



Monticello Nuclear Generating Plant  
2807 W County Road 75  
Monticello, MN 55362

August 28, 2014

L-MT-14-073  
10 CFR 2.202  
10 CFR 50.4

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

Monticello Nuclear Generating Plant  
Docket No. 50-263  
Renewed Facility Operating License No. DPR-22

Monticello Nuclear Generating Plant's 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) (TAC No. MF0923)

References:

1. NRC Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012 (ADAMS Accession No. ML12054A735).
2. NRC Interim Staff Guidance JLD-ISG-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," Revision 0, dated August 29, 2012 (ADAMS Accession No. ML12229A174).
3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August 2012 (ADAMS Accession No. ML12242A378).
4. NSPM Letter to NRC, "Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated October 29, 2012 (ADAMS Accession No. ML12305A420).

5. NSPM Letter to NRC, "Monticello Nuclear Generating Plant's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 28, 2013 (ADAMS Accession No. ML13066A066).
6. NSPM Letter to NRC, "Monticello's 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 28, 2013 (ADAMS Accession No. ML13241A200).
7. NSPM Letter to NRC, "Monticello Nuclear Generating Plant's 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) (TAC No. MF0923)," dated February 28, 2014 (ADAMS Accession No. ML14065A037).

On March 12, 2012, the Nuclear Regulatory Commission (NRC) staff issued Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (Reference 1), to all NRC power reactor licensees and holders of construction permits in active or deferred status. Reference 1 was effective immediately and directed Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, to develop, implement and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities following a beyond-design-basis external event for the Monticello Nuclear Generating Plant (MNGP). Specific requirements are outlined in Attachment 2 of Reference 1.

Pursuant to Condition C of Section IV, Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (ISG), an overall integrated plan, and status reports at six-month intervals following the submittal of the overall integrated plan. The ISG (Reference 2) endorses, with clarifications, an industry guidance document from the Nuclear Energy Institute (NEI), NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0 (Reference 3). Reference 4 provided the MNGP initial 60-day status report regarding mitigation strategies. Reference 5 provided the overall integrated plan for MNGP. The first and second six-month status reports were provided in Reference 6 and Reference 7, respectively.

The purpose of this letter is to provide the third six-month status report pursuant to Section IV, Condition C.2 of Reference 1, which delineates the progress made in

implementing the requirements of the Reference 1 Order. The enclosed report provides an update of milestone accomplishments since the Reference 7 status report was submitted, including changes to the compliance method, schedule, or the need and basis for relief, if any.

Please contact Jennie Wike, Licensing Engineer, at 612-330-5788, if additional information or clarification is required.

Summary of Commitments

This letter makes no new commitments and no revisions to existing commitments.

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

Executed on August 28, 2014.



Karen D. Fili  
Site Vice President, Monticello Nuclear Generating Plant  
Northern States Power Company - Minnesota

Enclosure

cc: Administrator, Region III, USNRC  
Director of Nuclear Reactor Regulation (NRR), USNRC  
Project Manager, Monticello Nuclear Generating Plant, USNRC  
Resident Inspector, Monticello Nuclear Generating Plant, USNRC

**Monticello Nuclear Generating Plant  
Third Six-Month Status Report for Implementation of Order EA-12-049,  
Order Modifying Licenses with Regard to Requirements for  
Mitigation Strategies for Beyond-Design-Basis External Events**

**1.0 Introduction**

The Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," on March 12, 2012 (Reference 1). The Order required licensees to develop, implement and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities following a beyond-design-basis external event. The Order required licensees to submit an Overall Integrated Plan (OIP), including a description of how the requirements in Attachment 2 of the Order would be achieved. Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, submitted the OIP (Reference 2) for the Monticello Nuclear Generating Plant (MNGP) on February 28, 2013. In accordance with Section IV, Condition C.2 of Reference 1, NSPM submitted the first six-month status report on August 28, 2013 (Reference 3) and the second six-month report on February 28, 2014 (Reference 4).

On November 25, 2013, the NRC issued an Interim Staff Evaluation (ISE) for MNGP's Mitigating Strategies OIP (Reference 5). The ISE documents the NRC's conclusion that NSPM has provided sufficient information to determine that there is reasonable assurance that the OIP, when properly implemented, will meet the requirements of Order EA-12-049 at MNGP. The ISE also documents the confirmatory and open items identified by the NRC as a result of their review and audit of MNGP's OIP.

This Enclosure provides the third six-month status report. This status report includes an update of milestone accomplishments since submittal of the second six-month status report, including changes to the compliance method, schedule, or the need and basis for relief, if any. This status report also provides an update on NSPM's closure of the open and confirmatory items identified in the NRC's ISE. This information is current as of July 31, 2014.

## **2.0 Milestone Accomplishments**

The original milestone schedule with target dates was provided in Attachment 2 of the Reference 2 Enclosure. The milestone dates were updated in the last six-month status report. No milestones were scheduled for completion since the last six-month status report and prior to July 31, 2014. Therefore, NSPM has no milestone accomplishments to discuss.

## **3.0 Milestone Schedule Status**

The following Table 1 provides an update of the milestone schedule for the OIP. This table includes a brief milestone status and a revised target date if the target date has changed. The target dates are planning dates subject to change as design and implementation details are developed. This schedule is current as of July 31, 2014.

- Commence Installation for Online Modifications – Phase 2 and 3

The target completion date for commencing installation for online modifications has been changed from August 2014 to October 2014 to align with the current schedule.

