

# WOLF CREEK NUCLEAR OPERATING CORPORATION

Richard A. Muench  
President and Chief Executive Officer

November 5, 2004  
WM 04-0050

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

- References:
1. Letter WO 03-0049, dated August 8, 2003, from Britt T. McKinney, WCNOG, to USNRC
  2. Letter WO 03-0064, dated November 21, 2003, from Britt T. McKinney, WCNOG, to USNRC

Subject: Docket No. 50-482: Response to NRC Request for Additional Information Related to Bulletin 2003-01

Gentlemen:

The attachment to this letter provides the Wolf Creek Nuclear Operating Corporation (WCNOG) response to NRC Request for Additional Information Related to Bulletin 2003-01, dated September 2, 2004. References 1 and 2 provided WCNOG's response to Bulletin 2003-01.

There are no commitments contained in this correspondence. If you have any questions concerning this matter, please contact me at (620) 364-4000, or Mr. Kevin Moles at (620) 364-4126.

Very truly yours,



Richard A. Muench

RAM/rlg

Attachment

cc: J. N. Donohew (NRC), w/a  
D. N. Graves (NRC), w/a  
B. S. Mallett (NRC), w/a  
Senior Resident Inspector (NRC), w/a

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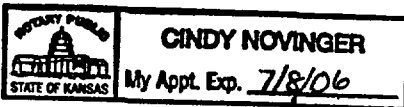
STATE OF KANSAS    )  
                                  ) SS  
COUNTY OF COFFEY )

Richard A. Muench, of lawful age, being first duly sworn upon oath says that he is President and Chief Executive Officer of Wolf Creek Nuclear Operating Corporation; that he has read the foregoing document and knows the contents thereof; that he has executed the same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By *Richard A. Muench*  
Richard A. Muench  
President and Chief Executive Officer

SUBSCRIBED and sworn to before me this 5<sup>th</sup> day of Nov., 2004.

*Gindy Novinger*  
Notary Public



Expiration Date 7/8/06

**Attachment**  
**Response to Request for Additional Information Related to NRC Bulletin 2003-01,**  
**“Potential Impact of Debris Blockage on Emergency Sump Recirculation at**  
**Pressurized-Water Reactors”**

**NRC Question 1:**

On page 2 of Attachment I of your Bulletin 2003-01 response you stated that enhanced classroom training for licensed operators would be conducted during pre-outage training classes, training to be completed by October 17, 2003. You further stated that a specific simulator loss-of-coolant accident (LOCA) scenario modeling recirculation sump blockage would be developed, training to be completed by February 27, 2004. However, your response does not completely discuss the operator training to be implemented in these two training efforts. For these two training efforts, please provide a detailed discussion of the operating procedures to be implemented, the indications of sump clogging that the operators are instructed to monitor, and the response actions the operators are instructed to take in the event of sump clogging and loss of ECCS recirculation capability.

**WCNOC Response 1:**

The licensed operator pre-outage training (training to be completed by October 17, 2003) that addressed Bulletin 2003-01 issues was included in a training simulator guide on performing a plant shutdown. This training class included discussions on mechanisms for debris generation and transport following a high energy line break, the adverse consequences of loss of net positive suction head margin on Emergency Core Cooling System (ECCS) pumps and Containment Spray System (CSS) pumps, sump screen structural loading issues associated with debris blockage, chokepoints in the containment that could restrict cooling water flow to the sump screens, and potential blockage at flow restrictions downstream of the ECCS and CCS pumps. This class also included a discussion of interim measures being implemented at Wolf Creek Generating Station (WCGS).

The pre-outage training class also included discussions of plant procedures for assuring containment cleanliness after performing work in containment and for assuring adequate pathways for water flow to the containment sump screens prior to containment closeout. However, future changes to operating procedures were not included in this training because the final determinations of the impacted procedures and the changes required had not yet been completed. Similarly, since emergency procedures had not yet been changed to address indications of sump clogging and associated operator actions, these issues were not included in the pre-outage training.

