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Constellation Energy
Nuclear Group

October 14, 2008

U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

ATTENTION: Document Control Desk

SUBJECT: Nine Mile Point Nuclear Station
Unit Nos. 1 & 2; Docket Nos. 50-220 & 50-410

Nine-Month Response to NRC Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems"

REFERENCES:

(a) NRC Generic Letter 2008-01, January 11, 2008, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems"

(b) Letter from Mr. K. J. Polson (NMPNS) to Document Control Desk (NRC), October 6, 2008, "Revised Three-Month Response to NRC Generic Letter 2008-01, Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems"

The Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 2008-01, Reference (a), to request that each licensee evaluate the licensing basis, design, testing, and corrective action programs for the Emergency Core Cooling Systems, Residual Heat Removal System, and Containment Spray System, to ensure that gas accumulation is maintained less than the amount that challenges operability of these systems, and that appropriate action is taken when conditions adverse to quality are identified.

The generic letter requested each licensee to submit a written response in accordance with 10 CFR 50.54(f) within nine months of the date of the GL.

As committed in Reference (b), Nine Mile Point Nuclear Station, LLC (NMPNS) will complete its evaluations of the inaccessible portions of these systems/functions for Nine Mile Point Unit 1 during the next refueling outage and provide a supplement to this report with those results within 90 days following startup from that outage.

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Attachment (1) to this letter contains the NMPNS nine-month response to NRC GL 2008-01. Attachment (2) contains regulatory commitments identified in this submittal.

Should you have any questions regarding the information in this submittal, please contact Terry F. Syrell, Licensing Director, at 315-349-5219.

Very truly yours,

STATE OF NEW YORK :
: **TO WIT:**
COUNTY OF OSWEGO :

I, Keith J. Polson, being duly sworn, state that I am Vice President Nine Mile Point, and that I am duly authorized to execute and file this response on behalf of Nine Mile Point Nuclear Station, LLC. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other Nine Mile Point employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.

Subscribed and sworn before me, a Notary Public in and for the State of New York and County of Oswego, this 14th day of October, 2008.

WITNESS my Hand and Notarial Seal:

Notary Public

My Commission Expires:

10-25-09
Date

SANDRA A. OSWALD
Notary Public, State of New York
No. 01OS6032276
Qualified in Oswego County
Commission Expires 10-25-09

KJP/KSE

Attachments: (1) Nine Mile Point Nuclear Station Units 1 and 2 Nine-Month Response to NRC Generic Letter 2008-01

(2) List of Regulatory Commitments

cc: R. Guzman, NRC
S. J. Collins, NRC
Resident Inspector, NRC

ATTACHMENT (1)

NINE MILE POINT NUCLEAR STATION UNITS 1 AND 2

NINE-MONTH RESPONSE TO NRC GENERIC LETTER 2008-01

ATTACHMENT (1)

NINE MILE POINT NUCLEAR STATION UNITS 1 AND 2
NINE-MONTH RESPONSE TO NRC GENERIC LETTER 2008-01

This Attachment contains the Nine Mile Point Nuclear Station, LLC (NMPNS) Unit 1 and Unit 2 (NMP1 and NMP2) nine-month response to NRC Generic Letter (GL) 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems."

The following information is provided in this response:

a) A description of the results of evaluations that were performed pursuant to the actions requested by the generic letter. This description includes information to demonstrate compliance with the quality assurance criteria in Sections III, V, XI, XVI, and XVII of Appendix B to 10 CFR Part 50 and the licensing basis and operating license.

b) A description of any corrective actions we determined necessary to ensure compliance with the quality assurance criteria in Sections III, V, XI, XVI, and XVII of Appendix B to 10 CFR Part 50 and the licensing basis and operating license with respect to the systems in question.

c) A statement regarding which corrective actions have been completed, the schedule for the corrective actions not yet complete, and the basis for that schedule.

The following systems were determined to be in the scope of the GL (hereinafter referred to as the "subject systems"):

NMP1
- Shutdown Cooling
- Core Spray (Emergency Core Cooling System, ECCS)
- Containment Spray

NMP2
- High Pressure Core Spray (ECCS)
- Low Pressure Core Spray (ECCS)
- Residual Heat Removal system modes of operation:
  - Low Pressure Coolant Injection (ECCS)
  - Shutdown Cooling
  - Suppression Pool Cooling
  - Containment Spray

Based on the below information, the subject systems at NMP1 and NMP2 are in compliance with the Technical Specification definition of Operable, i.e., capable of performing their specified functions. Additionally, NMP1 and NMP2 are currently in compliance with 10 CFR 50, Appendix B, Criterion III, V, XI, XVI and XVII, with respect to the concerns outlined in GL 2008-01 regarding gas accumulation in the accessible portions of the subject systems. As committed in Reference (a), NMP1 will complete its evaluations of the inaccessible portions of these systems during the next refueling outage and provide a supplement to this report with those results within 90 days following startup from that outage.

A. EVALUATION RESULTS

1. Licensing Basis Evaluation

The NMP1 and NMP2 licensing bases were reviewed with respect to gas accumulation in the subject systems. This review included the Technical Specifications (TS), TS Bases, Updated Final Safety Analysis Report (UFSAR), the Technical Requirements Manual (TRM) and TRM Bases, responses to NRC generic communications, NRC Commitments, and License Conditions.

