UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352

July 21, 2017

EA–16–175

Mr. Peter A. Gardner
Site Vice-President
Monticello Nuclear Generating Plant
Northern States Power Company, Minnesota
2807 West County Road 75
Monticello, MN 55362–9637

SUBJECT: MONTICELLO NUCLEAR GENERATING PLANT—NRC SUPPLEMENTAL INSPECTION REPORT 05000263/2017010 AND ASSESSMENT FOLLOW-UP LETTER

Dear Mr. Gardner:

On June 9, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection using Inspection Procedure 95001, "Supplemental Inspection Response To Action Matrix Column 2 Inputs," at your Monticello Nuclear Generating Plant. On June 9, 2017, the NRC discussed the results of this inspection and the implementation of your corrective actions with you and other members of your staff in an exit and Regulatory Performance Meeting. The results of this inspection are documented in the enclosed report.

By letter dated December 12, 2016, (ADAMS Accession No. ML16347A616), the NRC informed you that as a result of a White (low-to-moderate safety significance) finding in the Mitigating Systems Cornerstone that the NRC assessed Monticello Nuclear Generating Plant performance to be in the Regulatory Response Column of the Reactor Oversight Process (ROP) Action Matrix, effective July 1, 2016. In the same letter, the NRC informed you of our intent to perform a supplemental inspection using Inspection Procedure 95001 upon notification of your readiness for the inspection. On February 28, 2017, you informed the NRC that your station was ready for the supplemental inspection.

The NRC performed this inspection to review your station's actions in response to a White finding in the Mitigating System cornerstone which was documented and finalized in NRC Inspection Report 05000263/2016011. The finding was associated with your failure to correct oil leakage on the High Pressure Coolant Injection (HPCI) system since 2005 that degraded over time and resulted in a loss of the ability of the system to perform its safety function. The NRC determined that your staff's evaluation identified the primary root cause of the White finding as Monticello management was tolerant of leaks on the HPCI system; as a result, station personnel failed to advocate prompt repair of leakage on the system.

The NRC determined that completed or planned corrective actions were sufficient to address the performance issue that led to the White finding previously described and were prioritized commensurate with the safety significance of the issue. In addition, the NRC determined that

the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem and reached reasonable conclusions as to the root and contributing causes of the event.

After reviewing Monticello Nuclear Generating Plant's performance in addressing the White finding subject of this Inspection Procedure 95001, "Supplemental Inspection Response To Action Matrix Column 2 Inputs," the NRC concluded your actions met the objectives of the inspection. Therefore, in accordance with the guidance in Inspection Manual Chapter (IMC) 0305, "Operating Reactor Assessment Program," the White finding will only be considered in assessing plant performance for a total of four quarters. As a result, the NRC determined the performance at Monticello Nuclear Generating Plant to be in the Licensee Response Column of the ROP Action Matrix as of July 1, 2017.

Based on the results of the inspection, the NRC inspector documented one finding of very low safety significance (Green). The NRC has also determined that this finding involved a violation of an NRC requirement. Because the licensee initiated condition reports to address this issue, this violation is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2.a of the Enforcement Policy. The NCV is described in the subject inspection report.

If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555–0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement, and the NRC Resident Inspector at the Monticello Nuclear Generating Plant.

For administrative purposes, apparent violation (AV) 05000263/2016010–01 was updated to be violation (VIO) 05000263/2016010–01 which will be closed upon the issuance of this letter as NRC Inspection Report 05000263/2017010. NRC Inspection Report No. 05000263/2016011 erroneously stated that violation (VIO) 05000263/2016[010]–01 was opened but was not in actuality.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Billy Dickson, Chief
Branch 2
Division of Reactor Projects

Docket No. 50–263
License No. DPR–22

Enclosure:
Inspection Report 05000263/2017010

cc: Distribution via LISTSERV®

Letter to Peter A. Gardner from Billy Dickson dated July 21, 2017

SUBJECT: MONTICELLO NUCLEAR GENERATING PLANT—NRC SUPPLEMENTAL INSPECTION REPORT 05000263/2017010 AND ASSESSMENT FOLLOW-UP LETTER

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50–263
License No:	DPR–22
Report No:	05000263/2017010
Licensee:	Northern States Power Company, Minnesota
Facility:	Monticello Nuclear Generating Plant
Location:	Monticello, MN
Dates:	June 5 through June 9, 2017
Inspectors:	K. Carrington, Resident Inspector, Quad Cities
Approved by:	B. Dickson, Chief Branch 2 Division of Reactor Projects

Enclosure

SUMMARY

Inspection Report (IR) 05000263/2017010; 06/05/2017–06/09/2017; Monticello Nuclear Generating Plant; Supplemental Inspection—Inspection Procedure (IP) 95001; Other Activities (Section 4OA4).

This report covers a one-week announced supplemental inspection of a White finding in the Mitigating System Cornerstone. One Green self-revealed finding was identified by the inspector. The finding was considered a Non-Cited Violation (NCV) of the U.S. Nuclear Regulatory Commission (NRC) regulations. The significance of inspection findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects within the Cross Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG–1649, "Reactor Oversight Process," Revision 6.

The NRC staff performed this supplemental inspection in accordance with IP 95001, "Supplemental Inspection Response To Action Matrix Column 2 Inputs," to assess the licensee's evaluation of a White finding associated with a loss of the High Pressure Coolant Injection (HPCI) system safety function due to excessive oil leakage in March 2016. The NRC staff previously characterized this issue as having White (low-to-moderate) safety significance, as documented in NRC IR 05000263/2016011. During this supplemental inspection, the inspectors determined that the licensee performed a comprehensive evaluation of the self-revealing HPCI oil leakage issue, which occurred during a dynamic flow test. The licensee identified the primary root cause of the issue to be tolerance of leaks by management and individuals which resulted in station personnel failing to advocate and prioritize prompt repair of oil leaks on the HPCI system, and contributed to leakage on the system worsening over time. The licensee has taken corrective actions to ensure management and individuals are not tolerant of leaks by instituting a leak management program and applying more rigor to reviewing issues associated with safety-related and/or risk-significant equipment.

Given the licensee's acceptable performance in addressing the failure to correct excessive oil leakage on the HPCI system, the White finding associated with this issue will only be considered in assessing plant performance for a total of four quarters in accordance with the guidance in IMC 0305, "Operating Reactor Assessment Program."

Cornerstone: Mitigating Systems

Green. A finding of very low safety significance and associated Non-Cited Violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion III, "Design Control," was self-revealed as a result of an equipment cause investigation following failure of a pipe nipple in the safety-related piping for the HPCI system on March 22, 2016. Specifically, during original installation of the HPCI system, the licensee failed to correctly install a flexible hose to isolate vibrations in the system. Immediate corrective actions taken by the licensee included installing the flexible hose in the correct location to ensure isolation of vibrations in the system and performing walkdowns of other risk-significant systems to verify flexible hoses were installed in accordance with design. The issue was captured in the licensee's corrective action program under CAP 1516361.

