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December 21, 2017

L-MT-17-081
10 CFR 2.202
EA-13-109

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

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

Monticello Nuclear Generating Plant: Seventh Six-Month Status Report in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order EA-13-109), Phases 1 and 2 (CAC No. MF4376)

References:

1) NRC Order Number EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," dated June 6, 2013. (ADAMS Accession No. ML13143A334)
2) NRC Interim Staff Guidance JLD-ISG-2013-02, "Compliance with Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," Revision 0, dated November 14, 2013. (ADAMS Accession No. ML13304B836)
3) Letter from D. Skeen (NRC) to J. Pollock (NEI), Endorsement of Hardened Containment Venting System (HCVS) Phase 1 Overall Integrated Plan Template (EA-13-109) Rev 0, dated May 14, 2014. (ADAMS Accession No. ML14128A219)
4) NEI 13-02, "Industry Guidance for Compliance with Order EA-13-109," Revision 0, dated November 2013. (ADAMS Accession No. ML13316A853)
5) Letter from K. Fili (NSPM) to Document Control Desk (NRC), "MNGP's Phase 1 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109)," L-MT-14-052, dated June 30, 2014. (ADAMS Accession No. ML14183A412).

6) Letter from K. Fili (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant: First Six-Month Status Report in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109)," L-MT-14-092, dated December 16, 2014. (ADAMS Accession No. ML14353A215)
7) Letter from P. Gardner (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant: Second Six-Month Status Report in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), Phase 1," L-MT-15-031, dated June 22, 2015. (ADAMS Accession No. ML15173A176)
8) NEI 13-02, "Industry Guidance for Compliance with Order EA-13-109," Revision 1, dated April 2015. (ADAMS Accession No. ML15113B318)
9) NRC Interim Staff Guidance JLD-ISG-2015-01, "Compliance with Phase 2 of Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," Revision 0, dated April 2015. (ADAMS Accession No. ML15104A118)
10) Letter from P. Gardner (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant's Phase 2 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109) including Phase 1 Status Report," L-MT-15-090, dated December 17, 2015. (ADAMS Accession No. ML15356A120)
11) Letter from P. Gardner (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant: Fourth Six-Month Status Report in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), Phases 1 and 2," L-MT-16-034, dated June 17, 2016. (ADAMS Accession No. ML16169A309)
12) Letter from M. Halter (NRC) to P. Gardner (NSPM), "Subject: Monticello Nuclear Generating Plant – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase One of Order EA-13-109 (Severe Accident Capable Hardened Vents) (TAC No. MF4376),"dated April 2, 2015. (ADAMS Accession No. ML15082A167)

13) Letter from J. Quichocho (NRC) to P. Gardner (NSPM), "Subject: Monticello Nuclear Generating Plant – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase 2 of Order EA-13-109 (Severe Accident Capable Hardened Vents) (CAC No. MF4376),"dated September 6, 2016. (ADAMS Accession No. ML16244A120)
14) Letter from P. Gardner (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant: Fifth Six-Month Status Report in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), Phases 1 and 2," L-MT-16-072, dated December 19, 2016. (ADAMS Accession No. ML16354A666)
15) Letter from P. Gardner (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant: Sixth Six-Month Status Report in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), Phases 1 and 2," L-MT-17-042, dated June 14, 2017. (ADAMS Accession No. ML17166A051)

On June 6, 2013, the Nuclear Regulatory Commission (NRC) issued Order EA-13-109 (Reference 1) to Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy. Reference 1 was effective immediately and directs NSPM to install a reliable hardened venting capability for pre-core damage and under severe accident conditions, including those involving a breach of the reactor vessel by molten core debris, for Monticello Nuclear Generating Plant (MNGP). Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 required submission of a Phase 1 Overall Integrated Plan (OIP) pursuant to Section IV, Condition D. References 2 and 3 endorse industry guidance document, NEI 13-02, Revision 0 (Reference 4) with clarifications and exceptions. Reference 5 provided the MNGP Phase 1 OIP.

Reference 1 requires submission of status reports at six-month intervals following submittal of the Phase 1 OIP. References 2 and 4 provide direction regarding the content of the status reports. References 6 and 7 provided the first and second six-month status reports for Phase 1 of the order.

In Reference 9, the NRC endorsed industry guidance document NEI 13-02, Revision 1 (Reference 8) with clarifications and exceptions identified in Reference 9. NEI 13-02, Revision 1 provides guidance for implementing Phase 2 of Order EA-13-109. Reference 10 provided a combined Phase 1 and 2 OIP and provided an updated status of Phase 1 of the order. Reference 11 provided the fourth status report which included both Phase 1 and Phase 2 status updates. In References 12 and 13, the NRC provided

interim staff evaluations (ISEs) for HCVS Order Phase 1 and 2 OIPs, respectively. In Reference 14 and 15, NSPM provided the fifth and sixth HCVS Order status reports.

The purpose of this letter is to provide the seventh six-month status report pursuant to Section IV, Condition D, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. Enclosure 1 provides the status report, which includes an update of Phase 1 and 2 milestone accomplishments, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

Enclosure 2 to this letter provides the closure of the HCVS Order Phase 2 OIP Open Item identified in Attachment 7 of the enclosure to Reference 10.