There were no weaknesses or deficiencies in meeting regulatory requirements or commitments identified.

There were no deficiencies found in the Licensing Bases documentation.

The following is a summary of the Licensing Bases references with respect to gas accumulation:

a. Technical Specifications (TS) and TS Bases:

1. NMP1 TS and TS Bases

   The NMP1 Core Spray System TS Surveillance Requirement (SR) 4.1.4.g requires:

   > At least once per month when the reactor coolant temperature is greater than 212°F, verify that the piping system between isolation valves is filled with water.

2. NMP2 TS and TS Bases

   Section 3.5 of the Technical Specifications addresses ECCS systems, including the following systems within the scope of the GL: High and Low Pressure Core Spray Systems and the Low Pressure Coolant Injection System.

   Specifically, TS SRs 3.5.1.1 (ECCS-Operating) and 3.5.2.3 (ECCS-Shutdown) state:

   > Verify, for each ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve. (31 days)

   The TS Bases for TS SR 3.5.1.1 and 3.5.2.3 state:

   > The flow path piping has the potential to develop voids and pockets of entrained air. Maintaining the pump discharge lines of the HPCS System, LPCS System, and LPCI subsystems full of water ensures that the systems will perform properly, injecting their full capacity into the RCS upon demand. This will also prevent a water hammer following an ECCS initiation signal. One acceptable method of ensuring the lines are full is to vent at the high points. The 31-day Frequency is based on operating experience, on the procedural controls governing system operation, and on the gradual nature of void buildup in the ECCS piping.

b. Technical Requirements Manual (TRM)

NMP1 does not have a TRM and the NMP2 TRM does not address gas accumulation issues.

c. Updated Final Safety Analysis Report (UFSAR)

The NMP1 and NMP2 UFSARs were reviewed for information on gas voiding. The following sections contain information relevant to the GL:

1. NMP1 UFSAR

   (a) Section VII-A, Core Spray System, Section 2.1 and Section 4.0. These sections address gas accumulation issues associated with the core spray system and discuss core spray loop high point vents, the keep-full system (to allow testing of isolation valves at full power), and related tests and inspections.

2. NMP2 Updated Safety Analysis Report (USAR)

   (a) Section 1.12, Generic Licensing Issue #9 applies to gas accumulation issues. It addresses an initial licensing issue with pressure switches installed to ensure full High Pressure Core Spray, Low Pressure Core Spray, and Low Pressure Coolant Injection lines that questioned the ability to detect voids at the top of the piping in these systems. NMP2 uses ultrasonic level switches and control room indication.

   (b) Section 1.13, Unit 2 Position on Unresolved Safety Issues. This section provides a discussion on "Issue: A-1 - Water Hammer."

   (c) Section 5.4.7, Residual Heat Removal System (RHR). This section describes the design and operational controls to prevent gas accumulation issues from impacting the NMP2 Low Pressure Coolant Injection system. Additionally, this section describes the operation of the Steam Condensing mode of RHR and its design attributes that assure steam/water hammer issues do not become a concern. It further describes gas accumulation issues associated with securing the Steam Condensing mode of operation and subsequent operation in the Low Pressure Coolant Injection mode.

   (d) Section 6.3, Emergency Core Cooling Systems (ECCS) Section 6.3.2.2.5. This section discusses the ECCS Discharge Line Keep-Fill System.

d. Correspondence

A search of correspondence related to issues addressed in GL 2008-01 was performed. There were no issues identified as a result of the review.

e. Regulatory Commitments

A search of regulatory commitments related to issues addressed in GL 2008-01 was performed. Beyond the items described above, no additional regulatory commitments were identified.

f. License Conditions

A review of License Conditions related to issues addressed in GL 2008-01 was performed. No related license conditions were identified for NMP1 or NMP2.

g. Corrective Actions

No corrective actions were required as a result of the current licensing basis document review.

The industry Technical Specification Task Force is developing Technical Specifications surveillance(s) to address detection of gas voiding in the systems of concern. Upon completion and NRC approval of the new industry generic Technical Specifications currently under development by the Technical Specification Task Force, NMPNS will review these requirements and submit License Amendment Requests for NMP1 and NMP2, as appropriate. Refer to Attachment (2), List of Regulatory Commitments.

2. Design Evaluation

The NMP1 and NMP2 design bases were evaluated with respect to gas accumulation in the subject systems.

These evaluations are summarized below and included design basis documents, calculations, engineering evaluations and vendor technical manuals.

a. Design Bases Document Reviews

NMP1

The Containment Spray system piping is voided by design from the discharge side of the Containment Spray pump (from the level of the torus volume) to the spray nozzles inside containment. The containment spray pump automatically initiates on signal from the Reactor Protection System (RPS) on low-low reactor water level and high drywell pressure. The pump takes suction from the torus through the ECCS suction strainers, the 12-inch containment spray line, and the motor operated suction isolation valve. The flow exits the heat exchanger through the air operated inlet isolation valve and inlet check valve to the drywell primary loop spargers. Other than the opening of the inlet check valves, no valve actuations are required to initiate Containment Spray.

