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Site Vice President

August 16, 2011  
WO 11-0064

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

Subject: Docket No. 50-482: Request for Notice of Enforcement Discretion  
Regarding Technical Specification 3.7.5, "Auxiliary Feedwater (AFW)  
System"

Gentlemen:

On August 14, 2011, at 0815 Wolf Creek Nuclear Operating Corporation (WCNOC) verbally requested NRC to issue a Notice of Enforcement Discretion (NOED) to provide additional time to restore the Turbine Driven Auxiliary Feedwater Pump (TDAFWP) to OPERABLE before a plant shutdown would otherwise be required in accordance with TS 3.7.5, Required Action C.1 and C.2.

The events leading to WCNOC's request began at 1145 AM on August 11, 2011, when TS 3.7.5, "Auxiliary Feedwater (AFW) System," condition B.1 was entered which requires that the associated AFW train be declared inoperable. The entry into this TS resulted from the failure of the TDAFWP oil to meet the oil particulate limit specified in Wolf Creek Nuclear Operating Corporation's Lubricating Analysis procedure.

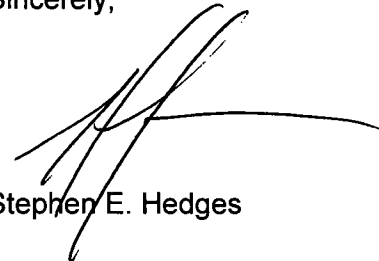
Enforcement discretion was sought to permit non-compliance with LCO 3.7.5 to allow additional time to restore the properties of the oil in the TDAFWP to compliance with requirements. An additional 24 hours was requested to replace and filter the oil not meeting specifications and to retest the oil in the TDAFWP following the addition of new oil. The requested additional time for restoring the TDAFWP had been evaluated and shown to result in a small increase in quantitative risk, offset by qualitative considerations. It was also determined that there was no net increase in radiological risk.

At 0945 hours CST on August 14, Mr. Kriss Kennedy, Director Division of Reactor Projects, Region IV, notified WCNOC that after NRC Region IV Office consideration of WCNOC's verbal request for enforcement discretion, and in consultation with the NRR technical staff, the request for a Notice of Enforcement Discretion (NOED) was approved. The approval was effective and would begin at 1145 hours on August 14, 2011, for an additional 24 hours. WCNOC is required to submit a written request for the NOED within two working days of the NRC verbal approval.

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NRR

The attachments provide the information documenting WCNOC's earlier verbal request for the NOED. If you should have any questions regarding this submittal please contact me at 620-364-4190, or Mr. Gautam Sen at (620) 364-4175.

Sincerely,



Stephen E. Hedges

SEH/rlt

Attachments: I Request for Notice of Enforcement Discretion  
II List of Commitments

cc: E. E. Collins (NRC), w/a  
J. R. Hall (NRC), w/a  
G. B. Miller (NRC), w/a  
Senior Resident Inspector (NRC), w/a

**Request for Notice of Enforcement Discretion Regarding Technical Specification  
3.7.5, "Auxiliary Feedwater (AFW) System"**

**1. The Technical Specification (TS) or other license conditions that will be violated.**

Wolf Creek Nuclear Operating Corporation (WCNOC) specifically requests enforcement discretion from the shutdown requirements of Required Action C.1 and C.2 of the Limiting Conditions for Operation (LCO) for TS 3.7.5. WCNOC requests this discretion to complete the restoration of the TDAFWP oil to within the required limits, and return the TDAFWP to OPERABLE, without placing the plant in MODE 4. Technical Specification 3.7.5, Required Action B.1 requires restoration of an inoperable Auxiliary Feedwater (AFW) Train to OPERABLE status within 72 hours. Conditions C.1 and C.2 of TS 3.7.5 would require placing the unit in MODE 3 in 6 hours and MODE 4 in 12 hours if required Action B.1 and its associated Completion Time is not met.