Enclosure 3 to this letter provides responses to various HCVS Order Phase 2 Interim Staff Evaluation Open Items. The Phase 2 Open Items are identified in the NRC's Interim Staff Evaluation (Reference 13).

Please contact Andrew Kouba, Regulatory Affairs Engineer, at 612-342-8971, 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 December 21, 2017.

Christopher R. Church
Site Vice President, Monticello Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosures (3)

cc: Administrator, Region III, USNRC
Project Manager, Monticello Nuclear Generating Plant, USNRC
Resident Inspector, Monticello Nuclear Generating Plant, USNRC

ENCLOSURE 1

MONTICELLO NUCLEAR GENERATING PLANT

SEVENTH SIX-MONTH STATUS REPORT FOR THE IMPLEMENTATION OF NRC ORDER EA-13-109, "ORDER MODIFYING LICENSES WITH REGARD TO RELIABLE HARDENED CONTAINMENT VENTS CAPABLE OF OPERATION UNDER SEVERE ACCIDENT CONDITIONS, PHASES 1 AND 2"

1.0 Introduction

Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, developed a Phase 1 Overall Integrated Plan (OIP) (Reference 1) for the Monticello Nuclear Generating Plant (MNGP), in response to Reference 2. The Phase 1 OIP documents the installation of a Hardened Containment Vent System (HCVS) that provides a reliable wetwell hardened venting capability for pre-core damage and under severe accident conditions, including those involving a breach of the reactor vessel by molten core debris. Starting with the fourth six-month status report (Reference 12), updates of milestone accomplishments were based on the combined Phase 1 and 2 OIP, (Reference 9). The fifth and sixth six-month status reports were provided in References 14 and 15. Previous status reports for Phase 1 only were provided to the NRC in References 6 and 8.

NSPM developed an updated and combined Phase 1 and 2 OIP (Reference 9), documenting:

1. The installation of a HCVS that provides a reliable hardened venting capability for pre-core damage and under severe accident conditions, including those involving a breach of the reactor vessel by molten core debris, in response to Reference 2.
2. An alternative venting strategy that makes it unlikely that a drywell vent is needed to protect the containment from overpressure related failure under severe accident conditions, including those that involve a breach of the reactor vessel by molten core debris, in response to Reference 2.

This enclosure provides an update of milestone accomplishments since submittal of the combined Phase 1 and 2 OIP, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2.0 Milestone Accomplishments

The original milestone schedule with target dates was provided in Part 5 of the combined Phase 1 and Phase 2 OIP (Reference 9). The milestone dates are updated, if necessary, in the six-month status reports. One milestone was completed since the

last six-month status report and prior to November 30, 2017. The milestone was related to Phase 2 of the HCVS Order. The milestone completed was:

- Phase 2 Modification - Design Engineering On-site/Complete on October 18, 2017.

3.0 Milestone Schedule Status

The following provides an update to Part 5 of the combined Phase 1 and 2 OIP (Reference 9). It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed (i.e., not considered formal regulatory commitments). This schedule is current as of December 1, 2017.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Phase 1 and 2 HCVS Milestone Table			
Submit Phase 1 OIP	June 2014	Complete	
Submit 6 Month Updates:			
Update 1	December 2014	Complete	
Update 2	June 2015	Complete	
Update 3 (with Phase 2 OIP)	December 2015	Complete	
Update 4	June 2016	Complete	
Update 5	December 2016	Complete	
Update 6	June 2017	Complete	
Update 7	December 2017	Complete with this Submittal	
Update 8	June 2018	Not Started	
Update 9	December 2018	Not Started	

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Phase 1 Specific Milestones			
Phase 1 Modifications:			
Hold preliminary/conceptual design meeting	June 2014	Complete	
Design Engineering On-site/Complete	November 2016	Complete	
Implementation Outage	May 2017	Complete	
Walk Through Demonstration/Functional Test	May 2017	Complete	
Phase 1 Procedure Changes Active:			
Operations Procedure Changes Developed	May 2017	Complete	
Site Specific Maintenance Procedure Developed	May 2017	Complete	
Procedure Changes Active	May 2017	Complete	
Phase 1 Training:			
Training Complete	May 2017	Complete	
Phase 1 Completion:			
HCVS Implementation	May 2017	Complete	
Submit Completion Report	July 2017	Not Required	Milestone is not required per NRC direction.
Phase 2 Specific Milestones			
Phase 2 Modifications:			

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Hold preliminary/conceptual design meeting	October 2015	Complete	
Design Engineering On-site/Complete	June 2018	Complete	
Implementation Outage	May 2019	Not Started	
Walk Through Demonstration/Functional Test	May 2019	Not Started	
Phase 2 Procedure Changes Active:			
Operations Procedure Changes Developed	December 2018	Started	
Site Specific Maintenance Procedure Developed	December 2018	Not Started	
Procedure Changes Active	May 2019	Not Started	
Phase 2 Training:			
Training Complete	May 2019	Not Started	
Phase 2 Completion:			
HCVS Implementation	May 2019	Not Started	
Submit Completion Report	July 2019	Not Started	

4.0 Proposed Changes to Compliance Method

There are no changes to the compliance methods as documented in the combined Phase 1 and 2 OIP (Reference 9). Updates to information in the OIP are discussed below.

