



## Nebraska Public Power District

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NLS2016068  
December 28, 2016

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

**Subject:** Nebraska Public Power District's 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)  
Cooper Nuclear Station, Docket No. 50-298, DPR-46

- 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
  2. NPPD letter to NRC, "Nebraska Public Power District'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)," dated June 30, 2014 (NLS2014057)
  3. NPPD letter to NRC, "Nebraska Public Power District's 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)," dated December 19, 2014 (NLS2014101)
  4. NPPD letter to NRC, "Nebraska Public Power District's Phase 1 and 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)," dated December 21, 2015 (NLS2015137)

On June 6, 2013, the Nuclear Regulatory Commission (NRC) issued Order EA-13-109 (Reference 1) to Nebraska Public Power District (NPPD). Reference 1 was immediately effective and directs NPPD to take certain actions to ensure that Cooper Nuclear Station (CNS) has a Hardened Containment Vent System to remove decay heat from the containment, and maintain control of containment pressure within acceptable limits following events that result in loss of active containment heat removal capability while maintaining the capability to operate under severe accident conditions resulting from an Extended Loss of AC Power. Specific requirements are outlined in Attachment 2 of Reference 1.

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Reference 1 required submission of a Phase 1 overall integrated plan (OIP) pursuant to Section IV, Condition D, and status reports at six-month intervals thereafter. NPPD submitted an initial OIP for CNS by letter dated June 30, 2014 (Reference 2), Revision 1 to the OIP by letter dated December 19, 2014 (Reference 3), and Revision 2 which provided a combined Phase 1 and Phase 2) OIP (Reference 4).

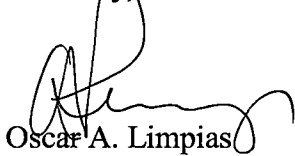
The purpose of this letter is to provide the fifth six-month update for both Phase 1 and Phase 2 OIP implementation pursuant to Section IV, Condition D.3, of Reference 1.

This letter contains no new regulatory commitments. Should you have any questions concerning the content of this letter, please contact Jim Shaw, Licensing Manager, at (402) 825-2788.

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

Executed on: 12-28-16

Sincerely,



Oscar A. Limpas  
Vice President - Nuclear and  
Chief Nuclear Officer

/bk

Attachment: Nebraska Public Power District's Fifth Six-Month Status Report for the Implementation of Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions"

cc: Regional Administrator, w/attachment  
USNRC - Region IV

Director, w/attachment  
USNRC - Office of Nuclear Reactor Regulation

Cooper Project Manager, w/attachment  
USNRC - NRR Plant Licensing Branch IV

Senior Resident Inspector, w/attachment  
USNRC - CNS

NPG Distribution, w/o attachment

CNS Records, w/attachment

## **Attachment**

### **Nebraska Public Power District's Fifth Six-Month Status Report for the Implementation of Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions"**

#### **Introduction**

Nebraska Public Power District (NPPD) developed an Overall Integrated Plan (OIP) for Cooper Nuclear Station (CNS) (Reference 1), documenting the installation of a Hardened Containment Vent System (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. Updates of milestone accomplishments are based on the combined Phase 1 and 2 OIP (Reference 4).

NPPD developed an updated and combined Phase 1 and 2 OIP (Reference 4) in accordance with the guidance contained in Reference 3, 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 attachment provides an update of milestone accomplishments since submittal of the June 2016 status report (Reference 6) including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

#### **Milestone Accomplishments**

Phase 1 specific milestones are complete.

#### **Milestone Schedule Status**

The following tables provide an update to Attachment 2 of the combined Phase 1 and 2 OIP. They provide 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.