For the simulator loss-of-coolant accident (LOCA) scenario modeling recirculation sump blockage (training to be completed by February 27, 2004), Licensed Operators were trained on blocked screen indications during the Large Break LOCA scenario. The simulator guide included the use of emergency procedures EMG E-1, Loss of Reactor Coolant, and EMG ES-12, Cold Leg Recirculation, for response to blocked screen indications. Included were discussions of indications of sump blockage (ECCS pump

motor amps changing, ECCS pump discharge flow fluctuation, and level difference between the two sumps) and the effects on the operability of the ECCS pumps. The simulator was set up to indicate a blocked sump screen, including a delta in sump levels and ECCS pump discharge pressure oscillations and pump motor amperage changes.

**NRC Question 2:**

On page 4 of Attachment I of your Bulletin 2003-01 response you state that "a schedule for Wolf Creek implementation of required [emergency procedure] changes will be established based on the WOG [Westinghouse Owners Group] recommended changes, if any." The WOG has developed operational guidance in response to Bulletin 2003-01 for Westinghouse and Combustion Engineering type pressurized water reactors. Provide a discussion of your plans to consider implementing this new WOG guidance. Include a discussion of the WOG recommended compensatory measures that have been or will be implemented at WCGS, and the evaluations or analyses performed to determine which of the WOG recommended changes are acceptable at WCGS. Also, provide technical justification for those WOG-recommended compensatory measures not being implemented by WCGS and include a detailed discussion of the procedures being modified, the operator training being implemented, and your schedule for implementing these compensatory measures.

**WCNOC Response 2:**

The following candidate operator actions (COA) from the WOG recommended compensatory measures (Reference 1) have been implemented by WCNOC. The basis for implementation of each COA is also described.

1. COA 1A – Operator action to secure one containment spray pump before recirculation alignment

This COA was selected because it will reduce the flow rate to the sump and the pressure differential across the sump screen if excessive debris buildup on the screen occurs. The assessment for this operator action indicated acceptable results since the containment pressure, temperature, PH and iodine control remained within the analyzed bounds of the current analysis of record. Additionally, the procedure changes for implementation were not complex and yielded risk benefits for Bulletin 2003-01 concerns.

2. COA 5 – Refill of refueling water storage tank (RWST)

This COA was selected because it would provide additional inventory for injection to containment. Starting RWST refill after transfer to cold leg recirculation is anticipated to provide an additional volume of water to be used for injection if containment sumps are not available. The new procedure EMG C-13, Control Room Sump Blockage Response, provides guidance for using the RWST water, and supporting engineering assessments were not complex and yielded risk benefits for Bulletin 2003-01 concerns. (Note: Although procedures direct the RWST refilling and use of the RWST water, injection of the additional RWST fluid mass during

accident conditions is not currently part of the WCGS design basis. Refer to the discussion of COA 6 below.)

3. COA 7 – More aggressive cooldown and depressurization guidance for small break LOCA

This COA was selected since it is characteristic of the current typical operation of Westinghouse plants, such as Wolf Creek Generating Station (WCGS), to allow cooldown at the Technical Specification limit. Therefore, WCNOG credited these operational actions as a response to this COA.

4. COA 8 – Provide guidance on symptoms and identification of containment sump blockage

This COA was selected to directly address the postulated problems due to containment sump blockage and provide guidance to increase operator awareness of sump clogging indications. The implementation of new procedure EMG C-13, Control Room Sump Blockage Response, providing indications of the sump blockage, as well as revisions to associated emergency procedures, provide the diagnostic indications to monitor for sump blockage. This additional awareness allows the operator to take designated actions once sump blockage symptoms are identified to protect the ECCS and CSS pumps and to establish and maintain minimum ECCS and CSS flow.

5. COA 9 – Develop contingency actions to be taken in response to containment sump blockage

This COA was selected to directly address the postulated problems due to containment sump blockage and provide explicit guidance to the operator as to the appropriate response. The implementation of new procedure EMG C-13, Control Room Sump Blockage Response, addresses sump blockage that occurs in both trains where cold leg recirculation cannot be established or maintained in both trains. This guidance allows the operator to take designated actions once sump blockage symptoms are identified to protect the ECCS and CSS pumps and to establish and maintain minimum ECCS and CSS flow.

The following WOG recommended compensatory measures described in Reference 1 were not selected for implementation at WCGS. The bases for not implementing the COAs are also described.

1. COA 1B – Operator action to secure both containment spray pumps before recirculation alignment

The COA was not selected due to risk (i.e., it may not be possible to accurately assess core damage within the time period associated with recirculation which can be as low as approximately 14 minutes for residual heat removal (RHR) pumps and 28 minutes for containment spray pumps). The preliminary assessment indicated that containment pressure and temperature may not remain below the current peak values during the time delay to start the secured containment spray pump.