The inspector determined that the failure of the licensee to implement adequate design control measures and assure any deviations from Design Drawing NX–8292–8 were properly controlled during installation of the flexible hose in the HPCI system was contrary to 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” and was a performance deficiency. The performance deficiency was determined to be more than minor, and thus a finding, because it was associated with the Mitigating Systems Cornerstone attribute of Design Control and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee’s failure to install the flexible hose in the correct location in the HPCI oil system resulted in increased vibrations and loads throughout the HPCI system which had the potential to further degrade and decrease the reliability of the system. The finding was screened using Inspection Manual Chapter 0609, Appendix A, against the Mitigating Systems Cornerstone and determined to be of very low safety significance (Green), because the inspectors answered “No” to all of the questions in Exhibit 2, “Mitigating Systems Screening Questions,” Section A, “Mitigating SSCs and Functionality.” A cross-cutting aspect was not assigned to this finding since the performance deficiency occurred during the original installation of the HPCI system and was determined not to be indicative of current licensee performance. (Section 4OA4)

REPORT DETAILS

4. OTHER ACTIVITIES

Cornerstone: Mitigating Systems

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

.1 (Closed) Licensee Event Reports 05000263/2016–001–00: High Pressure Coolant Injection System Cracked Pipe Nipple Caused Oil Leak

This event, which occurred on March 22, 2016, resulted in a loss of the HPCI system safety function. The event was reported as a condition that could have prevented the fulfillment of a structure, system, or component to perform a mitigating function during an accident. The event was discovered during a dynamic flow test when an excessive amount of oil was observed leaking from a pipe nipple in the HPCI system. This issue was entered into the licensee's corrective action program and a root cause evaluation was performed under (RCE) 1516361. The oil leak on the system was repaired and the effected pipe nipples that were the source of the leak were replaced. Documents reviewed are listed in the Attachment to this report. This Licensee Event Report (LER) is closed. A White finding in the Mitigating System cornerstone was previously documented and finalized in NRC Inspection Report 05000263/2016011.

This event follow-up review constituted one sample as defined in IP 71153–05.

.2 (Closed) Licensee Event Reports 05000263/2016–001–01: High Pressure Coolant Injection System Cracked Pipe Nipple Caused Oil Leak

This event, which occurred on March 22, 2016, was previously reported and submitted under LER 05000263/2016–001–00. The inspectors reviewed the revised LER for accuracy of content and reporting requirements. The updated LER discussed the licensee's determination that the March 22nd event constituted a condition prohibited by the licensee's technical specifications since it was identified that the HPCI system would have been inoperable prior to the date of the event. Documents reviewed are listed in the Attachment to this report. This LER is closed. No findings were identified.

This event follow-up review constituted one sample as defined in IP 71153–05.

.3 (Closed) Licensee Event Reports 05000263/2016–001–02: High Pressure Coolant Injection System Cracked Pipe Nipple Caused Oil Leak

This event, which occurred on March 22, 2016, was previously reported and submitted under LER 05000263/2016–001–00 and 05000263/2016–001–01. The inspectors reviewed the revised LER for accuracy of content and reporting requirements. The updated LER discussed the licensee's determination that the event constituted another condition prohibited by the technical specifications. Following the event, it was discovered that during the period of HPCI system inoperability, the Reactor Core Isolation Cooling (RCIC) system was also inoperable for planned maintenance. This represented a condition prohibited by Technical Specifications 3.5.1, Condition G which requires RCIC system to be operable when HPCI is inoperable. The condition was discovered not met following the March 22nd event and dated to a time frame prior to March 22nd when the RCIC system was taken out of service and rendered inoperable for

planned maintenance. Documents reviewed are listed in the Attachment to this report. This LER is closed. No findings were identified.

This event follow-up review constituted one sample as defined in IP 71153–05.

4OA4 Supplemental Inspection (95001)

.1 Inspection Scope

This inspection was conducted in accordance with Inspection Procedure (IP) 95001, "Supplemental Inspection Response to Action Matrix Column 2 Inputs," to assess the licensee's evaluation of one White inspection finding in the Mitigating Systems Cornerstone. The inspection objectives were to:

- Provide assurance that the root causes and contributing causes of risk-significant issues were understood;
- Provide assurance that the extent of condition and extent of cause of risk-significant issues were identified; and
- Provide assurance that licensee's corrective actions (taken and planned) will be sufficient to address the root and contributing causes and to preclude repetition.

Monticello Nuclear Generating Plant entered the Regulatory Response column of NRC's Action Matrix in the 3rd quarter of 2016 due to a White (low-to-moderate safety significance) inspection finding in the Mitigating Systems Cornerstone. The finding was associated with the station's failure to correct oil leakage on the HPCI system, i.e. conditions adverse to quality, which degraded over time and eventually resulted in loss of the ability of the system to perform its safety function. The finding was characterized as having White safety significance based on the results of a risk assessment performed by a region-based Senior Reactor Analyst (SRA). This issue was documented in NRC Inspection Reports (IRs) 05000263/2016010 and 05000263/2016011.

By letter dated February 28, 2017, the licensee notified the NRC that it had completed its evaluation of the circumstances surrounding the degraded performance and were ready for the NRC to assess the evaluation and subsequent corrective actions. In preparation for the inspection, the licensee performed Root Cause Evaluation (RCE) 1516361, "HPCI Oil Leak Report," Revision 6 to identify weaknesses that existed in various organizations which allowed for a risk-significant finding, and to determine the organizational attributes that resulted in the White finding.

The inspector reviewed the licensee's RCE in addition to other evaluations conducted in support and as a result of the RCE. The inspector reviewed corrective actions that were taken or planned to address the identified causes. The inspector also held discussions with licensee personnel to ensure that the root and contributing causes were understood and corrective actions taken or planned were appropriate to address the causes and preclude repetition.

.2 Evaluation of Inspection Requirements

02.01 Problem Identification

a. Determine whether the evaluation identified who (i.e., licensee, self-revealing, or NRC), and under what conditions the issue was identified.

The root cause evaluation concluded that the excessive oil leak that resulted in loss of the HPCI system safety function was self-revealed on March 22, 2016, during a dynamic flow test of the system. The issue was identified when a stream of oil was observed coming from a pipe nipple within the confines of the HPCI auxiliary oil system. The size of the leak was described as being of a magnitude that would have resulted in the system being declared inoperable.

The inspector determined that the licensee accurately specified who identified the issue and under what conditions the issue was identified.

b. Determine whether the evaluation documented how long the issue existed, and whether there were any prior opportunities for identification.

