

September 14, 2005

Mr. McCallum  
Duke Energy Corporation  
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Mail Code = EC07H  
Charlotte, North Carolina 28202

SUBJECT: MCGUIRE NUCLEAR STATION, UNITS 1 AND 2, CATAWBA NUCLEAR STATION, UNITS 1 AND 2 - RESPONSE TO NRC BULLETIN 2003-01, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY SUMP RECIRCULATION AT PRESSURIZED WATER REACTORS" (TAC NOS. MB9586, MB9587, MB9565, AND MB9566)

Dear Mr. McCallum:

This letter acknowledges receipt of your response dated August 7, 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, as well as acknowledging receipt of your supplemental responses dated May 27, December 16, 2004, and April 28, 2005, and your June 9, 2005, response to an NRC request for additional information (RAI) dated April 22, 2005, and your June 29, 2005, license amendment request. The NRC issued Bulletin 2003-01 to all pressurized-water reactor licensees requesting that they provide a response, within 60 days of the date of Bulletin 2003-01, that contains either the information requested in following Option 1 or Option 2 stated in Bulletin 2003-01:

- 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 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.

You stated in your bulletin response of August 7, 2003, that you have implemented the following measures or these measures are already in place:

(1) the issuance of an on-shift reading package for licensed operators and Technical Support Center personnel to familiarize these staff members with issues related to loss of emergency coolant recirculation capability due to sump performance issues (indications to be monitored for pump distress, diagnosis of sump blockage conditions, and existing procedural guidance on loss of emergency coolant recirculation) - ICM category #1;

(2) operator requalification classroom training on sump clogging (by December 31, 2003) - ICM category #1;

(3) for small and medium loss-of-coolant accidents (LOCAs), procedural direction to cooldown and depressurize the reactor coolant system, and sequential stopping of safety injection (SI) pumps - ICM category #2;

(4) a change to the emergency procedures user's guide to ensure that operators do not manually start containment spray earlier than required (e.g. in anticipation of the automatic spray switchover signal at a time when the ice condenser ice melt process is still in progress) - ICM category #2;

(5) adherence to current Westinghouse Owners Group (WOG) emergency response guidelines (ERGs) actions to delay RWST depletion (in ECA-1.1 "Loss of Emergency Coolant Recirculation") - ICM category #2;

(6) emergency procedures to direct RWST refill upon emergency coolant recirculation failure - ICM category #3;

(7) procedural direction to use various alternate reactor coolant system makeup sources following loss of emergency coolant recirculation (e.g., Volume Control Tank, boric acid transfer pump, spent fuel pool via the standby makeup pump, or sump water via the safety injection pump or containment spray pump recirculation line to the RWST) - ICM category #3;

(8) enhanced lower containment localized containment washdowns prior to entry into Mode 4 following unit outages, with visual inspections and cleaning as practical on remaining areas of containment (by Fall 2003) - ICM category #4;

(9) upgrades to the Foreign Materials Control program to require detailed inventories of all materials entering containment and accountability for their removal - ICM category #4;

(10) inspections of designed containment drainage paths (ice condenser drains, refueling canal drains, and crane wall penetrations) - ICM category #5; and

(11) procedures to perform sump screen structural and cleanliness inspections every outage, with fine mesh sump screen acceptance criteria of no gaps, tears or voids - ICM category #6.

You also stated in your response that you would evaluate any generic changes to WOG ERGs (expected to be issued by March 31, 2004) and that in the interim you would not direct operator actions to stop pumps or throttle flow solely for the purpose of delaying switchover to containment sump recirculation.

You also stated in your response that Duke was performing specific evaluations to prevent or stop containment spray actuation and delay switchover to containment sump recirculation:

- (1) starting a containment return air fan early in a small break LOCA event to avoid auto start of containment spray,
- (2) stopping one train of containment spray early in an event to reduce RWST inventory drawdown, and
- (3) increasing the containment spray setpoint to reduce the likelihood of CSS actuation in the event of a small or medium break LOCA.

