

November 16, 2005

Mr. Rick A. Muench  
President and Chief Executive Officer  
Wolf Creek Nuclear Operating Corporation  
Post Office Box 411  
Burlington, KS 66839

SUBJECT: WOLF CREEK GENERATING STATION - CLOSEOUT OF NRC BULLETIN 2003-01, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY SUMP RECIRCULATION AT PRESSURIZED-WATER REACTORS" (TAC NO. MB9632)

Dear Mr. Muench:

This letter acknowledges receipt of your response dated August 8, 2003, to Nuclear Regulatory Commission (NRC) Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," dated June 9, 2003. The NRC issued Bulletin 2003-01 to all pressurized-water reactor (PWR) licensees requesting that they provide a response, within 60 days of the date of Bulletin 2003-01. The bulletin provided the two following options for responding:

- Option 1: State that the emergency core cooling system (ECCS) and containment spray system (CSS) recirculation functions have been analyzed with respect to the potentially adverse post-accident debris blockage effects identified in this bulletin, taking into account the recent research findings described in the Discussion section, and are in compliance with all existing applicable regulatory requirements.
- Option 2: Describe any interim compensatory measures that have been implemented or that will be implemented to reduce the risk which may be associated with potentially degraded or nonconforming ECCS and CSS recirculation functions until an evaluation to determine compliance is complete. If any of the interim compensatory measures listed in the Discussion section will not be implemented, provide a justification. Additionally, for any planned interim measures that will not be in place prior to your response to this bulletin, submit an implementation schedule and provide the basis for concluding that their implementation is not practical until a later date.

You provided an Option 2 response.

Bulletin 2003-01 discussed six categories of interim compensatory measures (ICMs):

(1) operator training on indications of and responses to sump clogging; (2) procedural modifications, if appropriate, that would delay the switchover to containment sump recirculation (e.g., shutting down redundant pumps that are not necessary to provide required flows to cool the containment and reactor core, and operating the CSS intermittently); (3) ensuring that alternative water sources are available to refill the refueling water storage tank (RWST) or to otherwise provide inventory to inject into the reactor core and spray into the containment

atmosphere; (4) more aggressive containment cleaning and increased foreign material controls; (5) ensuring containment drainage paths are unblocked; and (6) ensuring sump screens are free of adverse gaps and breaches.

In your bulletin response of August 8, 2003, you stated that you had implemented the following ICMs (termed by you as "existing controls"):

- (1) emergency actions for operators to add makeup water to the RWST - ICM category #3; and
- (2) post-outage and at-power containment entry procedures which contain acceptance criteria of "no loose debris" - ICM category #4.

You also stated in your response that you would be implementing the following ICMs:

- (1) classroom training to increase operator awareness of Bulletin 2003-01 issues including discussions of the importance of containment cleanliness, indications of potential screen blockage, and ICMs in place (by October 17, 2003) - ICM category #1;
- (2) revisions to two procedures to enhance containment cleaning administrative controls, including more specific requirements for both general area and target area cleaning, an expanded list of debris items to be removed, and provisions for removing general area dust and dirt (by October 17, 2003) - ICM category #4;
- (3) a revision to a post-maintenance containment cleanliness inspection procedure to verify that the refueling pool drain screens are not blocked with debris following any maintenance activities in the refueling pool drain area - ICM category #5;
- (4) an additional detailed inspection to ensure that there are no gaps around the sump screens or no breaches in the sump screens larger than 1/8 inch for the inner screen or larger than 1/2 inch for the middle screen (by fall 2003) - ICM category #6;
- (5) perform outage contractor briefings to increase their understanding of the issues related to a containment sump screen blockage and the importance of containment cleanliness (by fall 2003) - ICM category #1;
- (6) inclusion of Bulletin 2003-01 information in Engineering Support Program classroom training to raise awareness of containment cleanliness requirements, the potential for recirculation sump blockage, and actions being taken to address Bulletin 2003-01 concerns (by September 12, 2003) - ICM category #1; and
- (7) the development of a tabletop training plan for Emergency Response Organization staff to provide guidance on the parameters which would indicate the development of a recirculation sump blockage and which compensatory actions should then be considered (by April 1, 2004) - ICM category #1.

You further stated in your response, including justifications, that you would not be implementing the following ICM: procedural modifications, if appropriate, that would delay the switchover to containment pump recirculation.

In a November 21, 2003, supplemental Bulletin 2003-01 response you modified your sump screen inspection commitment so that the inspection would verify that there are no gaps around the sump screens greater than 1/8 inch for the inner screen, or larger than 1/2 inch for the middle screen, and no breaches in the sump screens larger than 3/16 inch square for the inner screen, or larger than 5/8 inch square for the middle screen - ICM category #6.

In a November 5, 2004, response to an NRC request for additional information dated September 2, 2004, you:

- (1) elaborated on the licensed operator pre-outage training that addressed Bulletin 2003-01 issues, and the simulator loss-of-coolant accident (LOCA) scenario which models a recirculation sump blockage - ICM category #1; and
- (2) provided an analysis and conclusions regarding implementation of Candidate Operator Actions (COAs) described in Westinghouse Owners Group (WOG) report WCAP-16204, Revision 1, "Evaluation of Potential ERG [emergency response guideline] and EPG [emergency procedure guideline] Changes to address NRC Bulletin 2003-01 Recommendations."

