Duke Power®
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WILLIAM R MCCOLLUM, JR.
VP, Nuclear Support
Duke Energy Corporation

Duke Power
EC07H / 526 South Church Street
Charlotte, NC 28202-1802

Mailing Address:
P. O. Box 1006 - EC07H
Charlotte, NC 28201-1006

704 382 8983
704 382 6056 fax
wrmccoll@duke-energy.com

May 27, 2004

U.S. Nuclear Regulatory Commission
Washington D.C. 20555

ATTENTION: Document Control Desk

Re: Catawba Nuclear Station Units 1 & 2
Docket Nos. 50 -413, 414

McGuire Nuclear Station Units 1 & 2
Docket Nos. 50 -369, 370

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 enclosures provide a supplement to Duke Energy Corporation's (Duke's) response to NRC Bulletin 2003-01 for the Catawba Nuclear Station (CNS) and McGuire Nuclear Station (MNS).[1] This information provides additional description of Duke's evaluation of recommended interim compensatory measures. These measures are related to the reduction of risk associated with concerns of potential containment emergency sump blockage during Emergency Core Cooling System and Containment Spray System recirculation functions.

Enclosure I provides information to satisfy commitments established in the referenced response to NRC Bulletin 2003-01. Enclosure II provides additional information in response to a request for additional information provided by NRC staff.

Enclosures I and II identify interim compensatory measures that are appropriate for CNS and MNS to implement. Duke is establishing a commitment to have each of these interim compensatory measures implemented by December 31, 2004. This implementation includes issuing the applicable procedural guidance and completion of operations staff training.

Very truly yours,

W. R. McCollum, Jr.

[1] Letter, W. R. McCollum to U.S. NRC, Duke's response to NRC Bulletin 2003-01 for the McGuire, Catawba, and Oconee Nuclear Stations, dated August 7, 2003.

A103

Enclosures

Xc w/ encls.: L. A. Reyes, Regional Administrator
U.S. Nuclear Regulatory Commission, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

J. J. Shea, Project Manger (MNS) (Addressee Only)
U.S. Nuclear Regulatory Commission
Mail Stop O-7 D11
Washington, DC 20555-0001

S. E. Peters, Project Manager (CNS) (Addressee Only)
U.S. Nuclear Regulatory Commission
Mail Stop O-8 G9
Washington, DC 20555-0001

J. B. Brady
Senior Resident Inspector
U. S. Nuclear Regulatory Commission
McGuire Nuclear Station

E. F. Guthrie
Senior Resident Inspector
U. S. Nuclear Regulatory Commission
Catawba Nuclear Station

AFFIDAVIT

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.

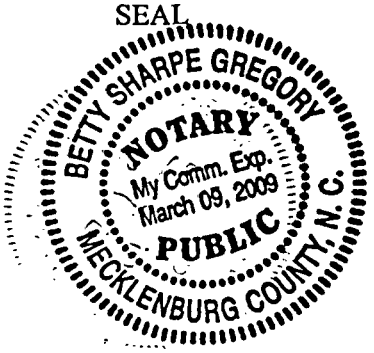
Vice President
Senior Nuclear Support

Subscribed and sworn to me: May 27, 2004
Date

Notary Public

My Commission Expires : March 9, 2009
Date

SEAL



bcc: L.F. Vaughn
M.T. Cash
R. L. Gill, Jr.
C.J. Thomas
L. A. Keller
K.L. Crane
K.E. Nicholson
G. B. Swindlehurst
H. T. Baumgardner
M. R. Weiner
M. L. Murdock
P.W. Roberson
S.C. Ballard
J.C. Bigham
Catawba Master File - 815.02
McGuire Master File - 815.02
ELL

Saluda River Electric Corporation
P.O. Box 929
Laurens, SC 29360-0929

NC Municipal Power Agency No. 1
P.O. Box 29513
Raleigh, NC 27626-0513

TR Puryear
NC Electric Membership Corporation
CN03G

Piedmont Municipal Power Agency
121 Village Drive
Greer, SC 29651

Enclosure I
Supplement to Required Responses to
NRC Bulletin 2003-01

This enclosure provides additional information as committed per Duke Energy Corporation (Duke) previously provided responses to the requested information of NRC Bulletin 2003-01, dated August 7, 2003.

