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U S Nuclear Regulatory Commission
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PALISADES NUCLEAR PLANT
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**NUCLEAR REGULATORY COMMISSION BULLETIN 2003-01: POTENTIAL IMPACT
OF DEBRIS BLOCKAGE ON EMERGENCY SUMP RECIRCULATION AT
PRESSURIZED-WATER REACTORS – 60-DAY RESPONSE**

On June 9, 2003, the Nuclear Regulatory Commission (NRC) transmitted Bulletin (BL) 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors." The NRC required that specific information be provided within 60 days of the date of the bulletin. In accordance with this requirement, Nuclear Management Company, LLC (NMC) is providing the 60-day response for the Palisades Nuclear Plant.

This letter contains seven new commitments and no revisions to existing commitments.

1. NMC will develop and implement training on sump clogging by January 31, 2004.
2. NMC will revise a plant off normal procedure (ONP) to lower the entry conditions from the current Technical Specification value of 1 gallon per minute (gpm) unidentified leakage to 0.15 gpm unidentified leakage. The reactor trip value in the ONP will also be lowered from 20 gpm leakage to 10 gpm unidentified leakage. This procedure revision will be implemented by January 31, 2004.
3. NMC will submit an implementation schedule for revising plant emergency operating procedures, where appropriate, to stop or throttle redundant pumps that are not necessary to provide required flows to cool containment and the reactor core within 30 days of the issuance of the generic guidance by the Westinghouse Owners Group, currently expected by March 31, 2004.
4. NMC will develop and implement a procedure to provide specific direction for refilling the safety injection refueling water tank from alternative water sources. This procedure will be completed by January 31, 2004.

5. NMC will determine enhancements to provide more aggressive containment cleaning requirements prior to containment closeout and measures will be implemented during the next refueling outage.
6. NMC will evaluate enhancements that may improve containment drainage paths. Modifications will be implemented during the next refueling outage, consistent with the evaluation.
7. NMC will analyze the emergency core cooling system and containment spray system recirculation functions with respect to the potentially adverse post-accident debris blockage effects on the containment sump, taking into account the recent research findings, to verify compliance with applicable regulatory requirements. NMC will continue to work with the Nuclear Energy Institute (NEI) to follow Generic Safety Issue 191 resolution methodology, currently being developed by NEI. NMC will implement the methodology, as appropriate for Palisades.

The interim compensatory measures as described in the above commitments 1 – 6, will remain in effect until commitment 7 is complete.

I declare under penalty of perjury that the foregoing is true and accurate. Executed on August 5, 2003.



Douglas E. Cooper
Site Vice-President, Palisades Nuclear Plant

CC Regional Administrator, USNRC, Region III
Project Manager, Palisades Nuclear Plant, USNRC, NRR
NRC Resident Inspector – Palisades Nuclear Plant

Attachment

ATTACHMENT

NUCLEAR MANAGEMENT COMPANY, LLC

**PALISADES NUCLEAR PLANT
DOCKET 50-255**

AUGUST 5, 2003

**NRC BULLETIN 2003-01: POTENTIAL IMPACT OF DEBRIS ON EMERGENCY
SUMP RECIRCULATION AT PRESSURIZED-WATER REACTORS
PALISADES PLANT 60-DAY RESPONSE**

8 Pages Follow

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Requested Information

All addressees are requested to provide a response within 60 days of the date of this bulletin that contains the information requested in Option 1 or Option 2.

Option 1: State that the ECCS and 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 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 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.

Response

Nuclear Management Company, LLC (NMC) is providing a response in accordance with Option 2 of Nuclear Regulatory Commission (NRC) Bulletin (BL) 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," for the Palisades Nuclear Plant. NMC chose Option 2 for Palisades, as the detailed analyses necessary to address Option 1 have not been performed at this time.

Interim compensatory measures that have been or that will be implemented to reduce risk which may be associated with potentially degraded or nonconforming emergency core cooling system (ECCS) and containment spray system (CSS) recirculation functions until an evaluation to determine compliance is complete are listed below:

- ***Operator training on indications of and responses to sump clogging***

Interim compensatory measures that will be implemented

NMC has reviewed existing operator training programs and determined a need to enhance operator training, on an interim basis, relative to indications of, and responses to, sump clogging. Training on sump clogging will be developed and

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administered to all licensed operators, auxiliary operators, Site Emergency Directors (SEDs), Assistant SEDs, and SEDs-in-training. The training on sump clogging will include, but not be limited to, the following topics:

1. Review of the response to loss-of-coolant-accidents (LOCAs), using the emergency operating procedures (EOPs).
2. Review of the importance of aggressively cooling the primary coolant system (PCS) in order to transition to shutdown cooling as soon as possible to avoid recirculation cooling.
3. Review of indications of ECCS and CSS pump distress including erratic discharge header pressure and header flow indication and the impact reduced flow will have on reactor coolant parameters.
4. Review of the impact of sump clogging on the EOP safety functions due to diminished ECCS/CSS performance.
5. Review of the content and implementation of the severe accident management guidelines (SAMGs), including actions available within the SAMGs to respond to sump clogging.
6. Review of changes to operating procedures such as alternate safety injection refueling water tank (SIRWT) inventory sources.
7. Simulator exercises demonstrating a loss of recirculation flow due to clogged sump screens and reinforcement of classroom training.

