

WOLF CREEK

NUCLEAR OPERATING CORPORATION

Adam C. Heflin
President, Chief Executive Officer and Chief Nuclear Officer

December 8, 2016

WM 16-0016

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

Reference: Letter dated November 8, 2016, from N. H. Taylor, USNRC, to A. C. Heflin, WCNO

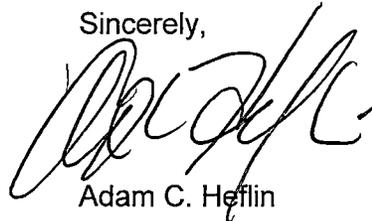
Subject: Docket No. 50-482: Response to Non-Cited Violation 05000482/2016003-01

Gentlemen:

In accordance with 10 CFR 50.4 and the Nuclear Regulatory Commission (NRC) Enforcement Policy, Wolf Creek Nuclear Operating Corporation (WCNO) hereby denies non-cited violation (NCV) 05000482/2016003-01, "Failure to Adequately Adjust Testing and Preventive Maintenance for Safety-Related Lockout Relays," which was documented in the Reference. The attachment describes the basis for denying NCV 05000482/2016003-01.

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4000, or Cynthia R. Hafenstine (620) 364-4204.

Sincerely,



Adam C. Heflin

ACH/rit

Attachment

cc: P. K. Holahan (NRC), w/a
K. M. Kennedy (NRC), w/a
B. K. Singal (NRC), w/a
N. H. Taylor (NRC), w/a
Senior Resident Inspector (NRC), w/a

IEDI
NRR

Denial of Non-Cited Violation (NCV) 05000482/2016003-01

Restatement of NCV 05000482/2016003-01

Introduction

The inspectors identified a Green non-cited violation of Technical Specification 5.4.1.a, for the licensee's failure to adequately adjust testing and preventive maintenance activities in accordance with Procedure AP 16B-003, "Planning and Scheduling Preventive Maintenance," Revision 5. Specifically, the licensee did not adjust a preventive maintenance task for a General Electric HEA 86 lockout relay and test the relay in accordance with vendor recommendations and operating experience, which resulted in the NB0215 186/M lockout relay associated with the B essential service water pump motor breaker failing as-found testing on August 2, 2016.

Description

During performance of Procedure STN NB-215, "DPEF01B Feeder Breaker Trip Circuit Verification," Revision 1A on August 2, 2016, while the B essential service water pump and breaker were out of service for maintenance, the 186/M lockout relay failed to trip during as-found testing. The lockout relay provides protection to the B essential service water pump motor and 4160 volt safety-related bus NB02 in the event of an overcurrent condition. If the lockout relay fails to actuate and trip the B essential service water pump motor breaker, it could result in damage to the 'B' essential service water pump motor or cause the NB02 bus to lockout due to an overcurrent condition on the bus, which would be recognized by the NB02 bus protection circuitry.

During the test in accordance with Section 8.2, "NB0215 186/M Lockout Relay Tests," of STN NB-215, a direct current test voltage of 82.5 volts is momentarily applied. The relay is expected to actuate at 80 volts or less, but it is considered within tolerance if it actuates at less than or equal to 87.5 volts, and the licensee determined that it is acceptable for the relay to actuate up to 95 volts. During the performance of STN NB-215 on August 2, 2016, the test voltage was increased up to 125 volts, but the relay did not trip. The licensee did not test the relay past this point and replaced the armature assembly associated with the relay, calibrated it, and retested it prior to returning the relay and system to service.

This test was last performed successfully using Procedure RNM C-1301, "Miscellaneous Relay and Meter Equipment," Revision 6, on August 10, 2009, and the NB0215 186/M lockout relay passed. The current testing and preventive maintenance task is performed every six years, and the August 2, 2016, test was conducted within the grace period for the current preventive maintenance task frequency.

