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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: 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 EA-13-109), Phases 1 and 2

- 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)

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. Reference 2 endorses 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 a status report at six-month intervals following submittal of the Phase 1 OIP. References 3 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.

The purpose of this letter is to provide the fifth 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 responses to various HCVS Order Phase 1 Open Items. The Phase 1 Open Items are identified in the NRC's Interim Staff Evaluation (Reference 12).

Please contact John Fields, Fukushima Response Licensing, at 763-271-6707, 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 19, 2016.



Peter A. Gardner
Site Vice President, Monticello Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosures (2)

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

FIFTH 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, (References 1 and 9). 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, 2016. The Design Engineering On-Site/Complete milestone was completed in November 2016.

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 November 30, 2016.

One milestone activity target date was revised and completed in this report. The Phase 1 Design Engineering On-site/Complete milestone target completion date was scheduled to be completed in July 2016 and was actually completed in November 2016. Therefore, the Revised Target Completion Date and Activity Status for this milestone have been revised in the table below.

Two milestone activity target dates were revised in this report. The Phase 1 Operations Procedure Changes Developed and Site Specific Maintenance Procedure Developed milestones have been revised from December 2016 to May 2017. These changes are necessary to align the procedure development activities with the engineering change (i.e. modification) that is installing equipment used to meet Phase 1 of the HCVS order. The milestone activity target completion date changes reflect the completion of these procedures as part of the engineering change process.

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

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	

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Update 3 (with Phase 2 OIP)	December 2015	Complete	
Update 4	June 2016	Complete	
Update 5	December 2016	Complete with this submittal	
Update 6	June 2017	Not Started	
Update 7	December 2017	Not Started	
Update 8	June 2018	Not Started	
Update 9	December 2018	Not Started	
Phase 1 Specific Milestones			
Phase 1 Modifications:			
Hold preliminary/conceptual design meeting	June 2014	Complete	
Design Engineering On-site/Complete	July 2016	Complete	November 2016
Implementation Outage	May 2017	Not Started	
Walk Through Demonstration/Functional Test	May 2017	Not Started	
Phase 1 Procedure Changes Active:			
Operations Procedure Changes Developed	December 2016	Started	May 2017
Site Specific Maintenance Procedure Developed	December 2016	Started	May 2017

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Procedure Changes Active	May 2017	Not Started	
Phase 1 Training:			
Training Complete	May 2017	Not Started	
Phase 1 Completion:			
HCVS Implementation	May 2017	Started	
Submit Completion Report	July 2017	Not Started	
Phase 2 Specific Milestones			
Phase 2 Modifications:			
Hold preliminary/conceptual design meeting	October 2015	Complete	
Design Engineering On-site/Complete	June 2018	Not Started	
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	Not 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	

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
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).

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.	Open – will be closed to ISE Phase 1 Open Item 1

OIP Phase 1 Open Items	Status
3. Determine radiological conditions for the FLEX portable equipment staging areas.	Open – will be closed to 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.	Open – will be closed to ISE Phase 1 Open Items 3 and 7
5. Determine approach or combination of approaches to control hydrogen.	Open – will be closed to ISE Phase 1 Open Items 8 and 9
6. Determine the Qualification Method for HCVS instrumentation.	Open – will be closed to ISE Phase 1 Open Item 10
7. Evaluate the effects of radiological and temperature constraints on the deployment of nitrogen bottles after 24 hours.	Open – will be closed to 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.	Open – will be closed to 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.	Open

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.	Open
2. Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.	Open
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.	Open
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 Enclosure 2
5. Make available for NRC staff audit the seismic and tornado missile final design criteria for the HCVS stack.	Complete See Enclosure 2
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.	Open
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.	Open
8. Provide a description of the final design of the HCVS to address hydrogen detonation and deflagration.	Complete See Enclosure 2

ISE Phase 1 Open Items	Status
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.	Open
10. Make available for NRC staff audit descriptions of all instrumentation and controls (existing and planned) necessary to implement this order including qualification methods.	Open
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 Enclosure 2

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

ISE Phase 2 Open Items	Status
7. Licensee to demonstrate the SAWM flow instrumentation qualification for the expected environmental conditions.	Open

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)

ENCLOSURE 2

MONTICELLO NUCLEAR GENERATING PLANT

**RESPONSES TO OPEN ITEMS
ASSOCIATED WITH NRC ORDER EA-13-109, PHASE 1**

**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 Interim Staff Evaluation (Reference 1) for the Monticello Nuclear Generating Plant (MNGP):

<u>Open Item #</u>	<u>Description</u>
4	HCVS Vent Capacity
5	Seismic and Tornado Missile Final Design Criteria for the HCVS Stack
8	Final design of the HCVS to address Hydrogen Detonation and Deflagration
11	HCVS Containment Isolation Valve Differential Pressure Opening Verification

References:

1. 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)

Open Item Responses:

Open Item 4 - HCVS Vent Capacity:

NRC Request

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

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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.