2. COA 2 – Manually establish one train of containment sump recirculation prior to recirculation

This COA was not selected due to additional operator burden after a postulated accident. Site calculations show that RHR recirculation swapover may occur within approximately 14 minutes from the accident commencement and containment spray swapover may occur after approximately 28 minutes. In order for this action to be accomplished, operators would need to establish one train of the containment spray prior to the minimum allowance of 28 minutes.

3. COA 3 – Terminate one train of safety injection after recirculation alignment

This COA was not chosen for implementation since the negative consequences of terminating one train of core cooling are greater than the risk due to sump clogging. Note: Analyses to account for interruption of safety injection flow during single failure would be needed with a potential license amendment required.

4. COA 4 – Early termination of one RHR pump prior to recirculation alignment

As described in Reference 1, this COA is not applicable for Westinghouse designed plants.

5. COA 6 – Injection of more than one RWST volume or alternate water source bypassing RWST

This COA was not selected for implementation due to the level of complexity associated with modeling and evaluating the impact of additional water volume on numerous potentially affected design basis safety analyses. Incorporation of this temporary compensatory measure into the design basis would require evaluating the impact of complex issues such as excessive containment flooding, containment sump chemistry control, and equipment qualification. (Note: Although procedures direct the RWST refilling and use of the RWST water, injection of the additional RWST fluid mass during accident conditions is not currently part of the WCGS design basis. Refer to the discussion of COA 5 above.)

6. COA 10 – Termination of one train of high pressure safety injection prior to recirculation

As described in Reference 1, this COA is not applicable for Westinghouse designed plants.

7. COA 11 – Prevent containment spray for small break LOCAs

As indicated in Reference 1, this COA is only applicable for plants with ice-condenser containments.

The following WCNOC emergency procedures were changed to address containment sump screen blockage. All procedures were implemented on 10/6/2004.

1. EMG C-13, Control Room Response to Sump Blockage:

This is a new procedure developed following Westinghouse generic guidance (Reference 1) to address containment sump screen blockage.

2. EMG ES-12, Transfer to Cold Leg Recirculation:

A new step was added to initiate refill of the RWST after the transfer to cold leg recirculation is complete.

A new step was added to identify the symptoms of containment sump screen blockage and to transition the operators to new procedure EMG C-13, Control Room Response to Sump Blockage, on indication that both sump screens are blocked.

3. EMG C-11, Loss of Emergency Coolant Recirculation:

Added a new step to ensure the operators do not remain in this procedure if sump screen blockage is the cause of the loss of recirculation. The step provides a mechanism to either confirm that the operator is in the proper guideline or to direct the operator to the guideline that should be in effect. This step is very similar to the step in EMG ES-12, which identifies symptoms of sump screen blockage. In this procedure, if sump screen blockage is determined to be the cause of the loss of recirculation capabilities the operators are directed to go to procedure EMG C-13 which was developed to specifically address sump blockage.

4. EMG E-1, Loss of Reactor or Secondary Coolant:

A step was changed to allow stopping one containment spray pump earlier than previously allowed. The step now stops containment spray pumps based on a combination of containment pressure and the running status of containment fan coolers.

Classroom and simulator training was provided to all licensed operators prior to implementation of the procedures described above. This included each operating crew performing a simulator scenario in which the operators had to identify sump blockage after transfer to cold leg recirculation, transfer to EMG C-13, and proceed through this new procedure.

**NRC Question 3:**

NRC Bulletin 2003-01 provides possible interim compensatory measures licensees could consider to reduce risks associated with sump clogging. In addition to those compensatory measures listed in Bulletin 2003-01, licensees may also consider implementing unique or plant-specific compensatory measures, as applicable. Please discuss any possible unique or plant-specific compensatory measures you considered for implementation at WCGS. Include a basis for rejecting any of these additional considered measures.

**WCNOC Response 3:**

WCNOC did not implement or consider for implementation unique or plant-specific compensatory measures, other than those discussed in WCNOC's response to Bulletin 2003-01.

**References:**

1. WCAP-16204, Evaluation of Potential ERG and EPG Changes to Address NRC Bulletin 2003-01 Recommendations, Westinghouse Electric Company, January 2004