Duke's response to NRC Bulletin 2003-01 is consistent with Option 2 of this bulletin, which provides information associated with implementation of recommended interim compensatory measures. These measures are related to the reduction of risk which may be associated with concerns of potential containment sump blockage during Emergency Core Cooling System (ECCS) and Containment Spray System recirculation functions.

This enclosure describes Duke's evaluations and specifics of any resulting changes to procedures or operator training for Catawba Nuclear Station (CNS) and McGuire Nuclear Station (MNS).

Commitment Items:

Item (1)
Any generic changes to the Westinghouse Owner's Group (WOG) Emergency Response Guidelines (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 be made based on the significance of change and the 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.

Response (1)
The WOG completed an evaluation of potential ERG changes to address NRC Bulletin 2003-01 recommendations. This evaluation is described in WCAP-16204, revision 1. Duke has reviewed this WCAP and determined applicable sections to include in plant specific guidance. Guidance will be included to:

- Initiate refueling water storage tank makeup following the successful transfer of ECCS and containment spray suction to the containment emergency sump (see item 5),
- Describe the symptoms of sump clogging problems, and
- Originate a response procedure to provide guidance for the potential of both trains of ECCS and containment spray being affected by containment sump blockage.

In addition to these WOG recommendations, Duke will implement the following additional procedure changes:

- Move the step to shut down a containment spray pump when no longer required to mitigate the event, to earlier in the procedure, and
- Add a step to manually start a containment air return fan to enhance air flow through the ice condenser (see item 2).

CNS and MNS will have plant specific guidance issued and associated operator training completed by December 31, 2004. This will provide full implementation of these interim compensatory measures.

Item (2)
The impact of starting a containment air return 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 air return 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 the 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.

Response (2)
Starting a containment air return fan early to initiate air flow through the ice condenser early was evaluated and determined to be beneficial for certain small break LOCAs (e.g., approximately a one half inch or less break size).

CNS and MNS will add procedure steps that direct the operator to perform a manual start of a containment air return fan. These steps will only be applicable to small break sizes where containment pressure increases from 1 psig to the containment spray setpoint at a rate that allows adequate time to take the manual action (e.g., 10 minutes). This will benefit very small LOCA cases by a reduction in the rate of containment pressure increase, which will add a delay for reaching the containment spray actuation setpoint. This will result in (a) delaying the time when transfer to the containment emergency sump occurs, and (b) an increased sump level at the time the transfer occurs due to additional ice melt.

CNS and MNS will have plant specific guidance issued and associated operator training completed by December 31, 2004. This will provide full implementation of these interim compensatory measures.

Item (3)
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.

Response (3)
The WOG has evaluated the impact of stopping one train of containment spray early in an event and has described this evaluation and conclusions in WCAP 16204, revision 1. This WCAP recommends that Ice Condenser plants not take this course of action for the following reasons:

- The Westinghouse ice condenser containment plants are especially sensitive to the single failure of the operating spray pump once ice condenser heat removal capability is exhausted. The sensitivity is driven by containment size, lower containment design pressure, and available containment heat removal systems.

- For a large-break LOCA, preliminary evaluations indicate that insufficient time would be available for the operator to respond to the loss of the operating containment spray following the exhaustion of heat removal capability by the ice condenser system.

- For a small-break LOCA, preliminary evaluations indicate sufficient time would be available for the operator to respond to the loss of the operating spray pump. This condition, however, drives

the applicability of this candidate operator action (COA) to only small-break LOCA, events that are not as challenging from the perspective of debris generation, transport, and differential pressure.

