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August 7, 2003

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington D.C. 20555

Subject: Duke Energy Corporation
McGuire Nuclear Station Units 1 & 2
Docket Nos. 50-369, 370
Catawba Nuclear Station Units 1 & 2
Docket Nos. 50-413, 414
Oconee Nuclear Stations Units 1, 2 & 3
Docket Nos. 50-269, 270, 287
Response to NRC Bulletin 2003-01:
Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized Water Reactors

Pursuant to 10 CFR 50.54(f), this letter and the associated attached Enclosures provide Duke Energy Corporation's (Duke) response to NRC Bulletin 2003-01 for the McGuire, Catawba and Oconee Nuclear Stations. This bulletin requested plant-specific information as a result of NRC staff concerns regarding the impact of debris blockage on emergency sump recirculation.

Responses are provided for the Requested Information of the Bulletin in Enclosures I, II and III for McGuire, Catawba and Oconee respectively. In accordance with Option 2 of the Bulletin, these responses provide 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. Enclosure IV list all commitments associated with this Bulletin response.

If you have questions or need additional information, please contact Gregory S. Kent at (704) 373-6032.

Very truly yours,

W. R. McCollum, Jr.

ENCLOSURES

A103

W. R. McCollum, Jr. affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

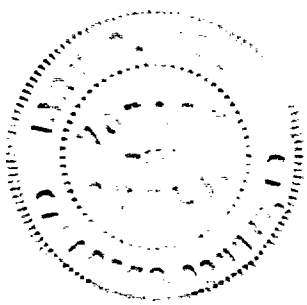
Senior Vice President
Nuclear Support

Subscribed and sworn to me: August 7, 2003
Date

Notary Public

My Commission Expires: JAN 22, 2006
Date

SEAL



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Enclosure I
McGuire Nuclear Station

Requested Information:

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.

Duke Response:

The following are McGuire Nuclear Station's (MNS) specific responses to each of the interim compensatory measures listed in the Discussion section:

1. **Operator training on indications of and responses to sump clogging**

In response to this bulletin the following training enhancements have been completed:

- An on-shift reading package was prepared and distributed to licensed operators to familiarize operators with issues related to loss of emergency coolant recirculation capability due to sump performance issues. This package reinforced operator expectations to monitor for indications of pump distress or loss of NPSH, such as erratic current, flow or discharge pressure. General symptoms of pump distress (erratic current, flow or discharge pressure) could be used in combination with sump level and incore temperatures to determine sump or core blockage. Symptoms of sump blockage and sump screen bypass were discussed. The package reviewed existing emergency procedure guidance addressing loss of emergency coolant recirculation in ECA-1.1 "Loss of Emergency Coolant Recirculation". It also reviewed how ECA-1.1 "Loss of Emergency Coolant Recirculation" would be used if Emergency Coolant Recirculation was established and subsequently lost.

- The on-shift reading package above was also given to Technical Support Center (TSC) staff members including the emergency coordinators and members in operations and engineering support organizations.

The following training actions will be completed following the response submittal:

- Classroom training included in licensed operator requalification training will be conducted to review issues related to loss of emergency coolant recirculation capability due to sump performance issues. This training will review the reading package distributed prior to the response submittal. This will be performed prior to December 31, 2003. The justification for not completing this training prior to

the submittal of this response is to allow sufficient time for all shifts to complete their next scheduled training.

- If emergency procedure changes related to the issue of sump performance are made as described later in this response, appropriate training will be conducted. Training will be completed in accordance with existing processes.

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)**

Existing emergency procedure guidance includes tactics to delay switchover to containment sump recirculation:

- For small to medium LOCAs, guidance to delay depletion of the Refueling Water Storage Tank (RWST) before switchover to sump recirculation currently exists in Westinghouse Owners Group (WOG) Emergency Response Guidelines (ERG) ES-1.2, "Post LOCA Cooldown and Depressurization." This guideline provides actions to cooldown and depressurize the RCS to reduce the break flow, thereby reducing the injection flow necessary to maintain RCS subcooling and inventory. The operating SI pumps are sequentially stopped to reduce injection flow, based on pre-established criteria that maintain core cooling, resulting in less outflow from the RWST. If containment spray actuates during small to medium LOCAs, transfer to the containment sump is likely anyway.

- A change to the emergency procedure user's guide was implemented to ensure operators do not start containment spray earlier than required. For most safeguard actuations, the user's guide recommends that operators initiate the safeguards signal in anticipation of the automatic signal. For containment spray actuation, early actuation would have the adverse effect of earlier switchover to containment sump recirculation, and less ice melt at time of switchover. This would result in a reduced containment sump level at time of switchover.