The root cause evaluation concluded that the origin of the oil leaks on the HPCI system dated back to 2005. Based on the licensee's review of work history and the results of the failure analysis report for the failed pipe nipple, the root cause concluded it was likely that inadequate maintenance during that period resulted in the introduction of a crack in the pipe nipple that degraded over time. The root cause evaluation discussed prior opportunities for the licensee to correct the degraded condition, including a 2013 work order to implement repairs that had been cancelled without adequate justification. The evaluation also discussed oil leaks that were previously identified on the system, including oil leaks that were first identified and documented in a condition report in March 2006, and again in January 2016 during operation of the HPCI system for surveillance testing. The evaluation also discussed a condition report documented in March 2016, prior to the date of the failure, that described the January 2016 leaks as having progressively worsened and needing prompt resolution. The evaluation further described the missed opportunities by the licensee to correct and implement timely repairs of the leaks when they had been perceived as worsening on March 16, 2016.

The inspector determined that the licensee documented both how long the issue existed and that there were prior opportunities to identify this issue.

c. Determine whether the licensee's root cause evaluation documented the significant plant-specific consequences and compliance concerns associated with the issue.

The root cause evaluation documented that oil leakage on the HPCI system on March 22, 2016, resulted in a loss of the HPCI system's safety function and required an immediate notification to the NRC per 10 CFR 50.72 for an event or condition that could have prevented fulfillment of the safety function of a structure, system, or component needed for accident mitigation. In addition, the evaluation discussed the Notice of Violation and associated White finding issued by the NRC for the licensee's failure to correct oil leakage on the HPCI system, i.e. a condition adverse to quality. The root cause evaluation also documented the risk assessment performed by the NRC that resulted in the White (low-to-moderate) safety significance finding and Monticello Nuclear Generating Plant being placed in the Regulatory Response Column of the

NRC's Reactor Oversight Process (ROP) Action Matrix. The evaluation documented the NRC's conclusion that oil leakage on the HPCI system impacted the system's ability to complete its Probabilistic Risk Assessment (PRA) 24–hour mission time for a period of 121 days (the period of time the system was most degraded) and represented a total delta Core Damage Frequency (CDF) of 3.8E–6/yr. or a finding of White safety significance. The root cause evaluation also documented other potential and/or actual consequences of the event. The evaluation concluded that there were no actual radiological or industrial consequences from the event. However, the evaluation concluded there were potential radiological and industrial consequences since the event had the potential to lead to personnel contamination, radiation exposure, personnel injury, and increased fire risk. The evaluation also concluded that there was an actual environmental consequence since the event was classified as a minor environmental event with no actual release to the environment. Specifically, the event resulted in a pint of oil being cleaned up and removed from the HPCI room and approximately five gallons of oil being removed from a floor drain sump and transferred to a barrel.

Based upon the above documented observations, the inspector concluded that the licensee appropriately documented the risk consequences and compliance concerns associated with the issue.

d. Findings

No findings of significance were identified.

02.02 Root Cause, Extent of Condition, and Extent of Cause Evaluation

a. Determine whether the licensee's root cause evaluation applied systematic methods in evaluating the issue in order to identify root causes and contributing causes.

The licensee assigned a multi-disciplined team to perform a Root Cause Evaluation to identify the root and contributing cause of the HPCI System loss of safety function. In its root cause analysis, the licensee used the following processes to identify the root and contributing causes:

- Data gathering through interviews and document review;
- Metallurgical report analysis;
- Performance analysis;
- Culpability analysis;
- Equipment causal evaluation;
- Barrier analysis; and
- Why staircase;

The licensee used the above processes to evaluate equipment and human performance issues associated with the event. The results of these processes revealed one root cause, two contributing causes, and two equipment contributing causes. The processes used were systematic processes governed by and implemented in accordance with the licensee's procedures. The processes were used to ensure the information and circumstances surrounding the problem were fully understood. Based upon this, the inspector determined that the licensee's evaluated the issue using a systematic methodology to identify the root and contributing causes.

b. Determine whether the licensee's root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

In its root cause analysis, the licensee classified the event as a "significant condition adverse to quality" and applied thorough processes and methodologies to identify the root and contributing causes associated with the licensee's failure to correct oil leakage on the HPCI system. The analyses performed in the root cause were of sufficient detail commensurate with the significance of the problem. The licensee's root cause evaluation included a timeline of events. The licensee conducted interviews, and performed work history and corrective action document reviews to capture the issues leading up to the event and to understand how the issue progressed. The evaluation also documented the results of the processes and methodologies used and the basis for applying each. The evaluation documented how the barrier analysis technique along with information gathering through interviews and document reviews were used to identify weak or missing barriers associated with the problem. The evaluation also documented how failed, weak, and missing barriers from the barrier analysis were analyzed to determine the causal chains and illustrate the logic ties to identify the root and contributing causes. The evaluation applied a Cause to Corrective Action Matrix and the Why Staircase technique to understand the logic ties between the causes and the corrective actions in the problem resolution. The evaluation also analyzed the results of the equipment cause evaluation and lab analysis associated with the oil leak and documented the equipment contributing causes of the event.

Based on the licensee's analyses, the evaluation identified the root cause as Monticello Nuclear Generating Plant management and individuals were tolerant of leaks on the HPCI system and as a result station personnel failed to effectively advocate prompt repair of the HPCI oil leaks. In addition, the evaluation identified the contributing causes as: (1) Operations and Engineering management failed to ensure entry into formal evaluation processes to address the degrading condition of the HPCI oil leaks; and (2) less than adequate procedure use and adherence. Specifically, the failure to enter into a formal evaluation process to ensure the oil leak would be corrected in a timely fashion resulted in missed opportunities to repair the HPCI oil leaks prior to the leaks degrading the system to a point of failure.

The evaluation also documented the equipment contributing cause and determined the apparent cause for the threaded pipe nipple failure and subsequent oil leak was that the 'D' port pipe nipple was exposed to significant loads that were sufficient to initiate a crack, likely from applied wrench torques, during oil leak repair activities in 2005. The evaluation also determined a contributing cause of the equipment failure was a flexible hose in the HPCI auxiliary oil system was installed at the incorrect location which resulted in elevated vibration stress levels at the 'D' port pipe nipple and contributed to the crack propagation.

Based upon the work performed for this root cause evaluation, the inspector concluded that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

c. Determine whether the licensee's root cause evaluation included consideration of prior occurrences of the problem and knowledge of prior operating experience.

In its root cause analysis, the licensee included an evaluation of internal and external Operating Experience (OE). Prior occurrences of management tolerance of leaks with

respect to prioritization and failure of personnel to enter into formal processes were analyzed. The root cause evaluation identified several examples of internal OE associated with leaks on systems that were found to be relevant to the HPCI issue; although none were noted as similar or repeated events. The evaluation considered whether corrective actions from previous events at Monticello should have prevented the licensee's failure to correct oil leakage on the HPCI system. The evaluation identified some missed opportunities by the licensee in regards to establishing thresholds for driving decision making for leaks or other degraded conditions. The licensee documented the gaps in their corrective action program. The root cause evaluation also reviewed OE at other reactor sites and documented whether issues at other sites had elements applicable to Monticello and how those elements, if applicable, were or are addressed.

