WOLF CREEK
NUCLEAR OPERATING CORPORATION

Richard A. Muench
President and Chief Executive Officer

December 9, 2009

WM 09-0065

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

Reference: Letter dated November 10, 2009, from G. B. Miller, USNRC to WCNOC – NRC Integrated Inspection Report 05000482/2009004

Subject: Docket 50-482: Response to NRC Integrated Inspection Report 05000482/2009004

Gentlemen:

Nuclear Regulatory Commission (NRC) Inspection Report 2009004 for the Wolf Creek Generating Station issued on November 10, 2009 (the Reference) summarized the results of the Integrated Inspection for the third quarter of 2009. Pursuant to 10 CFR 50.4, and in accordance with guidance in the NRC's Enforcement Policy, Wolf Creek Nuclear Operating Corporation (WCNOC) hereby disputes two of the noncited violations (NCV) identified in the report.

Attachment I provides WCNOC's denial of NCV 2009004-03, "Inadequate Evaluation of Emergency Diesel Generator for Common Cause Failure in the Supporting Essential Service Water System." Attachment II provides WCNOC's denial of NCV 05000482/2009004-06, "Performing Prohibited Elective Maintenance on Safety Bus NB02 Channel 4 during Emergency Diesel Generator Maintenance."

Additionally, Attachment III provides further information on NCV 2009004-07, "Failure to Report Conditions that Could Have Prevented Fulfillment of a Safety Function." WCNOC has completed further evaluations of two examples in this violation and has determined that these events do not meet the criteria for reporting under 10 CFR 50.73(a)(2)(v). However, because of the violation, WCNOC intends to report these events under 10 CFR 50.73(a)(2)(v) in either a supplemental LER or new LER based on the NRC characterizing these events as examples of a failure to submit LERs within 60 days following discovery of an event meeting the reportability criteria. WCNOC requests the NRC review the evaluations concerning the two examples and provide WCNOC with an assessment of their review. Based on this review, WCNOC will either supplement the LER with additional information from the NRC review or cancel the LER in accordance with the guidance in NUREG-1022, Revision 2.

IE01
RGN IV

While licensees are not required to provide written responses to NCVs, the guidance described in the NRC's Enforcement Policy allows licensees to dispute violations described as NCVs. We respectfully request that you fully consider the information provided in the attachments.

If you have any questions concerning this matter, please contact me at (620) 364-4000, or Mr. Richard D. Flannigan, Manager Regulatory Affairs at (620) 364-4117.

Sincerely,

Richard A. Muench

RAM/rlt

Attachment I Denial of Noncited Violation 2009004-03
II Denial of Noncited Violation 2009004-06
III Response to Severity Level IV Noncited Violation 2009004-07

cc: E. E. Collins (NRC), w/a
G. B. Miller (NRC), w/a
B. K. Singal (NRC), w/a
Director Office of Enforcement (NRC), w/a
Senior Resident Inspector (NRC), w/a

DENIAL OF NONCITED VIOLATION 2009004-03

WCNOC has reviewed the following noncited violation and based on information on the following pages does not believe a violation of Technical Specifications 3.8.1 existed.

Restatement of Noncited Violation (Excerpt from pages 16-18 of 05000482/2009004)

Introduction. The inspectors identified a Green noncited violation of Technical Specification 3.8.1 for failure to perform an adequate common cause evaluation within 24 hours to demonstrate no common cause failure mechanism existed between the operable and inoperable emergency diesel generators.

Description. At 11:15 a.m., on June 30, 2009, Wolf Creek auxiliary building watch discovered a through-wall leak in the essential service water Train B Piping EF-138-HBC-30 just upstream of valve EF-HV-0038. The piping was leaking through two adjacent pinholes at the bottom of the pipe spaced approximately 0.4 inch apart. This condition was recognized as a limiting condition of operations per Condition A of Technical Requirements Manual 3.4.17, "Structural Integrity," which requires the structural integrity of all ASME Class I, II, and III piping to be maintained. The required action directed operators to declare the essential service water Train B inoperable. Thus Wolf Creek entered Condition A of Technical Specification 3.7.8 "Essential Service Water," for one train of essential service water inoperable. This condition has a required action of restoring the essential service water train to operable status within 72 hours, but it also requires simultaneous entry into Condition B of Technical Specification 3.8.1, "AC Sources Operating," for the emergency diesel generator made inoperable by the essential service water system. There are four required actions associated with Technical Specification 3.8.1, Condition B. First, Required Action B.1, the control room operators are to verify correct breaker alignment and indicated power availability for each offsite power circuit within 1 hour and every 8 hours thereafter. Second, Required Action B.2 requires that features supported by the inoperable diesel generator be declared inoperable when its required redundant feature is inoperable within 4 hours. Third, Required Action B.3.1 requires Wolf Creek to determine that the operable diesel generator is not inoperable due to a common cause failure. Alternatively, Required Action B.3.2 directs Wolf Creek to verify the operable diesel generator starts from standby conditions and achieves steady state voltage and frequency, within 24 hours. Fourth, Required Action B.4.1 directs the restoration the diesel generator to operable status within 72 hours. Wolf Creek properly carried out Required Actions B.1, B.2, and B.4.1 required by Technical Specification 3.8.1, Condition B.

At 12:02 p.m., 47 minutes after the leak was discovered, the control room logs state that Technical Specification 3.8.1, Action B.3.1, is being exited because "Emergency Diesel Generator B inoperable due to ESW being inoperable not a common cause failure." The inspectors interviewed operations personnel on the adequacy of such a justification. Operations provided the inspectors with a completed copy of Procedure SYS KJ-200, "Inoperable Emergency Diesel." Procedure Step 6.1.5 states: "If the absence of any potential common cause failure can be demonstrated . . . then document the evaluation on the cover sheet." However, the cover sheet had only one sentence which matched the log entry verbatim. At the time of this determination, ultrasonic testing to determine flaw size and pipe wall thicknesses had yet to be performed. The results of that testing were the basis for an ASME N513.2 code case which eventually restored operability. During later interviews regarding the control room log entries, Wolf Creek stated that nonlicensed operators did not find any other through wall

leaks on essential service water Train B, and therefore Train B was operable. The inspectors found that this type of visual evaluation did not meet the reasonable assurance standard specified in RIS 2005-20. Visual examinations can not identify below minimum wall thickness piping or piping flaws under insulation. The inspectors concluded the licensee's evaluation lacked a valid technical basis for determination that a common cause failure mechanism did not exist on the opposite train emergency diesel generator.

The ASME N513.2 code case was issued and essential service water/emergency diesel generator operability restored at 9:40 p.m. that night. The code case verified the structural integrity of the piping despite the current through-wall flaw; however, it specified that due to the potential common cause nature of pitting flaws, five additional locations had to be ultrasonic tested to verify that minimum wall thickness was met. Although none of the additional locations indicated any below minimum-wall flaws in the essential service water piping, an expanded ultrasonic test of the leak area revealed two additional pits that were below the minimum wall thickness acceptance criteria. Separate evaluations were performed for those flaws and all three were permanently repaired per the ASME code on July 23, 2009.

Analysis: The inspectors determined that the failure to demonstrate operability of Emergency Diesel Generator B per Technical Specification 3.8.1, Required Action B.3.1 or B.3.2 was a performance deficiency. Traditional enforcement does not apply since there were no actual safety consequences or potential for impacting the NRC's regulatory function, and the finding was not the result of any willful violation of NRC requirements or Wolf Creek procedures. The inspectors determined that this finding was more than minor because it is associated with the equipment performance attribute for the Mitigating Systems Cornerstone; and, it affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, this issue relates to the availability and reliability examples of the equipment performance attribute because a latent common mode failure mechanism was not correctly evaluated. The inspectors evaluated the significance of this finding using Phase 1 of Inspection Manual Chapter 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At Power Situations," and determined that the finding was of very low safety significance (Green) because the issue was not a design or qualification deficiency confirmed to result in loss of operability or functionality, did not represent a loss of system safety function, an actual loss of safety function of a single train for greater than its technical specification allowed outage time, an actual loss of safety function of a nontechnical specification risk-significant equipment train, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The cause of the finding has a problem identification and resolution crosscutting aspect in the area associated with the corrective action program because Wolf Creek failed to thoroughly evaluate the failure mechanism such that the resolutions address the causes and extent of conditions, as necessary. Specifically, Wolf Creek did not properly consider the possibility of common-cause pitting failures which could have impacted the essential service water Train A piping structural integrity thereby affecting its cooling loads, including Emergency Diesel Generator A (P.1(c)).

Enforcement: Technical Specification 3.8.1 Required Actions B.3.1 and B.3.2 require, with one diesel generator inoperable, to determine that the operable diesel generator is not inoperable due to common cause failure or else perform SR 3.8.1.2 [run the diesel generator]. Contrary to this requirement, on June 30, 2009, the licensee failed to demonstrate that Emergency Diesel Generator A was operable by evaluation of common cause failure or by performing SR 3.8.1.2 while emergency diesel generator B was inoperable due to essential service water piping

corrosion. Specifically, the control room logs exited Required Action B.3.1 stating that "EDG B inoperable due to ESW being inoperable not a common cause failure." No further evaluation was provided. Because the finding is of very low safety significance and has been entered into the corrective action program as Condition Report 18347, this violation is being treated as an noncited violation, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000482/2009004-03: "Inadequate Evaluation of Emergency Diesel Generator for Common Cause Failure in the Supporting Essential Service Water System."

WCNOC RESPONSE

Description of Event

At 1115 CDT on June 30, 2009, a through wall leak on Essential Service Water (ESW) System piping just upstream of valve EF HV-038 was identified by shift crew personnel during building watch rounds. The "B" ESW train was declared inoperable based on Technical Requirement TR 3.4.17, "Structural Integrity," and Condition A of LCO 3.7.8, "Essential Service Water (ESW) System," was entered. Required Action A.1 of LCO 3.7.8 has a Note to enter the applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources – Operating," for a diesel generator (DG) made inoperable by the ESW System. This resulted in the "B" DG being declared inoperable and entering Condition B of LCO 3.8.1.

Required Action B.3.1 for TS 3.8.1 is to determine if the OPERABLE DG is inoperable due to a common cause failure. Control room personnel utilized procedure SYS KJ-200, "Inoperable Emergency Diesel," when the DG was declared inoperable and determined that a common cause failure did not exist since the inoperability was due to a support system. Step 6.1.5 of SYS KJ-200 specifies to document the evaluation of common cause on the procedure cover sheet. The documented evaluation indicated that "B" DG inoperability was not common cause due to the "B" train ESW being inoperable. At 1202 CDT Required Action B.3.1 was exited. Subsequent discussions with control room staff indicated that a dedicated walkdown after identification of the leak on the "B" train was not performed. This decision was due to the affected location on the "A" train being in the same room and a leak on the "A" train would have been easily observed by the building watch as part of building watch rounds.