<b>Phase 1 and 2 HCVS Milestone Table</b>			
<b>Milestone</b>	<b>Target Completion Date</b>	<b>Activity Status</b>	<b>Comments (Include date changes)</b>
Submit Phase 1 OIP	June 2014	Complete	
<b>Submit Six-Month Updates:</b>	--	--	
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 with this submittal	
Update 6	June 2017	Not Started	
Update 7	December 2017	Not Started	
Update 8	June 2018	Not Started	

<b>Phase 1 Specific Milestones</b>			
<b>Milestone</b>	<b>Target Completion Date</b>	<b>Activity Status</b>	<b>Comments (Include date changes)</b>
Hold preliminary/conceptual design meeting	June 2014	Complete	
Design Engineering On-site/Complete	September 2015	Complete	
Operations Procedure Changes Developed	August 2016	Complete	
Site Specific Maintenance Procedure Developed	August 2016	Complete	
Training Complete	September 2016	Complete	
Procedure Changes Active	November 2016	Complete	
Walk Through Demonstration/Functional Test	November 2016	Complete	

<b>Phase 2 Specific Milestones</b>			
<b>Milestone</b>	<b>Target Completion Date</b>	<b>Activity Status</b>	<b>Comments (Include date changes)</b>
Hold preliminary/conceptual design meeting	December 2015	Complete	
Design Engineering On-site/Complete	October 2017	In Progress	
Operations Procedure Changes Developed	May 2018	In Progress	
Site Specific Maintenance Procedure Developed	May 2018	In Progress	
Training Complete	June 2018	In Progress	
Implementation Outage	October 2018	Not Started	
Walk Through Demonstration/Functional Test	October 2018	Not Started	
Procedure Changes Active	October 2018	Not Started	
Submit Completion Report (60 days after full site compliance)	January 2019	Not Started	

### **Changes to Compliance Method**

There are no changes to the compliance method as documented in the combined Phase 1 and 2 OIP.

### **Need for Relief/Relaxation and Basis for the Relief/Relaxation**

NPPD has completed implementation of the Phase 1 Order requirements.

NPPD expects to comply with the Phase 2 Order implementation date and no relief/relaxation is required at this time.

### **Open Items from Combined Phase 1 and 2 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, the Interim Staff Evaluations (ISE) for Phase 1 and Phase 2 (References 5 and 7), and the status of each item.

<b>Combined Phase 1 and 2 OIP Open Items</b>		
<b>Phase 1 Open Items</b>		
<b>OIP Open Item #</b>	<b>Action</b>	<b>Status/Comment</b>
1	Determine location of HCVS ROS.	Closed. Response provided in Reference 6.
2	Evaluate accessibility of the Mechanical ROS for radiological and environmental conditions. Address dose and temperature items for the Mechanical ROS and non-MCR locations. FAQ-HCVS-01 (Reference 14) will be used as guidance.	Closed. Response provided in Reference 6.
3	Determine the location of the Dedicated HCVS Battery transfer switch.	Closed. Response provided in Reference 6.
4	Determine the location of backup nitrogen bottles and evaluate the effects of radiological and temperature constraints on their deployment.	Closed. Response provided in Reference 6.
5	Evaluate the location of the Portable DG for accessibility under Severe Accident HCVS use.	Closed. Response provided in Reference 6.
6	Confirm suppression pool heat capacity.	Closed. Response provided in Reference 6.
7	Determine which approach or combination of approaches Cooper Nuclear Station (CNS) will take to address the control of flammable gases, clearly demarcating the segments of vent system to which an approach applies.	Closed. Response provided in Reference 6.
8	Identify qualification method used for HCVS instruments.	Closed. Response provided in Reference 6.
9	Evaluate HCVS monitoring location for accessibility, habitability, staffing sufficiency, and communication capability with vent-use decision makers.	Closed. Response provided in Reference 6.

<b>Combined Phase 1 and 2 OIP Open Items</b>		
<b>Phase 1 Open Items</b>		
<b>OIP Open Item #</b>	<b>Action</b>	<b>Status/Comment</b>
10	Determine the number of required valve cycles during the first 24 hours. Size the electrical and pneumatic supplies accordingly.	Closed. Response provided in Reference 6.
11	Evaluate the impact of SA environmental conditions for post-24 hour actions supporting the implementation of power and pneumatic supplies.	Closed. Response provided in Reference 6.
12	Determine the control document for HCVS out of service time criteria.	Closed. The out-of-service time criteria for HCVS will be maintained in the Technical Requirements Manual.
<b>Phase 2 Open Items</b>		
None.		