- Issue Maintenance Procedures

The target completion date for issuing maintenance procedures has been changed from December 2014 to March 2015 to align with the purchase and delivery of equipment.

- Implement Training

The target completion date for implementing training has been changed from February 2015 to April 2015. This change was made to align this activity to the training schedule defined in the plant training plan.

| <b>Table 1 – Overall Integrated Plan Milestone Schedule</b>    |                               |                              |                                       |
|--|-------------------------------|------------------------------|---------------------------------------|
| <b>Milestone</b>   | <b>Target Completion Date</b> | <b>Activity Status</b>       | <b>Revised Target Completion Date</b> |
| Submit 60 Day Status Report                                    | October 2012*                 | Complete                     |                                       |
| Submit Overall Integrated Plan                                 | February 2013*                | Complete                     |                                       |
| Submit First Six-Month Status Report                           | August 2013*                  | Complete                     |                                       |
| Commence Engineering Modification Design – Phase 2 & 3         | January 2014                  | Complete                     |                                       |
| Submit Second Six-Month Status Report                          | February 2014*                | Complete                     |                                       |
| National SAFER Response Center Operational (MNGP)              | November 2014                 | Started                      |                                       |
| Procure Equipment  | December 2014                 | Started                      |                                       |
| Submit Third Six-Month Status Update                           | August 2014*                  | Complete with this submittal |                                       |
| Commence Installation for Online Modifications – Phase 2 and 3 | August 2014                   | Not Started                  | October 2014                          |
| Implement Storage  | December 2014                 | Started                      |                                       |
| Issue Maintenance Procedures                                   | December 2014                 | Started                      | March 2015                            |
| Implement Training   | February 2015                 | Not Started                  | April 2015                            |
| Submit Fourth Six-Month Status Report                          | February 2015*                | Not Started                  |                                       |
| Submit Staffing Assessment                                     | Four months prior to R27*     | Not Started                  |                                       |
| Complete Communication Recommendations                         | Four months prior to R27*     | Started                      |                                       |
| Issue Procedures Updated for FLEX strategies                   | April 2015                    | Started                      |                                       |
| Implementation Outage  | May 2015 (End of R27)*        | Not Started                  |                                       |
| Validation Walk-throughs                                       | April 2015                    | Not Started                  |                                       |
| Submit Completion Report                                       | August 2015                   | Not Started                  |                                       |

\*Required dates

#### 4.0 Proposed Changes to Compliance Method

There are six changes to the compliance methods and updates to the information provided in the Reference 2 OIP. These changes and updates to the information in the OIP are discussed below.

##### Reactor Depressurization

Change: Reactor depressurization will no longer be tied to completion of DC load shedding, but instead will be initiated independent of the DC load shedding activities.

The "Sequence of Events Timeline" table in Attachment 1 of the OIP (Reference 2) states that depressurization will begin after "Item 4" or load shedding is complete.

As operators in the control room have limited equipment to control during an Extended Loss of AC Power (ELAP), the lowering of reactor pressure can begin earlier. Depressurization will be secured in the range that will continue to support the operation of RCIC.

##### Phase 3 Suppression Pool Cooling

Change: Recovery actions using Phase 3 equipment will be based on the actual event, and may or may not involve restoration of Residual Heat Removal (RHR) and Residual Heat Removal Service Water (RHRSW).

The OIP submitted for MNGP included the following regarding Phase 3:

*The Phase 3 strategy is to use equipment from the Regional Response Center to restore power to one RHR pump and restore cooling water flow on the RHR Service Water (RHRSW) side of one RHR heat exchanger...*

*Alternate connection points are provided in Divisions I and II of RHRSW by removal of valve bonnets in the intake structure and installation of a flange with a hose connection...*

*The following modifications are planned:*

- *Add connection points to connect 4160 V diesel generators to the Division I or Division II 4160 V bus. Two breakers will be modified for connection to the 4160V portable diesel generators, one for each division. The breaker can be racked into the 4160 V load center in a spare location or in place of an existing breaker not required for the event.*

- *A flange will be fabricated for the alternate connection point in the intake structure to one of the four RHRSW lines. (Reference 2)*

Due to the multitude of possible damage scenarios and the availability of plant equipment, preplanning recovery actions prior to the event is not practical. Also, the Phase 2 equipment has the ability to remove decay heat past 24 hours. Therefore, the option selected for suppression pool cooling (and any associated flanges for connections) will be developed as a recovery action while Phase 2 FLEX equipment continues to operate. No installation of modifications to the plant in support of Phase 3 will be made prior to the event. The parts and procedures necessary to connect the SAFER cables from the SAFER 4160V diesel generator to the plant 4160V busses will be available.

As required by Section 12.1 of Nuclear Energy Institute (NEI) 12-06 (Reference 6), site procedures will address:

- Early notification to mobilize the offsite response
- Establishment of a point of delivery for off-site equipment
- Arrangement for delivery and deployment at the site
- Commodities to support the equipment and site personnel

Equipment from the National SAFER Response Center will be available to support extended suppression pool cooling, if necessary.

#### Portable Pump Connection Points

Change: The connection point for the FLEX portable pump to the RHRSW system will be in the Turbine Building versus the Reactor Building.

