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NL-09-142

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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Washington, D.C. 20555-0001

Subject: Response to Indian Point Nuclear Generating Station Unit Nos. 2 and 3, Request for Additional Information Regarding Response to Generic Letter 2008-001, (TAC Nos. MD7836 and MD7837)
Indian Point Unit Nos. 2 and 3
Docket Nos. 50-247 and 50-286
DPR-26 and DPR-64

References:
1. NRC Generic Letter 2008-001,"Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems" dated January 11, 2008.
2. Three Month Response to Generic Letter 2008-001 dated April 11, 2008, Letter No. NL-08-065.
3. Nine Month Response to Generic Letter 2008-001 dated October 9, 2008, Letter No. NL-08-136.
4. Unit 3 Ninety Day Supplemental Post Outage Response to Generic Letter 2008-001 dated July 6, 2009, Letter No. NL-09-075.
5. Indian Point Nuclear Generating Station Unit Nos. 2 and 3, Request for Additional Information Regarding Response to Generic Letter 2008-001, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems" (TAC Nos. MD7836 and MD7837) dated September 28, 2009

Dear Sir or Madam:

The Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 2008-001 (Reference 1), to request that each licensee evaluate the licensing basis, design, testing, and corrective action programs for the Emergency Core Cooling Systems (ECCS), Residual Heat Removal (RHR) System (RHRS), and Containment Spray System (CSS), to ensure that gas accumulation is maintained less than the amount that challenges operability of these systems, and that appropriate actions are taken when conditions adverse to quality are identified.

GL 2008-001 requested each licensee to submit a written response in accordance with 10 CFR 50.54(f) within 9 months of the date of the GL. Additionally, the NRC requested that if a licensee cannot meet the requested response date, the licensee "shall provide a response within 3 months of the date of the GL." On April 7, 2008, Entergy Nuclear Operations, Inc.

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(Entergy) notified the NRC that Indian Point Unit No. 3 (IP-3) could not complete all the requested actions required by the GL within 9 months and submitted the required 3 month letter (Reference 2). On October 9, 2008, Entergy submitted the required 9 month response (Reference 3). In the 9 month response Entergy committed to complete its assessments of those inaccessible portions of these systems/functions during the next IP-3 refueling outage scheduled for the spring of 2009 and provide a supplement to this report with those results within 90 days after startup from that outage. Accordingly, Entergy's supplemental response to the nine month response letter (Reference 4) was provided within 90 days of startup (initial criticality April 15, 2009) from the IP-3 cycle 15 refueling outage (3R15) in which the deferred actions were completed.

On September 28, 2009, the NRC issued a request for additional information (RAI) to complete its review (Reference 5). Enclosed in the RAI letter were specific questions that required a response within 45 days of the date of the RAI letter.

Accordingly, attached is Entergy's response to the RAI questions provided by NRC letter dated September 28, 2009.

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

Should you have any questions regarding this matter, please contact Mr. Robert Walpole, Manager, Licensing, Indian Point Energy Center at (914) 734-6710.

The requested information is being provided pursuant to the requirements of 10 CFR 50.54(f). I declare under the penalty of perjury that the foregoing information is true and correct. Executed on 11/09/2009.

Sincerely,

JEP/cbr

Attachment: 1. Response to NRC Request for Additional Information Regarding Response to Generic Letter 2008-01,"Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," Generic Letter 2008-001

cc: Mr. Samuel J. Collins, Region I Administrator, U.S. Nuclear Regulatory Commission
Mr. John P. Boska, Senior Project Manager, U.S. Nuclear Regulatory Commission
NRC Resident Inspectors, Indian Point Units 2 and 3.
Mr. Paul Eddy, New York State Department of Public Service
Mr. Francis J. Murray, President and CEO, NYSERDA

Attachment 1 to NL-09-142

Response to NRC Request for Additional Information Regarding Response to Generic Letter 2008-01,"Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," Generic Letter 2008-001

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 and 3
DOCKET NO. 50-247 and 50-286

IPEC Response to NRC RAI Regarding Generic Letter 2008-01

This attachment provides the response to the NRC Request for Additional Information (RAI) regarding IPEC's response to Generic Letter 2008-01. References referred to in this attachment are those references listed in the NRC RAI letter and provided at the end of this attachment.

RAI No. 1:

"The Recirculation subsystem need not be monitored ... The pumps are started only after the minimum submergence requirements in the sump are satisfied" (Reference 4). Clarify the minimum submergence requirements and discuss how the requirements are obtained.