The current licensing bases for CNS and MNS take credit for two 100 percent capacity containment spray pumps. This redundancy provides a continuous source of containment spray during an event when considering a single failure. However, if a containment spray pump is shut down during its run time, a single failure would interrupt the containment spray function for a period of time until manual operator actions could restart the shutdown pump. The consequences of such a period with no containment spray are required to be considered.

While Duke believes that the safety analysis might support this strategy for CNS and MNS, this would require a significant effort to revise the current licensing basis analysis. There are two primary elements of this safety analysis, the containment pressure response analysis and the radiological exposure analysis.

Containment pressure response analysis was evaluated by performing scoping runs for an interruption of the containment spray function. These scoping runs were conservative in that the interruption of the containment spray function is modeled as a second failure, and this occurred at the time immediately following depletion of the ice bed. These runs estimated that with an approximately 4 minute time period to successfully restart the intentionally secured train of containment spray, that the containment peak pressure will be maintained within the 15 psig design pressure of containment. These runs estimated that if this restart time was extended to 15 minutes, containment peak pressure would exceed the design pressure by about 2.5 psig. In this 15 minute restart case, containment pressure is restored to below the design pressure in approximately 18 minutes following successful restart of the containment spray train.

Radiological exposure analysis was evaluated and concluded that existing licensing basis methodology for performing this analysis will not support this proposed interruption to the containment spray function. However, it is expected that an analysis using an alternate source term (AST) methodology might support a 15 minute period of time to successfully restart a containment spray train. CNS is seeking approval of AST methodology and is currently awaiting approval of this license amendment request (LAR). MNS is also seeking approval of AST methodology and is expecting to have a LAR submitted this summer.

The effort to revise this safety analysis is substantial. It is not expected that this effort could be completed within the interim period of time intended for use of this compensatory measure. Duke has considered an option of submitting an exemption request from those requirements that impose the single failure criterion. Similar to the effort to complete safety analysis revisions, this would likely require an extensive effort to justify such an exemption, which would also result in this option not being feasible considering the interim time period which this compensatory measure is intended.

Therefore, CNS and MNS do not plan to pursue this option as an interim compensatory action.

Item (4)
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. The change is being considered in order to reduce the likelihood of containment spray system 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.

Response (4)
Duke has completed an evaluation of the impact of increasing the containment spray setpoint for CNS and MNS. The strategy proposed by WCAP-16204, revision 1 is to delay or prevent auto-start of containment spray by modification of the actuation logic or raising of the containment spray setpoint.

One obstacle to raising the containment spray setpoint is that it cannot be supported by the existing licensing basis radiological exposure analysis for the design basis LOCA. This safety analysis takes credit for the operation of containment spray to mitigate the consequences of the accident. Duke's evaluation concluded that the current licensing basis methodology for performing this safety analysis is not expected to be capable of supporting such a modification of the containment spray setpoint.

However, it is expected that analysis using an AST methodology would support a delayed auto-start of containment spray. CNS is seeking approval of AST methodology and is currently awaiting approval of this LAR. MNS is also seeking approval of AST methodology and is expecting to have a LAR submitted this summer.

Duke has determined that sufficient time will not be available to enable completion of the analysis, plant modifications, procedure changes, and operator training within the time period that these interim compensatory measures are intended to be utilized.

Therefore, this strategy will not be pursued as an interim compensatory measure.

Item (5)
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 by May 31, 2004 with the specifics of any planned changes to procedures or operator training.

Response (5)
A preliminary review has concluded that it is acceptable to allow a partial refill of the refueling water storage tank. This refill would occur after successful transfer to the containment emergency sump. Appropriate limitations on the volume of this refill will include consideration for any potential leakage through closed ECCS and containment spray system valves. Determination of these limitations will consider:

- The effect of the additional water on sump pH and therefore iodine partitioning.
- The effect of the additional water on the sump water boron concentration and cold leg recirculation.
- The maximum flood level in containment and equipment lost due to flooding.

For beyond design basis events, where both trains of ECCS are affected by containment sump blockage, refueling water storage tank makeup will be performed as necessary to maintain core cooling. This

procedure provision will be incorporated into a response procedure that is described in item 1 of this enclosure.