The OIP submitted for MNGP included the following regarding portable pump connection points:

*The FLEX pump will discharge through a hose into a connection point in the Division I RHR Service Water (RHRSW) piping in the Reactor Building. (Reference 2)*

A FLEX portable pump connection point will be in the RHR-RHRSW crosstie located in the Turbine Building rather than in the Division I RHRSW piping located in the Reactor Building (see Figure 1). At the connection point in the Turbine Building, the operator will be able to deliver water to:

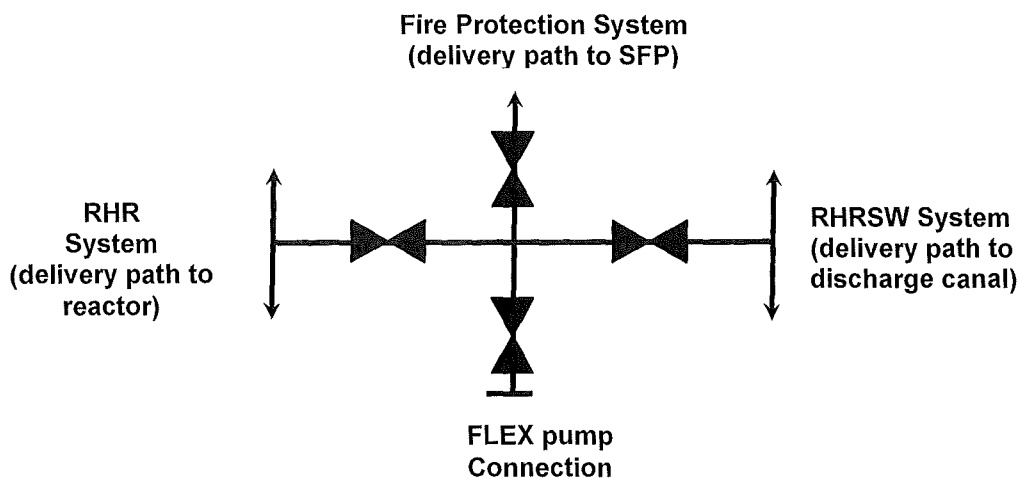
- The reactor through RHR (after opening an isolation valve in the Reactor Building),



- The spent fuel pool via fire protection piping after staging fire hoses in the Reactor Building (see discussion below), or
- The discharge canal as a minimum flow pathway. During cold weather conditions, it is important to maintain constant flow in the FLEX pump and hoses to prevent freezing. If little or no injection flow is needed to the reactor or spent fuel pool, flow can be continued by diverting to the discharge canal via RHRSW piping.

No change is proposed to the alternate connection point in the Division I RHR pump discharge piping.

**Figure 1 – RHR-RHRSW Crosstie Line (simplified)**



Additional Spent Fuel Pool Cooling Strategy

Change: An option for staging hoses to deliver water to the spent fuel pool from the fire protection piping on the spent fuel pool floor was added.

The OIP submitted for MNGP included the following regarding the FLEX pump connection points to the spent fuel pool:

*The FLEX pump could provide makeup either via RHR spent fuel pool cooling piping or via hoses that would be staged directly into the pool. (Reference 2)*

This addition will allow flow to the spent fuel pool to be controlled from the Turbine Building through fire protection piping using the FLEX portable pump connection discussed above and shown in Figure 1. The fire protection piping is not seismically designed, and therefore may not be available in all external events.

Should the fire protection system piping not be available, water can be delivered using the RHR spent fuel pool cooling piping without accessing the spent fuel pool floor.

Final flow analyses will verify that the necessary flow can be delivered via these paths.

#### Light Emitting Diode (LED) Modification

Change: Conversion to LED based area lighting will not be implemented.

The OIP submitted for MNGP (Reference 2) included the following regarding lighting:

*Necessary local battery-powered emergency lighting will be modified to use light emitting diode (LED) bulbs to extend the emergency lighting capability to beyond eight hours. (Reference 2)*

The response to Confirmatory Item 3.2.4.4.A in the second six-month status report included the following regarding lighting:

*As stated in the Overall Integrated Plan, these local battery-powered emergency lighting will be modified to use light emitting diode (LED) bulbs to extend the emergency lighting capability to beyond eight hours. (Reference 4)*

The DC emergency lighting (supplied by the safety-related batteries) will be load stripped early in the event. Local battery-powered emergency lighting (wall-mounted units) will supply lighting for at least 8 hours. DC emergency lighting will be restored following the FLEX 480V diesel generator being placed in operation and restoration of stripped loads. If there is a lighting gap between the lighting supplied by the local battery-powered emergency lighting (wall-mounted units) and DC emergency lighting powered by the batteries, headlamps and flashlights will be used to facilitate safe movement in the plant.

Therefore, local battery-powered emergency lighting will not be modified with LED bulbs as it will not be necessary.

#### Maintaining Power to Battery Loads

Change: The primary location of the connection for the 480V portable diesel generator will be moved from the Load Centers to the Battery Chargers.

The OIP submitted for MNGP included the following regarding maintaining power to battery loads:

*The FLEX portable diesel generator will use a primary connection point to a 480V load center, with an alternate connection point available at the battery chargers themselves...*

*Add connection points to connect 480V portable diesel generators to the 480V load centers (primary strategy). A breaker will be modified for connection to the 480V portable diesel generators. The breaker will be racked into the 480V load center in a spare location or in place of an existing breaker not required for the event. (Reference 2)*

The modification will add switches to disconnect the battery chargers from the motor control center and install plug-ins for cables from the portable diesel generator to re-power the battery chargers. This change will minimize the equipment required to re-power the battery chargers by eliminating the need to route power through load centers and motor control centers and associated cables.

The alternate method will be to re-power the Motor Control Centers (MCC). This method will supply power to the same battery chargers as the primary method. It will also allow additional MCC loads to be added as permitted by the diesel generator loading.