Enforcement discretion was sought to allow up to an additional 24 hours for restoring the TDAFWP to OPERABLE status. This would allow delayed entry into MODE 3 in accordance with Required Action C.1 so that entry into MODE 3 would not be required until 1745 hours Monday, August 15, 2011.

**2. The circumstances surrounding the situation: including likely causes; the need for prompt action; action taken in attempt to avoid the need for an NOED; and identification of any relevant historical events.**

Required Action B.1 of TS 3.7.5 was entered when the TDAFWP was declared inoperable at 1145 hours on Thursday, August 11, 2011, due to the failure of the TDAFWP oil to meet the oil particulate limit specified in Wolf Creek Nuclear Operating Corporation's Lubricating Analysis procedure.

Cause Contributors

A cause of the condition has been determined to be residual quantities of Fyrquel ® remaining in the system after an inadvertent addition of 8 ounces of Fyrquel ® to the system in March 2011. Fyrquel ® is not compatible with the lubricating oil used in this system. Immediately following the addition of Fyrquel ® and prior to operating the TDAFWP in March, the system was flushed, cleaned and the proper lubricant added.

Based on the results of the metal particulate oil analysis of samples taken on 8/15/2011 following multiple drain, fill, flush cycles of the turbine oil system there is no indication of degradation of the equipment. The most likely cause of the high particulate count from the 8/11/2011 sample was some particulate with an increased ISO value due to residual Fyrquel and some air entrainment. The numerous flushes of the system were successful in removing some of the particulate. Chemical analysis of the oil shows that constituents of Fyrquel ® remain present in the oil even though a system cleanup had been performed in March.

Samples of oil were sent out for laboratory analysis. From this analysis it was concluded that the particulates are not a result of wear. Wear would be indicated by metal particulate (aluminum, copper, brass, iron). However, the sample sent to the laboratory for metal particulate analysis indicated acceptable results for abrasive and other contaminant levels, and the results were well below what would be expected if material wear was the source of the particulate. It was also determined the materials were not due to water. If water was present in

oil, corrosion could occur which would result in higher levels of iron. Again, the sample sent to the laboratory contained very low quantities of iron and water. However, the oil system was drained, flushed and refilled to remove any existing water from the system.

#### Historical Events

The fact that this is a result of an incorrect maintenance practice from March of 2011 limits the extent of condition to this system. Reviews have been performed to eliminate other sources of particulates.

#### Action taken in attempt to avoid the need for an NOED

Immediate actions taken were to declare restoration of the inoperable TDAFWP as emergent work to be worked around the clock until the TDAFWP was restored to OPERABLE. Work was immediately started to drain and flush the oil from the TDAFWP and replace it with fresh oil. The system was drained and flushed multiple times.

Following the third drain and fill of the TDAFWP oil the surveillance test, STS-AL-103, "TDAFW Pump Inservice Test," was performed satisfactorily. However, oil sample results continued to indicate elevated particulate levels. Therefore, the TDAFWP remained inoperable.

At that time samples of both the source and makeup oil sources were sent to offsite laboratories to attempt to determine the reason for the high particulate counts while the system was prepared to again drain and replace the oil.

The result of the source samples was favorable so it was recommended by Engineering that one drain/fill/re-circulation cycle be performed and the oil retested. It was found that the source oil filter had been exhausted so the new oil added was re-circulated through a finer (2 micron) filter and added in conjunction with a TDAFWP run in accordance with SYS AL-124, "Venting the Turbine Driven Auxiliary Feedwater Pump Oil System."

Following the pump run another oil sample was obtained and the results remained unacceptable.

The next effort to correct this condition involved cleaning bearing housings where particulates have a high potential of being located followed by re-circulating the oil in the system through an in line re-circulation skid with a fine (2 micron) filter until the particulate limit is met. This method of filtering process proved effective. However, given the amount of time required to perform the pump post maintenance surveillance, take an additional sample, and perform additional filtering, additional hours were required beyond the Technical Specification limit to complete the work.

