WOLF CREEK
NUCLEAR OPERATING CORPORATION

Matthew W. Sunseri
Vice President Operations and Plant Manager

January 11, 2010
WO 10-0003

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

Reference: 1) Letter WO 08-0010, dated April 10, 2008, from M. W. Sunseri, WCNOC, to USNRC

2) Letter WM 09-0065, dated December 9, 2009, from R. A. Muench, WCNOC, to USNRC

Subject: Docket No. 50-482: Licensee Event Report 2008-002-01, Technical Specification Allowed Outage Time Exceeded due to Room Cooler Leak

Gentlemen,

Reference 1 submitted Licensee Event Report (LER) 2008-002-00 which described a condition in which Wolf Creek Nuclear Operating Corporation (WCNOC) requested and was granted a Notice of Enforcement Discretion to exceed the Technical Specification (TS) 3.8.1, Required Action B.2 Completion Time of 4 hours. Reference 1 submitted LER 2008-002-00 pursuant to 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by the plant's TSs.

The enclosed LER 2008-002-01 is being submitted based on the November 10, 2009, Nuclear Regulatory Commission (NRC) Integrated Inspection Report 2009004. This inspection report identified a green severity level IV noncited violation of 10 CFR 50.73, with three examples for failure to submit LERs within 60 days following discovery of events or conditions meeting the reportability criteria. One of the examples in the inspection report was the failure to report LER 2008-002-00 under 10 CFR 50.73(a)(2)(v) as an event or condition that could have prevented the fulfillment of a 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. WCNOC completed further evaluation of LER 2008-002 and has determined that this event does not meet the criteria for reporting under 10 CFR 50.73(a)(2)(v). Reference 2 provided the results of the additional evaluation and requested the NRC review the evaluation and provide WCNOC with an assessment of their review.

Based on the results of the NRC review, WCNOC will supplement this LER with additional information from the NRC review.

IE22
NRR

The Attachment to this letter contains a list of regulatory commitments. If you have any questions concerning this matter, please contact me at (620) 364-4008, or Mr. Richard D. Flannigan, Manager Regulatory Affairs at (620) 364-4117.

Sincerely,

M W Sunseri

Matthew W. Sunseri

MWS/rlt

Attachment
Enclosure

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

LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by WCNOC in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments. Please direct questions regarding these commitments to Mr. Richard Flannigan at (620) 364-4117.

REGULATORY COMMITMENT	DUE DATE/EVENT
Based on the results of the NRC review, WCNOC will supplement the LER with additional information from the NRC review.	6/30/2010

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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4. TITLE
Technical Specification Allowed Outage Time Exceeded due to Room Cooler Leak

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER 05000
02	14	2008	2008	- 002 -	01	01	11	2010	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE: 1

10. POWER LEVEL: 100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☒ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☒ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☒ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☒ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Richard D. Flannigan, Manager Regulatory Affairs	(620) 364-4117

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED		15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☒ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)*	☐ NO		6	30	2010

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

At 1420 hours Central Standard Time on February 13, 2008, with the "B" train diesel generator out of service for planned maintenance activities, the "A" train Centrifugal Charging Pump (CCP) was declared inoperable due to an associated room cooler tube leak. Technical Specification (TS) Limiting Condition of Operation (LCO) 3.0.3 was entered at 1820 hours due to two trains of Emergency Core Cooling Systems being declared inoperable. A plant shutdown was commenced at 1850 hours.

At 1950 hours, the NRC granted a Notice of Enforcement Discretion to allow an additional 15 hours to restore the "A" train CCP and its associated room cooler to OPERABLE status. The power reduction was stopped and the plant was returned to 100% power. TS LCO 3.0.3 was exited.

On February 14, 2008, at 0141 hours, the "A" train CCP room cooler was returned to service. The condition causing the need for the enforcement discretion was corrected. The appropriate TS Conditions were exited.

Subsequent to the October 14, 2009 NRC quarterly integrated inspection exit meeting and issuance of NRC Integrated Inspection Report 2009004, WCNOC performed further evaluation of the event to determine if the event met the reporting criteria of 10 CFR 50.73(a)(2)(v).

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NARRATIVE

PLANT CONDITIONS PRIOR TO EVENT:

MODE – 1
Power – 100

EVENT DESCRIPTION:

On February 11, 2008, at 0502 Central Standard Time (CST), the "B" diesel generator (DG) (EIIS Code: 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, 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 on February 13, 2008, water was identified coming from the drip pan for the "A" Centrifugal Charging Pump (CCP) (EIIS Code: P) 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 DG 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" Essential Service Water (ESW) train [EIIS Code: BI] was declared inoperable as required by Technical Requirement (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 on February 13, 2008, 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).

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At 1950 hours 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.

BASIS FOR REPORTABILITY:

Wolf Creek Nuclear Operating Corporation (WCNOC) requested and received a NOED from the NRC to obtain enforcement discretion to allow an additional 15 hours for restoring the "A" CCP room cooler and "A" CCP to OPERABLE status. The "A" CCP room cooler and "A" CCP were out of service for longer than allowed by the allowed outage time (AOT) of the Wolf Creek Generating Station (WCGS) TS 3.8.1, Required Action B.2. The event is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) for any operation or condition which was prohibited by the plant's TS.

Subsequent to the October 14, 2009 NRC quarterly integrated inspection exit meeting and issuance of NRC Integrated Inspection Report 2009004, 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. The additional evaluation also reviewed the circumstances of both DGs being inoperable and reportable per 10 CFR 50.73(a)(2)(v). This event is being reported per 10 CFR 50.73(a)(2)(v)(A-D) based on the NRC characterizing this event as an example of a violation for failure to submit an LER within 60 days following discovery of an event meeting the reportability criteria.