## **5.0 Need and Basis for Relief from the Requirements of the Order**

NSPM expects to comply with the Order implementation date and requirements. No relief from the requirements of the Order is required at this time.

## **6.0 Open Items from Overall Integrated Plan and Interim Staff Evaluation**

NSPM did not identify any open items in the MNGP Mitigating Strategies OIP. The OIP did contain future actions to ensure compliance with the Order. The future actions were identified internally and are being tracked through NSPM's corrective action program (CAP).

On November 25, 2013, the NRC issued the ISE for MNGP's Mitigating Strategies OIP (Reference 5). As a result of the review and audit of MNGP's OIP, the NRC identified a list of confirmatory and open items that required additional follow-up or resolution. Confirmatory items are items that the NRC considered conceptually acceptable, but for which resolution might be incomplete. These items require some minimal follow up review or audit prior to NSPM's compliance with Order EA-12-049. Open items are items for which NSPM did not present a sufficient basis for NRC to determine that the issue is on a path to resolution. The NRC's intention for designating an issue as an open item was to document significant items that needed resolution during the review process, rather than being verified after the compliance date through the inspection process.

A list of the ISE open and confirmatory items is provided in Table 2. The table provides an update on NSPM's closure of the open and confirmatory items identified in the NRC's ISE. These items will be tracked to closure in future six-month status reports.

| <b>Table 2 – Open Items and Confirmatory Items</b>  |   |
|---|---|
| <b>Item No.</b>   | <b>Description</b>  |
| Open Item<br>3.1.1.3.A  | The licensee's integrated plan did not address the potential impacts from large internal flooding sources that are not seismically robust and do not require ac power, the potential loss of ac power to mitigate ground water in critical locations, or the impact of potential failure of non-seismically robust downstream dams. |
| The requested information will be provided in the fourth six-month status report.               |   |
| Open Item<br>3.1.2.2.A  | The licensee's integrated plan did not address flooding deployment issues for restocking supplies during flooding conditions, protection for fuel supplies assuring connection points are protected, the need to provide water extraction pumps, and the need for temporary flood barriers.   |
| The requested information will be provided in the fourth six-month status report.               |   |
| Open Item<br>3.1.2.3.A  | The licensee did not discuss the need for temporary flood barriers and dewatering pumps during flooding events.   |
| The requested information will be provided in the fourth six-month status report.               |   |
| Open Item<br>3.2.1.2.A  | The licensee did not identify or provide justification for the assumptions made regarding primary system leakage from the recirculation pump seals and other sources.   |
| NSPM provided a response to this open item in the second six-month status report (Reference 4). |   |

| <b>Table 2 – Open Items and Confirmatory Items</b>  |  |
|---|--|
| <b>Item No.</b>   | <b>Description</b>   |
| Open Item<br>3.2.3.A  | Additional plant-specific Extended Loss of AC Power (ELAP) analysis information commensurate with the level of detail contained in NEDC-33771 P, including analysis assumptions and results in their tabulated and plotted formats is needed to conclude that containment functions will be maintained.  |
| NSPM provided a response to this open item in the second six-month status report (Reference 4). The criteria for opening the hard pipe vent are still being evaluated and will be provided in the fourth six-month status report. The criteria will not have a specific time constraint associated with opening the hard pipe vent. |  |
| Open Item<br>3.2.3.B  | The licensee needs to resolve the issue of the potential for the BWROG revised venting strategy to increase (relative to currently accepted venting strategies) the likelihood of detrimental effects on containment response for events in which the venting strategy is invoked. In particular it has not been shown that the potential for negative pressure transients, hydrogen combustion, or loss of containment overpressure (as needed for pump net positive suction head) is not significantly different when implementing Revision 3 of the Emergency Planning Guidelines/Severe Accident Guidelines (EPG/SAG) vs. Revision 2 of the EPG/SAG. |
| NSPM provided a response to this open item in the second six-month status report (Reference 4).   |  |
| Open Item<br>3.2.4.3.A  | The licensee needs to provide a discussion of the effects of loss of power to heat tracing.  |
| NSPM provided a response to this open item in the second six-month status report (Reference 4).   |  |
| Open Item<br>3.2.4.5.A  | The licensee needs to provide information regarding local access to the Protected areas under ELAP.  |
| NSPM provided a response to this open item in the second six-month status report (Reference 4).   |  |

| <b>Table 2 – Open Items and Confirmatory Items</b>  |   |
|---|---|
| <b>Item No.</b>   | <b>Description</b>  |
| Open Item<br>3.2.4.8.A  | The licensee did not provide any information regarding loading/sizing calculations of portable diesel generator(s) and strategy for electrical isolation for FLEX electrical generators from installed plant equipment.   |
| NSPM provided a response to this open item in the second six-month status report (Reference 4). Additional information for this open item will be provided in the fourth six-month status report once the equipment has been purchased. |   |
| Open Item<br>3.2.4.8.B  | The licensee needs to provide a description of the instrumentation that will be used to monitor portable/FLEX electrical power equipment including their associated measurement tolerances/accuracy to ensure that the electrical equipment remains protected and that operators are provided with accurate information |
| Additional information for this open item will be provided in the fourth six-month status report once the design for the portable 480V diesel generators and associated strategies are finalized.                                       |   |
| Confirmatory Item<br>3.1.1.2.A  | The licensee is still developing storage locations and associated deployment pathways for Phase 2 equipment. The availability of the potential need for ac power to deploy equipment could not be evaluated.  |
| The requested information will be provided in the fourth six-month status report.   |   |
| Confirmatory Item<br>3.1.1.4.A  | The licensee's integrated plan did not identify Regional Response Center resources, the off-site staging areas, and delivery methods sufficiently in order to evaluate the means to obtain the resources from off site.   |
| The requested information will be provided in the fourth six-month status report.   |   |
| Confirmatory Item<br>3.1.5.3.A  | The licensee did not provide measures for operating FLEX equipment at possible excessively high temperatures that may exist inside plant structures and buildings.  |
| The requested information will be provided in the fourth six-month status report.   |   |