The Core Spray System piping upstream of the outboard isolation check valves down to the elevation of the normal torus water level is voided by design. The piping has been shown by multiple tests not to be susceptible to water hammer loads. That is, the staggered pump starts limit water acceleration through the system. The minimum flow line relief valve lifting at the established setpoint dissipates hydraulic energy. Additionally, the nitrogen present in the system

prior to the pipe filling with water provides a cushion for energy absorption. Operational controls for mitigation of water hammer upon system starts have been developed. A keep-fill system keeps the Core Spray piping between the inside isolation valves and the outboard isolation check valve full of water during power operation. Keeping this piping filled with water permits surveillance testing (stroke time measurement) of the inside isolation valves with the reactor at power.

A design change installed new strainers on the Core Spray and Containment Spray suction piping that can accommodate the volume of insulation debris generated during a Loss of Coolant Accident (LOCA). The replacement strainers were installed in response to NRC Bulletin 96-03. Testing performed per NUREG/CR-2772 determined that there was zero or nearly zero air-withdrawal or vortices formed when the Froude number was less than or equal to 0.8 for any of the tested configurations. Given that the calculated Froude numbers for the NMP1 Core Spray and Containment Spray strainers are less than 0.8 and the strainer modules are designed with an equal approach velocity, air will not be ingested into the Core Spray and Containment Spray strainers from the torus water surface.

An evaluation was performed to determine if the bubbles formed in the NMP1 torus during a LOCA or a Safety-Relief Valve (SRV) discharge present a challenge to the operation of the Core Spray and Containment Spray systems taking suction from the torus. The LOCA air bubble lasts only a fraction of a second which does not coincide with the ECCS pump operation unless the Core Spray System is in test mode, or the Containment Spray System is in torus cooling/test mode. For this reason, NMP1 enters an LCO for surveillance testing and torus cooling. For SRV discharge, the evaluation indicates that air bubble ingestion is not possible based on bubble rise rates and strainer location relative to the SRV bubble.

There were no vulnerabilities identified during the system design basis document review.

NMP2

The ECCS piping is evaluated for water hammer loads. The calculations assume voided pipe downstream of the outboard isolation valves.

During a Loss of Offsite Power (LOOP) concurrent with a LOCA, the ECCS keep-fill pumps will stop running due to loss of power, until power is restored. If check valves were to leak, it is possible to form a void upstream of the injection valves. The water hammer loads that may occur during the ECCS injection mode initiation in a LOOP+LOCA were evaluated. Fluid transient loads associated with this void are bounded by design fluid transient loads.

A calculation has been performed that evaluates the potential for air ingestion in the ECCS lines resulting from a LOCA/Main Steam Line Break (MSLB) event. The non-condensable gases in the drywell and wetwell air space are forced into the suppression pool immediately following LOCA/MSLB initiation, yielding an elevated suppression pool level (pool swell) for a period of several seconds. The ECCS systems actuate within seconds to mitigate the consequences of a LOCA/MSLB event. Therefore, it is necessary to ensure the ECCS pumps do not ingest quantities of non-condensables that could compromise the systems' design functions. The conclusion of the calculation is that although air ingestion cannot be completely eliminated, whatever ingestion occurs will be limited in quantity and will be for a limited duration. The effect of air ingestion will not be detrimental to ECCS operation.

The probability for gas intrusion due to a debris-laden ECCS suction strainer is very low. The method used to determine debris loading is accepted by the NRC Safety Evaluation Report for NEDO-32686, Utility Resolution Guidance (URG) Document for ECCS Suction Strainer Blockage, dated August 1998. Calculations evaluated the head loss for the ECCS suction strainers and determined that sufficient NPSH margin exists. In accordance with NUREG-0869 and NUREG-0897, an increase in the pump NPSH requirement is not required if the level of air ingestion into the suction line is zero. The submergence depth of ECCS suction lines in the suppression pool is adequate to prevent vortex formation from adversely affecting ECCS pump performance. The potential for gas intrusion due to debris laden suction strainer geometry has been addressed in calculations.

There were no vulnerabilities identified during the system design basis document review.

b. New Applicable Gas Volume Acceptance Criteria

As a result of this evaluation, NMPNS did not develop new gas volume acceptance criteria for any specific piping segments in any system where gas can accumulate. NMPNS's position is that system piping shall be maintained sufficiently full of water to support operability. If a void is detected during surveillance testing or other activities, then it will be evaluated in accordance with the corrective action program.

c. Required Design Basis Document Changes (Corrective Actions)

One design basis document change has been identified and entered in the Corrective Action Program for follow up:

The NMP2 calculation related to LOCA analysis input parameters requires revision to address the impact on injection flow rates due to voided piping found in the Low Pressure Core Spray piping at the outside containment isolation valve. Design flow injection rates will not be affected due to the voiding since significant margin exists in the LOCA analyses. Refer to Attachment (2), List of Regulatory Commitments.

d. System P&ID And Isometric Drawing Reviews

System piping and instrument diagrams (P&IDs) and isometric drawings were reviewed to identify all system vents and high points. No issues were identified.

e. System Confirmation Walkdowns

All system piping under the scope of the GL has been walked down and inspected with the exception of walkdowns inside the NMP1 drywell, which will be completed during the spring 2009 refuel outage. Refer to Attachment (2), List of Regulatory Commitments.