Response:

The Recirculation Pumps are vertical pumps that take suction from the Recirculation Sump. The Recirculation Sump is below the 46' floor elevation in Containment. The Recirculation Sump pit floor elevation is at 35.5 foot and the bottom of the pump is +0.73 feet above the pit floor. The NPSH reference line elevation is 37.8 feet. Following a LOCA, the switch over from Injection mode to Recirculation mode begins when the RWST Alarms indicate that the minimum fluid volume has been reached in Containment. The minimum water level in Containment is expected to be over 47 feet elevation prior to start of the switch over procedure. Per the pump vendor, the minimum water level required for Recirculation Pump submergence is elevation 41.5 feet. Based on this and a minimum 47 foot flood level, the water level will be at least 11 feet above the pump suction and more than 5.5 feet above the minimum required submergence level prior to pump start. The EOPs provide specific requirements for monitoring the water level in Containment. It requires the Operator to verify that the water level in Containment is trending up prior to switch over to Recirculation mode.

For Unit 2, the level transmitters LT-920 & LT-5751 alarm when indicated level reaches the Low-Low level set point of 9.24 feet in the RWST. At this time at least 246,000 of 345,000 gallons in the tank will be injected. Based on the injected gallons, the water level in the Containment at start of procedure for initiating Recirculation will be at 47.5 foot elevation.

For Unit 3, the level instruments LT-920 & LIC-921 alarm when indicated level reaches the Low-Low level set point of 11.5 feet in tank. At this time at least 204,000 of 345,000 gallons in the tank will be injected. Based on the injected gallons, the water level in the Containment at start of procedure for initiating Recirculation will be at the 47.1 foot elevation.

RAI No. 2:

In Reference 4, the licensee stated that "all segments were water solid except one location in Unit 2 SI system" as the result of the conducted walkdowns. Discuss follow up actions, such as entry into the Corrective Action Program (CAP), identifying the source of the void, quantifying the size of the void, trending the volume of the void for the segment of piping, and trending the parameters associated with the source of the void.

Response:

The additional UT inspections performed indicated all locations were water solid except one location in Unit 2 SI system Line # 518. This finding was documented in the CAP (CR-IP2-2008-04282). This location was inspected due to the adverse pipe slope noted by a walkdown performed per GL 2008-01. The void volume was 0.10 cubic feet which was less than the acceptance criteria for SI pump suction of 0.24 cubic feet. The results of the other UTs performed verified that there were no other voids in lines to the 22 SI pump suction. Line # 518 is a 6 inch diameter piping alternate suction header from the RWST supply line to the 22 SI pump. It is used only if the normal suction header Line # 60 to SI pumps is not available. It is normally isolated by a manual valve 898. As such this line is stagnant and has no flow. Based on this and the piping configuration in the area, the as-found void was determined to be stagnant air from fill and vent. Additional UTs performed at this location verified that the void remained stable. Line # 518 has an existing vent valve on the same horizontal section of the piping where the void was noted. However, it was not at the high point based on the pipe slope noted during the walkdowns per this GL. An engineering modification package has been completed to install a new vent valve at this location. The installation is scheduled during the 2R19 outage in the Spring of 2010. This is one of the 4 new vent valves to be added at Unit 2 as listed in our 9 month response (Reference 4).

RAI No. 3:

Clarify the meaning of "accessible" and "inaccessible" as used in References 4 and 5. Include discussion of piping within containment; piping that requires scaffolding to reach; and piping in posted radiation areas.

Response:

Walkdowns inside the Unit 2 and 3 Containment buildings were performed during refueling outages. Numerous scaffolds were installed inside containment for several other activities including piping In-service Inspections (ISI) and PMs for motor operated valves, check valves and relief valves. The walkdown team was able to take advantage of these scaffolds to reach pipes in the overhead region. Ladders and extension poles were used for other locations if needed. As such, all accessible piping in containment was inspected. Piping located in a "Locked High Radiation" area or where it was impractical to build a scaffold, or in the vicinity of a local "hot spot" radiation area in the overhead was considered inaccessible and was not inspected. Similarly buried piping was considered inaccessible and was not inspected. However, for all inaccessible piping, a bounding adverse pipe slope was assumed based on the typical pipe slopes recorded as part of the walkdown. Based on this approach, potential void volumes were calculated for void accumulation evaluation.

RAI No. 4:

In Reference 4, the licensee states that "IPEC [Indian Point Energy Center] procedures and design features provide assurance that the volume of gas in the pump suction piping for the subject systems is limited such that pump gas ingestion is within the above PWROG [Pressurized Water Reactor Owners Group] program established interim criteria." Clarify the procedures and design features and discuss how they are used to determine gas volume. Compare the PWROG interim criteria to Reference 6 and justify the differences.

