September 22, 2005

MEMORANDUM TO: Lakshminaras Raghavan, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

FROM: David L. Solorio, Chief ***/RA/***
Balance of Plant Section
Plant Systems Branch
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

SUBJECT: CLOSEOUT LETTER FOR BULLETIN 2003-01, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY SUMP RECIRCULATION AT PRESSURIZED-WATER REACTORS"

The Plant Systems Branch (SPLB) has reviewed and evaluated the information provided in responses to Bulletin 2003-01 by the licensee for D.C. Cook Unit 1 and Unit 2. SPLB has determined that the licensee's actions have been responsive to and meet the intent of Bulletin 2003-01. Attached to this letter is the proposed close-out letter for the above plants. If you have any questions, please contact Leon Whitney or Alan Wang. Please include Alan Wang and Leon Whitney on the distribution list.

Docket Nos: 50-315, 50-316

Attachment: As stated

CONTACTS: Leon Whitney, SPLB/DSSA
415-3081
Alan B. Wang, DLPM, PD IV
415-1445

September 22, 2005

MEMORANDUM TO: L. Raghavan, Section 1
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Division of Licensing Project Management
Office of Nuclear Reactor Regulation

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DISTRIBUTION:
LWhitney
DSpaulding
AWang

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| OFFICE | DLPM/PDIV-2/PM | DSSA/SPLB | DSSA/SPLB |
|---|---|---|---|
| NAME | AWang | LWhitney | DSolorio |
| DATE | 09/ 22 /05 | 09/ 20 /05 | 09/ 20 /05 |

**OFFICIAL RECORD COPY**

Indiana Michigan Power Company
500 Circle Drive
Buchanan, MI 49107-1395

SUBJECT: DONALD C. COOK UNIT 1 AND UNIT 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. Bakken:

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. 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, 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 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; (6) ensuring sump screens are free of adverse gaps and breaches.

You stated in your bulletin response of August 7, 2003, that you had implemented the following ICMs:

(1) plant specific measures at Cook Nuclear Plant (CNP) which address potential debris blockage of recirculation sump screens, measures which 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 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) - ICM category #4;

(2) licensed operator training on indications of and responses to sump clogging (see below) - ICM category #1;

(3) extensive cleaning of the Unit 1 and Unit 2 containments and ice condensers in the 1997-2000 dual outage, with additional walkdowns during containment building system readiness reviews to identify and remove debris sources such as labels and tags, removal of debris from the ice condensers upon ice bed melting with rigorous foreign materials controls for ice bed reload and subsequent ice condenser maintenance, and a Technical Specifications required detailed inspection of containment for loose debris by two Operations Department personnel, independent inspection of the recirculation sump by Maintenance Department personnel, post-containment integrity establishment entry inspections for loose debris in work areas, and Foreign Material Exclusion (FME) program enhancements for work inside containment including foreign material inventories - ICM category #4;

(4) specific drainage path inspections of the refueling cavity drains, the ventilation and stairwell drains, the crane wall openings, and the ice condenser floor drains - ICM category #5; and

(5) an 18 month Technical Specifications required maintenance inspection of the recirculation sump including verification that the sump components (gratings, screens) show no evidence of structural distress or corrosion, verification that the screen wire mesh does not contain rips, tears, openings or gaps greater than 1/4 inch - ICM category #6.

You further stated in your response, including justifications, that you would not be implementing the following ICMs:

(1) procedural modifications, if appropriate, that would delay the switchover to containment pump recirculation; and

(2) 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.

In a January 24, 2005, response to a November 4, 2004, NRC request for additional information (RAI) you:

(1) pointed out 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, would be in place by September 1, 2005 (as discussed below) - ICM category #1; and

(2) discussed the results of your consideration of the ICMs Candidate Operator Actions (COAs) of Westinghouse Owners Group (WOG) report WCAP–16204, Revision 1, "Evaluation of Potential ERG and EPG Changes to Address NRC Bulletin 2003-01 Recommendations (PA-SEE-0085)."