1. Scope of the Walkdowns

   Walkdowns and inspections involving pipe slope verification and void detection ultrasonic testing (UT) measurements were performed on accessible piping. These inspections were performed to verify proper pipe slope, identify local high points, confirm that vents are

installed in the correct location and at the correct orientation, and to detect if voids exist in those areas identified as susceptible to gas accumulation.

2. Method of Walkdowns Performed at NMP1 and NMP2

At NMP1, the Core Spray and Containment Spray piping is not insulated. The only system within the scope of the GL that is insulated at NMP1 is the Shutdown Cooling piping. At NMP2, all the systems within the scope of the GL are insulated, except for the High Pressure Core Spray piping. Due to radiological dose and equipment qualification concerns (e.g., heat load), walkdowns were performed without removing insulation.

The following process was used to determine accuracy of pipe slope measurement with insulation in place:

- Four different pipe lines were selected to perform slope measurements. Pipes were selected based on size, variety and accessibility.
- A zip level (Ziplevel PRO-2000) was used to measure heights at different sections along the pipe by contacting the insulation with a probe from the bottom. The measurements were taken twice at each point to verify accuracy.
- The measurements were repeated with the insulation removed and direct pipe contact achieved at the same location as the first measurements with the insulation installed.

Recognizing there is a potential for a nonconservative variance between slope measurements when insulation is installed and when it is removed, NMPNS established a maximum variance between slope measurements of 0.3" when insulation is installed and when it is removed. This value is based on known tolerances for the insulation and measuring equipment accuracy. The 0.3" potential variance was addressed in the assessment of walkdown data.

3. Plant Walkdowns Performed at NMP1 and NMP2

NMP2 Spring 2008 Refuel Outage (N2R11)

Walkdowns of subject systems inside the NMP2 drywell were performed during the 2008 spring refuel outage. The walkdowns included Low Pressure Coolant Injection A, B, and C, Shutdown Cooling A and B, Low Pressure Core Spray, and High Pressure Core Spray. There were no discrepancies identified between as-built field conditions and the drawings relevant to gas accumulation. No significant new high points were found. Ultrasonic Testing (UT) was performed in susceptible locations. Except for the voids described below, all the locations where UTs were performed verified the piping to be full of water.

There were no other vulnerabilities identified during the refuel outage system walkdowns.

Balance of NMP1 and NMP2 Walkdowns

Walkdowns performed after the NMP2 spring 2008 refuel outage (excluding NMP1 inaccessible locations inside the drywell) included Core Spray, Containment Spray and Shutdown Cooling for NMP1 and Low Pressure Core Spray, High Pressure Core Spray and

the following modes of Residual Heat Removal for NMP2: Low Pressure Coolant Injection, Containment Spray, Shutdown Cooling, and Suppression Pool Cooling.

In locations where new high points were found, an evaluation was performed for acceptability. Industry guidance was used to ensure the minor slope variances would not be a significant gas accumulation or water hammer concern. For areas of concern, supplemental inspections will be performed. Procedural changes will be implemented to require pump runs to sweep out small air pockets, prior to restoring ECCS systems after maintenance. Refer to Attachment (2), List of Regulatory Commitments.

4. Discussion of Identified Voids.

Based on UTs performed, voids were identified in the subject systems at NMP1 and NMP2. None of the voids impacted operability of the subject systems. The identified voids are discussed below.

NMP1 Identified Voids

Shutdown Cooling - Seven locations were identified in the NMP1 Shutdown Cooling System where voids were found. These voids existed due to the significant period of time that the Shutdown Cooling System is not used after plant startup. The potential exists for air in-leakage due to drain valve leakage and valve packing leaks, or due to less than adequate venting during system initiation. The system does not have a keep-fill system that maintains lines full.

The Shutdown Cooling System does not have any automatic initiation signals. The system is manually placed in service by throttling open valves, which mitigates the potential for flow transients. To prevent flow induced system damage, procedural enhancements have been made to ensure Shutdown Cooling suction and discharge piping is vented and filled prior to placing the system in service. There is no impact on operability of the Shutdown Cooling System. During a plant shutdown (no later than 2009 refuel outage), ultrasonic testing will be performed at susceptible locations to assess system venting prior to placing the system in service. Refer to Attachment (2), List of Regulatory Commitments.

NMP2 Identified Voids

Low Pressure Core Spray pump discharge line – A small void was found downstream of the outboard isolation valve; however, voiding of piping inside the containment penetration could not be ruled out. No vent valves exist downstream of the containment isolation valve. The potential exists that after completion of all required system testing after an outage, some amount of voiding (trapped air) could remain downstream of the outside containment isolation valve due to lack of adequate venting capability. The voiding found at the location of the outside containment isolation valve is addressed by the existing water hammer analysis, which assumes voiding downstream of the outboard isolation valve (calculation assumes trapped air to within approximately one foot of the reactor pressure vessel). Design flow injection rates will not be affected due to the voiding since significant margin exists in LOCA analyses. Interim results of the follow-up UT performed in August 2008 identified the piping to be full upstream and downstream of the outside containment isolation valve. A vent valve will be installed downstream of the outside containment isolation valve during the

NMP2 2010 spring refuel outage to enhance system venting. To trend the existing voiding at the outside containment isolation valve, follow-up UTs will be performed with the results evaluated to determine the need for further action. Refer to Attachment (2), List of Regulatory Commitments.