**Table 2 – Open Items and Confirmatory Items**

| Item No.                       | Description  |
|--------------------------------|--|
| Confirmatory Item<br>3.2.1.1.A | From the June position paper, identify and discuss the benchmarks which are relied upon to demonstrate that MAAP4 is an appropriate code for simulation the of ELAP event. |

Extensive benchmarks have been performed to ensure that MAAP4 has sufficient fidelity to perform the mass and energy balances required for the ELAP calculations. The following table provides the BWR specific calculations that support all of the code calculations needed to model the ELAP scenarios.

| Sequence Initiating Event   | Type of Benchmark   | Number and Types of Sequences  | Overall Assessment   | Sequence Time Frame |
|---|---|--|--|---------------------|
| BWR transients (including SBOs, LOFW, and turbine trips)<br>Total with MAAP4: 3 + 4 minor support<br>Total with MAAP3B: 6 | Plant event: Oyster Creek (PE3)   | 1 LOFW   | Very good  | 30 min              |
|   | Integral code comparison to TRACG02 (IC3)   | 2 Loss of Offsite Power (LOOP) LOOPs with Large Loss of Coolant Accident (LLOCA) | Good   | 8 min               |
|   | Integral code comparison to SAFE (IC11)-MAAP3B  | 4 Loss of feedwater (LOFW)   | Good agreement with MAAP3B                                       | 15 min-2 hr         |
|   | Integral experiment comparison to FIST (IE11)-MAAP3B  | 2 LOFW   | Good agreement with MAAP3B                                       | 15-50 min           |
|   | Integral code comparison to MELCOR (IC10)   | 1 Station Blackout (SBO) and 3 transients  | Good: only a minor supporting benchmark for Level 1 applications | 40 hr               |
| BWR LLOCAs (excluding MSLBs)<br>Total with MAAP4: 3 + 1 minor support   | Integral code comparison to TRACG02 (IC3)   | 2 LOOPs with LLOCA   | Good   | 8 min               |
|   | Integral code comparison to SR5 and MELCOR (IC5)  | 1 LLOCA  | Good   | 4 hr                |
|   | Integral code comparison to MELCOR (IC10)   | 1 LLOCA  | Good: only a minor supporting benchmark for Level 1 applications | 40 hr               |
| BWR MLOCAs and SLOCAs<br>None with MAAP4<br>Total with MAAP3B: 2  | Integral code comparison to SAFE (IC11) – MAAP3B  | 1 Small Loss of Coolant Accident (SLOCA)   | Good agreement with MAAP3B                                       | 1 hr                |
|   | Integral experiment comparison to FIST (IE11) – MAAP3B  | 1 Medium Loss of Coolant Accident (MLOCA)  | Good agreement with MAAP3B                                       | 8 min               |
| BWR MSLBs<br>None with MAAP4<br>Total with MAAP3B: 1<br>Can be considered a subset of LLOCAs                              | Integral code comparison to SAFE (IC11) – MAAP3B  | 1 Main Steam Line Break (MSLB)   | Good agreement with MAAP3B                                       | 7 min               |
| BWR interfacing system LOCAs (discharge outside of containment)   | No supporting benchmarks, but essentially covered by LLOCA and S/MLOCA benchmarks.  |  |  |                     |
| BWR stuck- open SRVs  | No supporting benchmarks with stuck-open SRVs as an initiator, but similar to SLOCAs if discharge is to the gas space (versus to the suppression pool). Sequences are also supported by benchmarks in which stuck-open or manually opened SRVs are subsequent conditions. |  |  |                     |
| BWR feedwater line breaks   | No supporting benchmarks, but essentially covered by S/MLOCA benchmarks   |  |  |                     |
| BWR ATWS  | No supporting benchmarks  |  |  |                     |

| <b>Table 2 – Open Items and Confirmatory Items</b>   |  |
|--|--|
| <b>Item No.</b>  | <b>Description</b>   |
| <p>Confirmatory Item<br/>3.2.1.1.B</p>   | <p>Confirm that the collapsed level remains above Top of Active Fuel (TAF) and that the cool down rate was within the technical specification limits.</p>  |
| <p>NSPM provided a response to this confirmatory item in the second six-month status report (Reference 4).</p> |  |
| <p>Confirmatory Item<br/>3.2.1.1.C</p>   | <p>Confirm that MAAP was used in accordance with Sections 4.1, 4.2, 4.3, 4.4, and 4.5 of the June position paper.</p>  |
| <p>NSPM provided a response to this confirmatory item in the second six-month status report (Reference 4).</p> |  |
| <p>Confirmatory Item<br/>3.2.1.1.D</p>   | <p>Identify and justify the subset of key modeling parameters taken from Tables 4-1 through 4-6 of the MAAP4 Applications Guidance (EPRI 1020236). This should include response at a plant-specific level regarding specific modeling options and parameter choices for key models that would be expected to substantially affect the ELAP analysis performed for that licensee's plant. Although some suggested key phenomena are identified below, other parameters considered important in the simulation of the ELAP event by the vendor/licensee should also be included.</p> <ul style="list-style-type: none"> <li>a. Nodalization</li> <li>b. General two-phase flow modeling</li> <li>c. Modeling of heat transfer and losses</li> <li>d. Choked flow</li> <li>e. Vent line pressure losses</li> <li>f. Decay heat (fission products/actinides/etc.)</li> </ul> |
| <p>NSPM provided a response to this confirmatory item in the second six-month status report (Reference 4).</p> |  |