In your discussion of the results of your consideration of WCAP-16204, Revision 1 you discussed:

(1) COA A1a - Ice Addendum, "Westinghouse Ice Condenser Plants Operator Action to Secure One Spray Pump," concluding that this measure would not be implemented at Cook Nuclear Plant (CNP) because 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:

(2) COA A1b, "Operator Action to Secure Both Spray Pumps," concluding that this measure would not be implemented because CNP fan coolers are not designed for operation following a LOCA;

(3) COA A2, "Manually Establish One Train of Containment Sump Recirculation Prior to Automatic Actuation," concluding that, for technical reasons supplied in your RAI response, this measure is prohibited at CNP by residual heat removal (RHR) pump discharge pressure characteristics and SI pump minimum flow protection features and design characteristics;

(4) COA A3-W, "Terminate One Train of Safety Injection After Recirculation Alignment," concluding that due to the potential for cladding temperature rise and operator reaction considerations, this measure would not be implemented;

(5) COA A4, "Early Termination of One Low Pressure Safety Injection/RHR Pump Prior to Recirculation Alignment," concluding that this COA applies to CE plants only, unlike CNP's Westinghouse design;

(6) COA A5, "Refill of RWST," concluding that CNP procedures will be revised 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)
(by September 1, 2005) - ICM category #3;

(7) COA A6, "Inject More Than One RWST Volume From a Refilled RWST or By Bypassing the RWST," concluding that due to small containment flooding margins (which exceeded could impair accident mitigation indications such as core exit thermocouples), this measure would be added only to the beyond-design-basis procedural guidance of COA A9-W discussed below - ICM category #3;

(8) COA A7, "Provide More Aggressive Cooldown and Depressurization Following a Small Break LOCA," concluding that since the CNP emergency procedures already follow the

Westinghouse emergency response guidelines (ERGs), which include aggressive cooldown within Technical Specification limits for small break LOCAs, and that therefore this COA has already effectively been implemented at CNP - ICM category #2;

(9) COA A8-W, "Provide Guidance on Symptoms and Identification of Containment Sump Blockage," concluding that procedural guidance and training to identify symptoms of containment sump blockage or degraded ECCS pump performance, utilizing all available instrumentation, will be provided to the operators no later than September 1, 2005 - ICM category #1;

(10) COA A9-W, "Develop Contingency Actions in Response to Containment Sump Blockage, Loss of Suction and Cavitation," concluding that procedural guidance and training on responses to sump clogging, will be provided to the operators no later than September 1, 2005 - ICM category #1; and

(11) COA A10, "Early Termination of One Train of High Pressure Safety Injection/High-Head Injection Prior to Recirculation Alignment," concluding that this measure applies to CE designed plants only, unlike CNP's Westinghouse design;

(12) COA A11, "Prevent or Delay Containment Spray Actuation for Small Break LOCASs (Less Than 1.0 Inch Diameter) in Ice Condenser Plants," concluding that this measure would not be implemented because: (1) resetting the containment spray automatic actuation setpoint would also affect the plant response to a large break LOCA (containment pressure, recirculation sump pH, and containment iodine removal), (2) there is only .12 psig margin in the current analyses for containment pressure design basis limit, (3) manual operation intervention to prevent containment spray during a small break LOCA 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 an August 31, 2005, letter you described 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.

With respect to EOP changes and associated operator training for sump clogging, 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) was stated to have been implemented to respond to these indications. You provided summaries of the changes to each of the three procedures, and discussed the classroom and simulator training associated with their implementation. The procedural changes were stated 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 - ICM category #1.

Regarding the four specific COAs, you stated that for:

(1) COA A5, "Refill of RWST," EOP ES-1.3 had been changed to direct operators only to line

up the boric acid blender to the RWST when transferring to cold leg recirculation, but not to actually refill the RWST unless there is actual sump clogging due to concerns about inadvertent injection due to boundary valve leakage, resulting in water inventory in containment beyond that normally injected from a single RWST volume, impairing components credited in design basis accident analyses (only one inch containment flood-up margin in Unit 2).

(2) COA A6, "Inject More Than One RWST Volume From a Refilled RWST or By Bypassing the RWST," EOP ECA-1.3 included instructions to re-initiate 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 utilize all relevant instrumentation available in the control room - ICM category #1; and

(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, new EOP ECA-1.3 provides procedural guidance on responses 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 as follows:

(1) COA A5, "Refill of RWST," 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 (necessitating an immediate shutdown of the opposite unit); and

(2) COA A6, "Inject More Than One RWST Volume From a Refilled RWST or By Bypassing the RWST," 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.

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

Sincerely,

[Name], Project Manager, Section [1 or 2]
Project Directorate [I, II, III, or IV]
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

cc: See next page [Plant Mailing List]

**ADD TO DISTRIBUTION:** AWang, RArchitzel, DSolorio, MKowal, LWhitney