Low Pressure Core Spray line upstream of restricting orifice – A small void was found. The piping is analyzed for water hammer loads. The minor voiding found in the discharge piping, at the location of the restricting orifice, is not significant enough to impact system design flow injection rates and is not a water hammer concern. A follow up UT was performed and no voiding was detected.

Low Pressure Core Spray pump suction – The line upstream of the pump suction isolation valve and downstream of the suppression pool suction isolation valve at elevation 195' was found partially voided with a medium sized void. This is a horizontal portion of pipe located at the suction of the Low Pressure Core Spray pump near the suppression pool. During the 2008 refuel outage, suppression pool level was reduced to ~ 195' at the end of the refuel outage to accommodate vessel drain down inventory. This reduction in suppression pool water level could have contributed to voiding of a portion of the suction piping at the ~ 195' elevation. The normal suppression pool water level is greater than 20' above the pump suction nozzle, which provides significant NPSH. Operability of the Low Pressure Core Spray System was not impacted due to its medium size, being localized in a short section of pipe and being far away from the pump suction.

The Low Pressure Core Spray System suction piping at the location of the void was filled and vented. Subsequently, the pump was successfully operated. Follow-up UT performed indicated the line was full of water. The pump was considered fully operational to meet design requirements. The successful filling and venting of the Low Pressure Core Spray piping and assessment performed indicated that no operability issues existed with respect to Low Pressure Core Spray pump operation.

Due to similarity of physical locations in relationship to the suppression pool, when the suppression pool level is lowered to ~195' in support of refuel outage activities, this voiding could also occur in other ECCS systems. However, no voids were found in these systems when the UTs were performed. Review of operating data indicates that the other ECCS system pump, were operated before the UTs were performed, likely sweeping away any voids, if they existed.

The reduction in elevation of the Suppression Pool level during the refuel outage to accommodate reactor vessel inventory drain down could have contributed to voiding of a portion of the Low Pressure Core Spray suction piping at the ~ 195' elevation. To address this issue, procedures will be revised to verify suction piping for ECCS systems is full when Suppression Pool level is restored to above 199.5'. Refer to Attachment (2), List of Regulatory Commitments.

Residual Heat Removal (RHR) "A" Discharge Line – The 12-inch diameter line upstream of a check valve was found partially voided with a medium sized void. The void was potentially caused by inadequate filling and venting during the NMP2 spring 2008 refueling outage. The voided area is not significant enough to be a water hammer concern since shutdown cooling is manually placed in service with reactor pressure less than 130 psig. This

line has a design pressure of 1550 psig. Other locations of Loop 'A' RHR that were UT inspected did not identify any issues of voided piping. During normal plant operation, this segment of the piping is isolated by the Shutdown Cooling return outside containment isolation valve. The RHR pump flow is sufficiently high (7450 gpm rated) such that the void formed will be flushed into the recirculation piping/reactor vessel when the system is operational. According to plant procedures when the system is placed into service, the flow is slowly throttled to ensure that the reactor vessel level is stable. The throttling of flow ensures there is no adverse hydraulic transient to the RHR piping or reactor vessel water level. Therefore, it is concluded that the voided section of piping is not adverse to the operation of the RHR System in the shutdown cooling mode.

Residual Heat Removal (RHR) "B" Discharge Line – The 12-inch diameter line upstream of a check valve was found partially voided with a small void. Potential causes include gases coming out of solution due to leakage past the check valve and water flashing to steam during system warm-up, and inadequate fill and vent. The voided area is not significant enough to be a water hammer concern when the line is placed in service for shutdown cooling. The primary reason is that shutdown cooling is manually placed in service with reactor pressure less than 130 psig. This line has a design pressure of 1550 psig. Other locations of Loop 'B' RHR that were UT inspected did not identify any issues of voided piping. During normal plant operation, this segment of the system is isolated by the Shutdown Cooling return outside containment isolation valve. The RHS pump flow is sufficiently high (7450 gpm rated) such that any small void formed will be flushed into the recirculation piping/reactor vessel when the system is operational. Additionally, according to plant procedures when the system is placed into service, the flow is slowly throttled to ensure that the reactor vessel level is stable. Throttling of flow ensures that there is no adverse hydraulic transient to the RHR piping or reactor vessel water level. Therefore, it is concluded that the voided section of piping is not adverse to the operation of the RHR system in the shutdown cooling mode.

f. New Vent Valve Locations, Modifications to Existing Vent Valves, or Utilization of Existing Vent Valves Based on the Drawing Review and System Confirmation Walkdowns

Several opportunities to improve venting of the subject systems have been identified and are listed below. New vent valves will be installed in the station in accordance with the modification control process and procedures. This process ensures that impacted procedures are revised as appropriate to reflect the new design.