Implementation Schedule: The training on sump clogging will be developed and implemented by January 31, 2004. The basis for delaying implementation beyond the 60-day response date is to allow sufficient time to complete proposed procedure revisions, develop training materials and train affected personnel.

- ***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)***

Interim compensatory measures that have been implemented

NMC has reviewed existing operating procedures and identified the following procedure modification that will delay the switchover to containment sump recirculation.

A plant Technical Specification (TS) surveillance procedure was revised to raise the required minimum safety injection refueling water tank (SIRWT) volume from the current TS value of greater than or equal to 85% (250,000 gallons) for Modes 1, 2, and 3. A new administrative requirement was implemented to

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require greater than or equal to 92%. This change will delay the switchover to containment sump recirculation since there will be at least an additional 19,000 gallons available as compared to the volume available at the minimum TS required 85% value.

Interim compensatory measures that will be implemented

NMC has reviewed operating procedures and identified the following procedure modifications that would delay the switchover to containment sump recirculation.

NMC monitors and responds to PCS leakage rates that are lower than the values required by TS at Palisades. A plant surveillance procedure contains the instructions for performing the surveillance of PCS leakage. The leak rate calculation is performed daily. If unidentified leakage exceeds 0.1 gpm, increased monitoring is required by the procedure that includes monitoring of other sensitive leakage monitoring instruments as well as confirmatory leak rate calculations. Management notifications are performed at 0.3 gpm by procedure. Currently, the plant off normal procedure (ONP) may be entered at 1 gpm unidentified leakage.

A plant ONP will be revised to lower the entry conditions from the current TS value of 1 gallon per minute (gpm) unidentified leakage to 0.15 gpm unidentified leakage. The reactor trip criteria in the ONP will also be lowered from the current value of 20 gpm leakage to 10 gpm unidentified leakage. This change will lower the risk of containment sump clogging because the unit will be shut down with lower primary coolant leakage values before the leak can progress to a larger LOCA, potentially resulting in a recirculation actuation system (RAS) signal and associated containment sump recirculation.

Implementation Schedule: This procedure revision will be implemented by January 31, 2004. The basis for delaying implementation beyond the 60-day response date is to allow sufficient time to complete procedure revisions, develop training materials, train operator shifts and incorporate any feedback from training into the procedure revisions prior to issuance for use.

Plant EOPs may be revised, where appropriate, to stop or throttle redundant pumps that are not necessary to provide required flows to cool the containment and reactor core prior to the initiation of the RAS signal and associated containment sump recirculation. This change will delay the switchover to containment sump recirculation by reducing the depletion of SIRWT inventory during the initial stages of the LOCA.

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Implementation Schedule: Preliminary assessment by NMC, in consultation with the Westinghouse Owners Group (WOG), indicates that this change, with regards to securing high pressure safety injection (HPSI) and low pressure safety injection (LPSI) pumps prior to recirculation, may have an adverse effect on plant safety by substituting manual actions for existing automatic actions. These automatic actions introduce a potential for a single active failure vulnerability.

The WOG plans to issue revisions to the emergency procedure guidelines (EPGs) to provide generic guidance for containment sump blockage issues. After WOG programs have been completed to evaluate the generic impact of these changes, implementing changes to procedures to take pre-emptive operator actions to shut off HPSI and LPSI will be considered. Pre-emptive operator actions to stop pumps or throttle flow solely for the purpose of delaying switchover to containment sump recirculation will not be implemented until the impact of the changes can be evaluated on a generic basis for the following reasons:

1. Operator actions to stop HPSI or LPSI pumps or throttle flow may result in conditions that are either outside of the design basis safety analyses assumptions or violate the design basis safety analyses assumptions (single failure). This would result in the potential for creating conditions that would make the optimal recovery more challenging.
2. These actions are inconsistent with the overall WOG EPG philosophy. The WOG EPGs are symptom-based procedures that provide for the monitoring of plant parameters and prescribe actions based on the response of those parameters. To avoid the risk of taking an incorrect action for an actual event, the WOG EPGs do not prescribe contingency actions until symptoms that warrant those contingency actions are identified.
3. These actions are inconsistent with the current operator response using the WOG EPGs that has been established through extensive operator training. The expected operator response is based on the optimal set of actions considering both design basis accidents and accidents outside the design basis. The WOG EPG operator response is not limited to a specific accident progression in order to provide optimal guidance for a wide range of possible accidents.

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4. To be effective in delaying the switchover to containment sump recirculation, operator actions to stop HPSI or LPSI pumps must be taken in the first few minutes of an accident. This introduces a significant opportunity for operator errors based on other actions that may be required during this time frame. Any new operator actions to stop HPSI or LPSI pumps, when modeled in the probabilistic safety assessment (PSA), are likely to result in increased risk due to operator error.