NSPM Response

A calculation has been performed that confirms that the modified HCVS configuration with the additional check valve has the capacity to vent the steam/energy equivalent of one (1) percent of the current licensed/rated thermal power of 2004 MWT while maintaining containment pressure below design and Primary Containment Pressure Limit (PCPL). Additionally, this analysis evaluates the capacity of the Suppression Pool (SP) to absorb decay heat following a reactor shutdown from full power.

The calculation has been provided to the NRC on the eportal.

Open Item 5 - Seismic and Tornado Missile Final Design Criteria for the HCVS Stack:

NRC Request

Make available for NRC staff audit the seismic and tornado missile final design criteria for the HCVS stack.

NSPM Response

HCVS piping outside the Class I structure is designed for tornado/wind loads without failure to ensure functionality of the HCVS and safety related systems in the vicinity. HCVS piping up to and including the second primary containment isolation valve is designed to safety related seismic Class 1 requirements. HCVS piping downstream of the second containment isolation valve, although non-safety related, is designed to seismic Class 1 as it must remain functional following a seismic event.

Analysis of the tornado/wind loads and seismic loading is documented in calculations performed to support the design of the HCVS piping. The analysis of the modified HCVS piping includes incorporation of wind, tornado, and updated seismic requirements to meet sections 5.1.1.6 and 5.2 of NEI 13-02. Design basis loading requirements for wind, tornado, and seismic were used as described in the MNGP USAR, Section 12.02.

Portions of the HCVS outside of Class I structures will be protected from tornado missile impact up to 30 feet (ft) above grade. The HCVS design will meet assumptions found in guidance document HCVS-WP-04 which provides reasoning why protecting the HCVS 30 ft above grade is not required. An Engineering Evaluation validated the guidance is applicable for use at MNGP. Missile barrier design requirements for tornado generated

missiles, seismic, and wind loadings were used as described in the MNGP USAR, Section 12.02. Analysis of the missile barrier to these loading requirements is documented in calculations.

The calculations and analyses described above have been provided to the NRC on the eportal.

Open Item 8 - Final design of the HCVS to address hydrogen detonation and deflagration:

NRC Request

Provide a description of the final design of the HCVS to address hydrogen detonation and deflagration.

NSPM Response

The risk of hydrogen detonation and deflagration has been mitigated in the design of the MNGP HCVS system by use of the following elements:

- A check valve will be installed on the HCVS piping at the reactor building roof to prevent ingress of air when venting stops and the steam condenses. This will prevent a flammable mixture of gasses from potentially building up within the piping upstream of the check valve. Piping downstream of the check valve will be at a length less than the recommended run up distance in order to rule out detonation loading in this portion of the piping. HCVS piping where the check valve is installed will be routed slightly over the reactor building roof to allow for maintenance/testing accessibility, then routed upwards to direct effluent away from plant structures. This is consistent with Option 5 of NEI 13-02, Appendix H.
- A check valve will be utilized on the rupture disc pneumatic supply connection to the HCVS piping to prevent backflow to the remote operating station. With exception of the rupture disc supply, the HCVS piping is designed to have no interfaces with other plant systems. In addition, HCVS pneumatic system valves that open external to the system are designed to the system operating conditions. With these design features, the HCVS meets the requirement for minimizing the potential for hydrogen gas migration and ingress into site buildings. This is consistent with the guidance provided in NEI 13-02, Section 4.1.2, Appendix H, HCVS-FAQ-05 and HCVS-WP-03.
- The HCVS release point will be modified from its current location of 3 ft above the Reactor Building roof and plenum exhaust to be vertical over the reactor building roof. The modified release point is at an elevation higher than the adjacent power block structures, which is approximately 145 ft off the ground. The existing "T" type

exhaust at the top of the vent pipe will be replaced with a vertical exit to direct the effluent away from site structures and away from ventilation system intake and exhaust openings. A weather cap will be installed at the release point for protection of the pipe and newly installed check valve during normal operation, and will be designed to blow off if the vent is operated. The weather cap will be designed to blow off at a minimal interior pipe pressure to not impede the initial venting. This design allows for no permanently added resistance to piping for effluent flow. This is consistent with the guidance provided in NEI 13-02 Section 4.1.5, Appendix H and HCVS-FAQ-04.

- With the exception of the rupture disc supply, the HCVS piping is designed to have no interfaces with other plant systems. In addition, HCVS pneumatic system valves that open external to the system are designed to the system operating conditions. With these design features, the HCVS meets the requirement of minimizing unintended cross flow within the unit. MNGP is a single unit site, so cross flow between units is not a concern. This is consistent with the guidance provided in NEI 13-02, Sections 4.1.2, 4.1.4 and 4.1.6 and HCVS-FAQ-05.

The engineering change describing the above design elements has been provided to the NRC on the eportal.

Open Item 11 - HCVS Containment Isolation Valve Differential Pressure Opening Verification:

NRC Request

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 BDBEE and severe accident wetwell venting.

NSPM Response

A calculation was performed that determined that the HCVS primary containment isolation valves, AO-4539 and AO-4540, will open under the maximum differential pressure expected during Beyond Design Basis External Event (BDBEE) suppression pool venting with greater than 20% margin. The valves have been shown to open against a maximum expected differential pressure of 76.7 psid.

The calculation has been provided to the NRC on the eportal.