| <b>Table 2 – Open Items and Confirmatory Items</b>   |  |
|--|--|
| <b>Item No.</b>  | <b>Description</b>   |
| <p>Confirmatory Item<br/>3.2.1.1.E</p>   | <p>Identify the specific MAAP analysis case that was used to validate the timing of mitigating strategies in the integrated plan and state that it is available on a web portal for NRC staff to view. Alternately, a comparable level of information may be included in the response to the question. In either case, the analysis should include a plot of the collapsed vessel level to confirm that TAF is not reached (the elevation of the TAF should be provided) and a plot of the temperature cool down to confirm that the cool down is within tech spec limits.</p> |
| <p>NSPM provided a response to this confirmatory item in the second six-month status report (Reference 4).</p> |  |
| <p>Confirmatory Item<br/>3.2.1.3.C</p>   | <p>The licensee did not provide a completed analysis for repowering batteries using the portable FLEX 480 volt ac diesel generator and the associated time constraint for battery life. Additional analysis is required to confirm timing.</p>   |
| <p>The requested information will be provided in the fourth six-month status report.</p>                       |  |
| <p>Confirmatory Item<br/>3.2.1.3.D</p>   | <p>The licensee did not provide the basis for SOE Action Item 9 regarding the 8-hour time the portable diesel driven FLEX pumps will be staged. Additional analysis is required to confirm timing.</p>   |
| <p>NSPM provided a response to this confirmatory item in the second six-month status report (Reference 4).</p> |  |
| <p>Confirmatory Item<br/>3.2.1.3.E</p>   | <p>The licensee provided preliminary times for SOE Action Items 10, 11, and 12 regarding ventilation needs for various areas of the plant. Additional analysis is required to confirm timing.</p>  |
| <p>The requested information will be provided in the fourth six-month status report.</p>                       |  |

| <b>Table 2 – Open Items and Confirmatory Items</b>  |  |
|---|--|
| <b>Item No.</b>   | <b>Description</b>   |
| Confirmatory Item<br>3.2.1.4.A  | The licensee did not provide complete updated information regarding FLEX portable pump flow analyses. This will be provided in the licensee's February 2014 status update report.  |
| NSPM provided a response to this confirmatory item in the second six-month status report (Reference 4). Based on the changes described in Section 4, updates to the flow analyses may be needed once the design is finalized. NSPM will provide an update to this confirmatory item in the fourth six-month status report, when the flow analyses are revised and finalized.  |  |
| Confirmatory Item<br>3.2.1.4.B  | The licensee needs to provide further technical basis or a supporting analysis for the portable/FLEX diesel generator capabilities considering the capacity of the equipment. A summary of the sizing calculation for the FLEX 480V diesel generators to show that they can supply the loads assumed in Phases 2 is also needed. |
| NSPM provided a response to this confirmatory item in the second six-month status report (Reference 4). Additional information for this confirmatory item will be provided in the fourth six-month status report once the equipment has been purchased.   |  |
| Confirmatory Item<br>3.2.1.6.A  | The licensee specified that the 24-hour time constraint for supplying alternate nitrogen is preliminary but provided no technical basis or analysis to support the 24-hour requirement to supply alternate nitrogen. The licensee will provide updated information in a six-month status report in February 2014.                |
| NSPM provided a response to this confirmatory item in the second six-month status report (Reference 4). Since the second six-month status report was submitted, an error was identified in the alternate nitrogen calculation and therefore the alternate nitrogen calculation will need to be revised. NSPM will provide a response in the fourth six-month update. This concern was entered into the corrective action program. |  |
| Confirmatory Item<br>3.2.1.8.A  | The licensee did not provide a discussion regarding the methodology used to assure adequate NPSH for the RCIC pump and justify that it is adequate in light of the potential for limited margins and potentially significant transient phenomena. Additional information will be provided in a six-month update.                 |
| NSPM provided a response to this confirmatory item in the second six-month status report (Reference 4).   |  |