- Based on the philosophy adopted in the current WOG ERGs to take actions based on plant symptoms, emergency procedure guidance to "delay RWST inventory depletion" already exists once the loss of recirculation capability is diagnosed. This guidance is covered in ECA-1.1 "Loss of Emergency Coolant Recirculation".

Any generic changes to the WOG ERGs will be evaluated as part of the Owners Group program. The WOG has committed to member utilities to evaluate, change and issue revision to the ERGs to address containment sump blockage issues by March 31, 2004. Applicable emergency procedure changes will then be made on an accelerated schedule based on the significance of change and impact to procedures and operator training. Duke will supplement the response to this bulletin by May 31, 2004 with specifics of any planned changes to procedures or operator training.

The justification for the schedule of the programmatic review is provided. Pre-emptive operator actions to stop pumps or throttle flow solely for the purpose of delaying

switchover to containment sump recirculation is not planned until the impact of the changes can be evaluated on a generic basis by the WOG for the following reasons:

- Operator actions to stop ECCS or CSS 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 could potentially result in conditions that would make the optimal recovery more challenging.

- These actions would be inconsistent with the overall WOG ERG philosophy. The WOG ERGs 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 ERGs do not prescribe contingency actions until symptoms that warrant those contingency actions are identified.

- These actions would be inconsistent with the current operator response using the WOG ERGs 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 ERG operator response is not limited to a specific accident progression in order to provide optimal guidance for a wide range of possible accidents.

- To be effective in delaying the switchover to containment sump recirculation, operator actions to stop ECCS or CSS pumps must be taken very early during an accident. This introduces an opportunity for operator errors based on other actions that may be required during this time frame. Any new operator actions to stop ECCS or CSS pumps, when modeled in the PRA, would require evaluation of overall risk impact.

Concurrent with the WOG activities, Duke is performing specific evaluations to prevent or stop containment spray actuation and delay switchover to containment sump:

- The impact of starting a containment return air fan early in a small break LOCA event to avoid an auto start of containment spray will be evaluated by December 31, 2003. Starting a containment return air fan increases circulation of air and steam through the ice condenser, limiting subsequent containment pressure increase. This evaluation will review concerns with opening the associated fan's damper and starting the fan prior to meeting normal permissives for automatic operation. Based on this review, emergency procedure changes will be evaluated to manually start a fan early in an event that involves a slowly increasing containment pressure. Duke will supplement the response to this bulletin by May 31, 2004 with specifics of any planned changes to procedures or operator training.

- The impact of stopping one train of containment spray early in an event will be evaluated by December 31, 2003. This evaluation will review concerns with single failure of the remaining spray pump after stopping one pump. Operator actions will have to be credited to restart a spray pump to address this single failure. Based on this review, emergency procedure changes will be evaluated to

stop one containment spray pump early in an event. Duke will supplement the response to this bulletin by May 31, 2004 with specifics of any planned changes to procedures or operator training.

- The impact of increasing the containment spray setpoint will be evaluated by December 31, 2003. Additional implementation activities will follow pending the results of the safety analysis. This change is being considered in order to reduce the likelihood of CSS actuation in the event of a small or medium break LOCA. Duke will supplement the response to this bulletin by May 31, 2004 with specifics of any planned changes to procedures or operator training.

3. **Ensuring that alternative water scurces are available to refill the RWST or to otherwise provide inventory to inject into the reactor core and spray into the containment atmosphere**

This interim compensatory measure is satisfied by existing procedures.

Existing emergency procedures provide guidance to refill the RWST:

- ECA-1.1 "Loss of Emergency Coolant Recirculation" directs the refill of the RWST. Refill is performed using normal blender makeup. This is performed after operators diagnose they have a failure of emergency coolant recirculation.

Existing emergency procedures provide injection guidance and identify available alternate injection inventories:

- ECA-1.1 "Loss of Emergency Coolant Recirculation" directs use of alternate reactor coolant system makeup following loss of emergency coolant recirculation. Alternate sources that exist in our emergency procedure include:
  - Volume Control Tank (VCT) (VCT can be aligned to normal charging pumps. Steps to initiate VCT makeup are included.)
  - Emergency boration using boric acid transfer pump (if reactor coolant system is depressurized)
  - Standby makeup pump (A pump that takes suction on spent fuel pool and discharges to RCP seal injection)
  - An evaluation is made to pump sump water to the RWST using low head SI pump or containment spray pump recirc line to the RWST. (The potential for offsite and onsite release is evaluated before using this option during this beyond design basis event.)