OIP Update – Electrical Component Qualification

In Reference 9, Part 2, NSPM stated that any HCVS order electrical components that interface with Class 1E power sources would be considered safety related and that the remaining components would be considered augmented quality components.

As described in the response to ISE Open Item 10 in Reference 15, not all electrical components installed for the HCVS Order Phase 1 compliance are safety related or augmented quality. However, all components are qualified for the expected conditions that may occur should an ELAP with core damage occur.

OIP Update – Electrical Conduit Seismic Classification

In Reference 9, Part 2, NSPM stated that conduit designs will be installed to Seismic Class 1 Criteria.

The conduit work in support of the HCVS modifications to complete Phase 1 of the order were considered non-safety related installations. The conduit that was installed was required to be Underwriters Laboratory (UL) listed. The conduit was installed to Seismic II/I criteria, which ensures the conduit will not collapse in a design basis seismic event.

OIP Update – Backup Operating Station Valve Controls

In Reference 9, Part 2, NSPM stated that controls required to open the HCVS at the backup operating station (Remote Operating Station (ROS)) will be secured.

A key-lock switch is provided for the HCVS Primary Containment Isolation Valve controls at the Alternate Shutdown System Panel where the Primary Operating Station is provided. However, at the nitrogen bottles, manual isolation valves were installed, and these valves are normally closed but are not secured. Multiple actions (i.e. at the nitrogen bottles and at the ROS) are required to open an HCVS containment isolation valve or to rupture the rupture disk, therefore, inadvertent operation is not credible.

OIP Update – Drill/Exercise Performance

In Reference 9, Part 4, NSPM stated that the site will utilize the guidance provided in NEI 13-06 and 14-01 for guidance related to drills, tabletops, or exercises for HCVS operation. In addition, the site will integrate these requirements with compliance to any rulemaking resulting from the NTTF Recommendations 8 and 9.

It is NSPM's intention to comply with drill/exercise performance requirements consistent with the final 10 CFR 50.155 language. NSPM will continue to utilize the guidance of NEI 13-06 and NEI 14-01 insofar as it is consistent with the regulatory requirements promulgated in the final rulemaking.

OIP Update – SAWA and SAWM Flowrates

In Reference 9, Part 3, NSPM stated that the Severe Accident Water Addition (SAWA) flowrate for MNGP is 305 gpm and the Severe Accident Water Management (SAWM) flowrate is 61 gpm.

A refined evaluation of the required SAWA and SAWM flowrates has been completed for MNGP. As a result, SAWA flow is now 285 gpm and SAWM flow is now 57 gpm. These new SAWA and SAWM flowrates are reflected in the responses to the open items in enclosure 3 of this letter.

5.0 Need and Basis for Relief/Relaxation from the Requirements of the Order

NSPM expects to comply with the order implementation date and no relief/relaxation is required at this time.

6.0 Open Items from Combined Overall Integrated Plan and Interim Staff Evaluation

The following tables provide a summary of the open items documented in the combined Phase 1 and 2 OIP (Reference 9) and the Interim Staff Evaluations (ISE) (References 7 and 13) and the status of each item.

OIP Phase 1 Open Items	Status
1. Follow industry guidance on missile protection for HCVS.	Closed - see ISE Phase 1 Open Item 5
2. Identify the 24 hour power supply for the HCVS.	Closed – see ISE Phase 1 Open Item 1
3. Determine radiological conditions for the FLEX portable equipment staging areas.	Closed – see ISE Phase 1 Open Item 3
4. Evaluate the Alternate Shutdown System (ASDS) panel and Backup HCVS Operation Station locations for accessibility, habitability, staffing sufficiency, associated pathways from the control room and communication capability with vent-use decision makers.	Closed – see ISE Phase 1 Open Items 3 and 7

5. Determine approach or combination of approaches to control hydrogen.	Closed – see ISE Phase 1 Open Items 8 and 9
6. Determine the Qualification Method for HCVS instrumentation.	Closed – see ISE Phase 1 Open Item 10
7. Evaluate the effects of radiological and temperature constraints on the deployment of nitrogen bottles after 24 hours.	Closed – see ISE Phase 1 Open Item 3
8. Evaluate HCVS battery charger location for accessibility, habitability, staffing sufficiency, associated pathways from control room and communication capability with vent-use decision makers.	Closed – see ISE Phase 1 Open Items 3 and 7
OIP Phase 2 Open Items	**Status**
1. Determine approach to repower Low Pressure Coolant Injection (LPCI) swing bus from FLEX PDG.	Closed See Enclosure 2

ISE Phase 1 Open Items	**Status**
1. Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger including incorporation into FLEX Diesel Generator (DG) loading calculation.	Complete See Reference 15
2. Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.	Complete See Reference 15
3. Make available for NRC staff audit an evaluation of temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.	Complete See Reference 15
4. Make available for NRC staff audit analyses demonstrating that HCVS has the capacity to vent the steam/energy equivalent of one percent of licensed/rated thermal power (unless a lower value is justified), and that the suppression pool and the HCVS together are able to absorb and reject decay heat, such that following a reactor shutdown from full power containment pressure is restored and then maintained below the primary containment design pressure and the primary containment pressure limit.	Complete See Reference 14