Based upon the considerations described in the analysis, the inspector concluded that the licensee's analysis included consideration of prior occurrences of the problem and knowledge of prior operating experience.

d. Determine whether the licensee's root cause evaluation addressed extent of condition and extent of cause of the problem.

In its root cause analysis, the licensee evaluated fluid leaks on the HPCI system and other risk significant systems where further degradation could lead to inoperability. The licensee also evaluated flexible hose connections and piping alignments on risk-significant systems since inadequate installation had the potential to lead to degradation of a system.

To address the extent of condition associated with the fluid leaks, the licensee performed field walk downs and inspections and identified, documented, and reviewed leaks on the following systems: HPCI system, Reactor Core Isolation Cooling system, Residual Heat Removal system, Diesel Oil system, Residual Heat Removal Service Water system, Core Spray system, Security Facility Electrical system, Non-essential Diesel Generator system, Emergency Diesel Generator system, and Emergency Service Water system. The licensee also conducted reviews of their corrective action program to ensure no new leaks were identified and corrective actions were appropriately assigned. Where new leaks were identified, the licensee captured the leaks into their corrective action program. For each documented leak, the licensee assessed and prioritized repairs based on criteria in accordance with their new leak management program.

By incorporating risk-significant systems into their new leak management program, the licensee adequately addressed the extent of cause since the appropriate resolution to address the cause was to reduce the organization's tolerance of leaks on the HPCI system. In addition, the new program established procedural controls that direct corrective actions for leaks on safety-significant systems upon reaching pre-established thresholds.

To address the extent of condition associated with the inadequate flexible hose installation, the licensee performed field walk downs and inspections of the aforementioned systems and verified flexible hose connections were installed in accordance with their design and function. The licensee also verified piping was appropriately aligned in accordance with its design.

The inspector concluded that the licensee's analysis appropriately addressed extent of condition and extent of cause concerns.

e. Determine whether the licensee's root cause evaluation, extent of condition, and extent of cause appropriately considered the safety culture components as described in NUREG–2165, "Safety Culture Common Language," referenced in Inspection Manual Chapter (IMC) 0310.

The inspector determined that the root cause evaluation, extent of condition, and extent of cause appropriately considered the safety culture components as described in IMC 0310. However, the inspector discussed safety culture components the licensee had not included in their evaluation. The licensee documented the inspector's observations in a condition report and provided some justification for not considering the safety culture components in their evaluation.

f. Findings

No findings of significance were identified.

02.03 Corrective Actions Taken

a. Determine whether the licensee specified appropriate corrective actions for each root/contributing cause or that the licensee evaluated why no actions were necessary.

The licensee's root cause evaluation concluded that the root cause that led to the failure to correct excessive oil leakage on the HPCI system and resulted in a loss of the system safety function was that management and individuals were tolerant of leaks on the system. The evaluation further concluded that management and individuals' tolerance of leaks on the system resulted in station personnel failing to advocate prompt repair. As a result, several corrective actions were taken by the licensee. To address the root cause and prevent recurrence of the performance issue which resulted in the Notice of Violation and associated White finding, the licensee developed and institutionalized a fluid leak management program based on industry practices. The program established objective criteria for prioritization of resolution of fluid leaks on risk-significant systems which includes thresholds to drive timely repair of the leaks or entry into other processes. The licensee also replaced the failed piping and pipe nipples associated with the leak location and upgraded the piping to a more robust piping design. The 'D' port pipe nipple was immediately replaced and the system was restored to an operable status on March 24, 2016. Other corrective actions included, repairing other documented leaks on the HPCI system that had the potential to degrade further and ensuring any leaks on the system were appropriately captured, monitored, and prioritized in accordance with the licensee processes.

To address the organizational contributing cause that Operations and Engineering management did not ensure entry into formal evaluation processes to address the degrading condition of HPCI oil leaks, the licensee established additional barriers to reinforce the operability/functionality determination, decision making, and adverse condition monitoring processes and to direct when the processes are to be entered. The barriers included revisions to the procedures to specifically control and provide guidance for monitoring lower level deficiencies on equipment. The licensee also included actions to ensure proficiency with the formal evaluation processes by formalizing Engineering and Operation Departmental reviews of the corrective action program packages to

detect which processes were to be entered for specific degraded conditions. This action also addressed the second contributing cause regarding less than adequate procedure use and adherence. Additional actions taken to address the second contributing cause included reinforcing standards and expectations within each of the departments.

The inspector concluded that the corrective actions specified were appropriate for each root and contributing cause.

b. Determine whether the licensee prioritized the corrective actions with consideration of the risk significance and regulatory compliance.

The licensee's corrective actions to replace the failed pipe nipple for the 'D' port pilot cylinder and related section of piping, and to repair all major oil leaks on the HPCI system were prompt and effective. Additional corrective actions, which include: (1) modifying the piping in the HPCI system and upgrading the installed piping to more robust piping, i.e. schedule 80 versus schedule 40 piping; (2) swapping the flexible hose line in the system that had been incorrectly installed since original installation; (3) developing and institutionalizing a leak management program in accordance with industry practices; and (4) ensuring work orders were in place to address remaining leaks on the HPCI system, were also prompt and effective to address the leakage that resulted in the loss function of the HPCI system and the station's tolerance of leakage on the system. Other corrective actions taken by the licensee such as procedural revisions related to the licensee entering formal evaluation processes for leaks and other significantly degraded conditions were also considered timely. These corrective actions addressed the contributing causes associated with the Notice of violation and White performance issue. Specifically, the revisions to the procedures were to assure the engineering and operations organizations appropriately entered the licensee's formal evaluation processes when necessary. Finally, the corrective action to develop and institutionalize a new leak management program in accordance with industry practices to address the station management tolerance of leaks and failed prioritization by plant personnel to repair the leaks was already being implemented at the time of the inspection and considered complete and timely.

For each of the corrective actions assigned to address the root and contributing causes, the licensee prioritized the actions in accordance with their procedures. The inspector reviewed the licensee's immediate corrective actions to restore the HPCI system to an operable status. The immediate corrective actions included resolving the leakage on the HPCI system and satisfactorily testing the system to ensure it could accomplish its safety function. The inspector reviewed the licensee's plans to restore compliance and resolve the performance issue associated with the White finding.

Based on this, the inspector concluded that the corrective actions had been prioritized with consideration of risk-significance and regulatory compliance.

c. Determine whether the licensee established a corrective action plan and schedule for implementation of corrective actions and that individuals were appropriately assigned to ensure the corrective actions were promptly planned and completed.