Future enhancements may include procedure changes directing the refill of the RWST, and/or the use of alternate sources (such as Spent Fuel Pool inventory). These changes will be evaluated by the WOG, and any applicable procedure changes will be considered as part of response to ERG activities by March 31, 2004. Duke will supplement the response to this bulletin by May 31, 2004 with the specifics of any planned changes to procedures or operator training.

4. **More aggressive containment cleaning and increased foreign material controls**

Current containment cleaning practice at MNS includes localized washdowns as directed by Maintenance and Radiation Protection. Inspections to verify containment cleanliness

are conducted in accordance with station procedures. These inspections are performed prior to entry into Mode 4 following unit outages.

In response to this bulletin, MNS containment cleanliness practices for entry into Mode 4 will be enhanced as follows:

- Extensive containment cleaning will be conducted using water spray. In general, washdowns will be limited to the space in lower containment that would be submerged under large break LOCA conditions. Accessible floor and wall surfaces, mechanical equipment and cable trays will be washed down.

- Visual inspection will be performed as practical on remaining areas of containment. Identified potential debris will be cleaned or removed as necessary.

- These enhancements will be in place prior to the next refueling outage (2EOC15, Fall 2003).

The existing containment FME program includes the previously discussed containment cleanliness inspection activities and Mode 1 through 4 administrative controls. Recent upgrades to these controls require detailed inventories of all materials entering containment and accountability for their removal.

5. Ensuring containment drainage paths are unblocked

Designed containment drainage paths at MNS are Ice Condenser drains, Refueling Canal drains and Crane wall penetrations.

Specific inspections of the above identified drainage paths are conducted by procedure as startup prerequisites. In addition, a quarterly visual inspection is performed to verify there is no debris that could obstruct the refueling canal drains.

6. Ensuring sump screens are free of adverse gaps and breaches

Existing MNS procedures control the inspection of the sump screens. These inspections are performed each refueling outage. Structural integrity is procedurally verified by inspection. A separate cleanliness inspection is procedurally performed by Quality Control. Both procedures contain ECCS sump acceptance criteria to ensure no adverse gaps, tears or voids are present in the fine mesh screen.

7. Unique or plant-specific compensatory measures

No unique or plant-specific compensatory measures are necessary at MNS beyond those described in Items 1 through 6 above.

Enclosure II
Catawba Nuclear Station

Requested Information:

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.

Duke Response:

The following are Catawba Nuclear Station's (CNS) specific responses to each of the interim compensatory measures listed in the Discussion section:

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

In response to this bulletin the following training enhancements have been completed:

- An on-shift reading package was prepared and distributed to licensed operators to familiarize operators to issues related to loss of emergency coolant recirculation capability due to sump performance issues. This package reinforced operator expectations to monitor for indications of pump distress or loss of NPSH, such as erratic current, flow or discharge pressure. General symptoms of pump distress (erratic current, flow or discharge pressure) could be used in combination with sump level and incore temperatures to determine sump or core blockage. Symptoms of sump blockage and sump screen bypass were discussed. The package reviewed existing emergency procedure guidance addressing loss of emergency coolant recirculation in ECA-1.1 "Loss of Emergency Coolant Recirculation". It also reviewed how ECA-1.1 "Loss of Emergency Coolant Recirculation" would be used if Emergency Coolant Recirculation was established and subsequently lost.

- The on-shift reading package above was given to Technical Support Center (TSC) staff members including the emergency coordinators and members in operations and engineering support organizations.

The following training actions will be completed following the response submittal:

- Classroom training included in licensed operator requalification training will be conducted to review issues related to loss of emergency coolant recirculation capability due to sump performance issues. This training will review the reading package distributed prior to the response submittal. This will be performed prior December 31, 2003. The justification for not completing this training prior to the

submittal of this response is to allow sufficient time for all shifts to complete their next scheduled training.

- If emergency procedure changes related to the issue of sump performance are made as described later in this response, appropriate training will be conducted. Training will be completed in accordance with existing processes.

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)**

Existing emergency procedure guidance includes tactics to delay switchover to containment sump recirculation:

- For small to medium LOCAs, guidance to delay depletion of the RWST before switchover to sump recirculation currently exists in WOG ERG ES-1.2, "Post LOCA Cooldown and Depressurization." This guideline provides actions to cooldown and depressurize the RCS to reduce the break flow, thereby reducing the injection flow necessary to maintain RCS subcooling and inventory. The operating SI pumps are sequentially stopped to reduce injection flow, based on pre-established criteria that maintain core cooling, resulting in less outflow from the RWST. If containment spray actuates during small to medium LOCAs, transfer to the containment sump is likely anyway.

