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United States Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, Maryland 20852

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23

NINE-MONTH RESPONSE TO NRC GENERIC LETTER 2008-01,
"MANAGING GAS ACCUMULATION IN EMERGENCY CORE COOLING,
DECAY HEAT REMOVAL, AND CONTAINMENT SPRAY SYSTEMS"

Ladies and Gentlemen:

On January 11, 2008, NRC Generic Letter (GL) 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," was issued requesting that licensees provide a response within nine months. Carolina Power and Light Company, also known as Progress Energy Carolinas, Inc. (PEC), is providing the nine-month response for H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, in Attachment II to this letter.

HBRSEP, Unit No. 2, began Refueling Outage No. 25 (RO25) on September 26, 2008. Ultrasonic Testing (UT) related to GL 2008-01 began on September 22, 2008, and is expected to continue during RO25, scheduled to end the last week of October. This letter provides the status of GL 2008-01 activities through October 7, 2008. Information based on completed RO25 activities will be provided in the response to be submitted within 90 days following the completion of RO25, as committed in the letter dated July 25, 2008.

Attachment I provides an Affirmation in accordance with the provisions of Section 182a of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f).

Progress Energy Carolinas, Inc.
Robinson Nuclear Plant
3581 West Entrance Road
Hartsville, SC 29550

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If you have any questions concerning this matter, please contact Mr. C. A. Castell at (843) 857-1626.

Sincerely,

A handwritten signature in black ink, appearing to read "C. T. Baucom". The signature is fluid and cursive, with the first name "C. T." and the last name "Baucom" clearly distinguishable.

C. T. Baucom

Manager – Support Services – Nuclear

RAC/rac

Attachments:

- I. Affirmation
 - II. Nine-Month Response to NRC Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems"
- c: Mr. L. A. Reyes, NRC, Region II
Ms. M. G. Vaaler, NRC, NRR
NRC Resident Inspector

AFFIRMATION

The information contained in letter RNP-RA/08-0099 is true and correct to the best of my information, knowledge, and belief; and the sources of my information are officers, employees, contractors, and agents of Carolina Power and Light Company, also known as Progress Energy Carolinas, Inc. I declare under penalty of perjury that the foregoing is true and correct.

Executed On: 10/14/08



E. A. McCartney

Director – Site Operations, HBRSEP, Unit No. 2

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

NINE-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, “Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems,” to request that each licensee evaluate the licensing basis, design, testing, and corrective action programs for the Emergency Core Cooling Systems (ECCS), Decay 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.

GL 2008-01 requested each licensee submit a written response in accordance with 10 CFR 50.54(f) within nine months of the date of the GL to provide:

- “(a) A description of the results of evaluations that were performed pursuant to the requested actions;
- (b) A description of all corrective actions, including plant, programmatic, procedure, and licensing basis modifications that were determined to be necessary to assure 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 as those requirements apply to the subject systems; and,
- (c) A statement regarding which corrective actions were completed, the schedule for completing the remaining corrective actions, and the basis for that schedule.”

This attachment provides the nine-month response to NRC GL 2008-01 for H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2.

The following systems were determined to be in the scope of GL 2008-01:

- Safety Injection (SI) system
- Residual Heat Removal (RHR) system – serves both an emergency core cooling and decay heat removal function
- Containment Spray (CS) system

A. Licensing Basis Evaluation

The licensing basis was reviewed with respect to gas accumulation in the SI, RHR and CS 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, regulatory commitments, and License Conditions. The following is a common response for the three systems.

1. Summary of the document review results:

Review of the TS and TS Bases determined that there are requirements in the TS that the RHR, SI, and CS systems be operable. The discovery of gas voids in these systems would be expected to result in the assessment of operability, in which the ability of the affected system to perform its safety function would be evaluated. However, there are currently no TS or TS Bases requirements specifically related to gas accumulation or voids. The Standard TS surveillance requirement to verify that the ECCS is full of water is not included in the HBRSEP, Unit No. 2, TS.

Review of the UFSAR, TRM, TRM Bases, responses to NRC generic communications, regulatory commitments, and License Conditions did not identify any specific information related to the monitoring, control, or evaluation of gas accumulation in the subject systems.

2. Summary of changes to licensing basis documents:

No licensing basis document changes have been made in response to GL 2008-01. The following are the changes that will be implemented, along with the associated schedules. Planned corrective actions are also summarized in Table 1:

- a. A program for the detection of voids in the subject systems will be established. The exact details of the surveillances (type, location, frequency) will not be determined until after Refueling Outage No. 25 (RO25). Additional details will be provided in the response to the NRC required to be submitted 90 days following RO25. The program will be approved and implemented by April 30, 2009.
- b. A TS change request will be submitted that proposes appropriate TS requirements, including applicable industry Technical Specification Task Force (TSTF) proposed changes. This proposed change request will be submitted within nine months of NRC approval of the applicable TSTF generic changes to NUREG-1431, "Standard Technical Specifications Westinghouse Plants."