The NRC staff has accepted ASME Code Case N-513 (and later versions of the Case as approved by Regulatory Guide 1.147), "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 piping Section XI, Division 1," as an acceptable alternative to the ASME Code requirements for evaluating the structural integrity for flaws identified in moderate-energy piping. Therefore, a structural integrity evaluation utilizing Code Case N-513-2 was performed and demonstrated that adequate structural integrity of the "B" ESW train existed. The "B" ESW train and "B" DG were declared OPERABLE at 2140 CDT.

Condition Report (CR) 00018217 was initiated on June 30, 2009 for the identified leak on EF138HBC-30. The structural integrity evaluation that resulted in declaring the "B" ESW train and the "B" DG was documented in Work Order (WO) 09-318203-002. In addition, five augmented examinations at locations similar in configuration to the identified leak were required in accordance with Code Case N-513-2. The code case requires the augmented examinations to be performed within 30 days. The below table provides information on the five augmented examinations.

Work Order	Description	Completed	Train	Results
09-318269	EF081HBC-30 D/S EFHV037	7/8/09	A	acceptable
09-318272	EF081HBC-30 U/S EFHV037	7/8/09	A	acceptable
09-318268	EF223HBC-30 D/S EFV108	7/8/09	A	acceptable
09-318271	EF138HBC-30 D/S EFHV038	7/21/09	B	acceptable
09-318270	EF139HBC-30 D/S EFHV040	7/21/09	B	acceptable

Subsequent to the restoration of the "B" ESW train and "B" DG on June 30, 2009, the NRC Resident Inspector challenged the adequacy of the common cause failure determination.

Evaluation of TS Required Action Entry Times

WCNOC's review determined that a violation of TS 3.8.1, Required Actions B.3.1 or B.3.2, did not occur since the "B" DG was declared OPERABLE prior to the expiration of the 24 hour Completion Time.

As identified above, Condition B of LCO 3.8.1 was entered at 1115 CDT due to "B" DG being declared inoperable due to an ESW leak (there was no failure of the DG itself). At 1202 CDT Required Action B.3.1 (24 hour Completion Time) was exited when the common cause failure determination identified there was no common cause failure. The "B" DG was declared OPERABLE at 2140 CDT when an evaluation determined that structural integrity of "B" ESW train was maintained. If the common cause failure determination was inadequate, the 24 hour Completion Time clock for Required Action B.3.1 would have continued until 1115 CDT on July 1, 2009 or until Condition B was exited. In this case Condition B was exited prior to expiration of the 24 hour Completion Time of Required Action B.3.1. The TS 3.8.1, Required Action B.3.1 and B.3.2 Bases state, in part: "In the event the inoperable DG is restored to OPERABLE status prior to completing either B.3.1 or B.3.2, the plant corrective action program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition B."

LCO 3.0.2 states, in part, "If the LCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required unless otherwise stated." There is no Note in Condition B of LCO 3.8.1 stating that Required Action B.3.1 or B.3.2 be completed whenever Condition B is entered. As such, if the common cause failure determination was inadequate such that the Completion Time clock of Required Actions B.3.1 and B.3.2 continued, the LCO was met prior to the expiration of the specified Completion Times, and completion of Required Actions B.3.1 or B.3.2 is not required. Therefore, at no time did a condition prohibited by TSs exist.

Conclusion

WCNOC believes that the statement logged on STS KJ-200 constituted a common cause failure determination as required by TS 3.8.1, Required Action B.3.1. This is based on the implementation of the guidance in Generic Letter 93-05 that indicates that a common cause failure determination is not required if the DG is inoperable due to an inoperable support system. This is further discussed below in the Section titled: "Clarification of WCNOC Implementation of Generic Letter 93-05." However, if the common cause failure determination was considered by the NRC to be inadequate such that the Completion Time clock of Required Actions B.3.1 and B.3.2 continued, the LCO was still met prior to the expiration of the specified

Completion Times, and completion of Required Actions B.3.1 or B.3.2 is not required. Further evaluation of the ESW System was performed to verify structural integrity in accordance with ASME code requirements. This evaluation resulted in declaring the "B" DG OPERABLE prior to the expiration of the Completion Time for Required Action B.3.1.

In summary, because the requirement to complete a common cause failure determination ceased to exist when OPERABILITY of the "B" DG was restored within the specified Completion Time of Required Action B.3.1, WCGS remained in compliance with LCO 3.8.1. It would be inappropriate to consider an inadequate common cause failure determination to be a violation of the LCO when the requirement to perform such an evaluation had been eliminated.

Clarification of WCNOC Implementation of Generic Letter 93-05

While WCNOC understands and is committed to compliance with the Technical Specifications, it appears that the requirement for a common cause failure determination in LCO 3.8.1 goes beyond its original intent. The objective of LCO 3.8.1, Required Action B.3 (includes Required Action B.3.1 and B.3.2) is to ensure that a failure of a DG itself, does not affect the opposite train DG capability to perform its specified safety function. The inoperability of a DG itself does not necessarily affect the reliability of the OPERABLE DG, unless there is some common cause failure possibility. This is consistent with Generic Letter 93-05 (Reference 1) and NUREG-1366 (Reference 5).

Further review of the documentation associated with License Amendment No. 101 and License Amendment No. 123 determined that WCNOC was operating under the philosophy that the inoperability of a support system does not necessitate the need to conduct a common cause failure determination. This is based on the wording in the Safety Evaluation for Amendment No. 101 in which the principal contributors considered the existing wording in the Standard Technical Specifications (NUREG-1431, "Standard Technical Specifications – Westinghouse Plants" or improved Standard Technical Specifications) to be consistent with the recommendations contained in Generic Letter 93-05.

NRC Generic Guidance

NRC Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability"

In July 1984, the NRC issued Generic Letter (GL) 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability." The purpose of GL 84-15 was to propose actions that would improve the reliability of DGs. An example of a performance TS to support desired DG reliability goals was provided in Enclosure 3 to the GL. This GL provided two actions associated with the condition of one inoperable DG, which were: (1) verify correct breaker alignment and power availability of offsite power, and (2) verify the opposite train DG starts from ambient conditions and achieves rated frequency and voltage. The intent here was to demonstrate OPERABILITY and no common mode problems exist. According to GL 84-15, 24 hours was identified as a reasonable amount of time to perform this test to confirm that the OPERABLE DG was not affected by the same problem as the inoperable DG.

WCNOC implemented changes to the TSs based on GL 84-15 in Amendment No. 8 (Reference 7).

NUREG-1366, "Improvements to Technical Specification Surveillance Requirements"

In May 1992, the NRC completed a comprehensive examination of TS surveillance requirements that require testing at power. This evaluation was documented in NUREG-1366, which was published in December 1992. In this guidance document, the staff recommended: "When an EDG itself is inoperable (not including a support system or independently testable component), the other EDG(s) should be tested only once (not every 8 hours) and within 8 hours unless the absence of any potential common-mode failure can be demonstrated."

NRC Generic Letter 93-05, "Line-Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operations"

Based on the evaluation results that were documented in NUREG-1366, the NRC issued Generic Letter 93-05, "Line-Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operations," dated September 27, 1993. Item 10.1 of GL 93-05 includes recommendations for TS changes associated with DG surveillance requirements. Recommendation number 1 under Item 10.1 states, "When a EDG itself is inoperable (not including a support system or independently testable component), the other EDG should be tested only once (not every 8 hours) and within 8 hours unless the absence of any potential common mode failure can be demonstrated." Proposed TS wording acceptable to the NRC was also provided for licensees to incorporate the above recommendation into their TS as follows (Note that the proposed wording was based on the Standard TSs – NUREG-0452, not the improved Standard TSs – NUREG-1431):

> b. .....If the diesel generator became inoperable due to any cause other than <u>an inoperable support system, an independently testable component,</u> or preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generator by performing Surveillance Requirements 4.8.1.1.2.a.5 and 4.8.1.1.2.a.6 <u>within 8 hours</u>, <u>unless the absence of any potential common mode failure for the remaining diesel generator is demonstrated</u>.

NUREG-1431, "Standard Technical Specifications - Westinghouse Plants"

NUREG-1431, Revision 0, was formally issued on September 28, 1992 and contained the NUREG-1366 recommendations for either demonstrating that a common cause failure does not exist on the remaining DG or testing the remaining DG. However, the Completion Time for testing or demonstrating that a common cause failure does not exist on the remaining DG was relaxed from 8 to 24 hours, consistent with the earlier GL 84-15 recommendations.

Further relaxations in DG testing requirements were incorporated into Revision 1, published in April 1995, consistent with the GL 93-05 guidelines. Specifically, Revision 0 of NUREG-1431 had a Note in Condition B of LCO 3.8.1 (one DG inoperable) which required that Required Action B.3.1 or B.3.2 for the common cause evaluation or demonstration test be completed anytime Condition B was entered, even if the inoperable DG were restored to OPERABLE status within the 24 hour Completion Time. Because the common cause failure would no longer exist at that point, Revision 1 removed this Note and allowed the licensee's corrective action program to track the common cause failure evaluation on the alternate train DG.

The above changes incorporated into Revision 1 are unchanged in both Revision 2 and current Revision 3.

WCGS Prior Approval of TS Changes Based on Generic Letter 93-05 Guidance

On September 15, 1995, WCNOC submitted a license amendment request (Reference 2) proposing to revise TS 3/4.8.1, "Electrical Power Systems – A.C. Sources," in part, based on the guidance in Generic Letter 93-05 and Generic Letter 94-01, "Removal of Accelerated Testing and Special Reporting Requirements for Emergency Diesel Generators (Generic Letter 94-01)."

Specifically, Action b. of TS 3.8.1.1 was proposed to be revised (proposed wording to be added is italicized) as follows:

> b. With one diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the offsite A.C. sources by performing Specification 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter. Demonstrate the OPERABILITY of the remaining OPERABLE diesel generator by performing Specification 4.8.1.1.2a.4 within 24 hours~~**~~*, unless the absence of any potential common mode failure for the remaining diesel generator is demonstrated, or if the diesel generator became inoperable due to any cause other than an inoperable support system, an independently testable component, preplanned preventative maintenance or testing, or maintenance to correct a condition which, if left uncorrected, would not affect the OPERABILITY of the diesel generator;* restore the inoperable diesel generator to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
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> ~~**This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABLE status unless the diesel was declared inoperable to do preplanned preventative maintenance, testing, or maintenance to correct a condition which, if left uncorrected, would not affect the operability of the diesel generator.~~

Note that WCNOC maintained the 24 hours based on NUREG-1431, "Standard Technical Specifications – Westinghouse Plants." This specific change was approved in Amendment No. 101 (Reference 3) on August 9, 1996. The Safety Evaluation associated with Amendment No. 101, stated, in part:

> The proposed changes are consistent with the recommendations contained in GL 93-05. Also, these changes are in conformance with Action B of TS 3.8.1 of the STS. The GL suggests that when an EDG is inoperable (not including a support system or independently testable component), the other EDG should be tested only once, unless the absence of any potential common mode failure can be demonstrated. Information provided in the STS indicates that 24 hours is a reasonable time frame to confirm that the operable EDG is not affected by the same problem as the inoperable EDG. The licensee reports that 24 hours is compatible with plant operating experience. Thus, the proposed changes are acceptable.

