

October 13, 2005

Mr. Mano K. Nazar
Senior Vice President and
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Indiana Michigan Power Company
Nuclear Generation Group
One Cook Place
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SUBJECT: DONALD C. COOK NUCLEAR PLANT, 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. MB9570 AND MB9571)

Dear Mr. Nazar:

By letters dated August 7, 2003, January 24, 2005, August 31, 2005, and September 15, 2005, you provided a response to Nuclear Regulatory Commission (NRC) Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized Water Reactors [PWR]," dated June 9, 2003, for the Donald C. Cook Nuclear Plant, Units 1 and 2 (CNP). The NRC issued Bulletin 2003-01 to all PWR 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 below:

- 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 bulletin "Discussion" section, and are in compliance with all existing applicable regulatory requirements.
- Option 2: Describe any interim compensatory measures [ICMs] 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 for CNP.

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

- ICM Category 1 - Operator training on indications of and responses to sump clogging.

- ICM Category 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).
- ICM Category 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.
- ICM Category 4 - More aggressive containment cleaning and increased foreign material controls.
- ICM Category 5 - Ensuring containment drainage paths are unblocked.
- ICM Category 6 - Ensuring sump screens are free of adverse gaps and breaches.

In your August 7, 2003, letter, you stated that the following ICMs had been implemented:

1. ICM Category 1 - Licensed operator training on indications of and responses to sump clogging. Initial licensing training is provided on generic issues associated with pump cavitation. Training also includes pump starting, monitoring for indications of cavitation, and securing if cavitation is detected. The CNP procedure for loss of emergency coolant recirculation is included in the licensed operator requalification program.
2. ICM Category 4 - Extensive cleaning of the Unit 1 and 2 containments and ice condensers during the 1997-2000 dual outage. Containment building walkdowns during subsequent system readiness reviews were performed to identify and remove debris sources such as labels and tags, and remove debris recovered from the ice condensers upon ice bed melting. Rigorous foreign materials controls were implemented for ice bed reload and subsequent ice condenser maintenance. Technical specifications (TSs) require detailed containment inspections for loose debris by Operations Department personnel, and independent recirculation sump inspections are performed by Maintenance Department personnel. If a containment entry is made subsequent to establishing containment integrity, work area inspections are conducted to identify any loose debris. Foreign Material Exclusion program enhancements, including foreign material inventories, were established for work inside containment.

Additionally, plant-specific measures were developed to address potential debris blockage of recirculation sump screens. The measures are not operational actions, but are directed at assessing the magnitude of potential sump blockage, evaluating the effect of such blockage on safety systems, and controlling potential debris sources so as to minimize blockage (e.g., control of fibrous insulation in zones of influence for loss-of-coolant accidents (LOCAs), a Containment Recirculation Sump Protection Program, a Safety-Related Coatings Program, a containment debris generation and transport study, and an assessment of the effect of small debris downstream of the sump screens).

3. ICM Category 5 - Inspections of specific drainage paths of the refueling cavity drains, the ventilation and stairwell drains, the crane wall openings, and the ice condenser floor drains.
4. ICM Category 6 - An 18-month TS required maintenance inspection of the recirculation sump, including verification that sump components (gratings, screens) exhibit no evidence of structural distress or corrosion, and that the screen wire mesh does not contain rips, tears, openings or gaps greater than 1/4 inch.

You further stated in your August 7, 2003, letter that you will not be implementing Category 2 or Category 3 ICMs, and included justifications for each.

In your January 24, 2005, letter, you stated that new operator guidance on symptoms and identification of containment sump blockage, and new guidance on contingency operator actions in response to containment sump blockage, loss of suction, and cavitation, will be in place by September 1, 2005. These actions pertain to ICM Category 1.

In your January 24, 2005, letter, you also discussed your consideration of the Westinghouse Owners Group (WOG) Candidate Operator Actions (COAs) of WCAP-16204, "Evaluation of Potential ERG [emergency response guidelines] and EPG [emergency procedure guidelines] Changes to Address NRC Bulletin 2003-01 Recommendations (PA-SEE-0085), Revision 1," dated March 2004. In your COA evaluation, you reached the following conclusions:

1. COA A1a - Ice Addendum, "Westinghouse Ice Condenser Plants Operator Action to Secure One Spray Pump" will not be implemented since ice condenser plants are especially sensitive to the single-failure of the operating spray pump once ice condenser heat removal capability is exhausted, and there would be insufficient time for operator response to a large break LOCA (LBLOCA).
2. COA A1b, "Operator Action to Secure Both Spray Pumps" will not be implemented because CNP containment coolers are not designed for operation following a LOCA, and the CNP analyses for offsite and control room dose consequences from a LBLOCA rely on the CSS for iodine removal and pH control.
3. COA A2, "Manually Establish One Train of Containment Sump Recirculation Prior to Automatic Actuation" is precluded at CNP based upon residual heat removal (RHR) pump discharge pressure characteristics and safety injection pump minimum flow protection features and design characteristics.
4. COA A3-W, "Terminate One Train of Safety Injection After Recirculation Alignment" will not be implemented due to the potential for cladding temperature rise and operator reaction considerations.
5. COA A4, "Early Termination of One Low Pressure Safety Injection/RHR Pump Prior to Recirculation Alignment" will not be implemented since this COA applies to Combustion Engineering plants only, and not the CNP Westinghouse design.