Response:

Entergy has actively participated in the NEI Gas Accumulation Team and the respective PWR and BWR Owners' Group activities focused on developing suitable guidance for licensees in the evaluation of voids in the piping systems of our plants. These groups have engaged recognized industry experts, and NSSS vendors to determine the most appropriate criteria applicable to current reactor designs. The assessment of voids on the suction side, through the pump, on the discharge, and the effects on downstream piping and the reactor have been considered. The criteria are documented in eight separate reports generated to support this effort. All of these reports have been made available to the NRC staff for their information. These were the criteria that formed the basis of our response.

In order to summarize and focus these separate industry efforts, NEI issued APC 09-20 on May 18, 2009. This letter and its enclosure reference these industry documents and provide insight on their application to evaluation of operability. This industry guidance is being used by IPEC until such time that the NRC criteria can be formally issued and evaluated.

IPEC has established a systematic program to inspect and monitor for gas voids within the applicable systems. Procedure PT-M108 is used to perform regular UT inspections in susceptible systems. IPEC uses the UT method to determine the void size. This procedure identifies the UT locations and void acceptance criteria. It provides the requirements for venting the voids, performing post vent UT, acceptance criteria for each location and instructions for recording the void finding in the CAP.

RAI No. 5:

In Reference 4, the licensee states that "sections of piping evaluated to be acceptable with the voids within the sections" were excluded from the walkdown. Justify the reason for exclusion and discuss the criteria used to determine acceptability. Also, quantify the size of the voids and trending the volume of said voids.

Response:

Sections of piping excluded from the walkdown and evaluated to be acceptable with voids within the sections include Containment Spray System (CSS) downstream of the normally closed isolation valves and RCS Hot Leg connection piping.

CSS Pump discharge piping downstream of the normally closed valves up to and including the CSS spray ring headers inside containment, and the Recirculation spray piping downstream of the normally closed valves up to and including the CSS spray ring headers inside containment were excluded from the walkdown.

The PWROG methodology for CSS evaluates the piping response as the containment spray header is filled and compares the potential force imbalances with the weight of the piping. The net force resulting from the pressurization of the containment spray header during the filling transient is a small fraction of the dead weight of the filled piping, and therefore the filling transient is well within the margin of the pipe hangers. The Indian Point CSS discharge header piping including the Recirculation Spray piping was evaluated using the PWROG methodology described above. Using this methodology it was determined that the force imbalances on this piping are within the margin of the pipe hangers.

A PWROG methodology has been developed to assess when a significant (gas-water) water hammer could occur during switchover to hot leg recirculation. The methodology concludes that: If the upstream valve has an opening time of approximately 10 seconds and the downstream path to the Reactor Coolant System (RCS) is only restricted by check valve(s), no significant water hammer would occur, i.e., none of the relief valves in the subject systems would lift, and none of the piping restraints would be adversely impacted.

The Indian Point ECCS flow path for switchover to hot leg recirculation has an upstream motor operated valve that has an opening time of more than 10 seconds and the downstream path to the RCS is only restricted by check valves. Therefore, consistent with the PWROG program methodology, no significant water hammer will occur.

RAI No. 6:

The licensee states in Reference 4 that "locations that could not be effectively vented with existing system venting configurations were identified for further evaluation." Clarify how many segments of piping could not be vented effectively and the locations of the segments. Discuss the process and schedule to further evaluate these segments.

Response:

Initial review identified 19 potential locations at Unit 2 and 17 at Unit 3 that could not be effectively vented with existing system venting configurations. The size of potential void was calculated based on the measured slope. The potential void was evaluated against the stated acceptance criteria. If the potential unventable void did not meet the acceptance criteria, these locations were identified for UT inspection. Only one location in SI Line # 518 had a void (see RAI No.2). The potential voids on the pump's discharge sides were within the acceptance criteria. Although the potential voids on pumps suction sides were also within the acceptance criteria, it was decided to add new vent valves on the pump suction sides. The 9-month response (Reference 4) identified 7 new vent valves which included three (3) at Unit 3 and four (4) at Unit 2. The three new vent valves at Unit 3 were installed during the last outage (Spring 2009). Entergy is planning to add four new vent valves at Unit 2 in the refueling outage in the Spring of 2010.

RAI No. 7:

Training was not identified in the GL (Reference 3) but is considered to be a necessary part of applying procedures and other activities when addressing the issues identified in the GL as the licensee has recognized. Provide a brief description of training.