The inspectors reviewed applicable vendor documentation, GEH-2058, "Auxiliary Relays," Revision E, for type HEA61 relays. This vendor documentation states, "During any scheduled outage of the equipment and preferably at yearly intervals, the relay should be tripped electrically to insure that it is in good

operating condition, and that all the circuits are complete so that the breakers can be tripped." The inspectors also reviewed Wolf Creek corrective action document Performance Improvement Request (PIR) 2003-2708, which evaluated OE16724 – General Electric Type HEA Lockout Relay Test Interval. The PIR discussed contact made with General Electric, "HEA relays tend to be sluggish during the first operation when tested on a 3 to 5 year interval. The problem applies to the whole family of HEA relays, and General Electric recommends testing yearly." Wolf Creek's lockout relays were tested on a 6-year frequency.

The inspectors also reviewed industry operating experience from June 19, 2012, which was evaluated by Wolf Creek Condition Report 54212. The industry operating experience made two recommendations that included determining "the total population of General Electric HEA 86 relays and the subset of General Electric HEA 86 relays that are not normally actuated each cycle or within the [preventive maintenance] frequency." Additionally, the event report recommended, "Any that can be tested on line should be tested as soon as practicable. The functional test should be an electrical trip that actuates the relay coil. Replace any test failure with modified [General Electric] HEA 86 relays or suitable alternative." Corrective actions did not identify any necessary changes to the testing or maintenance activities for the NB0215 186/M lockout relay.

The inspectors noted that Section 6.2, "Establishing [Preventive Maintenance] Activities," of Procedure AP 16B-003, "Planning and Scheduling Preventive Maintenance," Revisions 2 through 7, provided direction for implementing the preventive maintenance program including consideration of vendor recommendations and operating experience. The inspectors determined that the August 2003 and June 2012 operating experience documents were not adequately evaluated, in that the licensee's relay testing and preventive maintenance activities were not adjusted after considering vendor recommendations and industry experience. The failure to appropriately adjust testing and maintenance activities for HEA relays resulted in the failure of the 186/M lockout relay on August 2, 2016. Additionally, neither the licensee's evaluation of Condition Report 106164, which was written to address the equipment failure on August 2, 2016, nor any other condition report identified the need to revise the testing and preventive maintenance frequency.

The licensee's corrective actions for the August 2, 2016, relay failure included replacing the armature assembly associated with the relay, retesting the relay satisfactorily, and returning the relay and system to service. The station entered the equipment condition into the corrective action program as Condition Report 106164, and the licensee entered Condition Reports 108440 and 108548 into the corrective action program to address the inspectors' concerns associated with the need to revise the testing and preventive maintenance activity frequency for the subject relay.

Analysis

The inspectors determined that the failure to adequately adjust a testing and preventive maintenance task for the NB0215 186/M General Electric HEA 86 lockout relay in accordance with Procedure AP 16B-003, "Planning and Scheduling Preventive Maintenance," was a performance deficiency. This finding is more than minor because it is associated with the equipment performance

attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, with the NB0215 186/M lockout relay failed on or before August 2, 2016, and the safety-related 4160 volt NB02 bus was susceptible to locking out as a result of an overcurrent condition. The inspectors evaluated the finding using Exhibit 2, "Mitigating Systems Screening Questions," of Inspection Manual Chapter 0609, Appendix A, "Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, and determined this finding is not a deficiency affecting the design or qualification of a mitigating structure, system, or component that maintained its operability or functionality; the finding does not represent a loss of system and/or function; the finding does not represent an actual loss of function of at least a single train for greater than its Technical Specification-allowed outage time; and the finding does not represent an actual loss of function of one or more non-Technical Specification trains of equipment designated as high safety-significant. Therefore, the inspectors determined the finding was of very low safety significance (Green).