The licensee established a plan and schedule for implementing corrective actions for each root and contributing cause. Immediately following the event, the licensee implemented both interim and immediate corrective actions. Some of the corrective

actions completed are discussed in Section 02.03. The corrective actions taken by the licensee to address excessive oil leakage on the HPCI system were completed prior to this inspection. Moreover, the HPCI system was restored to an operable status on March 24, 2016, two days following the event. Other leaks on the system that were noted as having the potential to further degrade the system were scheduled for repair and the repairs performed in a timely fashion. Additionally, revisions made to licensee procedures to address the contributing causes of the event were implemented in a timely fashion. These revisions were made and completed prior to the inspection. For each corrective action, the licensee created corrective action closure documents to ensure the corrective actions assigned to address the root and contributing causes were tracked to completion. The licensee also assigned a team of individuals to ensure the corrective actions were prompt and completed as scheduled. The inspector reviewed the corrective action closure documents created by the licensee for the corrective actions. The inspector identified two corrective actions that remained open, as of the last date of the inspection. The licensee established a schedule to ensure implementation and completion of the two corrective actions and the corrective actions were continuing to be tracked to closure in the licensee's corrective action program. The latest date for completion of both corrective actions was July 31, 2017. The corrective actions required both the engineering and operations departments to continue their weekday review of corrective action program documents to ensure leaks would be appropriately addressed and screened through licensee processes. Based on their review, the inspector concluded that the licensee had established a corrective action plan for the root and contributing causes, implemented and completed the plan in accordance with the established schedule.

d. Determine whether the licensee developed quantitative or qualitative measures of success for determining effectiveness of the planned and completed corrective actions.

   As documented in the root cause evaluation, the licensee developed qualitative measures for determining the effectiveness of the planned and completed corrective actions. These measures included the following:

   - Verify corrective action to prevent recurrence (CAPR) action was implemented as directed. Licensee procedure 4 AWI–04.05.20, Leak Management Process, procedure was created and distributed. The procedure meets all criteria required by the CAPR 01516361–24;
   - Verify self-assessment of the organization's use of 4 AWI–04.05.20 was performed. Critical criteria must include the following:
     - Verify a representative sample of work requests was prioritized in accordance with AWI–04.05.20;
     - Verify an aggregate list of all identified leaks applicable to this process was found in the applicable system notebooks; and
     - Verify all individual leaks or the aggregate impact of multiple leaks that were determined to require additional actions did result in entry to the ACMP, ODMI, and/or POD processes; and
   - Verify implementation of CAPR 01516361–24 did not result in unintended, adverse consequences.

   The licensee entered these corrective action items into their corrective action program (CAP) to ensure that the effectiveness review actions were performed. The inspector

concluded that the licensee had established quantitative or qualitative measures to validate the effectiveness of the planned and completed corrective actions.

e. Determine that the licensee's planned or taken corrective actions adequately address a Notice of Violation (NOV) that was the basis for the supplemental inspection.

The NRC issued an NOV to the licensee on December 12, 2016. During this inspection, the inspector confirmed that the licensee's root cause evaluation and planned and taken corrective actions addressed the NOV.

The inspector concluded that the corrective action to develop and institutionalize an objective-based leakage program in response to the White performance issue and associated Notice of Violation for the licensee's failure to correct excessive oil leakage on the HPCI system appropriately addressed the performance issue. In addition, the licensee's corrective actions to replace the degraded pipe nipple, replace the associated section of piping with more robust piping, replace the adjacent pipe nipples, repair other significant leaks on the system, ensure correct installation of the flexible hose in the auxiliary oil system, and schedule and prioritize additional leaks on the system were sufficient to bring the licensee back into compliance and resolve the excessive oil leakage issue.

The inspector walked down the affected portion of the HPCI system, performed interviews of licensee personnel to determine the effectiveness of the new leak management program, reviewed the work history and associated repair documents on the HPCI system, and reviewed the licensee's interim effectiveness reviews for the completed corrective actions. The inspector reviewed the licensee's documents and determined the excessive oil leakage issue on the HPCI system was resolved on March 24, 2016, when the system was satisfactorily tested and restored to an operable status following repairs. The inspector concluded the licensee restored full compliance upon implementation of their new leak management program in December 10, 2016, completion of updates and revisions to various procedures (July 8, 2016 and October 14, 2016), and completion of repairs to the HPCI system for the excessive oil leakage. Based on their assessment, the inspector concluded the licensee's corrective actions appropriately addressed the reason for the violation.

f. Findings

Evaluation of Old Design Issue: Failure to Ensure Adequate Design Controls During Installation of Flexible Hose on High Pressure Coolant Injection Auxiliary Oil System

Inspection Scope

The inspector reviewed an old design issue associated with the incorrect installation of a flexible hose in the HPCI system and considered whether the issue met the old design issue criteria in IMC 0305. The inspector considered the circumstances in which credit would be given to licensees for certain old design issues, such as those pertaining to engineering calculations, engineering analyses, associated operating procedures, or plant equipment installations and evaluated whether the performance issue met the criteria in IMC 0305 to determine if the issue was an old design issue. The inspector evaluated using the below criteria:

- Conditions Leading to Licensee Identification
  The issue was identified by the licensee as a result of an ongoing equipment investigation to determine the root and contributing causes associated with the HPCI oil leak. The issue was not identified as a result of a voluntary initiative, such as a design basis reconstitution.

- Timeliness of Corrective Actions
  The issue was corrected, within a reasonable time following identification. Specifically, the flexible hose connection was installed in the proper location per design.

- Opportunity for Prior Identification
  The issue was not likely to be previously identified by recent ongoing licensee efforts, such as normal surveillance, quality assurance activities, or evaluation of industry information. However, the issue may have likely been identified by a design or system engineering walkdown.

- Reflection of Issue on Current Licensee Performance
  The issue does not reflect a current performance deficiency associated with existing licensee programs, policy, or procedure.

The inspector determined the criteria for crediting an old-design issue was not met because the performance issue was self-revealed in that it was identified as a result of an equipment cause investigation. Moreover, discovery of the issue was not the result of any voluntary initiative by the licensee.

Introduction: A finding of very low safety significance (Green) and an associated non-cited violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR) 50, Appendix B, Criterion III, "Design Control," was self-revealed during an equipment cause investigation following failure of a pipe nipple in the HPCI auxiliary oil system on March 22, 2016. The finding was associated with the licensee's failure to implement design control measures to assure deviations from a quality standard were properly controlled. Specifically, the licensee failed to assure deviations from Design Drawing NX–8292–8, "Monticello Nuclear Generating Plant Oil Piping Diagram," were properly controlled during original installation of a flexible hose in the HPCI auxiliary oil piping system so that the piping would be isolated from excitation or pump generated vibration loads.