NMP1 Improvements		
Issue	Corrective Action	Estimated Completion Date
NMP1 Shutdown Cooling - Vent valves located between the Unit 1 Shutdown Cooling pump discharge and heat exchangers for the three loops that are used for system venting, are hard piped with no means of verifying venting adequacy and are located in the overhead (i.e., not easily accessible).	Install sight glass and modify vent valves to allow remote vent valve operation from floor.	Completion of NMP1 2009 spring refuel outage
NMP1 Shutdown Cooling – Based on procedure review, the vent valve that represents the highest accessible point upstream of the three Shutdown Cooling system pumps is not used during system fill and vent activities.	Revise procedure to include use of vent valve.	February 2009

NMP2 Improvements		
Issue	Corrective Action	Estimated Completion Date
NMP2 Low Pressure Core Spray - No vent valves exist downstream of the outside containment isolation valve. This makes the piping susceptible to air entrapment.	Add vent valve.	Completion of NMP2 2010 spring refuel outage

g. Fill and Vent Activities / Procedure Reviews

All procedures associated with the subject systems were reviewed against the criteria of the GL response guidance.

h. Procedure Revisions from Fill and Vent Activities

Condition Reports were initiated to address gaps identified in the procedures reviewed. No issues that would impact operability of the subject systems were identified. Several improvements to existing procedures to enhance fill and vent practices have been identified. These improvements were identified based on evaluation of UT results and procedure reviews. Refer to Attachment (2), List of Regulatory Commitments.

i. Potential Gas Intrusion Mechanisms

To determine the scope and areas for potential gas intrusion, Engineering evaluated each system using the following criteria to identify sources of gas intrusion:

- Leakage from accumulators or other high-pressure sources can result in gases coming out of solution.
- Leakage from the Reactor Coolant System can result in the formation of steam pockets or hydrogen coming out of solution.
- Dissolved gas can come out of solution due to a pressure reduction such as through control valves, orifices, and ECCS sump screens, or because of elevation changes or venting.
- Inadvertent draining, system realignments, and incorrect maintenance and testing procedures can result in gas intrusion.
- Air in-leakage can occur through system pathways which allow drainback to the system.
- Failure of level instruments to indicate the correct level for tanks used as a pump suction source can result in gas intrusion.
- Leakage through isolation valves or through check valves can result in gas transport from the intrusion location to other locations in the ECCS.
- Leakage through vent valves can occur when the local system pressure is less than the nominal atmospheric vent pressure.
- Temperatures at or above saturation temperature can occur due to heat conduction through piping connected to the RCS or due to leakage of RCS fluid through isolation valves.
- Verify that any discharge thermocouple monitoring thresholds are set conservatively, if applicable.
- Gas can be introduced from suction sources due to formation of air entraining vortices or by not isolating the suction source before it is completely drained.
- Air-operated valve designs may introduce potential air leakage into the system.
- Identify other plant specific methods of gas intrusion.

j. On-Going Industry Programs

Additional guidance from ongoing industry efforts to address acceptable gas volumes in the subject systems will be considered in future evaluations as appropriate. NMPNS will track these industry efforts using our internal action tracking system.

k. Items That Have Not Been Completed and Their Schedule for Completion

1. As committed in Reference (a), NMP1 will complete its evaluations of the inaccessible portions of the subject systems during the next refueling outage and provide a supplement to this report with those results within 90 days following startup from that outage.

2. Follow up confirmatory UT. During the design evaluation and field walkdown phases of the evaluation of the subject systems in accordance with the GL, several pipe slope discrepancies were identified. Each discrepancy was evaluated for its impact on the operability of the associated system. No operability issues were identified. Each discrepancy has been entered into the corrective action program. Based upon review of these discrepancies, several additional follow up, or confirmatory UTs, will be performed when plant and system conditions are appropriate to conduct the UTs. Refer to Attachment (2), List of Regulatory Commitments.

3. NMPNS uses a common Constellation Fleet design process when making design changes to plant systems. The process is being revised to address gas intrusion issues. Refer to Attachment (2), List of Regulatory Commitments.

3. Testing Evaluation

a. Periodic Venting or Gas Accumulation Surveillance Procedure Review

NMP1

NMP1 has one Technical Specification (TS) surveillance requirement (SR) for the subject systems. Specifically, for the Core Spray System, NMP1 TS Surveillance Requirement (SR) 4.1.4 states, "At least once per month when the reactor coolant temperature is greater than 212°F, verify that the piping system between valves 40-03, 13 and 40-01, 09, 10, 11 is filled with water." The Core Spray System monthly venting is performed per an approved surveillance procedure which satisfies this TS SR.

Additionally for the NMP1 Core Spray System, UFSAR Section VII-A.4.0, Test and Inspections, states: "At least once per month verification is made that the keep-full system piping is filled with water" and "Once each Quarter during schedule operability test, the system is visually inspected for leakage, and maintenance is performed as required." Approved NMP1 surveillance procedures are in place and implement these requirements.

The NMP1 Core Spray piping between the inside isolation valves and the outboard isolation check valves is maintained full by the use of a keep-fill system that supplies positive pressure to preclude air introduction while the system is in standby. A portion of the core spray discharge piping is voided by design.

The NMP1 Containment Spray discharge piping is normally dry, by design. Therefore, there are no periodic tests or surveillance activities associated gas accumulation issues for this system.

NMP2

NMP2 has two Technical Specification surveillance requirements for the subject systems. Specifically, TS SRs 3.5.1.1 (ECCS-Operating) and 3.5.2.3 (ECCS-Shutdown) state: "Verify, for each ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve (Every 31 days)."