<b>Phase 1 Interim Staff Evaluation Open Items</b>		
<b>ISE Open Item #</b>	<b>Action / ISE Section Reference</b>	<b>Status</b>
1	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. Sections 3.2.2.1, 3.2.2.2	Complete. Response provided in Reference 6.

<b>Phase 1 Interim Staff Evaluation Open Items</b>		
<b>ISE Open Item #</b>	<b>Action / ISE Section Reference</b>	<b>Status</b>
2	Make available for NRC staff audit the seismic and tornado missile final design criteria for the HCVS stack. Section 3.2.2.3	Complete.  Response provided in Reference 6.
3	Make available for NRC staff audit descriptions of all instrumentation and controls (existing and planned) necessary to implement this order including qualification methods. Section 3.2.2.10	Complete.  Response provided in Reference 6.
4	Make available for NRC staff audit a determination of the number of required valve cycles during the first 24 hours. Section 3.2.3.1	Complete.  Response provided in Reference 6.
5	Make available for NRC audit the control document for HCVS out of service time criteria. Section 3.4.1	Complete.  The out-of-service time criteria for HCVS will be maintained in the Technical Requirements Manual.
6	Make available for NRC staff to audit, an evaluation verifying the existing containment isolation valves, relied upon for the HCVS, will open under the maximum expected differential pressure during severe accident wetwell venting. Section 3.2.2.9	Complete.  The HCVS operational temperature has been updated to 310° F per NEDC 15-023, "Owner Acceptance of TetraTech Calculation CNS001-194-4933-004 - Calculation of the Pressure Gradient Across the HCVS Line and HCVS Maximum Operation Temperature." Change Notice #28 to CED 6036742, "Reliable Hardened Containment Venting System," authorized corresponding changes to the following air operated valve (AOV) and motor operated valve (MOV) related calculations to address HCVS flow rate and temperature increase:  NEDC 91-242, "Review of ERIN's System Level Design Basis Review for the Primary Containment System MOV's," Revision 2C1



<b>Phase 1 Interim Staff Evaluation Open Items</b>		
<b>ISE Open Item #</b>	<b>Action / ISE Section Reference</b>	<b>Status</b>
		<p>NEDC 96-025B, "Review of ADVENT LCA Calculation 96007TR-41 B, Rev. 1 for PC-MOV-232MV and -233MV," Revision 1C1</p> <p>NEDC 95-003, "Determination of Allowable Operating Parameters for CNS MOV Program MOVs," Revision 31C1</p> <p>NEDC 00-110, "MOV Program Valve Margin Determination," Revision 10C1</p> <p>NEDC 00-065, "Functional and MEDP Evaluation for PC-AOV-237AV," Revision 1C2</p> <p>NEDC 05-013, "AOV Component Level Calculation for PC-AOV-237AV," Revision 1C1</p>
7	<p>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.</p> <p>Section 3.2.2.5</p>	<p>Complete.</p> <p>Response provided in Reference 6.</p>
8	<p>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.</p> <p>Sections 3.2.1, 3.2.2.3, 3.2.2.4, 3.2.2.5, 3.2.2.10, 3.2.4.1, 3.2.4.2, 3.2.5.2, 3.2.6</p>	<p>Complete.</p> <p>Response provided in Reference 6.</p>
9	<p>Make available for NRC staff audit the final sizing evaluation for HCVS batteries/battery charger and incorporate into FLEX DG loading calculation.</p> <p>Sections 3.2.2.4, 3.2.3.1, 3.2.3.2, 3.2.4.1, 3.2.4.2, 3.2.5.1, 3.2.5.2, 3.2.6</p>	<p>Complete.</p> <p>Response provided in Reference 6.</p>