### **3. Information to show that the cause and proposed path to resolve the situation are understood, such that there is a high likelihood that planned actions to resolve the situation can be completed within the proposed NOED time frame.**

The TDAFWP was inoperable because of the failure of the TDAFWP oil to meet the oil particulate limit specified in Wolf Creek Nuclear Operating Corporation's Lubricating Analysis procedure. The particulate was a result of contamination introduced when Fyrquel ® was erroneously added to the TDAFWP. By cleaning the bearing housing of particulates, filtering the oil using a filtration rig for the number of hours estimated to return it to within the particulate specification, sampling the oil, performing system restoration and the required surveillance

testing for Operability, WCNOG proposed it could restore the system within the proposed NOED time frame. However, additional testing reflected the continued presence of particulates and the unit began transitioning to MODE 3 at 1051.

Cleanup efforts were completed. Current sample results, verified by two independent labs, indicated acceptable particulate levels. A Basic Engineering Disposition has been issued supporting the sample results and basis for operability. The Turbine Driven Auxiliary Feedwater Pump was declared operable at 1203 CDT on 8/15/2011 and the power reduction was halted at 82% Rated Thermal Power (RTP). Power ascension to 100% RTP was commenced at 1209 CDT on 8/15/2011.

**4. The safety basis for the request, including an evaluation of the safety significance and potential consequences of the proposed course of action.**

ICCDP and ICLERP Determination

The WCGS zero maintenance Revision 5 Probabilistic Risk Assessment (PRA) model was used to quantify the impact on risk of extending the allowed outage time per this request. Core Damage Frequency (CDF), Large Early Release Frequency (LERF), Incremental Conditional Core Damage Probability (ICCDP), and Incremental Conditional Large Early Release Probability (ICLERP) factors are listed below. The plant configuration consisted of the "A" Train aligned and in service, followed by the removal of the Turbine Driven Auxiliary Feedwater Pump (TDAFWP).

	CDF/yr	LERF/yr
TDAFWP in extended AOT	6.00E-05	4.58E-06

The ICCDP and ICLERP were calculated using Equations 1 and 2 below.

Equation 1:  $ICCDP = (CDF_2 - CDF_1) \times \text{Duration in years}$

Equation 2:  $ICLERP = (LERF_2 - LERF_1) \times \text{Duration in years}$

$CDF_1$  and  $LERF_1$  are defined as the CDF and LERF values with the following plant configuration that reflects the plant configuration prior to removal of the TDAFWP from service:

- "A" train aligned and in service,
- Block valve on BBHV8000A (PORV) is CLOSED
- As a conservative consideration, one Sharpe Station genset out-of-service.

$CDF_2$  and  $LERF_2$  are defined as the CDF and LERF values reflecting the plant configuration following removal of the TDAFWP from service.

The Duration in years is defined as the additional time for the plant to be in the emergent condition. This request is for an additional 24 hours (approximately  $2.74E-03$  years).

$ICCDP = (6.00E-05 - 1.62E-05) \times 2.74E-03 = \underline{1.20E-07}$

$ICLERP = (4.58E-06 - 2.69E-06) \times 2.74E-03 = \underline{5.18E-09}$

The ICCDP shown above fits into Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants," as an activity that merits risk management considerations and activities. The calculated value for ICCDP and ICLERP meet the Regulatory Issue Summary 2005-01, "Changes to Notice of Enforcement Discretion (NOED) Process and Staff Guidance," guidance threshold of less than or equal to  $5.0E-07$  and

5.0E-08, respectively. The calculated ICCDP and ICLERP values reported above does not account for various conservatisms in place including, but not limited to, the following:

- Reduction in risk by the avoidance of shutting down the plant,
- Control Room staff briefing as Just-In-Time training, and
- Availability of the nearby 20 MW Sharpe Generating Station.