B. Design Evaluation

The design basis was reviewed with respect to gas accumulation in the SI, RHR, and CS systems. Except where indicated, the following information is applicable to each of these systems. This evaluation included a review of Design Basis Documents, calculations, Engineering Change packages, WCAP-12070, "SIS Design Document Summary," and vendor manuals. It also included drawing reviews, system walkdowns, and procedure reviews.

1. Summary of the design evaluation results:

During the review of Design Basis Documents, it was determined that these documents do not include sufficient information pertaining to gas accumulation issues. As an enhancement, the Design Basis Documents for the three systems will be revised to include requirements and guidance related to gas accumulation.

The results of the drawing reviews, system walkdowns, and procedure reviews are provided in the following sections.

2. Gas volume acceptance criteria:

Location-specific gas volume acceptance criteria have not been established. Identification of gas voids is expected to result in the generation of a Nuclear Condition Report (NCR) within the Corrective Action Program (CAP). The NCR is evaluated for system operability impact. The NCR evaluation for operability is based on the location, void size, and other relevant information. Recently published industry guidance will be considered when evaluating operability and for establishing acceptance criteria.

3. Drawing reviews:

A review of Piping and Instrument Diagrams (P&IDs) and isometric drawings for the SI, RHR, and CS systems was performed. In addition, isometric sketches were created for each system to support the review. The review was performed to identify existing vent locations and to identify high point locations that are considered potentially vulnerable to gas accumulation.

The results of this drawing review were combined with the results of the walkdowns discussed in Section B.4 and are presented in Section B.5.

4. System confirmatory walkdowns:

System walkdowns were completed for the accessible sections of piping. System walkdowns for the inaccessible sections of piping, which are primarily inside containment, are currently being performed during RO25. Results based on the RO25 walkdowns will be provided in the response due 90 days following completion of RO25.

In addition to physical walkdowns, the system walkdowns employed the use of a laser scanning technique, which supported the development of three-dimensional models. The walkdowns and modeling were performed to confirm the location and orientation of existing system vents, and to identify areas vulnerable to gas accumulation.

The results of the walkdowns were combined with the drawing review results and are presented in Section B.5.

5. Results of drawing reviews and system walkdowns:

Based on the information collected during the drawing reviews and walkdowns, Ultrasonic Testing (UT) was planned at approximately 69 locations identified as being potentially susceptible to voids.

As of October 7, 2008, the planned locations have been tested. Ten of the locations had detectable voids. An NCR was written for each of the locations with detected voids. Evaluations of causes and past operability impacts are in progress.

As of October 7, 2008, twelve additional vent valves on ten piping segments are planned to be installed during RO25. The majority will be at locations where voids were detected. More details related to new vent valves will be provided with the response due 90 days following RO25.

The need for a vent valve at a specific location depends on various factors, such as:

- The susceptibility to void formation.
- The availability of other techniques, such as a dynamic flow sweeping process, that can be used to remove accumulated voids.
- The ability to demonstrate that the potential gas volume at a specific location will be within acceptance criteria.
- The practicality of installing a vent valve at a particular location due to safety concerns and accessibility.

6. Results of the fill and vent activities and procedure reviews for each system:

The process for filling and venting the subject systems is controlled through plant procedures. The procedures are limited in regard to verification that the system is sufficiently full, because there are currently a limited number of system vents, and there are no required surveillances to detect the presence of gas voids. It has been concluded that procedure improvements are needed for filling and venting.

There are also a number of procedures used for surveillances or maintenance of the subject systems that could introduce gas into the system. Improvements are also needed

to these procedures in order to minimize the potential for void formation, or to verify that the system is sufficiently full following such activities.

Section B.7 provides the planned corrective actions related to procedure improvements.

7. Procedure revisions or new procedures resulting from the fill and vent activities and procedure reviews:

Procedure changes are being made to improve the prevention, detection, and mitigation of gas voids in the subject systems. The following improvements will be incorporated into plant fill and vent and maintenance procedures, as applicable:

- Dynamic flow sweeping
- Improved venting sequences
- Use of existing vent locations
- Use of new vent locations to be installed during RO25
- Specify venting acceptance criteria (e.g., solid stream of liquid for two minutes)

Procedures and processes that will be used during RO25 that have a potential impact on ensuring that the subject systems are adequately full prior to startup will be revised during RO25. Subsequent to RO25, evaluations will be performed to identify those sections of procedures that could impact the prevention, detection, and mitigation of gas voids in the subject systems. Additional information will be provided in the response due 90 days following RO25.