Description: On March 22, 2016, the licensee conducted a dynamic flow test of the HPCI system. During the test, the licensee observed a four drop per second oil leak coming from a threaded pipe nipple for the 'D' port of the turbine control valve pilot cylinder which is located within the confines of the HPCI auxiliary oil system. After securing both pumps from the test, the licensee noticed a significant amount of oil pooled into a drip pan for the HPCI system. Due to the amount of oil in the pan and the need to quantify and locate the exact source of leakage, the licensee restarted the HPCI auxiliary oil pump. During the restart, the licensee noticed an excessive amount of oil streaming from the 'D' port pipe nipple and also noted leaks at three adjacent pipe nipples. Upon further investigation, the licensee found the piping connection at the 'D' port threaded pipe nipple loose and almost completely broken. The issue prompted immediate repairs, including disassembly, removal, and replacement of the degraded pipe nipples and associated piping. During disassembly, the licensee discovered a 340

degree circumferential through-wall crack in the pipe nipple for the 'D' port turbine control valve pilot cylinder. The licensee sent the failed nipple and the adjacent pipe nipples to a metallurgical lab for further analysis and performed an equipment cause evaluation to better understand the exact causes of the failure and crack propagation.

The licensee's equipment cause investigation determined the origin of the crack likely dated back to maintenance in the 2005 timeframe where excessive torqueing on the nipple likely resulted in the crack. The investigation also determined the crack propagation and subsequent failure of the 'D' port pipe nipple resulted from excessive loads on the system. An equipment contributing cause associated with crack propagation in the failed nipple was identified during the investigation and determined to be a flexible hose for the main oil pump discharge in the HPCI auxiliary oil system was installed in the incorrect location. The purpose of the flexible hose is to isolate the piping from excitation or pump vibrations. Installation of the flexible hose in the wrong location allowed vibrations to migrate through the system and resulted in elevated vibration stress levels at the 'D' port pipe nipple, thus contributing to propagation of the crack. Per Design Drawing NX–8292–8, the flexible hose was required to be installed on the auxiliary oil pump discharge to the auxiliary oil pump's main oil header. However, the hose was found installed on the relief valve, RV–4217, discharge back to the main oil tank. Although the flexible hose was a contributing cause associated with propagation of the crack and led to degradation of the pipe nipple, the licensee's investigation concluded that the actual failure resulted from a significantly large stress load such as that seen during the dynamic flow test. The licensee captured this issue in their corrective action program as CAP 15163621. In addition, the licensee corrected the nonconforming condition by installing a flexible hose in the correct location in accordance with Design Drawing NX–8292–8. The licensee also walked down other risk-significant systems to ensure flexible hoses were installed per design.

Analysis: The inspectors determined that the licensee's failure to establish adequate design control measures and assure any deviations from Design Drawing NX–8292–8 were properly controlled during installation of the flexible hose in the HPCI system was contrary to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and was a performance deficiency. The performance deficiency was determined to be more than minor, and thus a finding, because it was associated with the Mitigating Systems Cornerstone attribute of Design Control and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee's failure to install the flexible hose in the correct location in the HPCI oil system resulted in increased vibrations and loads throughout the HPCI system which contributed to crack propagation of a pipe nipple in the system and had the potential to further degrade and decrease reliability of the system. The finding was screened using the Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," and IMC 0609, Appendix A, "The Significance Determination Process for Findings at Power," issued June 19, 2012, and determined to be of very low safety significance (Green), because the inspectors answered "No" to all of the questions in Exhibit 2, "Mitigating Systems Screening Questions," Section A, "Mitigating SSCs and Functionality." This finding was not assigned a cross-cutting aspect since the performance deficiency occurred during original installation of the HPCI system and was not indicative of current performance.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures be established to assure that applicable regulatory requirements

and the design basis are correctly translated into specifications, drawings, procedures, and instructions. It further requires, in part, that these measures include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled.

Design Drawing NX–8292–8, "Monticello Nuclear Generating Plant Oil Piping Diagram," was the quality standard for controlling the installation of the flexible hose connection in the HPCI auxiliary oil system. Note 2 on the drawing specified proper location of the flexible hose and directed the hose be placed at the HPCI main oil pump discharge.

Contrary to the above, during original installation of the HPCI system, the licensee failed to assure deviations from Design Drawing NX–8292–8 were properly controlled such that the HPCI system piping would be isolated from vibrations seen from excessive loads on or throughout the system. Specifically, the licensee failed to install a flexible hose between piping from the HPCI system auxiliary oil pump discharge to the main oil header and instead installed the hose on the relief valve, RV–4217, discharge back to the main oil tank.

Corrective actions included the licensee installing the flexible hose in the correct location per Design Drawing NX–8292–8 and performing extent of condition walkdowns on other safety-related and risk-significant systems. This violation is being treated as an NCV, consistent with Section 2.3.2.a of the Enforcement Policy. The issue was entered into the licensee's corrective action program as CAP 1516361. **(05000263/2017010–01; Failure to Ensure Adequate Design Controls during Installation of Flexible Hose on High Pressure Coolant Injection Auxiliary Oil System)**

4OA6 Exit Meeting

.1 Exit Meeting Summary

The inspectors presented the inspection results to Mr. P. Gardner and other members of licensee management on June 9, 2017. The licensee representatives acknowledged the issues presented. The inspectors asked licensee management whether any materials examined during the inspection should be considered proprietary. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Regulatory Performance Meeting

On June 9, 2017, as part of the exit meeting associated with the 95001 inspection, the NRC met with the licensee to discuss their performance in accordance with Section 06.05.a.1 Section 10.02[b.4] of IMC 0305. During this meeting, the NRC and licensee discussed the issues related to the White finding that resulted in Monticello Nuclear Generating Plant being placed in the Regulatory Response Column of the Action Matrix. This discussion included the causes, corrective actions, extent of condition, extent of cause, and other planned licensee actions.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

P. Gardner, Site Vice President
K. Scott, Director of Site Operations
C. Dieckmann, Plant Manager
P. Huffman, General Manager Nuclear Fleet Operations
A. Ward, Regulatory Affairs Manager
M. Murphy, Director of Regulatory Affairs
D. Bosnic, Director of Regulatory and Site Support
M. Kelly, HU and Org. Effectiveness Manager
D. Tombers, Site Communications
P. Kissinger, Training Manager
K. Nyberg, Security Manager
M. Antony, Operations Manager
M. Plautz, Operations Support Manager
R. Gutridge, Shift Manager
N. French, Outage Manager
M. Lingenfelter, Director of Site Engineering
P. Young, Program Engineering Manager
T. Erickson, Engineering Supervisor
F. Muhvich, System Engineer
J. Davis, Instrumentation and Controls General Supervisor
S. Sollom, Regulatory Affairs Engineer (95001 Licensee Readiness Team Member)
B. Halvorson, Engineering Supervisor (95001 Licensee Readiness Team Member)
J. Forsman, Performance Improvement (95001 Licensee Readiness Team Member Lead)
K. Christopher, Procedure Manager (95001 Licensee Readiness Team Member Lead)
K. Booth, Maintenance Coordinator (95001 Licensee Readiness Team Member)