CNS and MNS will modify procedures to include steps for refueling water storage tank refill and to complete the associated training of Operations personnel by December 31, 2004. This will provide full implementation of these interim compensatory measures.

Enclosure II
CANDIDATE OPERATOR ACTION (COA) EVALUATIONS
From WCAP-16204, Rev. 1 March 2004

The NRC staff has requested additional information associated with Duke's response to NRC Bulletin 2003-01. Subsequent discussions with NRC staff clarified that the requested information was applicable to recommended Candidate Operator Actions (COA) described in Westinghouse Owners Group (WOG) WCAP-16204, revision 1. The following is a restatement of the request for additional information.

In your supplemental response, please provide:

1. A discussion of the evaluations or analyses performed to determine that these compensatory measures are acceptable for your plant, and provide technical justification for those compensatory measures not being implemented.
2. Include a detailed discussion of procedures being modified
3. Operator training being implemented
4. The schedule for implementing the compensatory measures

The major headings below are numbered to match the Candidate Operator Actions (COA) described in Westinghouse Owners Group (WOG) WCAP-16204, revision 1.

The comments under each are numbered to match the applicable four RAI item(s) above.

A1a-CE – Candidate Operator Action 1A – Combustion Engineering Plants Operator Action to Secure One Spray Pump –

1. This COA is not applicable to Westinghouse plants.

A1a-W – Candidate Operator Action 1A – Westinghouse Plants Operator Action to Secure One Spray Pump

1. This issue will be addressed under A1a-Ice Addendum.

A1a-Ice Addendum – Candidate Operator Action 1A –Westinghouse Ice Condenser Plants Operator Action to Secure One Spray Pump

1. Catawba and McGuire have no plans to secure one spray pump since WOG guidance states the following:

   "However, in general, implementation of this step is not recommended for plants with ice condenser containment cooling systems for the following reasons:

   - The Westinghouse ice condenser containment plants are especially sensitive to the single failure of the operating spray pump once ice condenser heat removal capability is exhausted. The sensitivity is driven by containment size, lower containment design pressure, and available containment heat removal systems.

- For a large-break LOCA, preliminary evaluations indicate that insufficient time would be available for the operator to respond to the loss of the operating containment spray following the exhaustion of heat removal capability by the ice condenser system.

- For a small-break LOCA, preliminary evaluations indicate sufficient time would be available for the operator to respond to the loss of the operating spray pump. This condition, however, drives the applicability of this COA to only small-break LOCA, events that are not as challenging from the perspective of debris generation, transport, and differential pressure.

The current licensing bases for CNS and MNS take credit for two 100 percent capacity containment spray pumps. This redundancy provides a continuous source of containment spray during an event when considering a single failure. However, if a containment spray pump is shut down during its run time, a single failure would interrupt the containment spray function for a period of time until manual operator actions could restart the shutdown pump. The consequences of such a period with no containment spray are required to be considered.

While Duke believes that the safety analysis might support this strategy for CNS and MNS, this would require a significant effort to revise the current licensing basis analysis. There are two primary elements of this safety analysis, the containment pressure response analysis and the radiological exposure analysis.

Containment pressure response analysis was evaluated by performing scoping runs for an interruption of the containment spray function. These scoping runs were conservative in that the interruption of the containment spray function is modeled as a second failure, and this occurred at the time immediately following depletion of the ice bed. These runs estimated that with an approximately 4 minute time period to successfully restart the intentionally secured train of containment spray, that the containment peak pressure will be maintained within the 15 psig design pressure of containment. These runs estimated that if this restart time was extended to 15 minutes, containment peak pressure would exceed the design pressure by about 2.5 psig. In this 15 minute restart case, containment pressure is restored to below the design pressure in approximately 18 minutes following successful restart of the containment spray train.