6. COA A5, "Refill of RWST" will be addressed. CNP procedures will be revised by September 1, 2005, to preemptively align valves to refill the RWST or lineup an alternative makeup source that bypasses the RWST (predicated on personnel access dose and boundary valve leakage analyses). This action pertains to ICM Category 3.
7. COA A6, "Inject More Than One RWST Volume From Refilled RWST or by Bypassing the RWST" will be added only to the beyond-design-basis procedural guidance of COA A9-W (discussed below) due to small containment flooding margins which, if exceeded, could impair accident mitigation indications such as core exit thermocouples. This action pertains to ICM Category 3.
8. COA A7, "Provide More Aggressive Cooldown and Depressurization Following a Small Break LOCA [SBLOCA]" has been effectively implemented at CNP, in that emergency procedures already follow the Westinghouse ERGSs, which include aggressive cooldown within TS limits for SBLOCAs. This action pertains to ICM Category 2.
9. COA A8-W, "Provide Guidance on Symptoms and Identification of Containment Sump Blockage" will be provided to operators no later than September 1, 2005, to ensure procedural guidance and training for containment sump blockage or degraded ECCS pump performance symptom identification utilizing all available instrumentation. This action pertains to ICM Category 1.
10. COA A9-W, "Develop Contingency Actions in Response to Containment Sump Blockage, Loss of Suction and Cavitation" will be provided to operators no later than September 1, 2005, to ensure that procedural guidance and training on responding to sump clogging has been provided. This action pertains to ICM Category 1.
11. COA A10, "Early Termination of One Train of High Pressure Safety Injection/High-Head Injection Prior to Recirculation Alignment" applies to CE-designed plants only, and not the CNP Westinghouse design.
12. COA A11, "Prevent or Delay Containment Spray Actuation for Small-Break LOCAs (Less Than 1.0 Inch Diameter) in Ice Condenser Plants" will not be implemented because: (1) resetting the containment spray automatic actuation setpoint will also affect the plant response to a LBLOCA (containment pressure, recirculation sump pH, and containment iodine removal); (2) there is only 0.12 psig margin in the current analyses for containment pressure design basis limit; (3) manual operation intervention to prevent containment spray during a SBLOCA would have to be taken early in an event due to the 3 psig automatic actuation setpoints; and (4) existing CNP guidance already directs operators to secure containment spray pumps if containment pressure is well below the design limit.

In your August 31, 2005, letter, you described Emergency Operating Procedure (EOP) changes for recognizing and responding to sump clogging, and provided a detailed discussion of procedure modifications and operator training regarding COAs A5, A6, A8-W and A9-W. You stated that the EOP for transfer to cold-leg recirculation (ES-1.3) and for the loss of emergency coolant recirculation (ECA-1.1) have been changed to focus on identifying indications of sump blockage. A new EOP (ECA-1.3) providing procedural guidance for addressing sump blockage

was to be implemented in response to these indications. You provided summaries of the changes, and discussed the classroom and simulator training associated with implementing each of these procedures. The procedure changes were to be based on the Westinghouse Sump Blockage Control Room Guideline (SBCRG) of WCAP-16204, Volume II, and on the

CNP design configuration in which both trains of the ECCS and CSS take suction from the single common recirculation sump. These changes pertain ICM Category 1.

Regarding the aforementioned four COAs, you provided the following:

1. COA A5, "Refill of RWST" - EOP ES-1.3 had been changed to direct operators to line up from the boric acid blender to add borated makeup water to the RWST, but not to actually refill the RWST unless there is actual sump clogging. A concern with refilling the RWST is from inadvertent injection due to boundary valve leakage which results in containment water inventory beyond that normally injected from a single RWST volume, and potentially impairing components credited in design-basis accident analyses.
2. COA A6, "Inject More Than One RWST Volume From Refilled RWST or by Bypassing the RWST" - EOP ECA-1.3 includes instructions to re-initiate reactor coolant system (RCS) injection from the RWST if adequate RWST inventory remains.
3. COA A8-W, "Provide Guidance on Symptoms and Identification of Containment Sump Blockage" - As discussed regarding the EOP changes above, guidance and training have been provided for identifying symptoms of containment sump blockage or degraded ECCS pump performance and utilizing all relevant instrumentation available in the control room. This change pertains to ICM Category 1.
4. COA A9-W, "Develop Contingency Actions in Response to Containment Sump Blockage, Loss of Suction, and Cavitation" - As discussed regarding the EOP changes above, EOP ECA-1.3 provides new procedural guidance for responding to sump clogging based on WOG recommendations from the SBCRG of WCAP-16204, Volume II, and training has been provided.

In a letter dated September 15, 2005, you elaborated on COA A5 and COA A6 by stating that:

1. COA A5 - If containment sump screen blockage occurs and the affected unit's RWST does not contain adequate inventory, operators are directed in procedure ECA-1.3 to makeup to the RCS from available sources, including the opposite unit RWST via a cross-connection utilizing the opposite unit charging pumps (this method would necessitate an immediate shutdown of the opposite unit).
2. COA A6 - If containment sump blockage occurs, procedure ECA-1.3 directs operators to add borated makeup water to the affected unit's RWST, and to add makeup to the RCS directly (bypassing the RWST) from available sources such as the volume control tank, the boric acid storage tank, the primary water storage tank, the chemical and volume control system holdup tank, and the aforementioned opposite unit RWST.

M. Nazar

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The NRC staff has considered your Option 2 response for ICMs that either have been, or will be, implemented at CNP to reduce the interim risk associated with potentially degraded or nonconforming ECCS and CSS recirculation functions. Based on the response, the NRC staff considers the actions to be responsive to and meet the intent of NRC Bulletin 2003-01 for CNP.

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 301-415-2928 or the lead PM for this issue, Alan Wang at 301-415-1445.

Sincerely,

/RA/

Deirdre W. Spaulding, Project Manager, Section 1
Project Directorate III
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Docket Nos. 50-315 and 50-316

cc: See next page

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