ISE Phase 1 Open Items	Status
5. Make available for NRC staff audit the seismic and tornado missile final design criteria for the HCVS stack.	Complete See Reference 14
6. Make available for NRC staff audit the descriptions of local conditions (temperature, radiation and humidity) anticipated during Extended Loss of AC Power (ELAP) and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions.	Complete See Reference 15
7. Make available for NRC staff audit documentation that demonstrates adequate communication between the remote HCVS operation locations and HCVS decision makers during ELAP and severe accident conditions.	Complete See Reference 15
8. Provide a description of the final design of the HCVS to address hydrogen detonation and deflagration.	Complete See Reference 14
9. Provide a description of the strategies for hydrogen control that minimizes the potential for hydrogen gas migration and ingress into the reactor building or other buildings.	Complete See Reference 15
10. Make available for NRC staff audit descriptions of all instrumentation and controls (existing and planned) necessary to implement this order including qualification methods.	Complete See Reference 15
11. Make available for NRC staff audit documentation of an evaluation verifying the existing containment isolation valves, relied upon for the HCVS, will open under the maximum expected differential pressure during Beyond Design Basis External Event (BDBEE) and severe accident wetwell venting.	Complete See Reference 14

ISE Phase 2 Open Items	Status
1. Licensee to provide the plant specific justification for SAWA [Severe Accident Water Addition] flow capacity less than specified in the guidance in NEI 13-02, Section 4.1.1.2.	Complete See Enclosure 3

ISE Phase 2 Open Items	Status
2. Licensee to evaluate the SAWA equipment and controls, as well as the ingress and egress paths for the expected severe accident conditions (temperature, humidity, radiation) for the sustained operating period.	Complete See Enclosure 3
3. Licensee to demonstrate how instrumentation and equipment being used for SAWA and supporting equipment is capable to perform for the sustained operating period under the expected temperature and radiological conditions.	Complete See Enclosure 3
4. Licensee to demonstrate that containment failure as a result of overpressure can be prevented without a drywell vent during severe accident conditions.	Complete See Enclosure 3
5. Licensee to demonstrate how the plant is bounded by the reference plant analysis that shows the SAWM [Severe Accident Water Management] strategy is successful in making it unlikely that a drywell vent is needed.	Complete See Enclosure 3
6. Licensee to demonstrate that there is adequate communication between the MCR [Main Control Room] and the Intake Structure operator at the FLEX manual valve during severe accident conditions.	Complete See Enclosure 3
7. Licensee to demonstrate the SAWM flow instrumentation qualification for the expected environmental conditions.	Complete See Enclosure 3

7.0 Interim Staff Evaluation Impacts

There are no potential impacts to the Phase 1 or 2 ISE identified at this time.

8.0 References

The following references support the updates to the combined Phase 1 and 2 OIP described in this enclosure.

1) Letter from K. Fili (NSPM) to Document Control Desk (NRC), "MNGP's Phase 1 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109)," L-MT-14-052, dated June 30, 2014. (ADAMS Accession No. ML14183A412)

2) NRC Order Number EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," dated June 6, 2013. (ADAMS Accession No. ML13143A334)

3) NEI 13-02, "Industry Guidance for Compliance with Order EA-13-109," Revision 0, dated November 2013. (ADAMS Accession No. ML13316A853)

4) NRC Interim Staff Guidance JLD-ISG-2013-02, "Compliance with Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," Revision 0, dated November 14, 2013. (ADAMS Accession No. ML13304B836)

5) Letter from D. Skeen (NRC) to J. Pollock (NEI), Endorsement of Hardened Containment Venting System (HCVS) Phase 1 Overall Integrated Plan Template (EA-13-109) Rev 0, dated May 14, 2014. (ADAMS Accession No. ML14128A219)

6) Letter from K. Fili (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant: First Six-Month Status Report in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109)," L-MT-14-092, dated December 16, 2014. (ADAMS Accession No. ML14353A215)

7) Letter from M. Halter (NRC) to P. Gardner (NSPM). "Monticello Nuclear Generating Plant - Interim Staff Evaluation Relating To Overall Integrated Plan In Response To Phase One Of Order EA-13-109 (Severe Accident Capable Hardened Vents) (TAC No. MF4376)," dated April 2, 2015. (ADAMS Accession No. ML15082A167)

8) Letter from P. Gardner (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant: Second Six-Month Status Report in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), Phase 1," L-MT-15-031, dated June 22, 2015. (ADAMS Accession No. ML15173A176)

9) Letter from P. Gardner (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant's Phase 2 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109) including Phase 1 Status Report," L-MT-15-090, dated December 17, 2015. (ADAMS Accession No. ML15356A120)

10) NRC Interim Staff Guidance JLD-ISG-2015-01, "Compliance with Phase 2 of Order EA-13-109, Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," Revision 0, dated April 2015. (Accession No. ML15104A118)

11) NEI 13-02, "Industry Guidance for Compliance with Order EA-13-109," Revision 1, dated April 2015. (ADAMS Accession No. ML15113B318)