The inspectors determined that the finding has a cross-cutting aspect in the area of problem identification and resolution, operating experience, because the organization did not systematically and effectively evaluate relevant internal and external operating experience in a timely manner. Specifically, PIR 2003-2708 and Condition Report 54212 documented vendor recommendations and industry operating experience regarding HEA relay failures, and neither the vendor recommendations nor the industry operating experience were effectively implemented and institutionalized through changes to station processes, procedures, equipment, and training programs, and testing and preventive maintenance activities were not adequately adjusted. This issue is indicative of current performance because the station did not take corrective actions to address the station's failure to adequately consider operating experience, the station did not recognize the need to revise the testing and maintenance strategy following the August 2, 2016, failure, and the same failure would be expected to occur [P.5].

Enforcement

Technical Specification 5.4.1.a, requires, in part, that procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2. Section 9.b of Appendix A to Regulatory Guide 1.33, Revision 2, requires that preventive maintenance schedules be developed to specify inspections of equipment and inspection or replacement of parts that have a specific lifetime. The licensee established Procedure AP 16B-003, "Planning and Scheduling Preventive Maintenance," which provides direction for implementing the preventive maintenance program to meet the Regulatory Guide 1.33 requirement. Section 6.2 of Procedure AP 16B-003 requires, in part, that preventive maintenance activities be developed by considering vendor recommendations and operating experience. Contrary to the above, until October 16, the licensee did not ensure that preventive maintenance activities were developed by considering vendor recommendations and operating experience. Specifically, the licensee did not ensure that adequate preventive maintenance activities were developed for the NB0215 186/M lockout relay by considering vendor recommendations to trip the relay electrically during any scheduled outage of the equipment and operating

experience documented in PIR 2003-2708 and Condition Report 54212. As a result, the NB0215 186/M lockout relay failed on or before August 2, 2016, and the safety-related 4160 volt NB02 bus was susceptible to locking out as a result of an overcurrent condition. The licensee entered this condition into its corrective action program as Condition Reports 106164, 108440, and 108548. The licensee replaced the relay armature assembly and retested the relay satisfactorily. Additional corrective actions to address the preventive maintenance activities are expected as a result of Condition Reports 108440 and 108548. This violation is being treated as a non-cited violation consistent with Section 2.3.2 of the Enforcement Policy: NCV 05000482/2016003-01, "Failure to Adequately Adjust Testing and Preventive Maintenance for Safety-Related Lockout Relays."

Basis for Denying NCV 05000482/2016003-01

Wolf Creek Nuclear Operating Corporation (WCNOC) contends that the performance deficiency described in non-cited violation (NCV) 05000482/2016003-01 is not valid because WCNOC staff did comply with the requirements of WCNOC Procedure AP 16B-003, "Planning and Scheduling Preventive Maintenance." The performance deficiency identified in NCV 05000482/2016003-01 is shown below:

"The inspectors determined that the failure to adequately adjust a testing and preventive maintenance task for the NB0215 186/M General Electric HEA 86 lockout relay in accordance with Procedure AP 16B-003, "Planning and Scheduling Preventive Maintenance," was a performance deficiency."

The following description from the enforcement section for NCV 05000482/2016003-01 more specifically defines the performance deficiency as identified by the inspectors:

"Contrary to the above, until October 16, the licensee did not ensure that preventive maintenance activities were developed by considering vendor recommendations and operating experience. Specifically, the licensee did not ensure that adequate preventive maintenance activities were developed for the NB0215 186/M lockout relay by considering vendor recommendations to trip the relay electrically during any scheduled outage of the equipment and operating experience documented in PIR 2003-2708 and Condition Report 54212."

Step 6.2, "Establishing PM Activities," of Procedure AP 16B-003 requires that preventive maintenance (PM) activities be developed in accordance with step 6.2.1 by considering the following:

- 6.2.1.1: Vendor recommendations
- 6.2.1.2: Equipment history
- 6.2.1.3: Regulatory and Code Requirements
- 6.2.1.4: Operating Experience (OE) (Industry and Station)
- 6.2.1.5: Predictive Maintenance recommendations
- 6.2.1.6: Component Functional Importance

WCNOC personnel considered all of these criteria in WCNOC Performance Improvement Request (PIR) 2003-2708, which evaluated industry OE16724, "General Electric Type HEA Lockout Relay Test Interval." This PIR evaluation determined that no change to the 6-year PM frequency was required. This was further reinforced with WCNOC's evaluation of INPO Event Report 12-53, documented in Condition Report (CR) 54212. The following discussion will present WCNOC's consideration of the 6 criteria listed in Step 6.2.1 of Procedure AP 16B-003.