Radiological exposure analysis was evaluated and concluded that existing licensing basis methodology for performing this analysis will not support this proposed interruption to the containment spray function. However, it is expected that an analysis using an alternate source term (AST) methodology might support a 15 minute period of time to successfully restart a containment spray train. CNS is seeking approval of AST methodology and is currently awaiting approval of this license amendment request (LAR). MNS is also seeking approval of AST methodology and is expecting to have a LAR submitted this summer.

The effort to revise this safety analysis is substantial. It is not expected that this effort could be completed within the interim period of time intended for use of this compensatory measure. Duke has considered an option of submitting an exemption request from those requirements that impose the single failure criterion. Similar to the effort to complete safety analysis revisions, this would likely require an extensive effort to justify such an exemption, which would also result in this option not being feasible considering the interim time period which this compensatory measure is intended.

Therefore, CNS and MNS do not plan to pursue this option as an interim compensatory action.

A1b – Candidate Operator Action 1B Operator Action to Secure Both Spray Pumps

1. CNS and MNS cannot add procedure steps for securing both Containment Spray trains during an event. See logic for A1a- Ice Addendum. CNS and MNS are ice condenser plants, and do not have containment fan coolers. Containment fan coolers are an important component of the WCAP recommendation to secure both trains. Also, containment spray from at least one train is assumed in the current radiological exposure analysis.
2. However, CNS and MNS will move the existing steps in the applicable procedures to allow containment spray shutdown to earlier in the sequence. This step only allows the shutting down of containment spray trains when no longer required to mitigate the accident.
3. Plant specific guidance will be issued and operator training completed by December 31, 2004.
4. These interim compensatory measures will be implemented by December 31, 2004.

A2 – Candidate Operator Action 2 Manually Establish One Train of Containment Sump Recirculation Prior to Automatic Actuation

1. This strategy is not usable for either CNS or MNS and will not be implemented. Physical piping layout prevents separating the suction piping for the charging / safety injection pumps. Also, the time available is not sufficient to perform such a manual action due to the limited time between achieving adequate containment sump level and the initiation of automatic swapover.

A3-CE – Candidate Operator Action 3 – Combustion Engineering Plants Terminate One Train of HPSI/High-Head Injection After Recirculation Alignment

1. This COA is not applicable to Westinghouse Plants.

A3-W – Candidate Operator Action 3 – Westinghouse Plants Terminate One Train of Safety Injection After Recirculation Alignment

1. This is not within the CNS and MNS licensing basis. The safety analysis for CNS and MNS does not include a provision for time without ECCS flow. CNS and MNS do not plan to pursue this COA since the benefit related sump blockage does not appear to outweigh the increased risk associated with core cooling.

A4 – Candidate Operator Action 4 Early Termination of One LPSI/RHR Pump Prior to Recirculation Alignment

1. This COA is not applicable to CNS and MNS. Although not designated as such by identifier, this item is specific to Combustion Engineering Plants.

A5 – Candidate Operator Action 5 Refill of Refueling Water Storage Tank

1. A preliminary review has concluded that it is acceptable to allow a partial refill of the refueling water storage tank. This refill would occur after successful transfer to the containment emergency sump. Appropriate limitations on the volume of this refill will include consideration for any potential leakage through closed ECCS and containment spray system valves. Determination of these limitations will consider:
   - The effect of the additional water on sump pH and therefore iodine partitioning.
   - The effect of the additional water on the sump water boron concentration and cold leg recirculation.
   - The maximum flood level in containment and equipment lost due to flooding.

   For beyond design basis events, where both trains of ECCS are affected by containment sump blockage, refueling water storage tank makeup will be performed as necessary to maintain core cooling.

2. CNS and MNS will modify procedures to include steps for refueling water storage tank refill by December 31, 2004.
3. CNS and MNS will modify training of Operations personnel related to procedure changes to include steps for refueling water storage tank refill by December 31, 2004.
4. These interim compensatory measures will be implemented by December 31, 2004.