12) Letter from P. Gardner (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant: Fourth Six-Month Status Report in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), Phases 1 and 2," L-MT-16-034, dated June 17, 2016. (ADAMS Accession No. ML16169A309)

13) Letter from J. Quichocho (NRC) to P. Gardner (NSPM), "Subject: Monticello Nuclear Generating Plant – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase 2 of Order EA-13-109 (Severe Accident Capable Hardened Vents) (CAC No. MF4376),"dated September 6, 2016. (ADAMS Accession No. ML16244A120)

14) Letter from P. Gardner (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant: Fifth Six-Month Status Report in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), Phases 1 and 2," L-MT-16-072, dated December 19, 2016. (ADAMS Accession No. ML16354A666)

15) Letter from P. Gardner (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant: Sixth Six-Month Status Report in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109), Phases 1 and 2," L-MT-17-042, dated June 14, 2017. (ADAMS Accession No. ML17166A051)

ENCLOSURE 2

MONTICELLO NUCLEAR GENERATING PLANT

CLOSURE OF OVERALL INTEGRATED PLAN OPEN ITEM ASSOCIATED WITH NRC ORDER EA-13-109, PHASE 2

ORDER MODIFYING LICENSES WITH REGARD TO RELIABLE HARDENED CONTAINMENT VENTS CAPABLE OF OPERATION UNDER SEVERE ACCIDENT CONDITIONS

Introduction:

This enclosure closes the following Open Item from the Monticello Nuclear Generating Plant (MNGP) Hardened Containment Vent System (HCVS) Overall Integrated Plan (OIP) (Attachment 7 of the enclosure to Reference 1) Associated with NRC Order EA-13-109, Phase 2:

Open Item #	Description
9	Determine approach to repower Low Pressure Coolant Injection (LPCI) swing bus from FLEX Portable Diesel Generator (PDG)

References:

1) Letter from P. Gardner (NSPM) to Document Control Desk (NRC), "Monticello Nuclear Generating Plant's Phase 2 Overall Integrated Plan in Response to June 6, 2013 Commission Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109) including Phase 1 Status Report," L-MT-15-090, dated December 17, 2015. (ADAMS Accession No. ML15356A120)

OIP Phase 2 Open Item – Approach to repower LPCI swing bus

Determine approach to repower LPCI swing bus from FLEX PDG

NSPM Closure

NSPM will install a permanent receptacle connection that can be used to directly re-power the LPCI swing bus when normal and emergency power are lost during a beyond design basis event. The connection will be through a Safety Related breaker installed in a spare cubicle. The receptacle will be mounted near the division 2 LPCI swing bus MCC-143B.

ENCLOSURE 3

MONTICELLO NUCLEAR GENERATING PLANT

RESPONSES TO OPEN ITEMS
ASSOCIATED WITH NRC ORDER EA-13-109, PHASE 2

ORDER MODIFYING LICENSES WITH REGARD TO RELIABLE HARDENED CONTAINMENT VENTS CAPABLE OF OPERATION UNDER SEVERE ACCIDENT CONDITIONS

Introduction:

This enclosure provides responses to the following Open Items from the NRC Hardened Containment Vent System (HCVS) Interim Staff Evaluation (Reference 1) for the Monticello Nuclear Generating Plant (MNGP):

Open Item #	Description
1	Justification for SAWA Flow Capacity less than NEI 13-02 Guidance
2	Evaluation of Severe Accident Conditions for SAWA Equipment and Controls as well as Ingress and Egress Paths
3	Demonstrate SAWA Instrumentation and Equipment Performance Under Expected Temperature and Radiological Conditions
4	Demonstrate Containment Overpressure Prevention without Drywell Vent during Severe Accident Conditions
5	Demonstrate MNGP is Bounded by Reference Plant Analysis by Showing SAWM Strategy is Successful in Making it Unlikely that a Drywell Vent is Needed
6	Demonstrate Adequate Communication between Main Control Room and Intake Structure Operator at FLEX Manual Valve
7	Demonstrate SAWM Flow Instrumentation Qualification for Expected Environmental Conditions

References:

1) Letter from J. Quichocho (NRC) to P. Gardner (NSPM), "Subject: Monticello Nuclear Generating Plant – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase 2 of Order EA-13-109 (Severe Accident Capable Hardened Vents) (CAC No. MF4376),"dated September 6, 2016. (ADAMS Accession No. ML16244A120)

Open Item Responses:

Open Item 1 - Justification for SAWA Flow Capacity less than NEI 13-02 Guidance:

NRC Request

Licensee to provide the plant specific justification for SAWA [Severe Accident Water Addition] flow capacity less than specified in the guidance in NEI 13-02, Section 4.1.1.2.

NSPM Response

NEI 13-02 Section 4.1.1.2 provides the following guidance in determining the maximum flow capacity:

> 4.1.1.2.1 Sites may use SAWA capacity at 500 GPM based on the generic analysis per reference 27.
> 4.1.1.2.2 Sites may use a SAWA capacity equivalent to the site specific RCIC design flow rate if less than 500 GPM (e.g., some sites have a RCIC design flow rate of 400 or 450 GPM).
> 4.1.1.2.3 SAWA capacity less than specified in 4.1.1.2.1 or 4.1.1.2.2 should be supported by plant specific design (i.e., SAWA flow rate determined by scaling, a ratio of the plant thermal power rating over the reference plant power level multiplied by 500 GPM).