Section 1.0 of the Safety Evaluation (Reference 3) states, in part:

> Specifically, the proposed changes would incorporate recommendations and suggestions from Generic Letter (GL) 93-05, "Line-Item Technical Specification Improvements to reduce Surveillance Requirements for Testing During Power

Operation;" the Improved Standard Technical Specifications, NUREG-1431, "Standard Technical Specification – Westinghouse Plants" (STS); .....

The wording in the Safety Evaluation indicates that the wording of the STS (NUREG-1431) are such that the common cause failure determination or performing SR 3.8.1.2 for the OPERABLE DG are not necessary if the inoperable DG were inoperable due to an inoperable support system, an independently testable component, preplanned preventative maintenance or testing, or maintenance to correct a condition which, if left uncorrected, would not affect the OPERABILITY of the DG.

Based on the wording in the Safety Evaluation for Amendment No. 101, the principal contributors considered the existing wording in the Standard Technical Specifications (NUREG-1431, "Standard Technical Specifications – Westinghouse Plants" or improved Standard Technical Specifications) to be consistent with the recommendations contained in GL 93-05.

WCGS Conversion to Improved TSs (Amendment No. 123)

WCNOC letter ET 97-0050 (Reference 6), dated May 15, 1997, provided the WCGS Technical Specification Conversion Application which was based on NUREG-1431, Rev, 1, "Standard Technical Specifications – Westinghouse Plants." Attachment 14 to the application was current technical specifications (CTS) Section 3/4.8, Electric Power Systems/improved technical specifications (ITS) Section 3.8, Electric Power Systems. Attachment 14 to ET 97-0050 provided the markups of Action b. and the associated description of changes (DOC). A review of DOC 1-05-LS-6 indicates that the change was considered a less restrictive change and the DOC further indicates that the change was based on the guidance in Generic Letter 84-15 and Generic Letter 93-05. While the expanded wording that was in the current TS was not incorporated into the ITS or ITS Bases, the justification indicates that the intent of the ITS wording is based on the guidance in Generic Letter 84-15 and Generic Letter 93-05 (an inoperable support system that results in the inoperability of the DG is not considered a common cause failure or would not require the performance of SR 3.8.1.2).

The Standard Technical Specifications or TS Bases (NUREG-1431) do not include specific discussion consistent with the guidance in Generic Letter 93-05 for DG inoperability due to any cause other than an inoperable support system, an independently testable component, or preplanned preventative maintenance or testing. Specific information that was incorporated into the TSs and TS Bases as a result of Amendment No. 101 was not incorporated into the improved TSs and expanded TS Bases developed during the conversion to the improved TS so as to more closely adhere to standardization as it was believed that this allowance was inherent, but not clearly stated, in the improved TS (Reference 4) and TS Bases.

Therefore, WCNOC considered that the NRC assessment in the Safety Evaluation for Amendment No. 101 which specified that the wording of the STS (NUREG-1431) are such that the common cause failure determination or performing SR 3.8.1.2 for the OPERABLE DG are not necessary if the inoperable DG was inoperable due to an inoperable support system, an independently testable component, preplanned preventative maintenance or testing, or maintenance to correct a condition which, if left uncorrected, would not affect the OPERABILITY of the DG. As such, inherent in the current TS Required Action B.3.1 is that a common cause determination is not required if the inoperable DG were inoperable due to an inoperable support system, an independently testable component, preplanned preventative maintenance or testing,

or maintenance to correct a condition which, if left uncorrected, would not affect the OPERABILITY of the DG.

References

1. Generic Letter 93-05, "Line-Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operation (Generic Letter 93-05)," September 27, 1993.

2. WCNOC letter ET 95-0099, "Revision to Technical Specification 3/4.8.1, "Electrical Power Systems – A.C. Sources," September 15, 1995.

3. License Amendment No. 101, "Wolf Creek Generating Station – Amendment No. 101 to Facility Operating License No. NPF-42 (TAC NO. M89995)," August 9, 1996.

4. License Amendment No. 123, "Conversion to Improved Technical Specifications for Wolf Creek Generating Station – Amendment No. 123 to Facility Operating License No. NPF-42 (TAC NO. M98738)," March 31, 1999.

5. NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," December 1992.

6. WCNOC letter ET 97-0050, "Technical Specification Conversion Application," May 15, 1997.

7. License Amendment No. 8, "Wolf Creek Generating Station – Amenement [Amendment] No. 8 to Facility Operating License No. NPF-42 (TAC NO. 63951)," May 29, 1987.

DENIAL OF NONCITED VIOLATION 2009004-06

WCNOC has reviewed the following noncited violation and based on information on the following pages does not believe a violation of Technical Specifications 3.8.1, Required Action B.4.2.2 existed.

Restatement of Noncited Violation (Excerpt from pages 27-29 of 05000482/2009004)

Introduction. The inspectors identified a Green noncited violation of Technical Specification 3.8.1.B.4 in which the licensee removed equipment from service that was required by technical specifications and the NRC safety evaluation.

Description. On March 24, 2009, the licensee entered Technical Specification 3.8.1, Required Action B.4.2.2. This action allowed an emergency diesel generator to be inoperable for up to 7 days. On March 24, 2009, at 4:20 p.m., the inspectors noted that Wolf Creek performed Procedure STS IC-208B, "4kV Loss of Voltage and Degraded Voltage TADOT NB02 Bus – Separation Group 4," Revision 2A, to determine the 'as-found' conditions of the Channel 4 under voltage power supply. Operators entered Technical Specification 3.3.5, Condition A.1 and exited 19 minutes later. The power supply voltage ripple passed Procedure STS IC-208B, but Wolf Creek elected to replace it. Again on March 24, 2009, at 4:54 p.m., Wolf Creek entered Technical Specification 3.3.5, Condition A.1, to replace the subject Channel 4 power supply. Condition A.1 required the out-of-service channel to be placed in trip within 6 hours. Wolf Creek exited Technical Specification 3.3.5 at 9:09 p.m., on March 24. The removal of Channel 4 from service resulted in a higher probability of loss of power to the safety bus because the coincidence logic changed from two out of four to one out of three. The inspectors found that this logic was an input to the NB02 normal offsite power feeder breaker described in the offsite power surveillance procedure, STS NB-005, "Breaker Alignment Verification," Revision 18.

The inspectors reviewed Technical Specification Bases 3.8.1.B.4 which prohibits elective maintenance within the switchyard that would challenge offsite power while in the 7-day emergency diesel generator extended outage. The inspectors also reviewed the NRC Safety Evaluation Report (SER) for the 7-day emergency diesel generator allowed outage time (Technical Specification 3.8.1.B.4.2.2) and found that Section 4.6.c, states: "The offsite power supply [emphasis added] and switchyard conditions are conducive to an extend[ed] DG [completion time], which includes ensuring that switchyard access is restricted and no elective maintenance within the switchyard is performed that would challenge the offsite power availability." Additionally, Condition D of the technical specification bases states that no equipment or systems assumed to be available for the extended emergency diesel generator completion time are removed from service, which includes auxiliary feedwater, component cooling water, essential service water and their support systems. The support equipment protections are also mirrored in Section 4.0 of the NRC safety evaluation for Amendment 163. However, Wolf Creek removed one channel of under voltage protection for offsite power to Bus NB02 (Train B) which is a support system for the above equipment. The inspectors found that Procedure STS IC-208B permits the testing of degraded voltage relays while the diesel is out of service. These relays control the opening logic for the normal offsite power feed to the safety bus NB02. Additionally, Procedure AP 22C-003, "Operational Risk Assessment Program," Revision 13, prohibits elective maintenance within the switchyard that would challenge offsite power during Technical Specification 3.8.1.B.4.2.2. Normally the safety bus NB02 cabinets are

protected equipment (no work allowed) but because this work was planned in advance for the diesel outage, the work was permitted. In consultation with the Office of Nuclear Reactor Regulation, the inspectors concluded that Procedure STS IC-208B and power supply replacement was inappropriate during the 7-day diesel outages because it increased the probability of the loss of offsite power to safety equipment that could not be powered by the diesel. Wolf Creek appropriately restricted access to the portion of the switchyard outside the protected area but did not appropriately restrict work for offsite power inside the protected area. The inspectors determined that challenges to offsite power can originate with elective maintenance inside the protected area. The inspectors found that Wolf Creek assessed risk under 10 CFR 50.65 a(4) for this evolution, resulting in elevated risk within the Green band during the 7-day diesel outage. The inspectors also found that Wolf Creek appropriately protected component cooling water, emergency service water, instrument busses, dc busses, emergency core cooling, the Train A diesel, and control room ventilation.

The inspectors reviewed corrective actions from NCV 05000482/2008002-02 previously identified by inspectors when Wolf Creek made one of the offsite power sources inoperable during a 7-day diesel outage. The licensee reviewed Procedure STS IC-208B but did not revise it because the load shedder and emergency load sequencer procedure tests one channel at a time. No other expanded explanation was articulated in Condition Report 2008-0489. Condition Report 15727 was initiated for the March 24, 2009, maintenance, and the issue has since been corrected by Wolf Creek.

Analysis. The inspectors determined that the failure to implement requirements of Technical Specification 3.8.1 and the associated NRC safety evaluation was a performance deficiency. Traditional enforcement does not apply since there were no actual safety consequences or potential for impacting the NRC's regulatory function, and the finding was not the result of any willful violation of NRC requirements or Wolf Creek procedures. The finding was more than minor because it is associated with the equipment performance attribute for 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 (i.e., core damage). Specifically, this issue relates to the availability and reliability examples of the equipment performance attribute because an offsite power source was at greater risk of being lost. The finding was determined to be of very low safety significance because the issue did not result in the Train B offsite power being inoperable for greater than 24 hours and did not involve external events such as flooding. Additionally, the cause of the finding has a problem identification and resolution crosscutting aspect in the area associated with the corrective action program. Specifically, Wolf Creek did an extent of condition review in response to a previous violation which included Procedure STS IC-208B, but still failed to prohibit performance of Procedure STS IC-208B during 7-day diesel outages [P.1(c)].

Enforcement. Technical Specification 3.8.1, Required Action B.4.2.2, permits one diesel generator to be inoperable for 7 days provided the limitations articulated in the NRC SER for License Amendment 163 are met. The NRC SER for License Amendment 163 requires that the offsite power supply and switchyard conditions be conducive to an extended diesel generator completion time, which includes ensuring that switchyard access is restricted and no elective maintenance within the switchyard is performed that would challenge the offsite power availability. Contrary to the above, on March 24, 2009, Wolf Creek performed elective maintenance which challenged offsite power availability while emergency diesel generator B was in the 7-day extended completion time. Specifically the licensee performed maintenance

on the safety bus NB02 degraded and undervoltage voltage relay Channel 4 power supply while the emergency diesel generator Train B was in an extended outage. Because the finding is of very low safety significance and has been entered into the corrective action program as Condition Report 15727, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000482/2009004-06, "Performing Prohibited Elective Maintenance on Safety Bus NB02 Channel 4 during Emergency Diesel Generator Maintenance."

