</p> <p>On page 11 of the Integrated Plan, following the sequence of events listed, the licensee stated that to confirm the times given, the licensee will prepare procedures for each task, perform time study walkthroughs for each of the tasks under simulated ELAP conditions, and account for equipment and tagging and other administrative procedures required to perform the task. Further review of the Sequence of Events will be required following this review.</p>	<p>Started</p> <p>FLEX Support Guidelines (FSG) have been prepared for each task. Validation of the FSG's will be performed per the approved NEI Guidance. The validations will assure that required tasks, manual actions, and decisions for FLEX strategies are feasible and may be executed within the constraints identified in the Overall Integrated Plan (OIP)/Final Integrated Plan (FIP) for Order EA-12-049.</p>
<p>3.2.1.8.A – Borated Coolant Basis</p> <p>Adequate basis is needed for the timing and quantity of the injection of borated coolant as well as justification that administrative procedures will ensure that subcriticality requirements for future cores are bounded.</p>	<p>Started</p> <p>Ameren Missouri will provide the basis for the timing and quantity of the injection of borated coolant. In addition, Ameren Missouri will provide the justification that administrative procedures will ensure that subcriticality requirements for future cores are bounded.</p>

<p align="center">Interim Safety Evaluation Confirmatory Item</p>	<p align="center">Status</p>
<p>3.2.2.A – SFP Cooling Connection Points</p> <p>The licensee stated the water supply for SFP cooling involves three connections points, all located on the exterior of the fuel building. The connection points on the exterior of the fuel building will need to be protected from high wind missile strikes. If protection is not possible, the connection points will need to be relocated to the inside of the building. The configuration needs to be resolved.</p>	<p>Complete.</p> <p>ULNRC-06087, Ameren Missouri’s second six-month OIP submittal update (Reference 12), section 4.4, stated that the three connections (primary, secondary, and spray) for the Spent Fuel Pool Cooling strategy had been revised to place these connections just inside the building. An evaluation determined that the connection points would be accessible early in the event.</p>
<p>3.2.2.B – Basis for SFP boil-off time</p> <p>The licensee stated that Westinghouse is being asked to clarify the basis for the 48 hour boil off time for the SFP level and the resulting information will be provided in a future 6-month update to the Integrated Plan.</p>	<p>Complete</p> <p>The boil off time in the OIP to a level of 15 feet above the fuel racks should have been 35.2 hours. The basis is the time to boil from initial conditions of 140°F and atmospheric pressure is 5.46 hours. An additional time of 29.79 hours was calculated for the boil-off time to a level in the SFP 15 feet above the fuel racks.</p> <p>The time to boil of 5.46 hours plus the boil-off time of 29.79 hours (a total of 35.2 hours) is the basis for a required action time of 33 hours. The 33 hours basis allows for deployment time of SFP Make-Up portable equipment prior to reaching a level of 10 feet above the fuel racks.</p> <p>The reference to 48 hours appears to be an error from previous draft versions of the OIP predicated on a level of 10 feet above the fuel racks.</p>
<p>3.2.3.A – Containment Condition Analysis</p> <p>The licensee will use GOTHIC to analyze containment conditions and based on the results of this evaluation, will develop required actions to ensure maintenance of containment integrity and required instrument function. The licensee stated that a detailed discussion of the GOTHIC analysis will be provided in a future 6-month update to address containment cooling during an ELAP event.</p>	<p>Started.</p> <p>The Gothic Analysis for all modes of operation has been performed. Containment pressure and temperature remain at acceptable levels. The results of the Instrumentation EQ Analysis are currently under review.</p>