- A change to the emergency procedure user's guide was implemented to ensure operators do not start containment spray earlier than required. For most safeguard actuations, the user's guide recommends that operators initiate the safeguards signal in anticipation of the automatic signal. For containment spray actuation, early actuation would have the adverse effect of earlier switchover to containment sump recirculation, and less ice melt at time of switchover. This would result in a reduced containment sump level at time of switchover.

- Based on the philosophy adopted in the current WOG ERGs to take actions based on plant symptoms, emergency procedure guidance to "delay RWST inventory depletion" already exists once the loss of recirculation capability is diagnosed. This guidance is covered in ECA-1.1 "Loss of Emergency Coolant Recirculation".

Any generic changes to the WOG ERGs will be evaluated as part of the Owners Group program. The WOG has committed to member utilities to evaluate, change and issue revision to the ERGs to address containment sump blockage issues by March 31, 2004. Applicable emergency procedure changes will then be made on an accelerated schedule based on the significance of change and impact to procedures and operator training. Duke will supplement the response to this bulletin by May 31, 2004 with specifics of any planned changes to procedures or operator training.

The justification for the schedule of the programmatic review is provided. Pre-emptive operator actions to stop pumps or throttle flow solely for the purpose of delaying

switchover to containment sump recirculation is not planned until the impact of the changes can be evaluated on a generic basis by the WOG for the following reasons:

- Operator actions to stop ECCS or CSS 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 could potentially result in conditions that would make the optimal recovery more challenging.

- These actions would be inconsistent with the overall WOG ERG philosophy. The WOG ERGs 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 ERGs do not prescribe contingency actions until symptoms that warrant those contingency actions are identified.

- These actions would be inconsistent with the current operator response using the WOG ERGs 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 ERG operator response is not limited to a specific accident progression in order to provide optimal guidance for a wide range of possible accidents.

- To be effective in delaying the switchover to containment sump recirculation, operator actions to stop ECCS or CSS pumps must be taken very early in during an accident. This introduces an opportunity for operator errors based on other actions that may be required during this time frame. Any new operator actions to stop ECCS or CSS pumps, when modeled in the PRA, would require evaluation of overall risk impact.

Concurrent with the WOG activities, Duke is performing specific evaluations to prevent or stop containment spray actuation and delay switchover to containment sump:

- The impact of starting a containment return air fan early in a small break LOCA event to avoid an auto start of containment spray will be evaluated by December 31, 2003. Starting containment return air fan increases circulation of air and steam through the ice condenser, limiting subsequent containment pressure increase. This evaluation will review concerns with opening the associated fan's damper and starting the fan prior to meeting normal permissives for automatic operation. Based on this review, emergency procedure changes will be evaluated to manually start this fan early in an event that involves a slowly increasing containment pressure. Duke will supplement the response to this bulletin by May 31, 2004 with specifics of any planned changes to procedures or operator training.

- The impact of stopping one train of containment spray early in an event will be evaluated by December 31, 2003. This evaluation will review concerns with single failure of the remaining spray pump after stopping one pump. Operator actions will have to be credited to restart a spray pump to address this single failure. Based on this review, emergency procedure changes will be evaluated to

stop one containment spray pump early in an event. Duke will supplement the response to this bulletin by May 31, 2004 with specifics of any planned changes to procedures or operator training.

- The impact of increasing the containment spray setpoint will be evaluated by December 31, 2003. Additional implementation activities will follow pending the results of the safety analysis. This change is being considered in order to reduce the likelihood of CSS actuation in the event of a small or medium break LOCA. Duke will supplement the response to this bulletin by May 31, 2004 with specifics of any planned changes to procedures or operator training.

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**

This interim compensatory measure is satisfied by existing procedures.

Existing emergency procedures provide guidance to refill the RWST:

- ECA-1.1 "Loss of Emergency Coolant Recirculation" directs the refill of the RWST. Refill is performed using normal blender makeup. This is performed after operators diagnose they have a failure of emergency coolant recirculation.

Existing emergency procedures provide injection guidance and identify available alternate injection inventories:

- ECA-1.1 "Loss of Emergency Coolant Recirculation" directs use of alternate reactor coolant system makeup following loss of emergency coolant recirculation. Alternate sources that exist in our emergency procedure include:
  - Volume Control Tank (VCT) (VCT can be aligned to normal charging pumps. Steps to initiate VCT makeup are included.)
  - Boric Acid Tank
  - Standby makeup pump (A pump that takes suction on spent fuel pool and discharges to RCP seal injection)
  - An evaluation is made to pump sump water to RWST using low head SI pump or containment spray pump recirc line to RWST. (The potential for offsite and onsite release is evaluated before using this option during this beyond design basis event.)