WCNOC RESPONSE

Description of Event

On March 24, 2009 at 0600 Central Standard Time (CST), Limiting Condition for Operation (LCO) 3.8.1 was declared not met and Condition B entered when the "B" diesel generator was taken out of service for voluntary planned maintenance activities. Required Action B.4.2.2 with a Completion Time of 7 days was applied when the DG was declared or rendered inoperable for the performance of voluntary planned maintenance.

At 1552 hours, a partial performance of STS IC-208B, "4kV Loss of Voltage and Degraded Voltage TADOT NB02 Bus – Separation Group 4," was commenced to take as-found data prior to the replacement of the 48 VDC power supply (EGL0002DA). Work Order (WO) 08-311106-000 had previously determined that this power supply was degraded and should be replaced at the next available opportunity. WO 09-314508 was initiated for the replacement of the power supply during the "B" train Technical Specification Equipment Outage scheduled for March 24, 2009. At 1620 hours, Condition A.1 of LCO 3.3.5 was entered when the Channel 4 degraded voltage circuitry was removed from service for the partial performance of STS IC-208B. Channel 4 was returned to service at 1630 hours and the partial performance of STS IC-208B completed satisfactorily. At 1654 hours, the Channel 4 degraded voltage circuitry was removed from service for replacing the 48 VDC power supply and Condition A.1 of LCO 3.3.5 entered with 6 hours to place the channel in trip. At 2109 hours, Condition A of LCO 3.3.5 was exited when the Channel 4 degraded voltage circuitry was returned to service after replacement of the power supply and completion of STS IC-208B.

The "B" DG was returned to service on March 28, 2009 at 0323 hours. The Condition B, Required Action B.4.2.2, of LCO 3.8.1 was completed well within (3 days 21 hours and 23 minutes) the 7 day Completion Time as required by the WCGS Technical Specifications.

Evaluation of TS Required Action Entry Times

Condition B of TS LCO 3.8.1, "AC Sources – Operating," specifies the Required Actions to be taken with one DG inoperable. Required Action B.4.2.2 requires the inoperable DG be restored to OPERABLE status in 7 days. The "B" DG was declared inoperable at 0600 hours on March 24, 2009 for planned preventative maintenance activities under Required Action B.4.2.2. The "B" DG was restored to OPERABLE status in 3 days 21 hours and 23 minutes, which is well within the 7 day Completion Time of Required Action B.4.2.2. Therefore, a violation of LCO 3.8.1, Required Action B.4.2.2 did not occur.

Required Action B.4.2.2 specifically states, "Restore DG to OPERABLE status." with a Completion Time of 7 days. The TS Required Action does not specify that the limitations articulated in the NRC Safety Evaluation for License Amendment No. 163 be met.

Nevertheless, the considerations in NRC Safety Evaluation for Amendment No. 163 were followed verbatim. The Safety Evaluation states that elective testing and maintenance activities in the switchyard that could cause a power line outage or challenge offsite power availability would be precluded [emphasis added]. The administrative controls established by WCNOC restricted switchyard access and restricted elective maintenance within the switchyard that would challenge offsite power availability. The Safety Evaluation also specified that additional elective equipment maintenance or testing that requires equipment to be removed from service during the extended DG CT will be evaluated and activities that would cause unacceptable results will be avoided. The replacement of the 48 VDC power supply and performance of STS IC-208B, which were not activities in the switchyard, were evaluated per AP 22C-003, "Operational Risk Assessment," and determined that this activity would not cause unacceptable results. Therefore, WCNOC concludes that the TS Bases administrative controls and the limitations articulated in the NRC Safety Evaluation for Amendment No. 163 were met.

Submittal of License Amendment Request for Changes to TS 3.8.1 for an Extended Completion Time for DG Planned Maintenance

Letter WO 03-0057 (Reference 1) submitted a license amendment request that proposed a revision to TS 3.8.1, "AC Sources -Operating," to extend the Completion Times for the Required Actions associated with an inoperable diesel generator. Section 4.1.1.2 of the application described the Tier 2 (avoidance of risk-significant plant conditions) compensatory measures and configuration risk management controls that would apply when utilizing the extended Completion Time allowance. Section 4.1.1.2 stated, in part:

> Additional compensatory measures and configuration risk management controls that will apply when entering the proposed planned, extended DG Completion Time (greater than 72 hours and up to 7 days) include:
>
> - Perform work during a favorable weather period (Sept. 6 through April 22)
> - Weather forecast checked for severe weather conditions
> - Elective testing and maintenance activities are precluded in the WCGS switchyard that could cause a line outage or challenge offsite power availability
> - Additional AC power Sharpe Station available and performance acceptable
> - Concurrent work on other key SSCs is not planned (Essential Service Water System, Component Cooling Water System, Motor/Turbine Driven Auxiliary Feedwater Pumps, Residual Heat Removal System)
>
> While in the proposed extended DG Completion Time, additional elective equipment maintenance or testing that requires the equipment to be removed from service will be evaluated and activities that yield unacceptable results will be avoided.

In the initial application (WO 03-0057) proposed TS Bases changes were provided to include the Tier 2 restrictions and specifically one of the administrative controls to be applied during use of Condition B for voluntary planned maintenance activities. The proposed changes to the TS

Bases (for information only) included that addition of administrative controls to address the Tier 2 requirements and included the following:

b. The offsite power supply and switchyard condition are conducive to an extended DG Completion Time, which includes ensuring that switchyard access is restricted and no elective maintenance within the switchyard is performed that would challenge offsite power availability.

License Amendment No. 163

License Amendment No. 163 (Reference 2) was issued on April 26, 2006 and implemented on July 24, 2006. Amendment No. 163 revised TS 3.8.1 to provide an extended Completion Time of 7 days for preplanned maintenance activities on a DG and add a Required Action to verify the required Sharpe Station gensets are available when utilizing the extended Completion Time. The NRC Safety Evaluation includes the following excerpts:

3.3.1.2 Tier 2 Considerations

For Tier 2, the licensee identified the following additional compensatory measures that will apply when the plant enters the proposed planned extended DG CT: [only the pertinent measures to this NCV are listed]

- Preclude elective testing and maintenance activities in the switchyard that could cause a power line outage or challenge offsite power availability.
- Additional elective equipment maintenance or testing that requires equipment to be removed from service during the extended DG CT will be evaluated and activities that would cause unacceptable results will be avoided.

4.0 REGULATORY COMMITMENTS

In Attachment VI to its application and its supplemental letter dated March 6, 2006, the licensee provided the following regulatory commitments for this amendment:

Stated in Supplemental letter dated March 6, 2006:

6. Prior to the licensee entering TS 3.8.1 Required Action B.4.2.2 for voluntary planned maintenance activities and using the extended 7-day CT for pre-planned DG maintenance activities, administrative controls will be applied to ensure or require that:

   b. The offsite power supply and switchyard conditions are conducive to an extend DG CT, which includes ensuring that switchyard access is restricted and no elective maintenance within the switchyard is performed that would challenge the offsite power availability.

Implementation of Amendment No. 163 resulted in changes to plant procedures that included the administrative controls identified in the license amendment application and the NRC safety evaluation. This implementation endorsed the Tier 2 plant configurations that required the

offsite power supply and switchyard conditions be conducive by ensuring access to the switchyard was restricted and no elective maintenance within the switchyard is performed that could cause a loss of the offsite circuits or the transmission network. This administrative control pertained to activities in the switchyard proper. WCNOC had identified (as discussed in Section 3.3.1.2 of the NRC safety evaluation) that additional elective equipment maintenance or testing that requires the equipment to be removed from service will be evaluated and activities that yield unacceptable results will be avoided.

Performance of STS IC-208B

Four potential transformers provide input to four degraded voltage bistables with associated time delays for each 4.16 kV Class 1E system bus for detecting a sustained degraded voltage condition. Once the bistable has actuated, a timer in the load shedder and emergency load sequencer (LSELS) circuitry provides an 8-second time delay to avoid false actuation on large motor starts other than an RCP. There are four of these 8-second timers per bus, one for each degraded voltage channel. The bistable outputs are then combined in a two-out-of-four logic to generate a degraded voltage signal if the voltage is below approximately 90%. Once the two-out-of-four logic is satisfied, contacts in the bus feeder breaker trip circuits close to arm the tripping circuitry. If a safety injection signal (SIS) were to occur concurrently with or after the arming of the tripping circuitry, the bus feeder breaker would open immediately, a bus undervoltage would be sensed, and a loss of power (LOP) signal would be generated. Should the degraded voltage condition occur in a non-accident condition (no SIS present), an additional 111-second time delay is provided. These time delays are specific to the feeder breakers (2 per bus). If the degraded voltage is not alleviated in the overall 119 seconds (nominal delay), the bus feeder breaker is tripped.

The Probabilistic Safety Assessment (PSA) group reviewed the Rev. 0 schedule and flagged WO 09-314508-000 as an activity in the PRA model. The WCGS PSA risk assessment in support of AP 22C-003, "Operational Risk Assessment," factors in activities with corresponding PSA model basic events. Those which would impact offsite power reflect in the total core damage frequency results/risk profile. The PSA risk assessment for Week 2009-113 (removal of "B" DG for planned maintenance under Required Action B.4.2) determined the activity to replace the power supplies did not render the LSELS unavailable. The coincidence was reduced from 2 of 4 to 1 of 3 logic. The performance of post maintenance test STS-IC-208B was identified as affecting risk and resulted in an extremely small change in the core damage frequency (CDF). The work order and associated post maintenance test were evaluated as part of the risk assessment and determined that the activities did not yield unacceptable results when performed in conjunction with the "B" DG inoperability for planned maintenance under Required Action B.4.2.2.

TS Requirements

LCO 3.8.1 requires:

> The following AC electrical sources shall be OPERABLE:
>
> a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System; and
>
> b. Two diesel generators (DGs) capable of supplying the onsite Class 1E power distribution subsystem(s); and
>
> c. Load shedder and emergency load sequencers for Train A and Train B.

With one DG inoperable, Condition B is applicable and the Required Actions of Condition B are required to be taken. The Note to Required Actions B.4 indicates that Required Action B.4.2.1 and B.4.2.2 are only applicable for planned maintenance and may be used once per cycle per DG. For the planned maintenance activities WCNOC was utilizing Required Action B.4.2.2 with a scheduled 7-day Completion Time. The "B" DG was returned to service after 3 days 21 hours and 23 minutes of initially declaring the DG inoperable for planned maintenance activities. The requirements of the TSs (restore the DG to OPERABLE status with a Completion Time of 7 days) was met. As such, LCO 3.8.1, Required Action B.4.2.2, which permits one DG to be inoperable for 7 days, was complied with.

Conclusion

Condition B of TS LCO 3.8.1, "AC Sources – Operating," specifies the Required Actions to be taken with one DG inoperable. Required Action B.4.2.2 requires the inoperable DG be restored to OPERABLE status in 7 days. The "B" DG was declared inoperable at 0600 hours on March 24, 2009 for planned preventative maintenance activities under Required Action B.4.2.2. The "B" DG was restored to OPERABLE status in 3 days 21 hours and 23 minutes, which is well within the 7 day Completion Time of Required Action B.4.2.2. Therefore, a violation of LCO 3.8.1, Required Action B.4.2.2 did not occur.