VENDOR RECOMMENDATIONS

As discussed in the inspection report, General Electric (GE) manual GEH-2058 "Auxiliary Relays," Rev E stated that the Type HEA relays should be tripped electrically:

"During any scheduled outage of the equipment and preferably at yearly intervals..."

In PIR 2003-2708, WCNOC personnel evaluated industry OE16724. As discussed in this PIR, this vendor recommendation is presumably written to account for HEA relays in all types of service conditions. The vendor recognizes that preventive maintenance cycles are best determined by the customer according to the device's plant performance and its application environment. All NB System safety-related (SR) GE HEA relays at Wolf Creek Generating Station (WCGS) operate in a conditioned air environment. A summary of the evaluation performed on page 4 of 5 of PIR 2003-2708 states:

"The system engineer took in consideration the history of the relays, the application, the low failure rate, the environment that the relays operate in, and the vendor recommendations. It was determined that the vendor recommendation is very conservative with the requirement to perform annual testing."

The station that issued OE16724 described a discussion it had with someone from GE regarding "sluggish" behavior of Type HEA relays tested on a 3-5 year interval. This was an informal conversation. There are no records of any official GE publication that makes reference to "sluggish operation" in HEA relays.

GE has issued 2 formal communications referred to as Service Advice Letters (SAL) related to the Type HEA relays:

- 1) SAL 165.1 was issued on 8/10/81. This related to the potential for malformed torsion springs in certain relays within a manufacturing period as indicated by a date code. All SR GE HEA lockout relays (86) were inspected and none were impacted by this SAL.
- 2) SAL 175.1 was issued on 9/28/83. This related to a minor design change that created the potential for mis-operation of relays that were manufactured within a specific time period. All SR GE HEA lockout relays (86) were inspected and were not impacted by this SAL.

There is no evidence that GE has officially indicated that these relays exhibit sluggish behavior based on testing frequency.

EQUIPMENT HISTORY

Previous and ongoing research due to CRs 106164 and 108548 reviewed the PM history of GE HEA relays in service at WCGS. The review included all PM activities performed on SR HEA relays since January 1, 2000 and was current as of October 18, 2016. There are 44 SR GE HEA relays in service at WCGS. Since January 1, 2000, 119 PMs have been performed on these SR relays that involved electrically tripping them. The results are as follows:

- 112 resulted in actuation of the relay at less than or equal to 87.5 VDC
- 4 actuated above 87.5 VDC, but below 95 VDC
- 2 actuated at system nominal voltage (As part of CR 12799, it was documented that the use of new test equipment contributed to the relays not actuating within tolerance.)
- 1 failed to actuate (the failed test on August 2, 2016)

87.5 VDC represents 70% of rated voltage and is the acceptance criteria specified in the PM procedure. 95 VDC is the action level at which the System Engineer must be notified per the PM procedure.

The function of these relays is to trip a specific piece of equipment due to a protective relay actuation, typically an overcurrent condition. This protects the equipment from damage or further damage, depending on the case. Since January 1, 2000, only 1 out of 119 tests would have resulted in a failure of a SR GE HEA relay to actuate. This is a very low failure rate, and as such supports the current PM frequency.

For the NB0215 186/M lockout relay specifically, which failed on August 2, 2016, the PM was performed 6 times prior to this failure starting on November 15, 1988 with the last successful test on August 10, 2009. Therefore, there were 5 performances over 21 years in which the relay actuated at or below the acceptance criteria of 87.5 VDC every time.