Response:

At IPEC, in early 2005 an event occurred with gas voiding in the suction piping of the Unit 2 SI pumps. The discovery of gas voiding led to an NRC white finding and numerous corrective actions (CR-IP2-2005-00370). One of the corrective actions was to train appropriate plant personnel on the event and the significance of gas intrusion into safety systems. Gas intrusion training was provided to engineers in 2005 per lesson plan ESP-0505 (CA-27 of referenced CR). Gas intrusion was also taught to newly hired engineers as industry Operating Experience. Operators were also trained on gas intrusion during the same time frame with each watch

section at Unit 2 and Unit 3 being trained on the issue (Lesson Plan I0LP-LOR-BRF001 was taught for both Unit 2 and 3 during Cycle 3 of 2005). Both Units' Licensed Operators were trained again during 2009. The following training was performed:

- Unit 2 – Lesson Plan I2LP-LOR-BRF001, taught during Cycle 1 of 2009.
- Unit 3 – Lesson Plan I3SG-LOR-AOP022, taught during Cycle 1 of 2009.
- Both Unit 2 and 3 – Lesson Plan I0LP-LOR-CVC001, taught during Cycle 4 of 2009.

Gas intrusion training was provided to Maintenance in lesson plan IOLP-MMC-SOE-06 for INPO SER 2-05 "Gas Intrusion in Safety System."

The NRC GL did not require discussion of training to satisfy the 10 CFR 50.54(f) request and therefore none was provided in Entergy response. However, when any station procedure is modified, an assessment for training needs and change management is required in accordance with Entergy procedure EN-TQ-201,"Systematic Approach to Training Process." The determination is typically a function of the nature of the change and the impact on the organization. If required, this training is generally accomplished prior to, or in parallel with the issuance of the procedure. For fill and vent procedure revisions, the changes have generally been minor, and have been considered enhancements. Procedures which direct the periodic examination of selected piping for the presence of voids were created or modified to draw upon pre-existing maintenance procedures which provide guidance for the ultrasonic inspection of piping to verify that it is full of water. The UT inspections are performed per controlled NDE procedure (CEP-NDE-0530 "Ultrasonic Examination of Components to Determine Fluid Level"). Per this procedure, UTs are performed by personnel certified to at least Ultrasonic Level II or by personnel with minimum 8 hrs classroom training and 4 hrs on job training provided by UT Level II or III.

Entergy is an active participant in the NEI Gas Accumulation Team, which is currently coordinating with the Institute of Nuclear Power Operations (INPO) in the development of generic training modules for gas accumulation and management. These training modules target the Engineering, Operations and Maintenance disciplines. When these training modules are completed and become available to the industry, Entergy will evaluate them for applicability to IPEC, and may implement a version tailored to meet station needs. Pending release of the INPO products, the schedule for such planned training has not yet been determined.

References:

1. Ruland, William H., "Preliminary Assessment of Responses to Generic Letter 2008-01, 'Managing Gas Accumulation in emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems,' and Future NRC Staff Review Plans," NRC letter to James H. Riley, Nuclear Energy Institute, ML091390637, May 28,2009.

2. Riley, James H., "Generic Letter (GL) 2008-01, 'Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Contain Spray Systems' Evaluation and 3 Month Response Template," Letter to Administrative Points of Contact from Director, Engineering, Nuclear Generation Division, Nuclear Energy Institute, Enclosure 2, "Generic Letter 2008-01 Response Guidance," March 20, 2008.

3. Case, Michael J., "NRC Generic Letter 2008-01: Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," Letter from Director,

Division of Policy and Rulemaking, Office of Nuclear Reactor Regulation, NRC, ML072910759, January 11, 2008.

4. Pollock, J. E., "Indian Point Entergy Center, Units 2 and 3, Docket No. 50-247, 50-286, Nine-Month Response to NRC Generic Letter 2008-01," Letter to Document Control Desk, NRC, from Site Vice President, Indian Point Energy Center, ML082890536, October 9, 2008.

5. Pollock, J. E., "Indian Point Entergy Center, Unit 3, Docket No. 50-286, Ninety Day Supplemental (Post Outage) Response to Generic Letter 2008-01," Letter to Document Control Desk, NRC, from Site Vice President, Indian Point Ener9Y Center ML091950328, July 6, 2009.

6. "Revision 2 to NRC Staff Criteria for Gas Movement in Suction Lines and Pump Response to Gas," ML090900136, March 26, 2009.