The TS Bases and the NRC Safety Evaluation for Amendment No. 163 specify that administrative controls will be applied to ensure or require that:

> The offsite power supply and switchyard conditions are conducive to an extend DG CT, which includes ensuring that switchyard access is restricted and no elective maintenance within the switchyard is performed that would challenge the offsite power availability.

The NRC Safety Evaluation for Amendment No. 163 and the license amendment request application specified that additional elective equipment maintenance or testing that requires equipment to be removed from service during the extended DG CT will be evaluated and activities that would cause unacceptable results will be avoided. The administrative controls established by WCNOC restricted switchyard access and restricted elective maintenance <u>within the switchyard</u> [emphasis added] that would challenge offsite power availability. The replacement of the 48 VDC power supply and performance of STS IC-208B were evaluated per AP 22C-003, "Operational Risk Assessment," and determined that this activity would not cause

unacceptable results. Therefore, WCNOC concludes that the TS Bases administrative controls and the limitations articulated in the NRC Safety Evaluation for Amendment No. 163 were met.

References:

1. WCNOC letter WO 03-0057, "Revision to Technical Specifications – Extensions of AC Electrical Power Distribution Completion Times," October 30, 2003.

2. License Amendment No. 163, "Wolf Creek Generating Station – Issuance of Amendment RE: Extended Diesel Generator Completion Times (TAC NO. MC1247)," April 26, 2006.

RESPONSE TO SEVERITY LEVEL IV NOCITED VIOLATION 200904-07

WCNOC has reviewed the following noncited violation and based on information on the following pages has determined that two of the examples did not prevent the fulfillment of the safety function of the structures or systems and as such are not reportable in accordance with 10 CFR 50.72(a)(2)(v).

Restatement of Severity Level IV Noncited Violation (Excerpt from pages 35-38 of 05000482/2009004)

Introduction. The inspectors identified a Severity Level IV noncited violation of 10 CFR 50.73, with three examples in which the licensee failed to submit licensee event reports within 60 days following discovery of events or conditions meeting the reportability criteria.

Description. First, on April 10, 2008, the licensee submitted LER 2008-002 under 10 CFR 50.73(a)(2)(i)(B) which is operation prohibited by technical specifications. For 11 hours from February 13-14, 2008, Wolf Creek did not have an operable emergency core cooling system because no high head charging pumps were operable. Wolf Creek was in Technical Specification 3.0.3 during this time. Wolf Creek received enforcement discretion to remain at power. Charging Pump B was required to be declared inoperable because emergency diesel generator B was inoperable, and charging Pump A was inoperable because it did not have an operable room cooler. On June 25, 2009, the inspectors identified that Wolf Creek failed to report this event as a safety system functional failure under 10 CFR 50.73(a)(2)(v) for the emergency core cooling system being inoperable. The inspectors discussed this with Wolf Creek and Condition Report 00018156 was initiated. On July 30, 2009, the licensee completed the evaluation of this condition report and concluded that the loss of high head charging was not reportable, however no evaluation demonstrated operability of the charging pumps.

The inspectors reviewed this issue under the safety system functional failures performance indicator. NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 5, defines a safety-system functional failure as those events meeting 10 CFR 50.73(a)(2)(v) and requires evaluation of conditions reported under other paragraphs of 50.73 for safety-system functional failures. Wolf Creek did not perform a review. Wolf Creek subsequently drafted a position paper which relied on the statements made in the Letter WO 08-0006, "Request for Notice of Enforcement Discretion from Technical Specification 3.8.1, 'AC Sources – Operating,'" which contained an attachment that provided information documenting Wolf Creek's verbal request for the Enforcement Discretion. The attachment contained the risk mitigation manual actions for not shutting down the unit, a discussion of the calculated incremental core damage probability used to justify enforcement discretion, and a qualitative statement regarding the adjacent pumps' room coolers. Wolf Creek also stated that it considered the centrifugal charging pump to be functional. The manual actions did not involve the failed room cooler. Wolf Creek also cited LER 2008-002-00 which contained the same discussion of the risk assessment, the functionality of the charging Pump A, and the adjacent pumps' room coolers. The inspectors did not find an evaluation demonstrating the operability of charging Pump A or B and hence the emergency core cooling system.

The inspectors consulted NUREG 1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73," Revision 2. NUREG 1022 Section 3.2.7, reportability under 50.73(a)(2)(v), states that operability under Generic Letter 91-18 is the correct standard to apply. Generic Letter 91-18

has been superseded by Regulatory Issue Summary 2005-20 which does not permit the use of risk assessment to justify operability. The inspectors found that Wolf Creek was incorrect in concluding that the application of functional under the risk assessment was equivalent to the words of "safety function" under 50.73(a)(2)(v). Another position paper drafted by Wolf Creek stated that centrifugal charging Pump B was operable although it was not supported by an operable emergency diesel generator. The inspectors disagreed with this application of the definition of the technical specification of operability and this application of Technical Specifications 3.8.1, 3.0.2, and 3.0.6 which require equipment to be supported by emergency power to perform the safety function. The inspectors consulted with NRR, who agreed with the inspectors' use of the rule and NUREG 1022. The issue was again placed into the corrective action program as Condition Report 19914.

In the second example, Wolf Creek filed LER 2008-004-00 on June 6, 2008. LER 2008 004-00 was filed under 50.73(a)(2)(iv)(A) for an event that caused automatic start of an emergency diesel during a loss of offsite power on April 16, 2008. No report was made under 50.73(a)(2)(v) for an event or condition that could have prevented a safety function due to the loss of offsite power. Inspectors reviewed NUREG 1022, Section 3.2.7 and found that:

> "Both offsite electrical power (transmission lines) and onsite emergency power (usually diesel generators) are considered to be separate functions by GDC 17. If either offsite power or onsite emergency power is unavailable to the plant, it is reportable regardless of whether the other system is available. GDC 17 defines the safety function of each system as providing sufficient capacity and capability, etc., assuming that the other system is not available. Loss of offsite power should be determined at the essential switchgear busses."

This missed licensee event report is specifically captured in Condition Report 19371. Wolf Creek indicated that it plans to update LER 2008-004-00 or make a second licensee event report.

Third, on April 10, 2008, Wolf Creek filed Event Notification Report 44131 per 10 CFR 50.72(b)(3)(ii)(B) based on a possible trip of all four containment coolers. The containment coolers have thermal overload protection such that if a cooler trips in fast speed during normal power operation, that cooler will not restart in slow speed for an accident. Wolf Creek evaluated this concern and issued Event Notification 44131. Wolf Creek later retracted the Event Notification stating: "Further analysis of the main steam line break, if this concern had existed, showed that the calculated post-accident pressure and temperature peak values would not exceed the peak accident values in the USAR. Therefore, an unanalyzed condition did not exist and Wolf Creek is retracting the 50.72(b)(3)(ii)(B) notification."

The inspectors found that Wolf Creek did not analyze the current draw for the motors prior to receipt of a safety injection signal. Wolf Creek assumed that the coolers would not restart and relied on containment, but this is still the loss of a safety function to remove heat from containment. Wolf Creek found that without the coolers, containment pressure exceeds the Analysis of Record but not the design pressure in the USAR. Inspectors found that this was not an appropriate method to consider the coolers' heat removal safety function met. At the end of the report period, Wolf Creek did not have an analysis for the containment cooler motors to determine if they would have tripped prior to receiving an accident signal. Wolf Creek's condition report and reportability evaluation has been open since April 11, 2008. No licensee event report has been submitted. The inspectors found insufficient evidence to show that the

containment coolers could accomplish their safety function and that this should have been reported under 10 CFR 50.73(a)(2)(v). This issue is captured in Condition Report 15318.

Analysis. The failure to submit a licensee event report was a performance deficiency. The inspectors reviewed this issue in accordance with Inspection Manual Chapter 0612 and the NRC Enforcement Manual. Through this review, the inspectors determined that traditional enforcement was applicable to this issue because the NRC's regulatory ability was affected. Specifically, the NRC relies on the licensee to identify and report conditions or events meeting the criteria specified in regulations in order to perform its regulatory function, and when this is not done, the regulatory function is impacted. The inspectors determined that this finding was not suitable for evaluation using the significance determination process, and as such, was evaluated in accordance with the NRC Enforcement Policy. The finding was reviewed by NRC management, and because the violation was determined to be of very low safety significance, was not repetitive or willful, and was entered into the corrective action program, this violation is being treated as a Severity Level IV noncited violation consistent with the NRC Enforcement Policy. This finding was determined to have a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program in that the licensee failed to appropriately and thoroughly evaluate for reportability aspects all factors and time frames associated with the inoperability of the emergency core cooling system, the offsite power system, and the containment heat removal system [P.1(c)] (4OA3)

Enforcement. Title 10 CFR 50.73(a)(1) requires, in part, that licensees shall submit a licensee event report for any event of the type described in this paragraph within 60 days after the discovery of the event. Title 10 CFR 50.73(a)(2)(v) requires, in part, that events or conditions that could have prevented the fulfillment of the safety function of structures or systems that are needed to shutdown the reactor and maintain it in a safe shutdown condition, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident. Contrary to the above, in 2008, Wolf Creek failed to submit a licensee event report within 60 days for three separate events that could have prevented the fulfillment of the safety function of structures or systems that are needed to shutdown the reactor and maintain it in a safe shutdown condition, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident. Specifically, emergency core cooling, offsite power, and containment cooling could have been or were actually lost on February 13-14, 2008, April 16, 2008, and April 10, 2008, respectively, and Wolf Creek did not submit an LER within 60 days. Wolf Creek did not have sufficient analyses to demonstrate that these three events were not reportable. In accordance with the NRC's Enforcement Policy, the finding was reviewed by NRC management and because the violation was of very low safety significance, was not repetitive or willful, and was entered into the corrective action program, this violation is being treated as a Severity Level IV noncited violation, consistent with the NRC Enforcement Policy: NCV 05000482/2009004-07, "Failure to Report Conditions that Could Have Prevented Fulfillment of a Safety Function."

WCNOC RESPONSE

WCNOC is not specifically contesting the noncited violation. After further consideration of the second example regarding LER 2008-004-00, WCNOC determined that the reporting criteria in 10 CFR 50.73(a)(2)(v)(D) was applicable for this event. WCNOC submitted LER 2008-004-00 on November 11, 2009, by letter WO 09-0040, that included reporting this event under 10 CFR 50.73(a)(2)(v)(D). WCNOC has completed further evaluations of the other two examples in this violation and has determined that these events do not meet the criteria for reporting under 10

CFR 50.73(a)(2)(v). However, WCNOC intends to report these events under 10 CFR 50.73(a)(2)(v) in either a supplemental LER or new LER based on the NRC characterizing these events as examples of a violation for failure to submit LERs within 60 days following discovery of an event meeting the reportability criteria. WCNOC requests the NRC review the evaluations concerning the two examples and provide WCNOC with an assessment of their review. Based on this review, WCNOC will either supplement the LER with additional information from the NRC review or cancel the LER in accordance with the guidance in NUREG-1022, Revision 2.