Future enhancements may include procedure changes directing the refill of RWST, and/or the use of alternate sources (such as Spent Fuel Pool inventory). These changes will be evaluated by the WOG, and any applicable procedure changes will be considered as part of response to ERG activities by March 31, 2004. Duke will supplement the response to this bulletin by May 31, 2004 with the specifics of any planned changes to procedures or operator training

4. **More aggressive containment cleaning and increased foreign material controls**

Current practice at CNS includes aggressive containment cleaning and cleanliness walkdowns. CNS outage practices assuring containment cleanliness are described as follows:

- Containment cleaning is conducted prior to Mode 4.

- Extensive containment cleaning is conducted using water spray. In general, washdowns are limited to the space in lower containment that would be submerged under large break LOCA conditions. Accessible floor and wall surfaces and mechanical equipment are washed down.

- Localized washdowns are performed as directed by Radiation Protection.

- Visual inspections are performed on remaining areas of containment. Identified potential debris is cleaned or removed as necessary.

- Containment cleanliness is verified prior to entry into Mode 4 by an inspection controlled by procedure. This cleanliness inspection ensures that the ECCS sump area is free of debris.

Containment FME controls and inspection activities are implemented during Modes 1 through 4. CNS FME control practices and inspection activities assuring containment cleanliness during Modes 1 through 4 are described as follows:

- Containment entries during normal power operations are controlled by an administrative procedure. Current process relies on FME and containment cleanliness training, pre-job briefs, and completion of containment access closeout logs.

Increased material accountability control at CNS is planned by requiring material accountability logs be kept for items carried into and out of containment during normal power operations (Modes 1 through 4). These procedural changes will be in place prior to end of the next refueling outage (1EOC14, Fall 2003).

5. <u>Ensuring containment drainage paths are unblocked</u>

Designed containment drainage paths at CNS are Ice Condenser drains, Refueling Canal drains and Crane wall penetrations.

Specific inspections of Ice Condenser drains and Refueling Canal drains are conducted by procedure as startup prerequisites. In addition, a quarterly visual inspection is performed to verify there is no debris that could obstruct the refueling canal drains.

Crane wall penetration inspections are presently performed in the containment cleanliness inspection prior to Mode 4 based upon instructions given in the pre-job briefing. An additional inspection procedure will be developed to ensure penetrations through the crane wall that are dedicated as recirculation sump flow pathways are free of obstruction. The new inspection procedure will be in place prior to the next refueling outage (1EOC14, Fall 2003).

6. Ensuring sump screens are free of adverse gaps and breaches

Inspections are currently performed to ensure the emergency recirculation sump screens are free of adverse gaps and breaches. The procedurally controlled ECCS sump area cleanliness inspection is performed prior to each entry into Mode 4. The procedure includes the inspection of sump screens and trash racks in particular, and includes check-off items for corrosion, tears, dents or abnormal wear.

An additional inspection procedure will be developed to ensure sump screen structural integrity. The procedure will contain ECCS sump acceptance criteria to ensure no adverse gaps, tears or voids are present in the fine mesh screen. The new inspection procedure will be in place prior to the next refueling outage.

In addition to implementing the routine inspection procedures described above, a special inspection of recirculation sump screen assemblies shall be performed prior to the end of the next refueling outage for each unit (1EOC14, Fall 2003 and 2EOC13, Fall 2004) to verify design documentation. Any adverse gaps or breaches found during these inspections shall be repaired prior to the end of the next refueling outage for each unit (1EOC14, Fall 2003 and 2EOC13, Fall 2004).

7. Unique or plant-specific compensatory measures

No unique or plant-specific compensatory measures are necessary at CNS beyond those described in Items 1 through 6 above.

Enclosure III
Oconee Nuclear Station

Requested Information:

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 RB Spray 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.

Duke Response:

The following are Oconee Nuclear Station's (ONS) specific responses to each of the interim compensatory measures listed in the Discussion section:

1. <u>Operator training on indications of and responses to sump clogging</u>

The following actions have been taken or are planned to address this compensatory measure:

- A Technical Support Center (TSC) Guidance Document will be developed to direct actions in the event of indications of Reactor Building Emergency Sump (RBES) blockage. This guidance will include:
  - Securing a Building Spray (BS) (i.e., containment spray) train when conditions permit.
  - Reducing flow on operating ECCS Low Pressure Injection (LPI) trains to meet minimum flow requirements while in the sump recirculation alignment. And,
  - Transferring ECCS High Pressure Injection (HPI) pump suction back to the Borated Water Storage Tank (BWST) when RBES blockage has progressed to the point that LPI pump failure has occurred.