| <b>Table 2 – Open Items and Confirmatory Items</b>   |   |
|--|---|
| <b>Item No.</b>  | <b>Description</b>  |
| Confirmatory Item<br>3.2.1.8.B   | The integrated plan provides no details regarding; actual connection points, (e.g., system valve numbers and actual location in plant piping) the length of hose runs and associated connecting fittings required to connect the portable pump at the primary and alternate locations, and no details regarding portable pump capabilities to correlate with actual flow and pressure requirements. It is not possible to determine based on the limited information that the strategies for phase 2 core cooling are viable. |
| The requested information will be provided in the fourth six-month status report.  |   |
| Confirmatory Item<br>3.2.1.8.C   | The licensee will provide additional information regarding final design and implementation plans for use of impure water for core makeup.   |
| NSPM provided a response to this confirmatory item in the second six-month status report (Reference 4).  |   |
| Confirmatory Item<br>3.2.1.8.D   | The licensee provided insufficient information to support a conclusion that the switchover from CST to the torus function will be accomplished in a timely manner so that RCIC injection to RPV will commence without delay and remain uninterrupted. Additional information to be provided in a six-month update.  |
| The requested information will be provided in the fourth six-month status report.  |   |
| Confirmatory Item<br>3.2.2.A   | The licensee will provide additional information regarding providing alternate makeup via RHR spent fuel cooling piping, e.g., the routing of hoses from the FLEX portable pump, location where the portable pump is connected to the RHR system, FLEX pump flow and pressure requirements using this flow path in a six-month update.  |
| See response to Confirmatory Item 3.2.1.4.A for information regarding the flow rates required for the SFP makeup. Based on the changes described in Section 4, updates to the flow analyses may be needed once the design is finalized. NSPM will provide an update to this confirmatory item in the fourth six-month status report, when the flow analyses are revised and finalized. |   |
| The requested information on the routing of hoses for this SFP strategy will be provided in the fourth six-month status report.  |   |

| <b>Table 2 – Open Items and Confirmatory Items</b>   |  |
|--|--|
| <b>Item No.</b>  | <b>Description</b>   |
| Confirmatory Item<br>3.2.2.B   | The licensee did not provide complete information regarding the FLEX portable pump for the strategy for maintaining SFP level including routing of hoses, available flow rates and flow rates required to the SFP.   |
| Based on the changes described in Section 4, updates to the flow analyses may be needed once the design is finalized. NSPM will provide an update to this confirmatory item in the fourth six-month status report, when the flow analyses are revised and finalized. |  |
| The requested information on the routing of hoses for this SFP strategy will be provided in the fourth six-month status report.  |  |
| Confirmatory Item<br>3.2.4.1.A   | The licensee did not provide additional formal analysis to determine the timing and scope of the supplemental cooling water, or systems and components need to support ELAP strategies. The results of this analysis will be provided in a six-month status report.  |
| The requested information will be provided in the fourth six-month status report.  |  |
| Confirmatory Item<br>3.2.4.2.A   | The licensee did not perform calculations or supporting analysis regarding the effects of loss of ventilation in the RCIC room (that NEI 12-06 states may be addressed by plant-specific thermal hydraulic calculations) nor other areas of the plant (main control room (MCR) and battery room) when normal ventilation will not be available during the ELAP. This should include formal analysis for supplemental cooling of the RCIC room and battery room using portable fans, opening doors, and the timing and scope of such actions. |
| The requested information will be provided in the fourth six-month status report.  |  |
| Confirmatory Item<br>3.2.4.2.B   | The licensee needs to provide information to confirm that the habitability limits of the MCR will be maintained in all Phases of an ELAP considering MIL-STD-1472C, which is incorporated by reference in NEI 12-06 via NUMARC 87-00 and specifies that 110°F is tolerable for light work for a 4-hour period while dressed in conventional clothing with a relative humidity of ~30%.   |
| The requested information will be provided in the fourth six-month status report.  |  |

| <b>Table 2 – Open Items and Confirmatory Items</b>  |  |
|---|--|
| <b>Item No.</b>   | <b>Description</b>   |
| Confirmatory Item<br>3.2.4.4.A  | The licensee needs to provide a discussion that includes a rationale for eliminating power to 125 volt dc emergency lighting. This action is inconsistent with other sections of the licensee's response regarding emergency lighting. |
| <p>The OIP submitted for MNGP included the following regarding lighting:</p> <p style="padding-left: 40px;"><i>Necessary local battery-powered emergency lighting will be modified to use light emitting diode (LED) bulbs to extend the emergency lighting capability to beyond eight hours. (Reference 2)</i></p> <p>The response to Confirmatory Item 3.2.4.4.A in the second six-month status report included the following regarding lighting:</p> <p style="padding-left: 40px;"><i>As stated in the Overall Integrated Plan, these local battery-powered emergency lighting will be modified to use light emitting diode (LED) bulbs to extend the emergency lighting capability to beyond eight hours.(Reference 4)</i></p> <p>The DC emergency lighting (supplied by the safety-related batteries) will be load stripped early in the event. Local battery-powered emergency lighting (wall-mounted units) will supply lighting for at least 8 hours. DC emergency lighting will be restored following: 1) the FLEX 480V diesel generator being placed in operation and 2) restoration of stripped loads. If there is a lighting gap between the lighting supplied by the local battery-powered emergency lighting (wall-mounted units) and DC emergency lighting powered by the batteries, headlamps and flashlights will be used to facilitate safe movement in the plant.</p> <p>Therefore, local battery-powered emergency lighting will not be modified with LED bulbs as it will not be necessary.</p> |  |
| Confirmatory Item<br>3.2.4.4.B  | Review of the licensee communications enhancements for confirmation that upgrades to the site's communications systems have been completed if necessary.   |
| <p>The requested information will be provided in the fourth six-month status report.</p>  |  |