Provided below is WCNOC's basis for determining that two of the examples cited above do not meet the criteria for reporting under 10 CFR 50.73(a)(2)(v).

Basis for Event Not Reportable Under 10 CFR 50.73(a)(2)(v) – LER 2008-002-00

Description of Event

On February 11, 2008, at 0502 Central Standard Time (CST), the "B" Diesel Generator (DG) was declared inoperable for voluntary planned maintenance activities in accordance with Technical Specification (TS) 3.8.1. Required Action B.4.2.2 of TS 3.8.1 specifies a Completion Time of 7 days to restore the DG to OPERABLE status.

On February 13, 2008, at 0749 CST the performance of procedure STS IC-805B, "Channel Calibration of NB02 Grid Degraded Voltage, Time Delay Trip," was initiated for testing of the train B degraded voltage relays. This resulted in the planned entry into TS 3.8.1, Condition A (one offsite circuit inoperable), Condition E (one offsite circuit inoperable and one DG inoperable) and Condition G (one load shedder and emergency load sequencer inoperable).

At 1420 hours CST on February 13, 2008, water was identified coming from the drip pan for the "A" Centrifugal Charging Pump (CCP) room cooler. At 1550 hours, after the removal of the outer cover panel of the room cooler, a leak was identified on a room cooler H-bend assembly. The "A" CCP room cooler and "A" CCP were declared inoperable. TS 3.5.2, Condition A / Required Action A.1 was entered with a 72 hour Completion Time to restore the inoperable train ("A" CCP) to OPERABLE status. Additionally, Condition B / Required Action B.2 of TS 3.8.1 was entered with a Completion Time of 4 hours to declare the required feature(s) supported by the inoperable EDG inoperable when its required redundant feature(s) is inoperable (i.e., 4 hours to declare the "B" CCP inoperable). When the "A" CCP was declared inoperable, entry into Condition B / Required Action B.2 of TS 3.8.1 was required as discussed in the TS Bases.

With the through-wall leak identified on the "A" CCP room cooler H-bend assembly, "A" ESW was declared inoperable as required by TR 3.4.17, "Structural Integrity," since structural integrity of the system could not be verified. TS 3.7.8, Condition A (one ESW train inoperable) was entered with a 72 hour Completion Time to restore the ESW train to OPERABLE status. Note 1 of Required Action A.1 (TS 3.7.8) indicates that the applicable Conditions and Required Actions of LCO 3.8.1 should be entered if an inoperable ESW train results in an inoperable DG. Plant operators entered TS 3.8.1, Condition F (two DGs inoperable) and Condition I (three or more required AC sources inoperable). Condition I of TS 3.8.1 required entry into LCO 3.0.3. Note that the entry into LCO 3.0.3 was backdated in the Control Room logs to time 1420 hours (time when it was identified that water was coming from the drip pan for the "A" CCP) and action was not taken within 1 hour to place the unit in MODE 3.

At 1613 hours, the "A" CCP room cooler was isolated from the ESW System. With the room cooler isolated, "A" ESW and "A" DG were declared OPERABLE and LCO 3.0.3 exited.

Enforcement discretion was sought to permit non-compliance with the Completion Time of Required Action B.2 of TS 3.8.1, i.e., to permit additional time to complete repairs and restoration of the "A" CCP room cooler and restoration of the "A" CCP before a plant shutdown was required.

At 1820 hours on February 13, 2008, Control Room operators declared the "B" CCP inoperable and entered LCO 3.0.3 (no TS 3.5.2 Condition for two trains inoperable).

At 1950 hours CST on February 13, 2008, the request for a Notice of Enforcement Discretion (NOED) was approved. The approval was effective and would begin at 1420 hours on February 13, 2008 for a total of 19 hours.

At the time of the approval of the request for NOED, the plant had reduced rated thermal power to approximately 90%. The plant was returned to 100% rated thermal power.

At 0141 hours on February 14, 2008, the "A" CCP room cooler was returned to OPERABLE status. The condition causing the need for the enforcement discretion was corrected and Required Action B.2 of TS 3.8.1 was exited.

Justification for Event Not Reportable Pursuant to 10 CFR 50.73(a)(2)(v)

Subsequent to the October 14, 2009 NRC quarterly integrated inspection exit meeting, WCNOC performed further evaluation of the event to determine if the event met the reporting criteria of 10 CFR 50.73(a)(2)(v). Table 1 below provides a detailed timeline of the event. A review of the detailed timeline determined that in addition to both CCPs being declared inoperable, both DGs were declared inoperable during this event for a period of 1 hour and 53 minutes. Therefore, the additional evaluation also reviewed the circumstances of both DGs being inoperable and reportable per 10 CFR 50.73(a)(2)(v).

To conclude whether this event meets the criteria for reporting under 50.73(a)(2)(v), the following was determined to be necessary:

1) An evaluation as to whether the "A" ESW train (and accordingly the "A" DG) would have been capable of performing its specified safety function on February 13, 2008 at 1420 CST to February 13, 2008 at 1613 CST with the leak on the "A" CCP room cooler H-bend assembly.

2) An evaluation as to whether the "A" CCP would have been capable of performing its specified safety function on February 13, 2008 at 1420 CST to February 14, 2008 at 0141 CST without the "A" CCP room cooler.

Table 1
Timeline for "A" CCP Room Cooler Leak (LER 2008-002-00) [1]

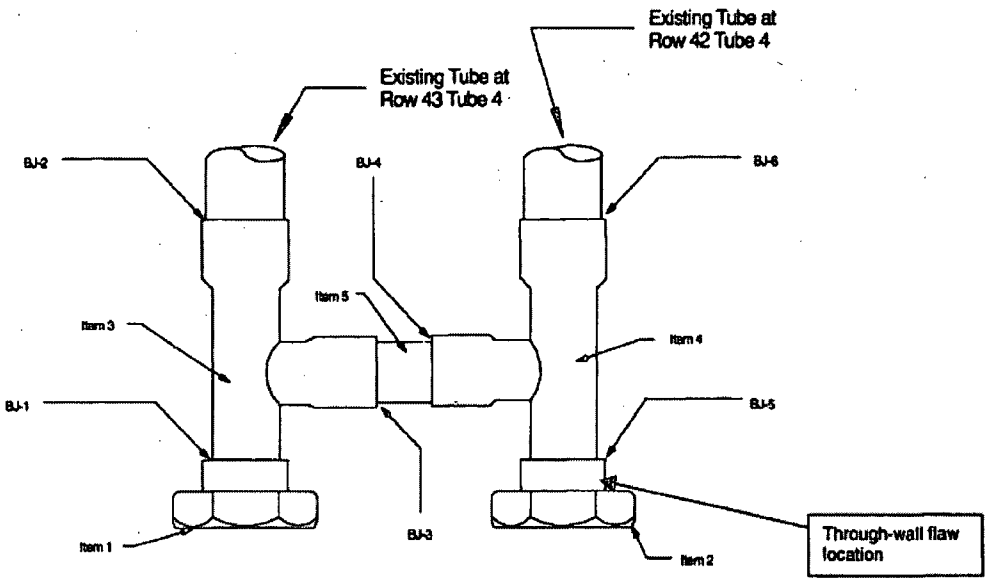
TRAIN A			TRAIN B		
			2/11	0502	B DG declared inop per TS 3.8.1, Required Action (RA) B.4.2 (7-day planned Completion Time)
			2/13	0749	Offsite circuit inoperable for STS IC-805B (planned). Entered TS 3.8.1, Condition A, E, G (12 hours to restore)
2/13	1420	A CCP room cooler leak. A CCP declared inop – Condition A of TS 3.5.2 (72 hours)	2/13	1420	Re-entered RA B.2 to declare inoperable the required features supported by the inoperable DG (4hrs to restore either B DG or A CCP)
	1420	A ESW inoperable due to ESW leak in room cooler			
	1420	A DG inoperable with ESW inoperable. Entered TS 3.8.1 Condition F (2 hours to restore 1 DG) and Condition I (enter LCO 3.0.3 immediately)			
	1420	Entered LCO 3.0.3 (TS 3.8.1, Condition I – 3 AC source inoperable)			
	1445	Breaker opened for A CCP room cooler			
	1550	Determined leak on A CCP room cooler was through wall. Structural integrity cannot be verified. Backdated entry into LCO 3.0.3 to time when leak in drip pan identified.			
	1613	A CCP room cooler isolated from ESW. Exited LCO 3.0.3.			
	1613	A ESW operable, A DG operable. Exited TS 3.7.8 Condition A, Exited TS 3.8.1 Condition F.			
				1820	B CCP declared inoperable (due to TS RA B.2 – declare required redundant features inop)
	1820	Enter LCO 3.0.3 due to both CCPs inoperable (no TS 3.5.2 Condition for two trains inoperable)			
				1826	STS IC-805B completed. Exited TS 3.8.1, Conditions A, E, G
	1950	Enforcement Discretion granted by NRC. A CCP and room cooler required to be restored by 0920 on 2/14. Exited LCO 3.0.3, Entered TS 3.8.1 RA B.2			
2/14	0141	A CCP room cooler restored. A CCP operable. Exited TS 3.8.2, RA B.2, and TS 3.5.2, Condition A			

[1] The timeline is based on log entries from the control room log. Note that the 1445 timeframe was not in the control room log. The time for opening the breaker for the A CCP room cooler was taken from CR 00008574 (2008-000469).

"A" ESW Train Evaluation

An evaluation was performed to determine if the "A" ESW train would have been capable of performing its specified safety function on February 13, 2008 at 1420 CST to February 13, 2008 at 1613 CST with the leak on the "A" CCP room cooler H-bend assembly.

The H-Bend assembly arrangement is composed of two tees joined together (see sketch below), and a threaded nut on one end of each tee. All of this is brazed together into a solid unit. An end plug (not shown) threaded into each nut and sealed by an o-ring completes the assembly.



Room Cooler H-Bend Assembly

To investigate the effects of a failure of the end plug, one pass of the room cooler heat exchanger was modeled using AFT Fathom. The modeling used the following data:

- 8 tubes exist in one pass, each tube 84 inches long. For the purposes of this computation, the tubes are assumed to be standard copper tubes with an ID of 0.545 inches (0.555 is the design value) and an absolute roughness of 0.00006 inches.
- ESW inlet and outlet was modeled as constant pressure sources, with the dP between the pressure sources set to the design pressure drop.
- Blanked off double tees were located at each return end, simulating the design configuration.

Two conditions were examined:

Condition 1 – Validation condition.

This condition assumed no break and computed the fluid flow under non-break conditions. This was done to validate that the model conservatively reflected the design parameters and to provide adjustments as necessary. A water temperature of 108.5°F was used to reflect average design temperature.

The initial run provided a flow about 5% under design flow. This is attributed to the slightly smaller ID of the standard tube and other minor differences in input that might have existed. While close, there was room for improvement and the model was adjusted by shortening the tube lengths to 80 inches, which resulted in a flow rate of 4.033 gpm. This provided good agreement with the design flow for one pass of 4 gpm.