U.S. Nuclear Regulatory Commission

B. Dickson, Chief, Reactor Projects Branch 2
K. Carrington, Resident Inspector, Quad Cities
P. Zurawski, Senior Resident Inspector, Monticello
D. Krause, Resident Inspector, Monticello

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000263/2017010–01	NCV	Failure to Ensure Adequate Design Controls During Installation of Flexible Hose on High Pressure Coolant Injection Auxiliary Oil System (Section 4OA4)

Closed

05000263/2017–010–01	NCV	Failure to Ensure Adequate Design Controls During Installation of Flexible Hose on High Pressure Coolant Injection Auxiliary Oil System (Section 4OA4)
05000263/2016–001–00	LER	High Pressure Coolant Injection System Cracked Pipe Nipple Caused Oil Leak (Section 4OA3.01)
05000263/2016–001–01	LER	High Pressure Coolant Injection System Cracked Pipe Nipple Caused Oil Leak (Section 4OA3.02)
05000263/2016–001–02	LER	High Pressure Coolant Injection System Cracked Pipe Nipple Caused Oil Leak (Section 4OA3.03)
05000263/2016–010–01	VIO	Failure To Plan and Perform Maintenance To Correct HPCI Oil Leak

LIST OF DOCUMENTS REVIEWED

The following is a partial list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspector reviewed the documents in their entirety, but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

Section 4OA4

Administrative Procedures
4 AWI-04.05.20; Leak Management Process; Revision 4;
CD 3.3; Performance Assessment Program; Revision 8;
CD 5.28; Conduct of System Engineering; Revision 9;
FG-WM-PLA-01; Conduct of System Engineering; Revision 5;
FG-WM-PLA-01; PassPort Work Planning Guide; Revision 5;
FG-WM-PLA-02; Maintenance Planning Writer's Guide; Revision 0;
FG-WM-WOI-01; Work Order Initiation and Screening Guideline; Revision 4;
FP-E-AUP-01; Aggregate Unit Risk Assessment Process; Revision 1;
FP-E-EQR-01; Conduct of Equipment Reliability Engineering; Revision 0;
FP-E-ER-01; Equipment Reliability; Revision 0;
FP-E-ERBC-01; Equipment Reliability Bubble Chart; Revision 2;
FP-E-PHC-01; Plant Health Committee; Revision 22;
FP-E-RI-01; Risk Integrator; Revision 1;
FP-E-SE-04; Conduct of System Engineering; Revision 22;
FP-E-SE-05, System Engineering Walkdowns, Attachment 1 (Monticello System Walkdowns Guidelines);
FP-E-Ven-01; Vendor Manual Control; Revision 11;
FP-G-DOC-04; Procedure Processing; Revision 31;
FP-MA-COM-01; Conduct of Maintenance; Revision 1;
FP-OP-ACM-01; Adverse Condition Monitoring Plan Process; Revision 1;
FP-OP-OL-01; Operability/Functionality Determination; Revision 19;
FP-PA-ARP-01; CAP Action Request Process; Revision 48;
FP-PA-ARP-02; NSPM Augmented Incident Evaluation Procedure; Revision 3;
FP-PA-CSE-01; Cause Evaluation Manual; Revision 0;
FP-PA-EFR-01; Effectiveness Review Manual; Revision 3;
FP-PA-EVAL-01; Evaluation Methods; Revision 3;
FP-PA-HU-05; Decision Making; Revision 3;
FP-PA-IPM-01; Integrated Performance Monitoring; Revision 0;
FP-PA-PAR-01; Performance Assessment Review Board and Performance Assessment Oversight; Revision 14;
FP-PA-SA-01; Focused Self-Assessment Planning, Conduct, and Reporting; Revision 19
FP-PA-SA-03; SnapShot Evaluation; Revision 8
FP-WM-OVW-01; Work Management Process Overview; Revision 12
FP-WM-PLA-01; Work Order Planning Process; Revision 31
FP-WM-SCH-01; Online Scheduling Process; Revision 20
FP-WM-WOI-01; Work Identification, Screening, Validation, and Cancellation; Revision 24,
MDI-01.04; Conduct of Maintenance; Revision 4
MMM-01.01; Mechanical Maintenance Manual; Revision 28
QF 1114 (FP-PA-HU-05); Operational Decision Making Issue Evaluation (Template); Revision 9
QF 1136 (FP-OP-OL-01); Functionality Assessment (Template); Revision 4

QF 1146 (FP-OP-OL-01); Past Operability Review (Template); Revision 3
QF 1100 (FP-OP-OL-01); Prompt Operability Determination (Template); Revision 18

Condition Reports

AT-0175 Action Request Record Report for CAP 1018528 - S-201 HPCI Drive Turbine Minor Oil Leaks; 07/21/2006
AT-0175 Action Request Record Report for CAP 1415802 - RBCCW In-Leakage Historical Review of Event; 02/19/2014
AT-0175 Action Request Record Report for CAP 1508130 - HPCI Oil Leak Observed at Pipe Inlet to Valve HPO-13; 01/09/2016AT-0175 Action Request Record Report for
CAP 1515945 - Oil Leaks on Threaded Connections Around HPO-13; 03/23/2016
AT-0175 Action Request Record Report for CAP 1512687 - Site DRUM: Cross-cut Theme of PU&A Shortfalls Across Depts; 04/24/2017
AT-0175 Action Request Record Report for CAP 1516361 - Repair HPCI Oil Leak to Restore HPCI Function; 05/31/2016
AT-0175 Action Request Record Report for CAP 1517910 - Old CAP Related WO Cancelled with LTA Justification Notes;
AT-0175 Action Request Record Report for CAP 1518748-02-00
AT-0175 Action Request Record Report for CAP for 1425443 - Six NRC Findings in H.14 Cross-Cutting Aspect; 04/04/2014
CA 1516361-31; Evaluate Open Work Orders Addressing Leaks
CA 1516361-61; Evaluate Open Work Orders Addressing Leaks
CAP 1516361-67; Extent of Cause Flex Hoses Installation
CAP 1516493; Additional HPCI Oil System Leaks IDed; 03/25/2016
CAP 1516622; Oil Leaks Noted during 538444-04 PMT;
CAP 1516813; Aggregate Review of HPCI System Health
CAP 1516860; Evaluate Missed Opportunity on HPCI Oil Leak
CAP 1517910; Old CAP Related WO Cancelled with LTA Justification Notes
CAP 1518192; Missed Opportunity to Prevent Unplanned HPCI Inoperability
CAP 1518258; QF0445 Not Submitted per FP-PA-PI-02
CAP 1518625; OPS Missed Opportunity to Prevent HPCI Window Extension
CAP 1560494; 95001: Minor Packing Leak Identified from FO-6-1; 06/06/2017
CAP 1560495; 95001: Oil Drops Identified on 11 EDG; 06/06/2017
CAP 1560499; 95001: Wetting Identified at Heater Shutoff Switch; 06/06/2017
CAP 1560501; 95001: Oil Drops Identified on 12 EDG; 06/06/2017
CAP 1560507; 95001: General Housekeeping Issues; 06/06/2017
CAP 1560518; 95001: Hanging Drop from P-109C/MTR Reservoir; 06/06/2017
RCE 01516361; HPCI Oil Leak Report; Revision 6; 04/12/2016