The TS Bases for TS SR 3.5.1.1 and TS SR 3.5.2.3 state: "The flow path piping has the potential to develop voids and pockets of entrained air. Maintaining the pump discharge lines of the HPCS System, LPCS System, and LPCI subsystems full of water ensures that the systems will perform properly, injecting their full capacity into the RCS upon demand. This will also prevent a water hammer following an ECCS initiation signal. One acceptable method of ensuring the lines are full is to vent at the high points. The 31-day Frequency is based on operating experience, on the procedural controls governing system operation, and on the gradual nature of void buildup in the ECCS piping."

The ECCS monthly venting is performed per several approved surveillance procedures which satisfy these TS SRs.

The above sections of the Technical Specifications (3.5) and related bases apply to the High and Low Pressure Core Spray and the Low Pressure Coolant Injection Systems. The specifications use terms such as "filled" and "full" when describing gas accumulation issues. The specifications are dual purpose: 1) Keeping the lines full minimizes time to inject/spray water (i.e., do not have to fill the pipe before injecting/spraying); and 2) prevent water hammer on an ECCS initiation signal.

The NMP2 ECCS discharge piping is maintained full by the use of a keep-fill system that supplies positive pressure to preclude air introduction while the systems are in standby. In addition, the NMP2 ECCS discharge lines are provided with high point level low alarms to detect air introduction. These high point vent level low switches are ultrasonic level switches instead of pressure switches. These switches are installed on standpipes at the high points of the injection piping. Any entrapped air will collect at this high point and a change in density will be detected and alarm in the control room.

The NMP1 and NMP2 surveillance procedures that implement the above requirements do not:

- Require any periodic UT.
- Measure the amount of gas that is actually vented, if venting is required.
- Implement acceptance criteria for the amount of gas vented, if venting is required.
- Specifically require venting/gas accumulation issues to be entered into the corrective action program.

A review of NMP2 procedures for systems that interface with NMP2 ECCS was completed. No other periodically scheduled test procedures which would vent the ECCS discharge headers and pre-condition the Technical Specification surveillance tests were identified. A similar review of NMP1 procedures was not conducted due to NMP1 not having the same TS surveillance requirements.

A review of NMP1 and NMP2 maintenance and operations procedures was completed and it was determined there was no inadvertent draining or realignment of subject systems that would result in unintended void formation. For any maintenance or operations procedure that realigns or drains a system, the system is required to be recovered by the applicable operating procedure to ensure adequate fill and vent.

In addition to the licensing basis-required procedures discussed above, other station procedures were reviewed to ensure subject systems are adequately filled, vented, and periodically checked to ensure system remains full. No issues were identified.

b. Procedure Revisions, or New Procedures Resulting From the Periodic Venting or Gas Accumulation Surveillance Procedure Review that Need to be Developed

Applicable NMP1 and NMP2 procedures will be revised as follows:

- Applicable NMP1 and NMP2 ECCS operating and surveillance procedures will be revised to:
    - o Incorporate guidance for UT measurements, as appropriate, and include any enhancements to the filling and venting procedures based on procedure reviews.
    - o For venting surveillance activities, establish a threshold for entering conditions into the corrective action program.
    - o Require identification and inclusion into the corrective action program any instance when any air is vented from the systems when not associated with system recovery.
    - o Include trending of any air vented from the systems.

- NMP1 Core Spray operating procedures will be evaluated to determine if filling and venting of the pump case and motor coolers following maintenance activities is necessary.
- NMP1 Shutdown Cooling operating procedures have been revised to require filling and venting of the system prior to placing into service.
- NMP2 ECCS operating procedures will be revised to verify that ECCS suction piping is full upon suppression pool level restoration from being lowered below normal operating levels in support of outage activities. This verification will be required if ECCS fill and vent was completed below the 199.5' Suppression Pool water level.
- NMP2 Residual Heat Removal System operating procedure will be revised to require instrumentation on the discharge side of the pump to be filled and vented following maintenance (this venting is already required for the suction side instrumentation).

Refer to Attachment (2), List of Regulatory Commitments.

c. Manual Operation of the RHR System in its Decay Heat Removal Mode of Operation

The NMP1 Shutdown Cooling System and the Shutdown Cooling mode of the NMP2 RHR System are started manually and venting is required per operating procedures prior to starting these systems.

d. Gas Intrusion Due to Inadvertent Draining

One issue was identified where gas intrusion could occur in the subject systems due to inadvertent draining. At NMP2, in support of refueling activities, the Suppression Pool water level is lowered in order to accept water during the draindown of the reactor vessel cavity following refuel activities. As part of this GL evaluation, a medium sized void was identified in the suction line of the Low Pressure Core Spray System and the issue entered into the Corrective Action Program. This void did not impact operability of the system. The void formation was attributed to the lowered level in the Suppression pool during the refuel outage. It is recognized that the potential of this Suppression Pool drain down activity during refuel outages could impact the fill and vent of other subject systems that draw suction from the Suppression Pool. No voids attributable to the lowered Suppression Pool level were found in suction pipe for the other subject systems. The practice of lowering Suppression Pool level during refuel outages is being re-evaluated in accordance with the Corrective Action Program. Refer to Attachment (2), List of Regulatory Commitments.

e. Documentation of Gas Voids

NMP1 and NMP2 operating and test procedures do not specifically require documentation of voids, if found. However, Operators typically report any unexpected or abnormal conditions or indications. Procedure changes associated with the subject systems will be developed to include specific requirements for documenting and reporting gas voids. Refer to Attachment (2), List of Regulatory Commitments.

f. Threshold (Acceptance Criteria) for Entry of Identified Voids into the Corrective Action Program (CAP)

NMP1 and NMP2 programs and procedures do not provide a threshold for entry of identified voids into the CAP. Procedure changes associated with the subject systems will be developed to include specific requirements for documenting and reporting gas voids. Refer to Attachment (2), List of Regulatory Commitments.