Condition 2 – Break Condition

This condition was identical to Condition 1 with the exception of a circumferential break existing at the plugged end of the Tee closest to the heat exchanger inlet. This forced cooler inlet flow to pass through 1 tube before exiting the break and cooler outlet flow to pass (backwards) through 7 tubes before exiting the break. The pressure sources were not changed. A water temperature of 40°F was used to reflect lake temperature at that time.

Constant pressure was conservatively maintained to simplify the computation by limiting the boundary of the problem. This assumption is conservative because, under leakage conditions, the higher inlet and lower outlet flow rates would, in practice, result in a reduced pressure at both the inlet and outlet of the cooler coil.

The inlet pressure was established to be 200 psi above the break exit pressure which bounds any pressure that could exist in the system at the inlet of the cooler coil. Again, this was done to simplify and limit the computation effort.

This condition resulted in a computed exit flow (or leakage flow) of 83 gpm.

It was noted that with the expected pressures, the high velocities created by this condition resulted in pressures falling below saturation. In practice, this would have resulted in two-phase flow, thereby further reducing the actual flow rates. Since AFT Fathom is not capable of predicting two-phase flows, the pressures for Condition 1 and 2 were artificially increased sufficiently to remain above saturation pressure at every point although the differential pressure relationships were maintained. Pressures used were 300 psig inlet, 290.75 outlet, and 100 psig break pressure.

To further explore this configuration, 200 psig inlet, 190.75 psig outlet, and 0 psig break pressures were used, along with inclusion of an orifice at the break outlet. Orifice size was adjusted until pressures remained slightly above saturation. This resulted in a break flow rate well under 10 gpm. Thus, the results presented for Condition 2 are exceedingly conservative, with 10 gpm expected to be more representative of potential leak rate.

Conclusion

Assuming the main dam fails, the available ultimate heat sink (UHS) leakage margin is 130 gpm for a 30-day mission time. The conservatively determined maximum leak rate of this configuration is much less than 130 gpm.

The flowrate of an ESW pump is 15,000 gpm at approximately 155 psi. The room cooler leak rate is expected to be much less than ½% of the design flow of an ESW pump. Further, during this period that the cooler was out of service, historical plant data shows the lake temperatures were less than 40°F as opposed to the design cooling value of 95°F. The reduced

temperatures would reduce the flowrates necessary for the ESW System to perform its function to a fraction of that required for design conditions.

It is concluded that had this "A" CCP room cooler leaking end plug fitting catastrophically failed, the resulting leak rate would not have threatened the capability of either the UHS or the "A" ESW train to perform their respective function. Although the "A" ESW train was declared inoperable as required by TR 3.4.17, "Structural Integrity," and TS 3.7.8, "ESW System," during and until the leaking "A" CCP room cooler was isolated, the "A" ESW train remained continuously capable of performing its specified function. With the "A" ESW train capable of performing its specified function the "A" DG was also capable of performing its specified function. The "A" DG had been declared inoperable based on Note 1 of Required Action A.1 (TS 3.7.8) that indicates the applicable Conditions and Required Actions of LCO 3.8.1 should be entered if an inoperable ESW train results in an inoperable DG. As such, with the "A" DG capable of performing it specified function, the event would not have been reportable under 10 CFR 50.73(a)(2)(v) since onsite emergency power was available to the plant.

"A" Centrifugal Charging Pump Evaluation

A GOTHIC analysis was performed to provide a reasonable estimate of the temperature transient in the "A" CCP room had a design basis accident (DBA) occurred during this period. This analysis included conditions existing during this period, and considered a maximum 12 hour mission time for the CCP. The analysis shows that the room average temperature and the average temperature around the "A" CCP remain below 122 °F limit but some local temperatures in the vicinity of the pump and motor exceed the limit by a few degrees.

According to EQWP-AE-2 qualification documents, a maximum average temperature of 122 °F identified for the room temperature when the CCP is running. Therefore, this temperature condition is adequately addressed in the existing Environmentally Qualified life evaluations for the equipment of Room 1114.

However, the analysis of the room temperature identified that the localized temperature for the motor could reach just over 128 °F during this transient condition, which has been evaluated to determine any effects of the temperature increase on the qualified life of the CCP motor (DPBG05A). This evaluation was accomplished using the following Arrhenius Analysis.

$$t_s/t_a = e^{(\varnothing/k)(1/T_s - 1/T_a)}$$

where:
- $\varnothing$ = activation energy (eV) (1 eV = 23.06 Kcal/mole)
- k = Boltzmann's constant = 8.617×10^{-5} eV/K
- t_a = accelerated aging time (any convenient unit of time, provided it is the same for t_a and t_s)
- t_s = service time being simulated
- T_a = aging temperature (K)
- T_s = service temperature (K)

The CCP motors have a qualified life of 10.9 years, but this is based on electrical stresses being the limiting condition, not environmental conditions. The electrical stresses on the thermalastic epoxy result in a life of only 11.4 years (reduce by 0.5 years for post-DBA to get a qualified life

of 10.9 years). The evaluation of the increased temperature need only be done to ensure that effects don't result in the new "environmental" life being less than the electrical life.

According to EQWP-AE-2 qualification documents, the motors have an environmentally qualified life of approximately 15.4 years, which is based on the following:

1. 50 °C (122 °F) ambient room condition when pump is running, with 63 °C motor temp rise, for a total aging temperature of 113 °C
2. Activation Energy = 1.11
3. The qualification testing was done via thermal aging of 168 hours @ 210 °C

To account for the transient condition, the new average constant temperature T_e must be determined using the following formula, where T_e is substituted for the service temperature T_s of 113 °C used to determine original qualified life. Note that for the transient condition, the new average temperature is conservatively based on 128 °F (53.3 °C) occurring for the full 12 hour assumed mission time to allow for simplified analysis.

formula

$$T_e = -\frac{\Phi}{k}\left[\ln\left(\frac{1}{t_s}\sum_{i=1}^{n} t_i e^{-\Phi/kT_i}\right)\right]^{-1}$$

Using the new total temperature of 116.3 °C (53.3 + 63), T_e is found to be 113 °C, over the averaged period of 10.9 years (transient occurs once in 10.9 years). This average is the same as the original T_s (rounding to the nearest 100th °K). Therefore, there is no change to the environmentally qualified life for this minor transient condition occurring over such a short period of time. Qualified life remains to be based on the electrical stresses.

Conclusion

Functional capability of the "A" CCP room cooler was maintained up to the point it was removed from service for repairs. During this time period, it would have continued to remove heat from the "A" CCP room. This capability would have been maintained even with catastrophic failure of the leaking nut on the H-bend assembly.

Functional capability of the "A" CCP with its respective room cooler out of service was further investigated by computing the best estimate temperatures that would have existed in the "A" CCP pump room during a DBA without the cooler providing function. It was found that maximum average room temperature remained below 122°F and maximum local temperature was about 128°F. The available service life of the equipment in the "A" CCP room was evaluated and it was concluded that the "A" CCP would have been capable of performing its specified function during the period it would have been required in a post DBA scenario. As such, with the "A" CCP capable of performing it specified function, the event would not have been reportable under 10 CFR 50.73(a)(2)(v) since emergency core cooling capability was maintained.

Information in Inspection Report 05000482/2009004

A review of the inspection report identified a potential discrepancy in the information documented in the report.

Page 35 of the inspection report states:

> On June 25, 2009, the inspectors identified that Wolf Creek failed to report this event as a safety system functional failure under 10 CFR 50.73(a)(2)(v) for the emergency core cooling system being inoperable. The inspectors discussed this with Wolf Creek and Condition Report 00018156 was initiated.

Condition Report (CR) 00018156 was initiated on June 25, 2009, based on information obtained at a Strategic Teaming and Resource Sharing (STAR) Integrated Regulatory Affairs Group (IRAG) meeting held on June 25, 2009. The initiating description of the CR states, in part:

> During the IRAG on 6/25/2009, it was mentioned that the NRC questioned the Safety System Functional Failure (SSFF) calls on 6 LERs at the ROP meeting held last week. Later discussion by STARS with the NRC revealed that one of the LERs in question is WCGS LER 2008-002.

The evaluation and cause indicated that WCNOC had not been notified by the NRC inspectors about concerns of not reporting this event under 10 CFR 50.73(a)(2)(v). A Regulatory Issues Matrix that WCNOC utilizes to track NRC resident inspector concerns indicates that the concern on reporting LER 2008-002-00 under 10 CFR 50.73(a)(2)(v) was identified by the NRC inspectors on August 12, 2009.

Therefore, WCNOC believes that the initiation of CR 00018156 was not based on the NRC resident inspectors identification that WCNOC failed to report this event.

Basis for Event Not Reportable Under 10 CFR 50.73(a)(2)(v) – Containment Fan Coolers

Description of Event

On April 2, 2008, Performance Improvement Request (PIR) 2008-001307 (subsequently renumbered as CR 00009375) was initiated as a result of discussions with Callaway Plant personnel regarding concerns that with the containment fan coolers running in fast speed, that certain small break loss-of-coolant accidents (SBLOCA) harsh environment scenarios may result in the fan coolers not starting in slow speed on an safety injection (SI) signal. On April 10, 2009, this event was reported in accordance with 10 CFR 50.72(b)(3)(ii)(B) as an event or condition that results in the nuclear power plant being in an unanalyzed condition that significantly degrades plant safety (Event Number 44131). The notification indicated that investigation and analysis as of the date of the notification (evaluation and analysis was still ongoing) indicated that in the case of a Main Steam Line Break, the fan coolers could trip while running in fast speed and not be able to be automatically started by the sequencer in slow speed due to the electrical design configuration. At the time of the notification the plant was defueled for Refueling Outage 16 and the issue would be resolved prior to entry into MODE 4.

A modification was implemented in Refueling Outage 16 that changed the control circuit on the cooling fan motors to allow the cooling fan to start in slow speed, in the event the fast speed thermal overloads have tripped.

The evaluation for CR 00009375 performed an analysis for a spectrum of small break LOCA scenarios and limiting main steam line break (MSLB) scenarios with the assumption that the fan coolers were not available to perform their specified function. This analysis determined that for the small break LOCA scenarios the potential failure of the fan coolers, due to harsh environmental conditions, would not challenge the containment integrity, as the passive heat sinks within the containment, along with the actuation of the containment spray system, would function to suppress the containment pressure and temperature surge. For the MSLB scenarios, the analysis determined that the highest peak containment pressure would exceed the analysis of record peak pressure by approximately 5 psig but was still within the design pressure limit. In addition to the analysis, a review of plant data for the period January 1, 2005 through June 10, 2008 was performed to identify those periods of time when the fan coolers were in high speed operation concurrent with containment and cooling water conditions conducive to high loading that could potentially cause the fast speed thermal overloads to trip. The review determined that the conditions were present for a period of 48 days and a trip of the containment cooler did not occur. Based on this evaluation, WCNOC concluded that it had reasonable assurance that the containment fan coolers were designed to operate at elevated pressures with higher-density steam/air mixtures and that the coolers would have performed their specified function. WCNOC retracted the event notification (event number 44131) on June 20, 2009 based on the evaluation determining that an unanalyzed condition did not exist. Reportability Evaluation Request 2008-011 was closed on June 20, 2008. An action plan associated to the CR was initiated to determine the most limiting environmental conditions to which the fan cooler could be subjected to, assess the resulting brake horsepower when the fan cooler is in fast speed, and assess whether this brake horsepower would cause a fan cooler to overload on fast speed.