<p align="center">Interim Safety Evaluation Confirmatory Item</p>	<p align="center">Status</p>
<p>3.2.4.2.A – Hydrogen Accumulation Prevention</p> <p>The licensee needs to provide details regarding a plan to prevent hydrogen accumulation in the battery room during phases 2 and 3.</p>	<p>Started.</p> <p>FSG-45, Temporary Ventilation and Lighting, will provide detailed written instructions to address this Confirmatory Item. <i>The primary strategy is to provide positive ventilation via portable fans powered from a small portable generator. FSG-45 also includes instructions to monitor hydrogen levels in the battery rooms.</i></p>
<p>3.2.4.2.B – Low Temperature Effect on Batteries</p> <p>A discussion is needed specifically on the extreme low temperatures effects of the batteries capability to perform its function for the duration of the ELAP event.</p>	<p>Complete.</p> <p><i>A Gothic Analysis was performed to ensure that the temperature in the battery rooms do not fall below 60°F due to extreme low outside temperatures until such time that the FLEX generators are supplying the battery chargers. The analysis showed with the original minimum room temperature of 60°F the battery rooms will have a slight temperature increase through the ELAP event with no equipment heaters. The DC powered equipment in the room surrounding the battery room will provide sufficient heat to keep the battery room temperatures above 60°F.</i></p>
<p>3.2.4.2.C – Coping for Beyond 24 Hours</p> <p>The licensee stated that an assessment of room environmental conditions and effects on key equipment was performed and the assessment determined that the near term actions were considered acceptable for 24 hours following a BDBEE scenario as outlined in NEI 12-06. However, the licensee further stated that a future action is required to evaluate coping times beyond 24 hours. This action should also address the capability to vent the SFP area.</p>	<p>Started.</p> <p>For coping times beyond 24 hours, temporary ventilation will be provided. Callaway will utilize EOP Addendum 20, Control Room Cabinet Door List, FSG-45, Temporary Ventilation and Lighting, and Attachment II of Emergency Coordinator Supplemental Guide, Fuel Building Ambient Cooling, to address NEI 12-06 Section 3.2.2, Guideline 10.</p>

<p align="center">Interim Safety Evaluation Confirmatory Item</p>	<p align="center">Status</p>
<p>3.2.4.3.A – Freeze Protection for FLEX Equipment</p> <p>The potential for (1) freezing of water in FLEX equipment and (2) crystallization of boric acid solution, and therefore the potential need for heat tracing on Chemical and volume control system lines, is still not addressed for long periods of time during the ELAP event scenarios. The licensee stated that additional work is required on these subjects to ensure that the potential for freezing and boron solidification is addressed.</p>	<p>Started.</p> <p>Callaway has developed FSG-50, Freeze Protection for ELAP Response. FSG-50 is being modified to incorporate ways to keep the Boric Acid Tanks (BATs) from freezing. <i>An analysis is being performed to determine heating requirements for the Boric Acid Tanks and for the batching of boric acid after the BDBEE.</i></p>
<p>3.2.4.4.A – Temporary Lighting</p> <p>The licensee needs to provide information concerning the source of power, storage location and the procedures the operators will use to stage temporary lights.</p>	<p>Complete.</p> <p>Callaway has developed FSG-45, Temporary Ventilation and Lighting. This FSG identifies the various sources of power available for temporary lighting. Temporary Lighting will be stored in the Hardened Storage Building.</p>
<p>3.2.4.4.B – Communications Systems Upgrade</p> <p>The NRC staff has reviewed the licensee communications assessment ... and has determined that the assessment for communications is reasonable. Confirmation is required to demonstrate that upgrades to the site's communication systems have been completed.</p>	<p>Complete</p> <p>Callaway has modified the plant radio passive antenna system in the power block to enhance radio communications. The portable radio cart has been procured and is stored in the Hardened Storage Building. External antennas have been installed in the Control Room, TSC, and EOF to support satellite phone communications. <i>Acceptance Testing of the portable radio cart has been completed.</i></p>
<p>3.2.4.6.A – Temporary Ventilation</p> <p>There were several references in the Integrated Plan regarding the need for analyses and procedures to address ventilation of areas such as equipment rooms and the spent fuel pool area. The licensee responded to questions regarding habitability and stated that the subject of area ventilation will be addressed in a future 6-month update.</p>	<p>Started.</p> <p>Callaway will utilize EOP Addendum 20, Control Room Cabinet Door List, FSG-45, Temporary Ventilation and Lighting, and Attachment II of Emergency Coordinator Supplemental Guide, Fuel Building Ambient Cooling, to address NEI 12-06 Section 3.2.2, Guideline 10.</p>