In your supplemental bulletin response of May 27, 2004, you stated that in March, 2004, the WOG had completed its evaluation of potential ERG changes to address Bulletin 2003-01 (WCAP-16204, Revision 1 "Evaluation of Potential ERG and EPG Changes to Address NRC Bulletin 2003-01 Recommendations (PA-SEE-0085)," which contained 11 specific candidate operator actions (COAs)). In that supplemental response you discussed:

- (1) COA A1a, "Operator Action to Secure One Containment Spray Pump Before Recirculation Alignment," concluding that for single failure and containment pressure response and radiological exposure reasons, you would not be stopping one train of containment spray early in an event;
- (2) COA A1b, "Operator Action to Secure Both Spray Pumps," concluding that for single failure and containment pressure response and radiological exposure reasons, you would not be stopping both trains of containment spray early in an event;
- (3) COA A2, "Manually Establish One Train of Sump Recirculation Prior to Automatic Actuation," concluding that physical piping layout (inability to separate the suction piping for the charging and safety injection pumps), and limited time between achieving adequate containment sump level and the initiation of automatic switchover to sump recirculation, you would not be manually establishing one train of sump recirculation prior to automatic actuation;
- (4) COA 3, "Terminate One Train of Safety Injection After Recirculation Alignment," concluding that, because the McGuire and Catawba licensing bases do not include a provision for a time without ECCS flow (which could occur with a single failure of one operating safety injection pump), you would not be terminating one train of safety injection after recirculation alignment;

- (5) COA 4, "Early Termination of One Low Pressure Safety Injection (LPSI)/Residual Heat Removal (RHR) Pump Prior to Recirculation Alignment," concluding that this COA is specific to Combustion Engineering, Inc. (CE) plants, unlike McGuire/Catawba's Westinghouse design;
- (6) COA 5, "Refill of Refueling Water Storage Tank," concluding that McGuire and Catawba would initiate RWST makeup following the successful transfer of ECCS and containment spray suction to the containment emergency sump - ICM category 3;
- (7) COA 6, "Inject More Than One RWST Volume From a Refilled RWST or by Bypassing the RWST," concluding that this COA would be performed for beyond design basis events in which both trains of ECCS are affected by sump blockage (see discussion of COA 5 above and also the detailed information on alternate injection sources from the August 7, 2003, response above) - ICM category #3.
- (8) COA 7, "Provide More Aggressive Cooldown and Depressurization Following a Small Break LOCA," concluding that the Westinghouse Emergency Response Guidelines already address maximizing the cooldown rate up to the Technical Specifications limit [the staff notes that this guidance is in WCAP-16204, Volume II, Step 17 of the SBCRG] - ICM category #2;
- (9) COA 8, "Provide Guidance on Symptoms and Identification of Containment Sump Blockage," concluding that you would develop guidance for identifying symptoms of sump blockage within certain emergency operating procedures (EOPs) (by December 31, 2004) - ICM category #1;
- (10) COA 9, "Contingency Actions in Response to: Containment Sump Blockage, Loss of Suction, and Cavitation," concluding that you would develop contingency actions to respond to containment sump blockage, loss of suction and cavitation within certain EOPs (by December, 2004) - ICM category #1;
- (11) COA 10, "Early Termination of One Train of HPSI/High-Head Injection Prior to Recirculation Alignment (RAS)," concluding that this COA was applicable only to CE designed reactor plants, unlike McGuire and Catawba's Westinghouse design; and
- (12) COA 11, "Prevent or Delay Containment Spray for Small Break LOCAs (<1 Inch Diameter) in Condenser Plants," concluding that raising containment spray setpoints cannot be supported by the existing licensing basis radiological exposure analysis, that the reactor plants' licensing basis methodologies for performing this safety analysis would require alternate source term license amendment request approval and, therefore, this COA cannot be accomplished on the time scale of an interim compensatory measure.

In your supplemental bulletin response of May 27, 2004, you also stated that you would:

- (1) move the step to shut down containment spray pumps when no longer required to mitigate a LOCA event to earlier in the response procedure - ICM category #1; and
- (2) add a step to manually start a containment air return fan to enhance air flow through the ice condenser for small break LOCAs - ICM category #1.

In your June 9, 2005, response to an April 22, 2005, RAI you reiterated and amplified your reasoning for not adopting WOG COA 1a - Ice Addendum, adding WOG owner's group rationales for not implementing this COA. You further stated that preventing or delaying containment spray by raising the containment spray setpoint (COA 11) could not be supported by the existing licensing basis radiological consequences analysis for the design basis LOCA, and, therefore, this Duke initiated potential interim compensatory measure and WOG analyzed COA would not be implemented.

In a letter dated June 29, 2005, you submitted a license amendment request to implement an additional operator action to manually start one air return fan at a containment pressure of 1 psig prior to the automatic 9 minutes (+ or - 1 minute) delayed start described in the Updated Final Safety Analysis Report for the subject reactor plants.

The NRC staff has considered your Option 2 response for compensatory measures that were or 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 301-415-1842 or the lead PM for this issue, Alan Wang at 301-415-1445.

Sincerely,

*/RA/*

Sean E. Peters, Project Manager, Section 1  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-369, 50-370, 50-413, and 50-414

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