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.

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

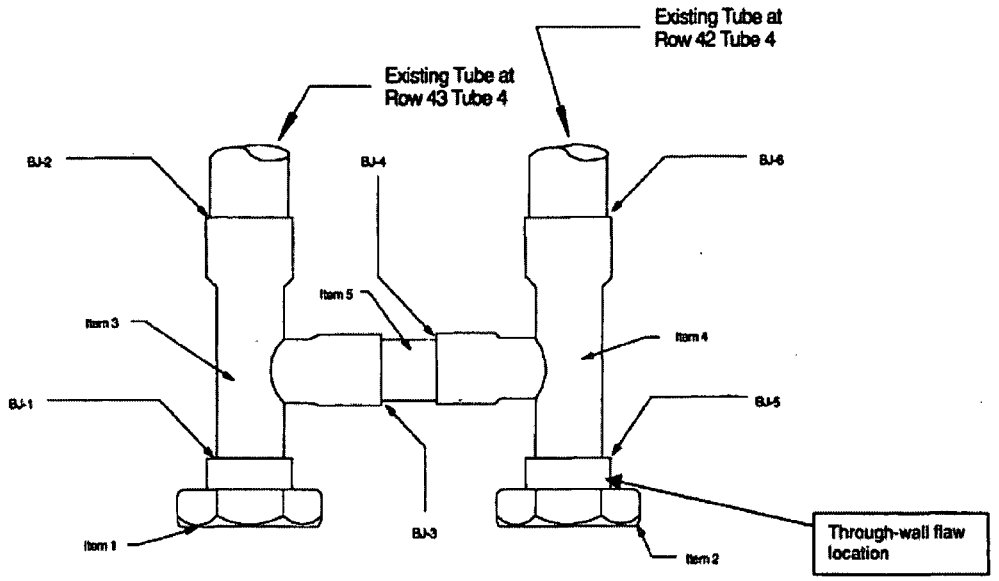
TRAIN A			TRAIN B		
			2/11	0502	B DG declared inoperable per TS 3.8.1, Required Action (RA) B.4.2 (7-day planned Completion Time)
			2/13	0749	Offsite circuit inoperable for STS IC-805B (planned). Entered TS 3.8.1, Condition A, E, G (12 hours to restore)
2/13	1420	A CCP room cooler leak. A CCP declared inoperable – 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 declared inoperable due to ESW leak in room cooler			
	1420	A DG declared 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 inoperable)
	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 3.8.1, 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 degrees 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 degrees 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 degrees F as opposed to the design cooling value of 95 degrees 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 the 122 degrees 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 degrees F is 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 degrees 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 degrees C (122 degrees F) ambient room condition when pump is running, with 63 degrees C motor temp rise, for a total aging temperature of 113 degrees C
2. Activation Energy = 1.11
3. The qualification testing was done via thermal aging of 168 hours @ 210 degrees 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 degrees C used to determine original qualified life. Note that for the transient condition, the new average temperature is conservatively based on 128 degrees F (53.3 degrees 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 degrees C (53.3 + 63), T_e is found to be 113 degrees 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 degrees F and maximum local temperature was about 128 degrees 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.

CAUSE:

The "A" CCP room cooler is original installed plant equipment. The apparent degradation mechanism is flow-induced erosion in the H-Bend area. This failure mechanism has been seen on other room coolers that utilize H-Bends for connecting the circuits.

Flow erosion is a slow wear mechanism that degrades the H-Bends over a long period of time. This component has been in service for about 23 years and, other than maintenance outages, this component maintains continuous flow through the tubes. The continuous flow plus the length of service suggests that this is normal aging and not an accelerated degradation event.

CORRECTIVE ACTIONS:

The "A" CCP Room Cooler was isolated to repair the H-Bend leak. The repair activities replaced the defective H-Bend and returned the CCP Room Cooler to operable status.

The original room coolers included the use of H-Bend returns soldered to CuNi alloy tubes. The long-term plan to replace all CuNi coils with up-graded stainless steel components by the end of the first quarter of 2009 has been completed. The replacement room coolers have been re-designed which eliminated the H-bends and improved the tube material. The first of the new coils were installed in 1999.

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SAFETY SIGNIFICANCE:

The final quantitative risk analysis indicated that the incremental conditional core damage probability (ICCDP) for the extension was 1.53E-08, and the incremental conditional large early release probability (ICLERP) for the extension is essentially zero. While the extension was for an additional 15 hours (approximately 1.71 E-03 years), the ICCDP and ICLERP were calculated using a bounding 24 hours (approximately 2.74E-03 years). The value for ICLERP is less than the guidance threshold in Inspection Manual Part 9900 Technical Guidance.

The calculated value for ICCDP meets the Regulatory Issue Summary 2005-01 threshold of less than or equal to 5.0E-07. The calculated ICCDP did not consider the implied risk of shutting down the plant with only one available diesel generator, the "A" CCP being in a functional status, and that the CCP room volume communicates with the Safety Injection and Containment Spray pump rooms which have their own functional room coolers.

To further mitigate the risk impact, WCNOC implemented a series of compensatory actions to minimize challenges to the dominant core damage frequency (CDF) contributor of Loss of Offsite Power. These measures included avoidance of testing and maintenance impacting availability of the "A" train safety bus, ensure no switchyard work was allowed, continual monitoring by the grid operator regarding grid conditions, and availability of the Sharpe Station to mitigate a Station Blackout (SBO).

OPERATING EXPERIENCE/PREVIOUS EVENTS:

None.