In addition your November 5, 2004, response provided the following discussions regarding the WOG COAs:

- (1) COA 1A, "Operator Action to Secure One Containment Spray Pump Before Recirculation Alignment," you concluded that it would be implemented because it will reduce flow rate to the sump and pressure differential across the sump screen if excessive debris buildup on the screen occurs - ICM category #2;
- (2) COA 1B, "Operator Action to Secure Both Containment Spray Pumps Before Recirculation Alignment," you concluded that containment pressure and temperature may not remain below current peak values during the time delay to start the secured spray pump, and that, therefore, this COA would not be implemented;
- (3) COA 2, "Manually Establish One Train of Containment Sump Recirculation Prior to Recirculation Alignment," you concluded that this measure would involve a significant operator burden after a postulated accident relative to any benefit, and that, therefore, this COA would not be implemented;
- (4) COA 3, "Terminate One Train of Safety Injection After Recirculation Alignment," you concluded that the negative consequences of terminating one train of core cooling are greater than the risk due to sump clogging. In a September 23, 2005, e-mail to the NRC staff, Mr. Peterson of Wolf Creek Nuclear Operating Corporation (WCNOC) stated that the negative consequences were for the potential of complete interruption of safety

injection (SI) flow until an operator could manually restart the standby SI pump, resulting in an increased likelihood of core damage, and that, therefore, this COA would not be implemented;

- (5) COA 4, "Early Termination of One RHR [residual heat removal] Pump Prior to Recirculation Alignment," you concluded that this CE-targeted COA is not applicable to Wolf Creek which is a Westinghouse-designed plant;
- (6) COA 5, "Refill of Refueling Water Storage Tank," you concluded that refilling the RWST after transfer to cold-leg recirculation would provide an additional volume of water to be used for injection if the containment sumps are not available, and that, therefore, this COA would be implemented - ICM category #3;
- (7) COA 6, "Injection of More Than One RWST Volume or Alternate Water Source Bypassing RWST," you concluded that this would be a complex addition to the Wolf Creek design basis for flooding, chemistry and equipment qualification reasons, and therefore, would not be implemented as a proceduralized action within a revised design basis (however, the NRC staff notes that, with the implementation of COA 5 above, significant amounts of water would be available in beyond-design basis situations);
- (8) COA 7, "More Aggressive Cooldown and Depressurization Guidance for Small-Break LOCA," you concluded that this COA (cooldown at the Technical Specification Limit) is "characteristic of the current typical operation of Westinghouse plants" like Wolf Creek, and that therefore, this COA has already effectively been implemented - ICM category #2;
- (9) COA 8, "Provide Guidance on Symptoms and Identification of Containment Sump Blockage," you conclude that the implementation of a new procedure EMG C-13, "Control Room Sump Blockage Response," provides operators with indications of a sump blockage as well as diagnostic indications to monitor for a sump blockage - ICM category #1;
- (10) COA 9, "Develop Contingency Actions to Be Taken in Response to Containment Sump Blockage," you concluded that new procedure EMG C-13, "Control Room Sump Blockage Response," addresses sump blockage that occurs in both trains, allowing operators to take designated actions once sump blockage symptoms are identified to protect the ECCS and CSS pumps and to re-establish and maintain minimum ECCS and CSS flow - ICM category #1;
- (11) COA 10, "Termination of One Train of High Pressure Safety Injection Prior to Recirculation," you concluded that this CE-targeted COA is not applicable to Wolf Creek which is a Westinghouse-designed plant; and
- (12) COA 11, "Prevent Containment Spray for Small-Break LOCAs," you concluded that this COA is only applicable for ice-condenser design plants, unlike Wolf Creek which is a dry containment.

In an August 31, 2005, response to NRC staff questions raised in a July 29, 2005, conference call with WCNOG, you stated that even though WCNOG did not formally adopt WCAP-16204,

Volume I, COA 6, "Injection of More Than One RWST Volume or Alternate Water Source Bypassing RWST," procedures for reactor coolant system (RCS) injection from a refilled RWST or RCS injection from an alternate source which bypasses the RWST do exist as follows:

- (1) Procedure EMG-13, "Control Room Response to Sump Blockage," Step 10 directs high head SI from the RWST, and
- (2) Various existing normal and emergency procedures, training documents, and operating guidance documents address lineups which would support severe accident management decisions to inject inventory into the RCS. These alternate RWST bypass makeup sources would be the Recycle Holdup Tank, the Spent Fuel Pool, various fire protection connection points, the Boric Acid Batching Tank, and the Volume Control Tank.

The NRC staff has considered your Option 2 response for compensatory measures that were to have been implemented to reduce the interim risk associated with potentially degraded or nonconforming ECCS and CSS recirculation functions. Based on your response, the NRC staff considers your actions to be responsive to and meet the intent of Bulletin 2003-01. Please retain any records of your actions in response to Bulletin 2003-01, as the NRC staff may conduct subsequent inspection activities regarding this issue.

Should you have any questions, please contact me at 301-415-1307 or the lead PM for this issue, Alan Wang at 301-415-1445.

Sincerely,

**/RA**

Jack Donohew, Senior Project Manager  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-482

cc: See next page

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