Interim Safety Evaluation Confirmatory Item	Status
<p>3.2.4.7.A – RWST Missile Protection</p> <p>The licensee stated the primary strategy for providing adequate cooling during Modes 5 and 6 will take suction from the new RWST connection on the RWST drain line. The licensee further stated that the RWST is seismically qualified but not missile protected. The licensee has noted a self-identified open item stating that the RWST will be missile protected to credit its use in core cooling with SGs not available strategies.</p>	<p>Started.</p> <p><i>Ameren Missouri has revised our Mode 5 – 6 Shutdown ELAP Strategy due to concerns that the RWST is not missile protected. The revised strategy will utilize the new Hardened Condensate Storage Tank (HCST) as a water source and the Boric Acid Batching Tanks (BABT) as our boron source for make-up to the Boric Acid Tanks (BATs). The RWST will not be a credited source of borated water.</i></p>
<p>3.2.4.10.A – Effect of Load Shed Evolution</p> <p>With regard to the battery load shed evolution, the licensee did not address the general question as to whether the potential loss of plant functions and resulting consequences has been addressed. Also, the licensee explained that the main generator seal oil pump is powered from the balance of plant batteries but did not address generator hydrogen hazards when the balance of plant batteries are exhausted. Licensee is requested to address these concerns.</p>	<p>Started</p> <p>Ameren Missouri is formulating the response to this item and will provide the requested information at a later update submittal.</p>

7 Potential Interim Safety Evaluation Impacts

There are no potential impacts to the Interim Safety Evaluation identified at this time.

8 References

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

1. ULNRC-05962, "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," dated February 28, 2013
2. NRC Order Number EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012
3. ULNRC-06024, "First 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)," dated August 29, 2013
4. ULNRC-06036, Request For Relaxation From NRC Order EA-12-049, "Order Modifying Licenses With Regard To Requirements For Mitigation Strategies For Beyond-Design-Basis External Events," dated October 09, 2013
5. ML13319A668, Callaway Plant, Unit 1- Relaxation Of The Scheduler Requirements For Order EA-12-049 "Issuance Of Order To Modify Licenses With Regard To Requirements For Mitigation Strategies For Beyond Design Basis External Events," dated December 11, 2013
6. ML133224A195, Callaway Plant, Unit 1 - Interim Staff Evaluation Relating To Overall Integrated Plan In Response To Order EA-12-049 (Mitigation Strategies) (TAC No. MF0772), dated December 19, 2013
7. ML13273A514, NEI Shutdown/Refueling Modes White Paper, Rev 0 9/18/13
8. ML13267A382, NRC Letter from Mr. Jack Davis, NRC, to Mr. Joseph E. Pollock, NRC Endorsement of FLEX Generic Open Item for Shutdown Refueling Modes, dated September 30, 2013
9. ML13276A183, NRC Letter from Mr. Jack Davis, NRC, to Mr. Jack Stringfellow, PWROG, NRC Endorsement of PWROG Boron Mixing White Paper, dated January 8, 2014
10. ML13241A186, NEI Letter from Mr. Nicholas Pappas, Senior Project Manager, Nuclear Energy Institute, to NRC, Mr. Jack R. Davis, Director Mitigating Strategies Directorate, EA-12-049 Mitigating Strategies Resolution of Extended Battery Duty Cycles Generic Concern, dated August 27, 2013
11. ML13241A188, NRC Letter from Mr. Jack Davis, Director Mitigating Strategies Directorate to Mr. Joseph E. Pollock, Vice President, Nuclear Operations, Nuclear Energy Institute, Battery Life White Paper Endorsement, dated September 16, 2013
12. ULNRC-06087, Second 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)
13. ULNRC-06135, "Third 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)," dated August 28, 2014

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14. ML14132A128, NRC Letter from Mr. Jack Davis, Director, Mitigating Strategies Directorate to Mr. James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company LLC, dated May 28, 2014.
15. ML14265A107, NRC Letter from Mr. Jack Davis, Director Mitigating Strategies Directorate to Mr. Joseph E. Pollock, Vice President, Nuclear Operations, Nuclear Energy Institute, Staff Assessment of National SAFER Response Centers Established in Response to Order EA-12-049, dated September 26, 2014.
16. ULNRC-06184, "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)," dated February 26, 2015