<b>Phase 1 Interim Staff Evaluation Open Items</b>		
<b>ISE Open Item #</b>	<b>Action / ISE Section Reference</b>	<b>Status</b>
10	Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location. Sections 3.2.1, 3.2.2.4, 3.2.3.1, 3.2.3.2, 3.2.4.1, 3.2.4.2, 3.2.5.1, 3.2.5.2, 3.2.6	Complete. Response provided in Reference 6.
11	Make available for NRC staff audit the descriptions of local conditions (temperature, radiation and humidity) anticipated during ELAP and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, and etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions. Sections 3.2.2.3, 3.2.2.5, 3.2.2.9, 3.2.2.10	Complete. Response provided in Reference 6.

<b>Phase 2 Interim Staff Evaluation Open Items</b>		
<b>ISE Open Item #</b>	<b>Action / ISE Section Reference</b>	<b>Status</b>
1	Licensee to demonstrate that containment failure as a result of overpressure can be prevented without a drywell vent during severe accident conditions. Section 3.3.3	Complete. ER 1252, "NRC Order EA-13-109 Phase 2 Reliable Hardened Containment Vent Engineering Study," evaluated Phase 2 Order requirements. In this ER, CNS referred to the MAAP analysis that was performed for the reference Mark I plant (Peach Bottom). An evaluation of the plant parameters between CNS and Peach Bottom was performed to ensure that the MAAP analysis for Peach Bottom would be a bounding evaluation for CNS and confirms that the Severe Accident Water Addition/Severe

<b>Phase 2 Interim Staff Evaluation Open Items</b>		
<b>ISE Open Item #</b>	<b>Action / ISE Section Reference</b>	<b>Status</b>
		<p>Accident Water Management strategy endorsed by the nuclear industry (NRC, Nuclear Energy Institute and Boiling Water Reactor Owner's Group) would preserve the use of a wetwell vent path to ensure containment integrity.</p> <p>Calculation NEDC 15-020, "Owner Acceptance of TetraTech Calculation CNS001-194-4933-001 - Calculation of HCVS Flow Rate and Vent Size," performs the analysis to ensure that the wetwell vent can achieve the required capacity to vent the steam/energy equivalent of 1% of the licensed/rated thermal power.</p>
2	<p>Licensee to demonstrate that there is adequate communication between the MCR and the operator at the FLEX pump during severe accident conditions. Section 3.3.3.4</p>	<p>Complete.</p> <p>The Main Control Room (MCR) is the normal monitoring and operating location for HCVS. Hand held radios will be used for communications between the MCR and the operator at the FLEX pump.</p> <p>Base station repeaters (Base 1 and Base 2) were upgraded to 24-hour battery life. Both bases are capable of being powered via FLEX generator and one base station will be powered from a FLEX generator after 24 hours.</p> <p>The communications assessment performed in response to Near Term Task Force Recommendation 9.3 (NLS2013028) documented the acceptability of this communications channel.</p>
3	<p>Licensee to demonstrate the SAWM flow instrumentation qualification for the expected environmental conditions. Section 3.3.3.4</p>	<p>In Progress.</p>

### **Interim Staff Evaluation Impacts**

There are no potential impacts to the ISEs identified at this time.

### **References**

1. NPPD letter to NRC, "Nebraska Public Power District'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)," dated June 30, 2014
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
3. NEI 13-02, "Industry Guidance for Compliance with NRC Order EA-13-109, 'To Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions,' Revision 1, dated April 2015
4. Nebraska Public Power District's Phase 1 and 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), dated December 21, 2015
5. NRC letter to NPPD, "Cooper Nuclear Station - Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase 1 of Order EA-13-109 (Severe Accident Capable Hardened Vents) (TAC NO. MF4384)," dated February 11, 2015
6. NPPD letter to NRC, "Nebraska Public Power District's 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)," dated June 30, 2016
7. NRC letter to NPPD, "Cooper Nuclear Station - Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Phase 2 of Order EA-13-109 (Severe Accident Capable Hardened Vents) (TAC NO. MF4384)," dated September 29, 2016