4. <u>Corrective Actions Evaluation</u>

a. Results of Reviews Regarding How Gas Accumulation Has Been Addressed at NMP1 and NMP2

The NMPNS Corrective Action Program is used to document gas intrusion/accumulation issues as potential nonconforming conditions. Current NMP1 and NMP2 procedures do not establish a specific threshold for documenting gas accumulation issues.

Current Corrective Action Program procedures require any unexpected or unexplained plant responses to be reported and entered into the Corrective Action Program. Additionally, such conditions are also to be reported to the Shift Manager. Therefore, current generic station guidance implies that abnormal venting results or pipe void identification would be reported and evaluated in accordance with the Corrective Action Program, which ensures those conditions are evaluated for potential impact on the station, including system operability. Therefore, NMPNS review concluded that issues involving gas intrusion/accumulation are properly prioritized and evaluated under the Corrective Action Program.

b. Actions

Actions to improve identification and reporting of gas accumulation issues are planned. This will be accomplished by incorporating specific guidance into applicable operating and test procedures for the subject systems that would provide station personal specific guidance for determining when to enter gas accumulation issues into the Corrective Action Program. Refer to Attachment (2), List of Regulatory Commitments.

B. DESCRIPTION OF NECESSARY CORRECTIVE ACTIONS

No conditions were identified at NMP1 or NMP2 as a result of completing the requested actions required by GL 2008-01 that rendered any of the NMP1 or NMP2 subject systems inoperable in accordance with station Technical Specifications.

C. CORRECTIVE ACTION SCHEDULE

Refer to Attachment (2), List of Regulatory Commitments.

CONCLUSION

Based upon the above, we conclude that we are in conformance with our commitments to the applicable criteria of 10 CFR 50, Appendix B, as described in our Quality Assurance Policy. Any identified deviations that have not yet been corrected are entered into our Corrective Action Program for tracking and final resolution.

As committed in Reference (a), NMPNS will complete its evaluation of the inaccessible portions of NMP1 subject systems before startup from the next Refuel Outage at NMP1 and will provide a supplement to this response within 90 days thereafter.

REFERENCE:

(a) Letter from Mr. K. J. Polson (NMPNS) to Document Control Desk (NRC), October 6, 2008, "Revised Three-Month Response to NRC Generic Letter 2008-01, Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems"

ATTACHMENT (2)

LIST OF REGULATORY COMMITMENTS

ATTACHMENT (2)

LIST OF REGULATORY COMMITMENTS

The following table identifies actions committed to in this document by Nine Mile Point Nuclear Station, LLC (NMPNS) Unit 1 and Unit 2 (NMP1 and NMP2). Any other statements in this submittal are provided for information purposes and are not considered regulatory commitments. Direct any questions regarding these commitments to Terry F. Syrell, Licensing Director, at 315-349-5219.

Regulatory Commitment	Due Date
Upon completion and Nuclear Regulatory Commission (NRC) approval of the new industry generic Technical Specifications currently under development by the Technical Specification Task Force (TSTF), NMPNS will review these requirements and submit License Amendment Requests for NMP1 and NMP2, as appropriate.	Upon NRC approval of the TSTF Traveler
NMPNS will complete follow up confirmatory ultrasonic testing (UT) to validate the effectiveness of the evaluations and actions taken to date to address discrepancies.	NMP1: Completion of NMP1 2009 spring refuel outage[1] NMP2: March 2009[1]
NMPNS will implement modifications to install new vent valves to improve fill and vent activities of the subject systems.	NMP1: Completion of NMP1 2009 spring refuel outage[1] NMP2: Completion of NMP2 2010 spring refuel outage[1]
NMPNS will revise identified NMP1 and NMP2 operating and test procedures for Emergency Core Cooling Systems and Shutdown Cooling Systems to incorporate fill and vent improvements identified during Generic Letter (GL) 2008-01 evaluation.	NMP1: February 2009[1] NMP2: July 2009[1]
NMPNS will revise NMP2 calculation related to Loss of Coolant Accident analysis input parameters to address the impact on injection flow rates due to voided piping found in the Low Pressure Core Spray piping at the outside containment isolation valve.	March 2009[1]
NMPNS will revise the Constellation fleet design change process procedure to incorporate additional controls for evaluating gas intrusion issues.	June 2009[1]

[1] The planned changes above are considered enhancements as none of the subject systems were declared inoperable as a result of the evaluations conducted in accordance with Generic Letter 08-01. Therefore, the scheduled due dates for completing the actions related to discovered conditions described in the table above are reasonable based on the current operability of the affected systems, increased awareness of engineering staff to the GL concerns, and the unlikely need to utilize post maintenance fill and vent procedures before the scheduled refueling outages for NMP1 and NMP2.