#### Dominant Risk Contributors

Only three initiating events account for over 84 percent of the total conditional core damage contribution. As expected, loss of offsite power (INIT-LSP) dominates all other initiating events by contributing 71.1 percent to CDF. Small LOCA (INIT-SLO) contributes 7.3 percent and Steam Line Break (INIT-SLB) contributes 6.2 percent to CDF.

Contribution of initiating events to LERF is dominated by interfacing system LOCA type events. 33.5 percent of the total LERF is due to interfacing system LOCA involving the cold leg injection. Loss of offsite power contributes only 25.3 percent of total LERF and steam generator tube rupture (INIT-SGR) contributes 16.7 percent of the total LERF.

Important operable components from the Safety Monitor<sup>TM</sup> with the TDAFWP unavailable include the Class 1E DC Bus SSCs, Motor Driven AFW components, Startup Transformer, Essential Service Water, and Class 1E Electrical Bus SSCs.

#### Compensatory Risk Management Measures

Qualitative risk insight indicates that compensatory measures to limit the possibility of experiencing a SBO have significant impact on the risk to the plant. Such compensatory measures that are in place include, but are not limited to, the following:

- Avoidance of testing and maintenance impacting availability of the "A" train safety bus, including but not limited to, the ESW, Motor Driven Auxiliary Feedwater Pump (MDAFP), Component Cooling Water (CCW), Residual Heat Removal (RHR), Air Conditioning Units, and all 125 Volt DC System (NK) Batteries and the associated DG to maximize the mitigative response to a Station Blackout Event (SBO),
- Ensure no switchyard work is allowed. This includes XMR01, No. 4, 5, and 7 transformers,
- Posting protected train signs for both 'A' and 'B' trains of spent fuel pool cooling, component cooling water, emergency diesel generators, essential service water, class 1E switchgear NB buses, 125 volt DC system NK buses and both motor driven auxiliary feedwater pumps.
- Enhanced operator sensitivity to safety bus electrical power supply issues to recognize and respond expeditiously to a SBO or loss of offsite power event (e.g., posting of protected train signage to NK rooms),
- Control Room staff briefing as just in time training to review EMG FR-H1 for alternate AFW supply via the diesel fire pump,
- Continual monitoring by the grid operator regarding grid conditions to anticipate challenges to offsite power availability, and
- Availability of the Sharpe Station to mitigate an SBO.

### Weather Forecast

The National Weather Service forecast for the duration of the request for enforcement discretion was that temperatures would be in the upper 80's for highs and upper 60's for lows. The conditions were expected to be mostly clear to partly cloudy. A 30% chance of thunderstorms were forecast for Monday. No severe weather or significant front is expected to be moving through the area for the duration of this request.

### **5. The justification for the duration of the non-compliance.**

As discussed in the probabilistic risk assessment in section 4, extending the completion time of TS 3.7.5, required action B.1 from 72 hours to 96 hours does not result in a significant increase in risk.

Activities to filter and retest the oil, followed by system restoration were worked on a 24-hour schedule until completion.

The following compensatory actions were taken and continued until the TDAFWP was restored to OPERABLE status.

- Avoided testing and maintenance impacting availability of the "A" train, including but not limited to, the ESW, Motor Driven Auxiliary Feedwater Pump (MDAFP), Component Cooling Water (CCW), Residual Heat Removal (RHR), Air Conditioning Units, and all 125 Volt DC System (NK) Batteries and the associated DG to maximize the mitigative response to a Station Blackout Event (SBO),
- Ensured no switchyard work was allowed. This included XMR01, No. 4, 5, and 7 transformers,
- Posted protected train signs for both 'A' and 'B' trains of spent fuel pool cooling, component cooling water, emergency diesel generators, essential service water, NB buses, NK buses and both motor driven auxiliary feedwater pumps.
- Enhanced operator sensitivity to safety bus electrical power supply issues to recognize and respond expeditiously to a SBO or loss of offsite power event (e.g., posting of protected train signage to NK rooms),
- Control Room staff briefing conducted as just in time training to review EMG FR-H1 for alternate AFW supply via the diesel fire pump,
- Continual monitoring by the grid operator regarding grid conditions to anticipate challenges to offsite power availability, and
- Availability of the Sharpe Station to mitigate an SBO was maintained.