NEI 13-02 Appendix C describes the basis for the reference plant SAWA flowrates (500 gpm initial flowrate, and then reduced to 100 gpm for remainder of the mission time). Guidance is provided for determining plant specific flow rates based on scaling, using the ratio of the specific plant thermal power to the reference plant thermal power.

Additional basis for determining the reference Plant SAWA flow rates is provided in EPRI Technical Report 3002003301. The EPRI Report in turn references the SOARCA which provides the Peach Bottom (reference plant) specific analysis.

Based on the established guidance, the MNGP plant specific flowrates are determined using the scaling method:

Reference plant values:

Rated thermal power= 3514 MWth
SAWA flow= 500 gpm

MNGP calculation:

SAWA = 500 gpm * (2004/ 3514) = 285 gpm
SAWM = 100 gpm * (2004/ 3514) = 57 gpm

It should be noted that these values are different than those provided in the Phase 2 OIP. The original calculation used a reference plant thermal power of 3293 MWth, resulting is SAWA/ SAWM values of 305/61 gpm.

The analyses and supporting information described above were provided to the NRC in the eportal.

Open Item 2 - Evaluation of Severe Accident Conditions for SAWA Equipment and Controls as well as Ingress and Egress Paths:

NRC Request

Licensee to evaluate the SAWA equipment and controls, as well as the ingress and egress paths for the expected severe accident conditions (temperature, humidity, radiation) for the sustained operating period.

NSPM Response

Equipment and Controls:

Plant instrumentation for SAWM that is qualified to RG 1.97 or equivalent is considered qualified for the sustained operating period without further evaluation. The following plant instruments are qualified to RG 1.97:

PI-7251B (PT-7251B) Primary Containment Wide Range Pressure

LI-7338B (LT-7338B) Suppression Pool Level

Passive components that do not need to change state after initially establishing SAWA flow do not require evaluation beyond the first 8 hours, at which time they are expected to be installed and ready for use to support SAWA/SAWM.

The following additional equipment performing an active SAWA/SAWM function is considered:

SAWA/SAWM flow instrument:

The environmental (temperature) capability of the flow instrument has been documented in ISE Open item 7.

The deployment location for the flowmeter is inside the Turbine Building, east side, 931' elevation. In this location, the Turbine Building provides environmental protection from external events, and substantial radiation shielding from the HCVS vent line. Dose calculations performed determine that peak severe accident dose rate in this area is 0.186 R/hr with a 7-day integrated dose of 15.5 R. This radiation level is not expected to have any adverse effect on operation of the flowmeter.

SAWA/SAWM pump (Flex Pump):

The deployment and staging for the portable diesel pump is the same as FLEX strategies. The deployment routes and environmental operating conditions (temperature) have previously been addressed for FLEX. Planned staging locations are near the Intake Structure, Discharge Canal, or Cooling Tower Basins.

Dose calculations performed determine the peak accident dose rates and

integrated 7- day dose in these areas:

- Intake Structure- 3.1R/hr, 261 R (7-day integrated dose)
- Discharge Canal- 0.15 R/hr, 122 R (7-day integrated dose)
- Cooling Tower Basin (not calculated, but similar to Discharge canal)

An alternate staging location for a flood event requires suction from the Condensate Storage Tanks (CST). An engineering evaluation was performed to determine dose rates in a staging location south of the Radwaste Building. This evaluation concludes that the dose rates would be similar to the FLEX Diesel Generator south location, which are negligible.

These radiological conditions in the planned staging locations are not expected to affect pump operation.

SAWA/SAWM generator (FLEX generator):

Deployment and staging of the 480VAC portable diesel generator is the same as FLEX strategies. This is required to provide the power supply to the LPCI injection valve via the LPCI swing bus. The deployment routes and environmental operating conditions (temperature) have previously been addressed for FLEX. Planned staging locations are near the Plant Administration Building (PAB) south entrance or east entrance.

Dose calculations determined the peak accident dose rates and integrated 7- day dose in these areas:

- PAB south, negligible dose rate and 7- day dose
- PAB east- negligible dose rate and 7- day dose

These radiological conditions are not expected to affect generator operation.

Ingress and Egress:

Instrumentation (PI-7251B and LI-7338B):

These instruments are located on the ASDS Panel in the EFT Building 3rd Floor. Dose calculations performed determine the peak accident dose rate in this area is 1.75mR/ hr. Access to this area will not be affected by the radiological conditions.

SAWA/SAWM flow instrument:

Dose calculations determined the peak dose rate associated with the transit path to the flow instrument (Turbine Building 931' east side) is approximately 5 R/hr. Since the transit times to the area are short, ingress and egress are not expected to be impacted.

SAWA/SAWM pump (Flex pump):

As documented above, the radiological conditions for the deployment and staging locations are relatively low. The dose rates at the Intake Structure location could preclude access to that area; in that case, one of the alternate locations would be used. Access for operation and refueling of the pump would not be impacted by the radiological conditions.