| <b>Table 2 – Open Items and Confirmatory Items</b>                                |   |
|---|---|
| <b>Item No.</b>   | <b>Description</b>  |
| Confirmatory Item<br>3.2.4.9.A  | The licensee did not address actions to maintain the quality of fuel stored in the tanks of the portable equipment for potentially long periods of time when the equipment (diesel driven pumps and generators will not be operated.  |
| The requested information will be provided in the fourth six-month status report. |   |
| Confirmatory Item<br>3.2.4.10.A   | The licensee provided various examples of loads to be shed, and loads to remain powered from both divisions of the 125V DC and 250V DC buses, and stated that the station batteries do not require portable supplemental charging before eight (8) hours. The licensee needs to provide a completed load shed analysis.                                 |
| The requested information will be provided in the fourth six-month status report. |   |
| Confirmatory Item<br>3.3.2.A  | The licensee needs to provide a description of the configuration control program it will implement that includes a program document that will contain; a historical record of previous strategies and the basis for changes, and a change control process to allow changes to the strategies only if they continue to meet the guidelines of NEI 12-06. |
| The requested information will be provided in the fourth six-month status report. |   |
| Confirmatory Item<br>3.4.A  | The licensee needs to provide additional information regarding the minimum capabilities for offsite resources for which each licensee should establish availability as noted in considerations 2 through 10 of NEI 12-06, Section 12.2 lists the following minimum capabilities.  |
| The requested information will be provided in the fourth six-month status report. |   |

## 7.0 Potential Interim Staff Evaluation Impacts

An evaluation of the potential impacts of the changes to the OIP, described in Section 4, to the NRC's ISE is described below.

### Reactor Depressurization

The NRC's ISE included the following regarding NSPM's approach for reactor depressurization:

*The SOE notes for Action 5 that following Action 4, the operators will depressurize the Reactor using the SRV's to Approximately 100 psig. (Reference 5)*

The change to the Phase 1 reactor depressurization strategy, described in Section 4, impacts the above ISE statement. As described in Section 4, depressurization to a reactor pressure that maintains RCIC operation, which is Action 5 in the SOE in Attachment 1 of the OIP (Reference 2), will occur prior to the completion of load stripping, which is Action 4 in SOE in Attachment 1 of the OIP (Reference 2).

### Phase 3 Suppression Pool Cooling

The NRC's ISE included the following regarding suppression pool cooling in Phase 3:

*In the long term, additional equipment, such as 4160 volt ac diesel generators and diesel driven pumps, will be delivered from one of two Regional Response Centers established by the nuclear power industry to provide supplemental accident mitigation equipment to power an RHR pump and supply RHR service water cooling water. (Reference 5)*

The change to the Phase 3 suppression pool cooling strategy, as described in Section 4, impacts the above ISE statement regarding exclusive use of RHR and RHRSW pumps. NSPM plans to continue to use Phase 2 strategies past 24 hours, and re-powering the RHR and RHRSW pump will occur as a recovery action based on the nature of the event.

### Portable Pump Connection Points

The Interim Staff Evaluation included the following regarding the portable pump connection points:

*The FLEX pump will discharge through a hose into a connection point in the Division I RHR Service Water (RHRSW) piping in the Reactor Building, via a seismically qualified cross tie connection between RHR and RHRSW then via RHR Low Pressure Coolant Injection (LPCI) lines. (Reference 5)*

The change to the Phase 2 core cooling strategy, as described in Section 4, impacts the above ISE statement. The connection point will be installed in the RHR and RHRSW system crosstie in the Turbine Building versus the Reactor Building.

#### Additional Spent Fuel Pool Cooling Strategy

The NRC's ISE included the following regarding the spent fuel pool cooling strategy

*The FLEX pump could provide makeup either via RHR SFP cooling piping or via hoses that would be staged directly into the pool. (Reference 5)*

The change to the spent fuel pool cooling strategy, as described in Section 4, impacts the above ISE statement. The change provides an additional option for supplying water to the spent fuel pool.

#### Light Emitting Diode (LED) Modification

The NRC's ISE included the following regarding the modification for the LEDs:

*On page 36 of the Integrated Plan, the licensee specified that, necessary local battery-powered emergency lighting will be modified to use light emitting diode (LED) bulbs to extend the emergency lighting capability to beyond eight hours. (Reference 5)*

The change to the plant lighting strategy, as described in Section 4, impacts the above ISE statement. The modification to use LED bulbs will not be implemented. Lighting will be available from wall mounted units for the first 8 hours, and later from the emergency DC lighting. Flashlights and headlamps will be available if there is a lighting gap.

#### Maintaining Power to Battery Loads

The NRC's ISE included the following on maintaining power to battery loads:

*The FLEX portable diesel driven generator will be used to power 250 volt dc and 125 volt dc battery chargers and reenergize selected 480 volt load centers. This will allow energizing selected motor control centers so that power is available to critical loads such as required motor-operated valves, dc components through the installed battery chargers, and desired ac instrumentation. (Reference 5)*

The change to the strategy for maintaining power to the battery loads, as described in Section 4, impacts the statements in the ISE. The primary location of the connection for the 480V portable diesel generator will be moved from the Load Centers to the Battery



Chargers. The alternate method for maintain power to the battery loads will be to repower the Motor Control Centers (MCC).

## 8.0 References

1. NRC Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012 (ADAMS Accession No. ML12054A735).
2. NSPM Letter to NRC, "Monticello Nuclear Generating Plant's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 28, 2013 (ADAMS Accession No. ML13066A066).
3. NSPM Letter to NRC, "Monticello's 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 28, 2013 (ADAMS Accession No. ML13241A200).
4. NSPM Letter to NRC, "Monticello Nuclear Generating Plant's 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) (TAC No. MF0923)," dated February 28, 2014 (ADAMS Accession No. ML14065A037).
5. NRC Letter to NSPM, "Monticello Nuclear Generating Plant – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC No. MF0923)," dated November 25, 2013 (ADAMS Accession No. ML13220A139).
6. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August 2012 (ADAMS Accession No. ML12242A378).