### **6. The condition and operational status of the plant (including safety-related equipment out of service or otherwise inoperable).**

At the time of the NOED request the plant was operating in MODE 1 at 100% power. The current plant awareness level was 2 due to the inoperability of the TDAFWP. Plant Awareness Level identifies the risk of performing work activities by considering core damage frequency and commercially significant equipment.

There was no Safety Related or Safe Shutdown equipment Out of Service other than the TDAFWP.

**7. The status and potential challenges to off-site and on-site power sources.**

The plant was operating, providing power to the offsite power grid and all the onsite and offsite power sources were OPERABLE. According to System Operations (Westar Energy Transmission Services), the transmission system was lightly loaded due to mild weather conditions, and there were no problems stressing the grid. Grid voltage is required to be maintained between 97% and 105% of nominal value. The voltage was at 101.6% at 0811 on August 14, 2011. WCNOG has an off normal procedure (OFN AF-025, "Unit Limitations," Attachment E) should the voltage have deviated from the required band.

**8. The basis for the conclusion that the noncompliance will not be of potential detriment to the public health and safety.**

The request for enforcement discretion is to allow an additional 24 hours to TS 3.7.5, Required Action B.1, to effect repairs and post-maintenance testing on the TDAFWP to preclude a unit shutdown. The proposed additional time does not involve a significant hazards consideration based on the three standards set forth in 10 CFR 50.92(c) as discussed below:

- (i) Do the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed request does not adversely affect accident initiators or precursors nor alter the design assumptions or the manner in which the plant is normally operated and maintained. The proposed request does not affect the source term, containment isolation, or radiological release assumptions used in evaluating the radiological consequences of an accident previously evaluated. The proposed request is consistent with safety analysis assumptions, which apply when the plant is operating in compliance with LCO requirements.

Therefore, the proposed request does not involve a significant increase in the probability or consequences of an accident previously evaluated.

- (ii) Do the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed request does not result in a change in the manner in which the Auxiliary Feedwater System supplies feedwater following an accident. The one-time extension of the Completion Time does not change any existing accident scenarios, nor create any new or different accident scenarios. The proposed request is consistent with the safety analysis assumptions and current plant operating practice.

Therefore, the proposed request does not create a new or different kind of accident from any accident previously evaluated.

- (iii) Do the proposed changes involve a significant reduction in a margin of safety?

Response: No



The proposed request does not affect the acceptance criteria for any analyzed event nor is there a change to any Safety Analysis Limit (SAL). There will be no effect on the manner in which safety limits, limiting safety system settings, or limiting conditions for operation are determined nor will there be any effect on those plant systems necessary to assure the accomplishment of protection functions. There will be no impact on the overpower limit, Departure From Nucleate Boiling Ratio (DNBR) limits,  $F_q$ ,  $F_{\Delta H}$ , LOCA peak centerline temperature (PCT), peak local power density, or any other margin of safety. The radiological dose consequence acceptance criteria listed in the Standard Review Plan will continue to be met. The quantified risk ICCDP impact is small and offset by qualitative considerations. The proposed request seeks to reduce the risk by maintaining plant at 100% power.

Therefore, the proposed request does not involve a significant reduction in the margin of safety.

Based on the above evaluations, WCNOG concludes that the activities associated with the above described enforcement discretion request present no significant hazards consideration under the standards set forth in 10 CFR 50.92 and as such, would not be a potential detriment to the public health and safety.