SAWA/SAWM generator (FLEX generator):

As documented above, the radiological conditions for the deployment and staging locations are negligible. Access for operation and refueling of the generator would not be impacted by the radiological conditions.

[Note: The dose calculation performed does not consider radiation shine from the external radioactive plume. Station procedures will direct plant staff to monitor the radiological conditions in and around the plant during an emergency. Based on the specific site conditions, equipment locations, transport paths, and stay times would be altered as necessary to minimize personnel dose.]

The analyses and supporting information described above were provided to the NRC in the eportal.

Open Item 3 - Demonstrate SAWA Instrumentation and Equipment Performance Under Expected Temperature and Radiological Conditions:

NRC Request

Licensee to demonstrate how instrumentation and equipment being used for SAWA and supporting equipment is capable to perform for the sustained operating period under the expected temperature and radiological conditions.

NSPM Response

Equipment and Controls:

The following instrumentation and equipment has been evaluated for the expected temperature and radiological conditions (Reference the response to Phase 2 Open Item 2 on pages 4-6 of this enclosure):

PI-7251B Primary Containment Wide Range Pressure
LI-7338B Suppression Pool Level
SAWA/SAWM flow instrument
SAWA/SAWM pump (FLEX pump)
SAWA/SAWM generator (FLEX generator)

This equipment is capable of performing during the sustained operating period in the expected environmental conditions.

One additional active component requires review, MO-2014 RHR Div. 1 LPCI Inboard Injection Valve. This valve would be electrically opened from the Main Control Room in order to establish the RPV injection path. The valve is located in the Reactor Building, 931' elevation, East Shutdown Cooling Room. The motor operated valve would be cycled within the first eight hours of the event.

Temperature:

A calculation determined environmental temperature profiles for various locations in the Reactor Building. The temperature in the East Shutdown Cooling Room is not calculated. It is conservative to assume this room is at the same temperature as the Torus room (highest value in the Reactor Building), which reaches approximately 170°F at 8 hours for the severe accident case.

The Environmental Qualification (EQ) Report applicable to MO-2014 specifies a peak qualification temperature of 343°F, with test temperatures at or above 251°F for 96 hours. Based on this, there is high confidence

the valve can be electrically opened in the first 8 hours of the accident.

Radiation:

A dose rate calculation determined dose rates and total 7-day integrated dose for various locations, including the Reactor Building. The dose rates in the East Shutdown Cooling Room were not calculated. It is conservative to assume this room has the same radiological conditions as the Torus room, which is the compartment below this area (does not account for any shielding effect from 931' floor slab). The peak dose rate in the Torus room (near CV4539/ CV4540) is 2.7E5 R/hr. The 7-day integrated dose is 1.14E7 R.

The EQ Report applicable to MO-2014 specifies a demonstrated total equivalent gamma dose of 2.04E8 Rad. Assuming that 1Rem = 1Rad for this case, the qualified dose exceeds the calculated accident dose. Based on this, there is high confidence the valve can be electrically opened in the first 8 hours of the accident.

The analyses and supporting information described above were provided to the NRC in the eportal.

Open Item 4 - Demonstrate Containment Overpressure Prevention without Drywell Vent during Severe Accident Conditions:

NRC Request

Licensee to demonstrate that containment failure as a result of overpressure can be prevented without a drywell vent during severe accident conditions.

NSPM Response

The SAWA/ SAWM strategy requires demonstration that the wetwell vent will remain available for the 7- day mission time (i.e. water level does not rise above the elevation of the vent connection on the torus). An Engineering Evaluation has been performed to determine wetwell water level during the event. The evaluation determines the SAWA and SAWM flowrates; the RPV injection rate is specified as 285 gpm for four hours, then 57 gpm for the remainder of the 7 days. The resulting wetwell water level at 7 days is approximately 24.2 feet (elevation 922.95 feet), which is below the wetwell vent elevation of 925.21 feet (upper limit on water level instrument is 925 feet). The analysis is conservative since no mass loss through the HPV is credited. Based on this analysis, the wetwell vent capability is maintained for a 7- day mission time.

The wetwell vent has been designed and installed to meet NEI 13-02 Rev 1 guidance, which ensures that it is adequately sized to prevent containment overpressure under severe accident conditions. The SAWM strategy will ensure that the wetwell vent remains functional for the period of sustained operation. MNGP will follow the guidance (flow rate and timing) for SAWA/SAWM described in BWROG-TP-15-008 and BWROG-TP-15-011. The wetwell vent will be opened prior to exceeding the PCPL value of 62 PSIG. Therefore, containment over pressurization is prevented without the need for a drywell vent.

The analyses and supporting information described above were provided to the NRC in the eportal.

Open Item 5 - Demonstrate MNGP is Bounded by Reference Plant Analysis by Showing SAWM Strategy is Successful in Making it Unlikely that a Drywell Vent is Needed:

NRC Request

Licensee to demonstrate how the plant is bounded by the reference plant analysis that shows the SAWM [Severe Accident Water Management] strategy is successful in making it unlikely that a drywell vent is needed.

NSPM Response

NEI 13-02 Appendix C provides a description of the Severe Accident Water Management strategy, and recognizes insights gained from EPRI Technical Report 3002003301.