- An Operations Management Focus Item will be prepared and covered with each shift by the Operations Shift Manager to raise awareness of this issue. This Management Focus Item will address the RBES clogging issue and the forthcoming TSC Guidance Document.

- Operators will be trained on EOP changes associated with modifications to Unit 1 LPI system described under Interim Compensatory Measure 2 below.

- Operators have been trained on the symptoms of pump cavitation. This is part of the established operator training program. Alarms alert the operator to indications of low flow and low differential pressure across LPI pumps. General

symptoms of pump distress (erratic current, flow, and discharge pressure) are addressed as a part of operator training.

The implementation schedule for the above measures is as follows:

1) TSC Guidance Document developed by October 1, 2003.

2) Operations Management Focus Item completed by October 31, 2003.

3) Operator training on Unit 1 EOP changes completed by December 15, 2003.

The scope of the activities required to implement the above measures does not permit implementation before submittal of this response.

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)**

ONS is in process of making significant physical modifications to both the BS and LPI systems. It is anticipated that implementation of these modifications will facilitate procedural changes which would delay the switchover to containment sump recirculation. The scope and schedule for these modifications do not support their completion before submittal of this response. The benefits and status of these modifications are described below:

- Reactor Building Spray
  - The system has been modified to eliminate throttling by adding fixed system resistance. This modification reduces system flow while aligned to the BWST, thus delaying the time to switchover. The modification also increases the NPSH margin from approximately 6 feet to approximately 9 feet in the sump recirculation alignment.
  - The status of this modification is as follows:
    - Unit 1 Will be installed in 1EOC-21 (Fall of 2003)
    - Unit 2 Fully installed
    - Unit 3 Fully installed

- Low Pressure Injection
  - The LPI system will be modified to eliminate throttling by the addition of fixed system resistance. This will decrease the LPI flow, thereby delaying the time to switchover. The flow reduction also reduces the velocity of the fluid at the RBES, thus reducing debris transport and sump screen head loss. It will also increase the NPSH margin from 1.6 feet to approximately 5 feet in the sump recirculation alignment.
  - Unit 1 modification is scheduled to be installed in 1EOC-21 (Fall of 2003).
  - Unit 2 modification is scheduled to be installed in 2EOC-20 (Spring of 2004).
  - Unit 3 modification is scheduled to be installed in 3EOC-21 (Fall of 2004).

- The Units 2 and 3 EOPs will be modified to throttle LPI flow as supported by design analysis during the injection phase of the event provided that two LPI trains are available. This will extend the time for injection from the BWST. This

will also provide the added benefits of reduced debris transport and improved NPSH margin on both Units 2 and 3. The Units 2 and 3 EOP changes will be completed by December 31, 2003.

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**

EOP guidance for refilling BWST currently exists. This guidance is utilized when the transfer from the BWST to the RBES is complete. The alternative water source used by current procedures is the Bleed Holdup Tanks. Other sources such as the Spent Fuel Pool, an alternate unit's BWST, and other available sources will be evaluated for inclusion as additional operating guidance where appropriate. This evaluation will be completed by December 31, 2003. The scope of the activities required to implement the above measure does not permit implementation before submittal of this response.

4. **More aggressive containment cleaning and increased foreign material controls**

ONS has very aggressive Reactor building cleaning practices. The entire reactor building, from fourth floor to basement, is washed down with high pressure water spray every refueling outage. Based on industry feedback, ONS's practice for Reactor Building (RB) washdowns exceeds most of the industry. For this reason, ONS should be considered a clean containment plant. This has been validated by latent debris collection activities performed during Unit 3 refueling outage in the Spring of 2003 (3EOC-20). During this outage, debris effluent from the washdown at the beginning of the outage was collected. The washdown for this outage was particularly aggressive to cleanup chromate leakage from a closed loop system in the RB. The amount of debris collected was less than 50 pounds.

ONS also has a comprehensive program in place for establishing and maintaining containment cleanliness and controls for foreign materials exclusion in Mode 4 and above. The program includes procedures for cleanliness inspections prior to entering Mode 4 and a site directive for foreign materials control for Mode 4 and above.

This Interim Compensatory Measure is therefore considered to be satisfied by current practice.