**9. The basis for the conclusion that the noncompliance will not involve adverse consequences to the environment.**

WCNOG has determined that the proposed request would not change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would not change an inspection or surveillance requirement. This request for enforcement discretion meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) as specified below:

(i) Involves no significant hazards consideration.

As demonstrated above, this request does not involve any significant hazards consideration.

(ii) There is no significant change in the types of or significant increase in the amounts of any effluents that may be released offsite,

The request does not involve a change to the facility or operating procedures that would cause an increase in the amounts of effluents or create new types of effluents.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The request would not adversely affect the operation of the reactor and would not affect any system that would affect occupational radiation exposure. The proposed request does not create additional exposure to utility personnel nor affect radiation levels that are present. The request will not result in any increase in individual or cumulative occupational radiation exposure.

Accordingly, the proposed request meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed request is not required.

- 10. A statement that the request has been approved by the facility organization that normally reviews safety issues (Plant Safety Review Committee).**

The WCGS Plant Safety Review Committee gave approval for the NOED request on August 14, 2011.

- 11. The request must specifically address which of the NOED criteria for appropriate plant conditions specified in Section B of Part 9900, "Operations – Notices of Enforcement Discretion," is satisfied and how it is satisfied**

This request is made under the criteria in Section B, Paragraph 2.1, Item 1.a – avoid unnecessary transients as a result of compliance with the license condition and, thus, minimize potential safety consequences and operational risks; in Part 9900: Technical Guidance, "Operations – Notices of Enforcement Discretion."

The type of NOED required per this request is a "regular" NOED, i.e., one that does not involve severe weather or other natural phenomena. It involves a nonrecurring noncompliance as it only involves a single request for extending the period of time that an inoperable plant component must be restored to OPERABLE status as specified per the plant Technical Specifications. As such it involves a plant condition whereby the plant would be returned to compliance with the plant operating license within a short period of time.

With Wolf Creek Generating Station currently in Mode 1 at 100% power, this request is for an Operating plant. The intent is to avoid an unnecessary plant shutdown, thereby avoiding the increased potential for a transient associated with plant shutdown, consistent with criterion 2.1.1(a).

- 12. Unless otherwise agreed as discussed in Section B of Part 9900, a commitment is required that the written NOED request will be submitted within 2 working days and the follow-up amendment will be submitted within 4 working days of verbally granting the NOED.**

This request for enforcement discretion is a one-time only extension of the Completion Time to complete restoration activities on the TDAFWP. As such, a follow-up License Amendment is not required.

- 13. For a severe weather NOED request provide the following information:**

**The name, organization and telephone number of the official in the government or independent entity who made the emergency situation determination. Details of the basis and nature of the emergency situation, including, but not limited to, its effect on:**

- i. on-site and off-site emergency preparedness**
- ii. plant and site ingress and egress**
- iii. off-site and on-site power sources**
- iv. grid stability; and**
- v. actions taken to avert and or alleviate the emergency situation (e.g., coordinating with other utilities and the load dispatcher organization for buying additional power or for**

**cycling load, or shedding interruptible industrial or non-emergency loads).**

**Potential consequences of compliance with existing license requirements (e.g., plant trip, controlled shutdown).**

**The impact of the emergency situation on plant safety including the capability of the ultimate heat sink.**

**Potential adverse effects on public health and safety from enforcing compliance with specific license requirements during the emergency situation.**

**This is not a severe weather NOED request**

### LIST OF COMMITMENTS

The following table identifies those actions committed to by Wolf Creek Nuclear Operating Corporation (WCNOC) in this document. Any other statements in this submittal are provided for information purposes and are not considered to be commitments. Please direct questions regarding these commitments to Mr. Gautam Sen, Manager Regulatory Affairs at Wolf Creek Generating Station, (620) 364-4175.

<b>COMMITMENT</b>	<b>Due Date/Event</b>
WCNOC is required to submit a written request for the NOED within two working days of the NRC verbal approval.	August 16, 2011