EPRI Technical Report 3002003301 performs a comprehensive analysis of two reference plants. The approach develops several cases using various water addition/ venting strategies, and a range of bounding plant parameters. Each case determines whether the strategy is successful in preventing primary containment failure.
In order to demonstrate that the reference plant analyses are applicable to the Mark I fleet, plant-to-plant variability was assessed. This is presented in section 4 of the report. Plant specific data were reviewed to determine if there were variations that would influence the overall conclusions from the technical analysis. Some of the potential plant variations were investigated further to confirm that the overall conclusions using the reference plant would be applicable to the other Mark I plants. The following table provides the parameters that were reviewed, including the MNGP specific values:

Parameter	Mark I Fleet	MNGP
Containment Heat Capacity (MW_{th}/ Containment Free Volume)	6- 13 kilowatts/ cubic feet	6.46 kw/ ft^3
Torus Freeboard Volume	300,000 to 1,000,000 gallons	728,812 gallons
DW to WW Spillover Height	7.4 to 36 inches	8.2 inches
SAWA/ SAWM Flowrate	SAWA flow is 500 GPM at 8 hours followed by 100 GPM from 12 hours to 168 hours	SAWA flow is 285 GPM at 8 hours followed by 57 GPM from 12 hours to 168 hours

Based on the results, plant-to-plant variations would not be expected to significantly influence the overall conclusions. Therefore, MNGP is bounded by the reference plant analysis.

Additional evaluation of the severe accident water management strategy was performed by the BWROG (TP-15-011). The purpose of the evaluation is to demonstrate that the Mark I (and Mark II) fleet is bounded by the reference plant analyses. This study addressed how suppression pool level control could be achieved in a manner that maintains long term function of the wetwell vent, and determined if there would be adverse effects by controlling (limiting) flow rate. The study concludes that plants with Mark I containments, with injection into the RPV, can maintain containment cooling and preserve the wetwell vent without a plant specific analysis. Since this is the planned strategy, MNGP is bounded by the conclusions of the BWROG evaluation.

The analyses and supporting information described above were provided to the NRC in the eportal.

Open Item 6 - Demonstrate Adequate Communication between Main Control Room and Intake Structure Operator at FLEX Manual Valve:

NRC Request

Licensee to demonstrate that there is adequate communication between the MCR [Main Control Room] and the Intake Structure operator at the FLEX manual valve during severe accident conditions.

NSPM Response

The severe accident response strategies require coordinated communications between the Main Control Room, ASDS panel for HCVS operation (EFT third floor), FLEX manual valve for SAWA flow control (Turbine Building 930 east), and the FLEX pump staging location (Intake area, discharge canal, or cooling towers).

Communication methods are the same as accepted in Order EA-12-049 for FLEX strategies (Final Integrated Plan section 8.3). Communications necessary to provide on-site command and control of the response strategies can be effectively implemented with a combination of the power block Private Branch Exchange (PBX), sound powered phones, satellite phones, and hand-held radios. These items will be powered and remained powered using the same methods as evaluated under EA-12-049 for the period of sustained operation.

The analyses and supporting information described above were provided to the NRC in the eportal.

Open Item 7 - Demonstrate SAWM Flow Instrumentation Qualification for Expected Environmental Conditions:

NRC Request

Licensee to demonstrate the SAWM flow instrumentation qualification for the expected environmental conditions.

NSPM Response

MNGP has two types of flowmeters available for use (one in each FLEX storage location). These are a Siemens Sitrans F M MAG 8000, product number 7ME681-4BJ31-2AA1 and Flow Technologies Inc. FTI EL2200-125, with MC608B electronics. Each flowmeter has 5" hose adapters which facilitate installation in-line on the 5" pump discharge hose. Plant procedures provide the deployment instructions for the portable diesel pump, hoses, and flowmeter. As described in the procedure, the flowmeter is installed in the common 5" discharge hose, between the final two sections of hose just before reaching the FLEX valve (RHRSW-68) (Turbine Building, east side, 931' elevation).

The deployment location for the flowmeter is inside the Turbine Building, east side, 931' elevation. In this location, the Turbine Building provides environmental protection from external events, and substantial radiation shielding from the HCVS vent line. Dose calculations determined that peak severe accident dose rate in this area is 0.186 R/hr with a 7-day integrated dose of 15.5 R. This radiation level is not expected to have any adverse effect on operation of the flowmeter. The peak dose rate associated with the transit path to the area is approximately 5 R/hr. Since the transit times to the area are short, ingress and egress are not expected to be impacted.

The selected instruments are designed for the expected flow rate, temperature and pressure for SAWA over the period of sustained operation.

SAWA Flow Instrument Qualification		**Expected SAWA Parameter Range**
Siemens F M Mag 8000	FTI EL2200-125	
50- 2000 GPM 1761 GPM	38- 1914 GPM	57- 285 GPM
-4°F to +140°F	-40°F to +176°F	+0°F minimum No maximum specified for ELAP event
150# class ANSI 16.5 flange rating	150# class ANSI 16.5 flange rating	0 to <150 PSIG

The analyses and supporting information described above were provided to the NRC in the eportal.