5. **Ensuring containment drainage paths are unblocked**

In 1997, ONS performed a detailed Self Initiated Technical Audit (SITA) to address 'trapped' water in containment not available to the Reactor Building Emergency Sump (RBES) (PIP 97-4165). This SITA identified many non-conservative assumptions and inputs in the Reactor Building Water Level calculation and led to a revision of the calculation to account for the non-conservative inventory. The following drainage paths have been identified as having a potential to trap inventory and make it unavailable to the RBES:

1) Reactor Vessel (RV) Annulus area
2) Fuel Transfer Canal
3) Incore Instrumentation Tank

Procedural controls are in place to verify the strainer baskets are removed from the Fuel Transfer Canal drains prior to entering Mode 4. Draining of the Fuel Transfer Canal and Incore Instrumentation Tank by normal procedures provides adequate assurance that the flow paths are unobstructed. The flow path from the RV Annulus area to the sump is through an open drain line which has no isolation valves. No controls are currently in place to ensure free flow through the RV Annulus drains. ONS performed a flush of this drain on Unit 3 during 3EOC-20 in the Spring of 2003 to ensure the drain was not obstructed. Similar flushes will be performed on Units 1 and 2 during their next outages (Fall of 2003 and Spring of 2004 respectively). In addition, a Periodic Maintenance activity will be implemented on a frequency of every third refueling outage to perform this flush. These measures cannot be implemented before submittal of this response. The above schedules are adequate considering the risk factors associated with potential sump clogging for the ONS units, meeting ALARA guidelines, and current work activities.

Note that the ONS RBs are not compartmentalized, as is the case with many plants. This large open design provides good communication between the RBES and the water inventory in the RB. The RBES is exposed (located inside the secondary shield wall) to allow free flow of inventory.

6. Ensuring RBES screens are free of adverse gaps and breaches

RBES inspections are performed every refueling outage. These inspections are threefold:

1) The sump screens are inspected by Maintenance per procedure. The procedure requires inspection for debris, gaps or tears in the screen, missing cover plate bolts, and openings in or around the sump cover in excess of the screen mesh opening size.

2) Quality Control inspects the sump and sump screens per the same criteria.

3) The BS System Engineer inspects the sumps visually for debris, damage, and configuration each refueling outage as part of the Engineering Support Program.

This proposed Interim Compensatory Measure is therefore considered satisfied by current practice.

7. Unique or plant-specific compensatory measures

No unique or plant-specific compensatory measures are necessary at ONS beyond those described in Items 1 through 6 above.

SUMMARY OF COMMITMENTS RE: BULLETIN 2003-01
MCGUIRE NUCLEAR STATION

COMMITMENT	SCHEDULED DATE
Classroom training included in licensed operator requalification training will be conducted to review issues related to loss of emergency coolant recirculation capability due to sump performance issues.	Prior to December 31, 2003.
Applicable emergency procedure changes will be made based on the significance of changes to Westinghouse Owners Group Emergency Response Guidelines and the impact to procedures and operator training.	May 31, 2004
The impact of starting a containment return air fan early in a small break LOCA event to avoid an auto start of containment spray will be evaluated.	December 31, 2003
Based on the review of concerns with opening the associated fan's damper and starting the fan prior to meeting normal permissives for automatic operation, emergency procedure changes will be evaluated to manually start a fan early in an event that involves a slowly increasing containment pressure. Duke will supplement the response to this Bulletin with specifics of any planned changes to procedures or operator training.	May 31, 2004
The impact of stopping one train of containment spray early in an event will be evaluated.	December 31, 2003
Based on this review, emergency procedure changes will be evaluated to stop one containment spray pump early in an event. Duke will supplement the response to this Bulletin with specifics of any planned changes to procedures or operator training.	May 31, 2004
The impact of increasing the containment spray setpoint will be evaluated.	December 31, 2003
Additional implementation activities will follow pending the results of the safety analysis. This change is being considered in order to reduce the likelihood of CSS actuation in the event of a small or medium break LOCA. Duke will supplement the response to this Bulletin with specifics of any planned changes to procedures or operator training.	May 31, 2004
Future enhancements may include procedure changes directing the refill of the RWST, and/or the use of alternate sources (such as Spent Fuel Pool inventory). These changes will be evaluated by the WOG, and any applicable procedure changes will be considered as part of response to ERG activities by March 31, 2004. Duke will supplement the response to this Bulletin with specifics of any planned changes to procedures or operator training.	May 31, 2004
MNS containment cleanliness practices for entry into Mode 4 will be enhanced as outlined in Enclosure I.	In place prior to the next refueling outage (2EOC15, Fall 2003).