For these reasons, this proposed change may require a revision to the safety analysis and license amendment. Due to the complexity of justification for this proposed change, the WOG plans to issue revisions to the EPGs to provide generic guidance for containment sump blockage issues by March 31, 2004. Within 30 days after the issuance of the generic guidance by the WOG, NMC will evaluate the changes recommended and submit an implementation schedule for the applicable EOP revisions. The basis for delaying implementation beyond the 60-day response date is to allow sufficient time to resolve any potential inconsistencies with existing safety analysis assumptions and obtain prior NRC approval, if required.

- ***Ensuring that alternative water sources are available to refill the SIRWT or to otherwise provide inventory to inject into the reactor core and spray into the containment atmosphere***

Interim compensatory measures that will be implemented

NMC has reviewed the availability of alternative water sources to refill the SIRWT or to otherwise provide inventory to inject into the reactor core and spray into the containment atmosphere. This review indicated that multiple alternative water sources are available. A procedure will be developed to provide specific direction for refilling the SIRWT from these sources. The procedure will be implemented following containment sump recirculation in accordance with the SAMGs.

Implementation Schedule: This procedure revision will be implemented by January 31, 2004. The basis for delaying implementation beyond the 60-day response date is to allow sufficient time to complete procedure revisions, develop training materials, train operator shifts and incorporate any feedback from training into the procedure revisions prior to issuance for use.

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- ***More aggressive containment cleaning and increased foreign material controls***

Interim compensatory measures that have been implemented

NMC has reviewed procedure requirements for containment cleaning and foreign material controls. This review indicated that procedure requirements currently exist to reduce the possibility of containment sump blockage due to debris and foreign material at Palisades. These requirements are implemented procedurally through a detailed checklist performed by a senior reactor operator prior to commencing power operations. The checklist contains a requirement to ensure areas are properly cleaned, including ensuring that loose materials that could plug the containment sump screens are removed from containment. The procedure identifies areas of specific concern since debris from these areas has a greater potential to reach the containment sump. A detailed list of what may remain in containment during power operation is also included in the procedure.

Plant administrative procedures provide requirements on foreign material control in containment. Additionally, foreign material inside of containment is minimized by the use of safety related coatings. Coating program requirements are specified in a plant specification. Safety related coating applications within containment are facilitated using a plant procedure and qualified personnel.

Interim compensatory measures that will be implemented

A review of containment closeout procedures indicated that enhancements may exist to allow for more aggressive containment cleaning prior to containment closeout. These enhancements will be evaluated and measures will be implemented to provide more aggressive cleaning requirements to further reduce resident debris source terms in containment.

Implementation Schedule: The enhanced containment cleanliness requirements will be implemented during the next refueling outage. The basis for delaying implementation beyond the 60-day response date is to allow for planning and appropriate plant conditions to perform these activities consistent with as low as reasonably achievable (ALARA) requirements.

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- ***Ensuring containment drainage paths are unblocked***

Interim compensatory measures that will be implemented

NMC has reviewed containment drainage paths based on evaluations and walkdowns conducted during past refueling outages. This review indicated that no significant containment drainage path restrictions exist at Palisades.

Enhancements may be possible that would further improve containment drainage paths. An engineering evaluation will be performed to identify enhancements that may improve containment drainage paths. Modifications will be implemented consistent with the evaluation.

Implementation Schedule: An engineering evaluation will be performed, and modifications will be implemented consistent with the engineering evaluation during the next refueling outage. The basis for delaying implementation beyond the 60-day response date is to allow sufficient time to perform an engineering evaluation, plan any modification activities and perform these activities during appropriate plant conditions consistent with ALARA requirements.

- ***Ensuring sump screens are free of adverse gaps and breaches***

Interim compensatory measures that have been implemented

NMC has reviewed procedure requirements for ensuring sump screens are free of adverse gaps and breaches. This review indicated that surveillance procedure requirements currently exist to inspect the containment sump suction inlet. Inspections are performed in accordance with the surveillance procedure at the end of each refueling outage at Palisades. The surveillance procedure includes acceptance criteria to ensure that the containment sump inlet screen surfaces are clear of debris and shows no evidence of structural distress or abnormal corrosion (frame-to-liner gaps, enlarged screen holes or broken screen wires, gaps at edges of the screens, etc). NMC has reviewed the results of past inspections at Palisades. Sump screen issues that had been identified in past inspections were promptly resolved. The sump screen inspection performed during the 2003 refueling outage did not identify any issues concerning gaps or breaches.

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NMC has addressed above the six compensatory measures as discussed in the Bulletin. Therefore, there are no compensatory measures, as listed in the Discussion section of the Bulletin, that have not been addressed.

In addition, NMC is committing to analyze the emergency core cooling system and containment spray system recirculation functions with respect to the potentially adverse post-accident debris blockage effects on the containment sump, taking into account the recent research findings, to verify compliance with applicable regulatory requirements. NMC will continue to work with the Nuclear Energy Institute (NEI) to follow Generic Safety Issue 191 resolution methodology, currently being developed by NEI. NMC will implement the methodology, as determined appropriate for Palisades. The commitments made in relation to the compensatory measures will remain in effect until an evaluation to verify compliance is complete.