A6 – Candidate Operator Action 6 Inject More Than One RWST Volume From a Refilled RWST or by Bypassing the RWST

1. Injecting more than one refueling water storage tank volume will only be performed for a beyond design basis event resulting where both trains of ECCS are affected by containment sump blockage. Intentionally injecting more than one refueling water storage tank volume has a potential to place the plant in a condition beyond those conditions of design basis accident analysis. This COA will not be employed as an interim compensatory measure. See response for COA "A5" above.

A7 – Candidate Operator Action 7 Provide More Aggressive Cooldown and Depressurization Following A Small Break LOCA

1. Not applicable to CNS or MNS, which are Westinghouse Plants. Although not designated as such by identifier, this item is specific to Combustion Engineering Plants as described by the WCAP introduction to the discussion of the item. The introduction includes the statement "This evaluation applied only to the Combustion Engineering Emergency Procedure Guidelines (EPGs). The Westinghouse Emergency Response Guidelines (ERGs) already address maximizing the cooldown rate up to the Technical Specification limit."

A8-CE – Candidate Operator Action 8 – Combustion Engineering Plants Provide Guidance on Symptoms and Identification of Containment Sump Blockage

1. This COA is only applicable to Combustion Engineering plants.

A8-W – Candidate Operator Action 8 – Westinghouse Plants Provide Guidance on Symptoms and Identification of Containment Sump Blockage

1. CNS/MNS will develop guidance to operators for identifying signs of sump blockage within certain emergency operating procedures and the associated plant transitions to the plant adaptation of the Westinghouse Owner's Group Sump Blockage Control Room Guideline.
2. CNS and MNS commit to upgrade procedures in this area by December 31, 2004.
3. Operation's training for COA Item A8-W will be completed by December 31, 2004.
4. These interim compensatory measures will be implemented by December 31, 2004.

A9-CE – Candidate Operator Action 9 – Combustion Engineering Plants Develop Contingency Actions in Response to: Containment Sump Blockage, Loss of Suction, and Cavitation

1. This COA is not applicable to Westinghouse plants.

A9-W – Candidate Operator Action 9 – Westinghouse Plants Develop Contingency Actions in Response to: Containment Sump Blockage, Loss of Suction, and Cavitation

1. CNS and MNS will develop contingency actions for operators in response to containment sump blockage, loss of suction or cavitation within certain emergency operating procedures based on the WOG Sump Blockage Control Room Guideline.
2. CNS and MNS commit to upgrade procedures in this area by December 31, 2004.
3. Procedures and Operations training will be completed for COA Item A9-W by December 31, 2004.
4. These interim compensatory measures will be implemented by December 31, 2004.

A10 – Candidate Operator Action 10 Early Termination of One Train of HPSI/High-Head Injection Prior to Recirculation Alignment (RAS)

1. This COA is not applicable to CNS or MNS. Although not designated as such by identifier, this item is specific to Combustion Engineering Plants.

A11 – Candidate Operator Action 11 Prevent or Delay Containment Spray for Small Break LOCAs (<1.0 Inch Diameter) in Ice Condenser Plants

1. The strategy proposed by the WCAP is to delay or prevent autostart of containment spray by modification of the actuation logic or raising the containment spray setpoint.

   One obstacle to raising the containment spray setpoint is that it cannot be supported by the existing licensing basis radiological exposure analysis for the design basis LOCA. This safety analysis takes credit for the operation of containment spray to mitigate the consequences of the accident. Duke's evaluation concluded that the current licensing basis methodology for

performing this safety analysis is not expected to be capable of supporting such a modification of the containment spray setpoint.

However, it is expected that analysis using an alternate source term (AST) methodology would support a delayed auto-start of containment spray. CNS is seeking approval of AST methodology and is currently awaiting approval this LAR. MNS is also seeking approval of AST methodology and is expecting to have a LAR submitted this summer.

Duke has determined that sufficient time will not be available to enable completion of the analysis, plant modifications, procedure changes, and operator training within the time period these interim compensatory measures are intended to be utilized.

Therefore, this strategy will not be pursued as an interim compensatory measure.