SUMMARY OF COMMITMENTS RE: BULLETIN 2003-01
CATAWBA NUCLEAR STATION

COMMITMENT	SCHEDULED DATE
Classroom training included in licensed operator requalification training will be conducted to review issues related to loss of emergency coolant recirculation capability due to sump performance issues.	Prior to December 31, 2003.
Applicable emergency procedure changes will be made based on the significance of changes to Westinghouse Owners Group Emergency Response Guidelines and the impact to procedures and operator training. Duke will supplement the response to the Bulletin with specifics of any planned changes to procedures or operator training.	May 31, 2004
The impact of starting a containment return air fan early in a small break LOCA event to avoid an auto start of containment spray will be evaluated.	December 31, 2003
Based on the review of concerns with opening the associated fan's damper and starting the fan prior to meeting normal permissives for automatic operation, emergency procedure changes will be evaluated to manually start a fan early in an event that involves a slowly increasing containment pressure. Duke will supplement the response to the Bulletin with specifics of any planned changes to procedures or operator training.	May 31, 2004
The impact of stopping one train of containment spray early in an event will be evaluated.	December 31, 2003
Based on this review, emergency procedure changes will be evaluated to stop one containment spray pump early in an event. Duke will supplement the response to the Bulletin with specifics of any planned changes to procedures or operator training.	May 31, 2004
The impact of increasing the containment spray setpoint will be evaluated.	December 31, 2003
Additional implementation activities will follow pending the results of the safety analysis. This change is being considered in order to reduce the likelihood of CSS actuation in the event of a small or medium break LOCA. Duke will supplement the response to the Bulletin with specifics of any planned changes to procedures or operator training.	May 31, 2004
Future enhancements may include procedure changes directing the refill of the RWST, and/or the use of alternate sources (such as Spent Fuel Pool inventory). These changes will be evaluated by the WOG, and any applicable procedure changes will be considered as part of response to ERG activities by March 31, 2004. Duke will supplement the response to the Bulletin with specifics of any planned changes to procedures or operator training.	May 31, 2004
Increased material accountability logs will be kept for items carried into and out of containment during normal power operations (Modes 1 through 4).	In place prior to the end of the next refueling outage (1EOC14, Fall 2003).
An inspection procedure will be developed to ensure penetrations through the crane wall that are dedicated as recirculation sump flow pathways are free of obstruction.	In place prior to the next refueling outage (1EOC14, Fall 2003).
An inspection procedure will be developed to ensure sump screen structural integrity. The procedure will contain ECCS sump acceptance criteria to insure no adverse gaps, tears or voids are present in the fine mesh screen.	In place prior to the next refueling outage (1EOC14, Fall 2003).
A special inspection of recirculation sump screen assemblies shall be performed prior to the end of the next refueling outage for each unit (1EOC14, Fall 2003 and 2EOC13, Fall 2004) to verify design documentation. Any adverse gaps or breaches found during these inspections shall be repaired prior to the end of the next refueling outage for each unit	Prior to the end of 1EOC14, Fall 2003 and 2EOC13, Fall 2004

SUMMARY OF COMMITMENTS RE: BULLETIN 2003-01
OCONEE NUCLEAR STATION

COMMITMENT	SCHEDULED DATE
New Technical Support Center (TSC) guidance regarding 1) securing Building Spray (BS) when conditions permit, 2) reducing Low Pressure Injection (LPI) flow to minimum in recirculation, and 3) transferring High Pressure Injection (HPI) to Borated Water Storage Tank (BWST) when Reactor Building Emergency Sump (RBES) blockage results in LPI pump failure will be developed.	October 1, 2003
An Operations Management Focus Item prepared and covered with each shift by the Operations Shift Manager to address the RBES clogging issue and changes to the TSC guidance document for actions in the event of RBES sump blockage will be completed.	October 31, 2003
Operator Training on Unit 1 EOP changes associated with modifications to LPI system will be completed.	December 15, 2003
Modify Unit 1 Building Spray to eliminate throttling by adding fixed system resistance. (Units 2 & 3 already complete).	1EOC-21 (Fall of 2003)
LPI modification to eliminate throttling by addition of fixed system resistance.	1EOC-21 (Fall of 2003), 2EOC20 (Spring of 2004), and 3EOC21 (Fall of 2004)
Make EOP changes for Units 2 and 3 EOPs to throttle LPI flow as described in the submittal.	December 31, 2003
Other sources of borated water such as the Spent Fuel Pool, an alternate unit's BWST, and other available sources will be evaluated for inclusion as additional operating guidance where appropriate.	December 31, 2003.
Perform flush on Unit 1 RV Annulus drain	1EOC21, Fall of 2003
Perform flush on Unit 2 RV Annulus drain.	2EOC20, Spring of 2004
Implement a Periodic Maintenance activity to perform a flush of the RV Annulus drains.	Frequency of every third refueling outage