REGULATORY AND CODE REQUIREMENTS

There are no regulatory or code requirements which specify a PM frequency for these types of protective devices.

OPERATING EXPERIENCE

Industry OE16724, which was issued on June 11, 2003, indicated that the failure of a relay to trip at another station was caused by excessive time between PMs. The PM frequency of the failed relay discussed in this OE was 4 years. When contacted by the station which issued this OE, someone at GE indicated that these relays become "sluggish" with a PM interval of 3-5 years. This was an informal communication with GE. As previously mentioned, there is no official documentation from GE which describes this behavior as a result of PM frequency.

WCNOC PIR 2003-2708 evaluated OE16724. Based on the very low number of failures of the relays at WCGS, and the fact that all of the NB System SR GE HEA relays operate in conditioned air environments, WCNOC personnel determined that a 6-year PM frequency coinciding with breaker maintenance was appropriate.

On June 19, 2012 the Institute of Nuclear Power Operations (INPO) issued Level 2 Event Report 12-53, which pertained to GE HEA Relays. There were 2 recommendations contained in this report:

- 1) Review GE SAL 165, HEA Relay Failures. Determine the total population of GE HEA 86 relays and the subset of GE HEA 86 relays that are not normally actuated each cycle or within the PM frequency. GE SAL 165, as discussed above, dealt with relays with malformed torsion springs, which were identified with certain date codes. None of the relays in service at WCGS were covered by this SAL.
- 2) Review the subset of lockout relays identified above that are not normally actuated each cycle or within the PM frequency, in accordance with INPO AP-913. Any of these which can be tested on-line should be tested as soon as practicable.

WCNOC CR 54212 evaluated this INPO report. All SR GE HEA relays were in an existing PM with an established PM frequency. No changes to the PM activities for the SR GE HEA relays were deemed necessary.

Station operating experience has indicated that since January 1, 2000, out of 119 PMs performed on the 44 SR GE HEA relays at WCGS, only 1 failed to actuate. This very low failure rate would indicate that the 6-year PM frequency in place for these relays is sufficient.

PREDICTIVE MAINTANENCE RECOMMENDATIONS

There are no predictive maintenance recommendations for these types of protection devices.

COMPONENT FUNCTIONAL IMPORTANCE

PIR 2003-2708 evaluated the functional importance of the SR GE Type HEA relays. Their function is to trip the power to specific devices due to a protective relay actuation. The failure of one of these devices might allow a SR piece of equipment to be further damaged, or to cause the bus to trip if the condition is severe enough. However, WCGS PM test results on SR GE HEA relays since January 1, 2000, show only 1 test result out of 119 with a failure to actuate. Therefore, with such a low failure rate, the PM frequency is adequate for the functional importance for these components.

Conclusion

The information provided demonstrates that WCNOC complied with the requirements of WCNOC Procedure AP 16B-003 by considering vendor recommendations and industry operating experience in developing PM activities for the NB0215 186/M GE HEA lockout relay. In addition, in accordance with Procedure AP 16B-003, WCNOC also considered equipment history and station operating experience as detailed in PIR 2003-2708. PM practices should be developed with all of these criteria in mind. When all of the criteria are evaluated, including service conditions and the low failure rate of SR GE HEA 86 lockout relays at WCGS, the adequacy of the current PM practices is supported. Had the NB0215 HEA 86 relay been tested more frequently, there is no evidence that a failure of this relay to actuate would not have occurred.

The performance deficiency identified in NCV 05000482/2016003-01 over emphasizes the consideration of vendor recommendations and does not provide appropriate credit for all of the information, including equipment history, service operating conditions, and station-specific operating experience considered by WCNOC staff in developing PM activities for the NB0215 186/M GE HEA lockout relay. Based on the review of all the information required by Procedure AP 16B-003, WCNOC denies that the performance deficiency as described by the inspectors in

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NCV 05000482/2016003-01 occurred. Therefore, WCNOC denies that there is a valid basis for this violation.