8. Discussion of potential gas intrusion mechanisms:

Each system was assessed to determine potential mechanisms of gas intrusion or accumulation into the vulnerable segments of piping. A list of locations where gas might accumulate was developed. The various mechanisms that could cause gas intrusion include:

- Leakage through valves from accumulators (SI and RHR)
- Leakage from the RCS, which can result in the formation of steam pockets or dissolved gas coming out of solution (SI and RHR)
- Dissolved gas that can come out of solution due to a pressure reduction caused by flow through control valves, orifices, and ECCS sump screens, or due to elevation changes or venting (SI and RHR)
- Inadvertent draining, system realignments, and incorrect maintenance and testing procedures (SI, RHR, and CS)
- Inadequate system fill and vent procedures (SI, RHR, and CS)
- Conditions where local temperatures are at or above saturation temperature (RHR)

9. Evaluation of ongoing industry programs:

Ongoing industry programs in the following areas may impact the conclusions reached during the GL response "Design Evaluation." These activities will be monitored to determine if additional changes related to gas intrusion are needed.

- Gas Transport in Pump Suction Piping

The Pressurized Water Reactor Owner's Group (PWROG) has initiated testing to provide additional knowledge relative to gas transport in large diameter piping.

- Pump Acceptance Criteria

Long-term industry tasks were identified that will provide additional tools to address GL 2008-01 with respect to pump gas void ingestion tolerance limits.

10. List of items that have not been completed, a schedule for their completion, and the basis for that schedule:

See Table 1.

C. Testing Evaluation

Periodic surveillances for gas accumulation are not currently required for HBRSEP, Unit No. 2. The UT for voids that began on September 22, 2008, is the first set of tests intended to quantify void location and size. As such, procedural instructions or standard practices for the documentation and trending of voids were not previously established.

New procedures for periodic gas accumulation surveillance and venting will be written to implement the new program discussed in Section A.2. These procedures are expected to include acceptance criteria and guidelines for documentation, tracking, and mitigation of voids. UT for voids will be performed prior to startup from RO25 at the locations where the voids were found prior to and during RO25.

D. Corrective Action Evaluation

Summary of how gas accumulation has been or would be addressed within the Corrective Action Program:

As discussed in Section B.2, gas volume acceptance criteria have not been established. Currently, a Nuclear Condition Report (NCR) within the Corrective Action Program (CAP) is to be initiated for any identified gas void. The Corrective Action Program procedure (CAP-NGGC-0200) requires evaluation of NCRs for system operability impact. NCRs are assigned a priority level based on significance of the condition identified, which establishes

the level of the investigation, corrective actions, and trending. If an adverse trend is identified, an NCR that describes the trend is expected to be initiated and a common cause investigation is expected to be performed in accordance with CAP-NGGC-0200.

E. Conclusion

Based on the results of the evaluations and inspections performed, combined with the corrective actions taken to:

- install vents at identified locations, and
- improve fill and vent procedures to adequately preclude voids before returning a system or section of piping to service,

PEC has concluded that the SI, RHR and CS systems are operable, as required by TS, are in conformance with commitments to the applicable General Design Criteria (GDC), as stated in the UFSAR, and are in conformance with commitments to 10 CFR 50, Appendix B, Criterion III, V, XI, XVI, and XVII.

The actions, as described, are expected to provide additional assurance of system operability.

Table 1
Summary of Corrective Actions
(This table of corrective actions provides the commitments made in this letter.)

Item #	Corrective Action	Completion Date
1	Include the following information in the post-outage GL 2008-01 response letter: <ul style="list-style-type: none"> • A description of the new program for void detection. • Update summary of locations potentially susceptible to gas accumulation based on containment walkdowns in RO25. • Resolution for void detection and control at the identified locations potentially susceptible to gas accumulation, including the location of new vent valves installed or planned for installation. • Listing of new procedures or procedure changes to be made for filling and venting. • Listing of procedure changes to be made to operations, testing, or maintenance procedures to prevent, detect, or mitigate gas intrusion. 	90 days following completion of RO25
2	Implement a program for detection of gas intrusion in the SI, RHR, and CS systems.	April 30, 2009
3	Submit a TS change request that proposes appropriate TS requirements for gas intrusion, including applicable aspects of NRC-approved TSTF generic changes to NUREG-1431.	Nine months following NRC approval of the TSTF generic changes to NUREG-1431
4	Install vents as determined necessary for system venting and perform UT for voids at the locations where voids were found prior to and during RO25.	Prior to startup from RO25, expected to end on or about October 30, 2008
5	Establish methods for evaluating discovered voids for operability impact, including pre-established acceptance criteria where possible. Consider recent industry guidance during development.	April 30, 2009
6	Monitor generic industry activities related to GL 2008-01 and incorporate required elements to the program determined to be applicable to HBRSEP, Unit No. 2.	Ongoing

Table 1 (continued)

Item #	Corrective Action	Completion Date
7	Enhance the Design Basis Documents for the RHR, SI and CS systems to include requirements related to gas accumulation.	April 30, 2009
8	Subsequent to RO25, evaluations will be performed to identify those sections of procedures that could impact the prevention, detection, and mitigation of gas voids in the subject systems. Additional information will be provided in the response due 90 days following RO25.	90 days following completion of RO25
9	Revise as necessary those procedures and processes that will be used during RO25 that have a potential impact on ensuring that the subject systems are adequately full prior to startup.	Prior to startup from RO25