Drawings
NH-36249-1; Monticello Nuclear Generating Plant P&ID HPCI Hydraulic Control & Lubrication System; Revision 77
NX-8292-0; Monticello Nuclear Generating Plant Oil Piping Diagram; Revision 76
NX-8292-8; Monticello Nuclear Generating Plant Oil Piping Diagram; Revision S
NX-8292-8; Oil Piping Diagram; Revision 77
NQ-211484-1-1; Monticello Nuclear Generating Plant HPCI Hydraulic Control Lubrication System; Revision 0
EC-9712-01; Monticello Nuclear Generating Plant HPCI Hydraulic Control Lubrication System; Revision 0

Engineering Changes
0000027256; HPCI: Revise Note 7 on NX-8292-8 to Disallow Small Dia Sch 40; Revision 0
0000009712; HPCI Lube Oil Piping Material and Fitting Changes; Revision 1
EC-0441 EC Closeout Package Report, Revision 2
EC-0441 EC Closeout Package Report, Revision 4

Procedures (Operations)
1047-02; Operations Control Room Checklist; Revision 101
Temporary Change Request 1047-03; Operations Reactor Side Checklist Weekly Procedure; 04/17/2017
Temporary Change Request 0255-06-IA-1; 03/24/2017

Work Orders/Requests
WO 140337; Replace HPCI EGR Actuator and Servo; 04/20/2005
WO 140390; Repair Oil Leaks on HPCI Lube Oil Connections; 04/09/2013
WO 141719; Oil Leak on Pipe Elbow Near HPO-13; 07/06/2006
WO 417033; Oil Leak on MC-1751; 06/14/2016
WO 446917; Oil Leaking From Actuator RHR (MO-2021); 02/20/2017
WO 449146-01; Repair Coolant Leak on 13 Dies El.; 09/19/2016
WO 449146-06; Repair Coolant Leak on 13 Dies El.; 12/01/2016
WO 449146-08; Repair Coolant Leak on 13 Dies El.; 12/01/2016
WO 485933; Mech-HO-7, External Oil Leak; 04/23/2017
WO 492905; RHR Div. 2 Disch to Torus Otbd, Oil Leak on Gearbox; 01/06/2015
WO 499576; 1069 HPCI Flow Cntrl Sys Dynamic Test Procd; 03/22/2016
WO 504137-01; Various Oil Minor Leaks on HPCI Oil System; 04/23/2017
WO 522095; 0255-06-IA-1 HPCI Vlv Op Test Rx Rated Press (2); 01/09/2016
WO 524701; P-202C, 13 RHR Pump, Oil Seeping From Port at Motor Pedestal; 11/03/2016
WO 527641; 1047-02 Operations Weekly Control Room Ck Lst; 03/17/2016
WO 538444-01; HPCI Oil Leak Observed at Pipe Inlet to Valve HPO-13; 03/22/2016
WO 538444-02; HPCI Oil Leak Observed at Pipe Inlet to Valve HPO-13; 03/22/2016
WO 538444-03; HPCI Oil Leak Observed at Pipe Inlet to Valve HPO-13; 03/23/2016
WO 538444-05; HPCI Oil Leak Observed at Pipe Inlet to Valve HPO-13; 03/23/2016
WO 542784-01; Oil Leaks on HPCI Front Standard Area; 12/19/2016
WO 542784-02; Oil Leaks on HPCI Front Standard Area; 12/20/2016
WO 542784-03; Oil Leaks on HPCI Front Standard Area; 12/19/2016
WO 542791-01; Small Oil Leak Discharge of HPCI Relief Valve Onboard Pump; 06/20/2016
WO 542791-03; Small Oil Leak Discharge of HPCI Relief Valve Onboard Pump; 06/22/2016
WR 121404; HPCI Oil Leak Observed At Pipe Inlet to Valve HPO-13; 01/09/2016
WR 123182; Oil Leaks on Threaded Connections around HPO-13; 3/16/2016
WR 123284; S-37, Rx Bldg Flr Drn Sump Full of Oil and SW; 3/22/2016
WR 125475; Swap HPCI Oil Lines in Sept 2016 HPCI Maint Window; 06/21/2016

Miscellaneous
0067-1607-RPT-007; Evaluation of HPCI Pump Lube Oil Piping Crack; Revision 0
MT-MME-CNT-111L; Torque/Concrete Anchors/Pipe Threading; Revision 0
MT-MME-PIP-2410; Conduct Maintenance on Piping System; Revision 25
Monticello Site Clock Reset - Red Sheet: CAP Number 1516361
(Face-to-Face) Monticello Stop Light Memo, “Monticello Issues a Stop Light Memo Regarding the Performance of a High Pressure Coolant Injection (HPCI) Surveillance Run on March 22, 2016”

L-MT-16-056; Response to an Apparent Violation Regarding NRC Inspection Report 05000263/2016010 (EA-16-175); 10/14/2016
MSPI Basis Document, Revision 8
Operations Memo 16-37: Ops Status Notes Action for Operability Determination; 12/02/2016
Memo to Engineering Department: Interim Communications - HPCI Oil Leak; 05/05/2016
CAP 1518748-02 for Leak Assessment.docx
Site Interview with Station Operator on HPCI Run 3/21/2016-3/22/2016
Laboratory Report (L-4272A); 04/20/2016
Lesson Plan R8301A-016; Piping; 03/10/2017
WM-0100 WO Task Attribute Report 11-15; Revision 1
HPCI White Finding 1516361-44

LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
CAP	Corrective Action Program
CAPR	Corrective Action to Prevent Recurrence
CDF	Core Damage Frequency
CFR	*Code of Federal Regulations*
DRP	Division of Reactor Projects
IMC	Inspection Manual Chapter
HPCI	High Pressure Coolant Injection
RCIC	Reactor Core Isolation Cooling
IP	Inspection Procedure
IR	Inspection Report
LER	Licensee Event Report
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
OE	Operational Experience
RCE	Root Cause Evaluation
ROP	Reactor Oversight Process
SRA	Senior Reactor Analyst
SSC	Structure, System, and Component
WO	Work Order