Provided below is a summary of calculation WCN003-PR-01, "Worst Case Brake Horse Power Requirements on Containment Air Cooler (CAC) Fan Motors." This calculation concluded that with the most limiting environmental conditions in containment, the thermal overloads would not actuate with the containment fan coolers operating in fast speed.

Calculation WCN003-PR-01, Rev. 0, "Worst Case Brake Horse Power Requirements on Containment Air Cooler (CAC) Fan Motors"

This calculation included a determination of the brake horsepower requirements of the containment fan coolers prior to a safety injection signal (SIS) and a comparison of the motor current for the containment fan cooler motors under the worst-case brake horsepower to the minimum trip current for the thermal overload.

The fan coolers will be operating until the SIS completes the component load shed. Once the fan coolers have been tripped, the sequencer will then restart them in slow speed. A review of the design specification for the fan coolers (Specification Number 10466-M-620, Rev. 14) was performed. From that review it was determined that the fan coolers were designed to produce airflow of 140,000 CFM at a vapor/air mixture density of 0.075 lbm/ft3 through each of the fan coolers while operating in fast speed. In addition, the water flow under the same conditions would be 1,100 gpm through each of the fan coolers.

The attributes of the vapor/air mixture entering the fan coolers and other operating conditions just prior to the SIS, based on the design specification and Calculation Change Notice (CCN) AN-05-016-000-CN001, "Containment Pressure and Temperature Response of the Limiting MSLB Scenarios, Assuming No Fan Coolers Operation," and the above assumptions, are as follows:

Containment Pressure – 20.7989 psia (6.1 psig)
Containment Temperature – 203.712 °F
Total Vapor Mass – 31,454.2 lbm
Total Air Mass – 161,271 lbm
Mixture Density – 0.077 lbm/ft^3
Service Water Flow Rate – 1210 gpm
Service Water Temperature – 33 °F
Containment Cooler Air Flow Rate – 154,000 cfm
Containment Cooler Tube Fouling Factor - 0 %

A 10% factor has been added to the containment fan cooler air and service water flow rates for conservatism.

Based on the information provided by the vendor and using the design inputs listed above, the wet bulb and dry bulb temperatures of the vapor/air mixture at the fan inlet are as follows:

Wet Bulb 149.0 °F
Dry Bulb 151.4 °F

Based on the wet/dry bulb temperatures provided by the vendor, the density of the vapor/air mixture entering the fans inlet is 0.076 lb/ft3.

A Containment Air Cooler Duct Pressure Loss Calculation (Attachment 1, Table 7-1 of WCN003-PR-01) shows that the worst-case brake horsepower requirements will occur in the train "A" fan cooler (SGN01A) due to that train having the highest total ductwork pressure loss at rated flow. Therefore, the worst-case brake horsepower for train "A" was determined, which envelops the other 3 fan coolers.

Table 1, below, provides data points from the fan curve of total pressure (TP_T) and brake horsepower (BHP) provided in the Witness Test Report contained in drawing M-12GN01, "Piping and Instrumentation Diagram Containment Cooling System," along with the calculated total ductwork pressure loss (TP_C), versus flow rate.

Table 1 – Total Pressure, Duct Pressure and BHP at Various Flow Rates Flow Rate

Flow Rate (CFM X10^3)	**TP_T (in wg)**	**TP_C (in. wg)**	**BHP**
100	6.8	6.13	158
110	6.6	7.02	160
120	6.3	7.99	159
130	5.75	9.05	155
140	4.96	10.19	150
150	3.85	11.41	142
160		12.72	
170		14.11	
180		15.59	
190		17.15	
200		18.80	

Note 1: TP_T and BHP were not determined in the Test Report at a flow of 160, 000 CFM and above.

Figure 1, below, is a graphical plot of the above values listed in Table1:

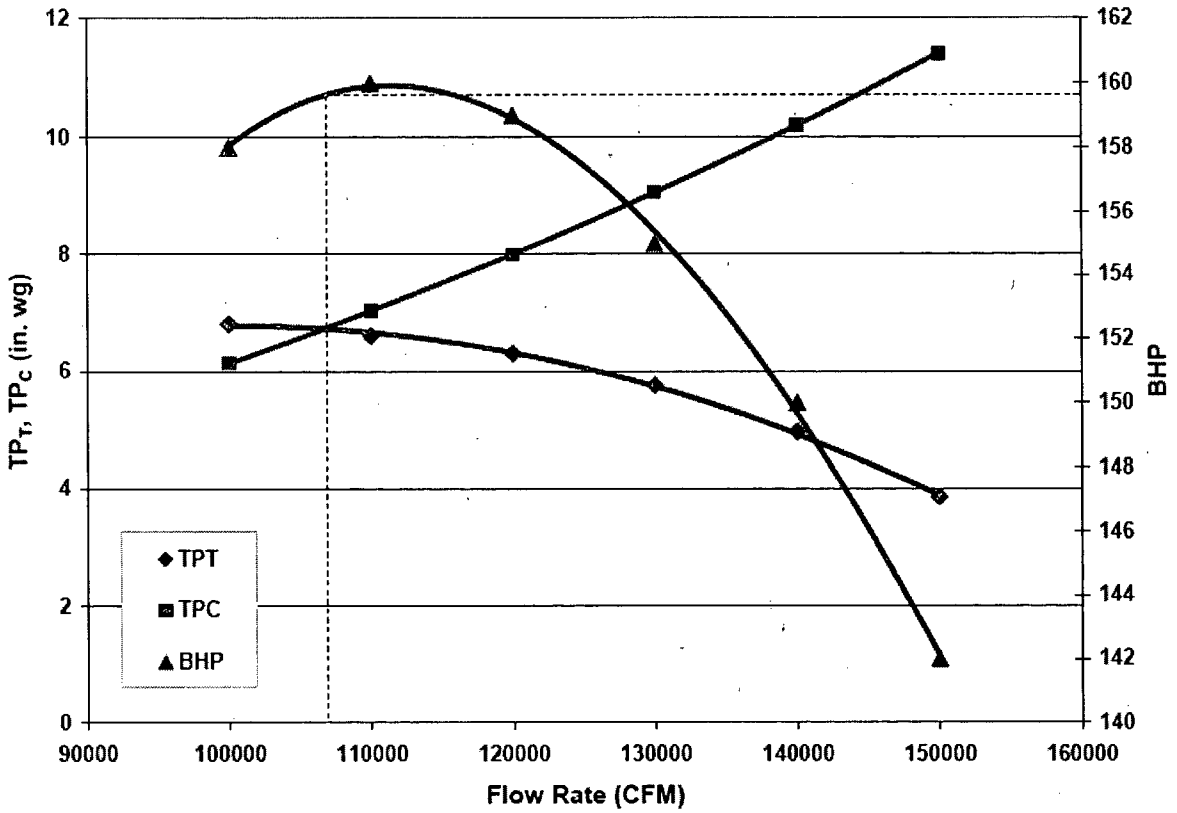


Figure 1 – Graph of Table 1 Values

The operating point of the containment fan cooler (flow and required BHP) is determined by where the fan cooler curve (TP_T) and the system resistance curve (TP_C) intersect. The BHP requirement of the train "A" fan cooler is less than 160 at the flow rate of approximately 107,000 CFM just prior to the Safety Injection Signal. Therefore, the worst-case BHP requirement on the containment fan cooler motors is less than 160 Hp.

Utilizing the worst-case BHP requirement from above, a comparison of the motor current for the containment fan cooler motors to the minimum trip current for the thermal overload was performed.

The worst-case full load amps at 100% loading is 171 Amps per the Reliance test sheet attached to design change package (DCP) 05856, "Heater Size Change, Containment Cooling Fan Motor Starters." Prorating the 150 Hp current to the worst-case 160 Hp current yields:

171 Amps x 160/150 = 182.4 Amps

The motor control center cubicles for the containment fan coolers have adjustable ambient compensated thermal overloads. According to drawing E-11NG20, "Low Voltage System Class IE Motor Control Center Summary," the fan cooler motors are 150/75Hp, the starters are Size 5, and T34 thermal elements (overload heater) are installed for these motors. Vendor manual E-018-00190, "Instruction Manual for Motor Control Centers," indicates that the current at which

the T34 heater will trip the thermal overload is 1.25 times the minimum current of 174 Amps. From drawing E-11NG20, the thermal overloads are set at 100%. This means that the thermal overloads are expected not to trip until 100% of 125% of the minimum trip current:

174 Amps x 1.25 x 100% = 217.5 Amps

The adjustable ambient compensated thermal overloads do not operate at their exact setpoint, as they have a defined plus/minus tolerance. Time-Current Characteristic Curve of drawing E-018-00847 indicates that the lowest possible value the thermal overloads could trip would be at 88% of its setting, and then only if a long-term overload condition existed for greater than 15 minutes (900 seconds).

In addition, the thermal overloads have a standard rating temperature of 40°C (104°F). The overloads are located within motor control centers NG001T through NG004T, which are located in the Auxiliary Building (Rooms 1409 and 1410). The maximum Design Basis Accident temperature for these rooms is 106°F. The Ambient Temperature Correction Curve for these thermal overloads, provided by drawing E-018-00845, indicates that the slightly elevated temperature will reduce the trip point of the thermal overload by less than 1%, which requires multiplying the final trip value by a maximum of 0.99%.

The above two factors must be applied to the minimum trip current of 217.5 Amps:

217.5 Amps x 0.88 x 0.99 = 189.5 Amps

Based upon the above, the thermal overloads will not trip with a current less than 189.5 Amps. The maximum postulated motor current of 182.4 Amps, during the worst-case fast speed BHP conditions, would not result in the thermal overload tripping the containment fan cooler.

Conclusion

At the time WCNOC retracted the 10 CFR 50.72 notification, WCNOC believed that the containment fan coolers were designed to operate at elevated pressures with higher-density steam/air mixtures and that the coolers would have performed their specified function. A calculation to determine the break horsepower requirements of the containment fan coolers prior to a SIS and a comparison of the motor current for the containment fan cooler motors under the worst-case brake horsepower to the minimum trip current for the thermal overload was finalized subsequent to the October 14, 2009 NRC quarterly integrated inspection exit meeting. This calculation concluded that the containment fan coolers would have operated in fast speed under the worst-case environmental conditions and that upon a Safety Injection Signal would have started in slow speed as required by the analysis of record. As a result, WCNOC concludes that the condition is not reportable under 10 CFR 50.73(a)(2)(v) since the containment fan coolers were capable of performing their specified function.