Entergy

Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, N.Y. 10511-0249
Tel (914) 254-6700

John A. Ventosa
Site Vice President
Administration

NL-13-012

May 16, 2013

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

SUBJECT: **Closure Option for Generic Safety Issue - 191**
Indian Point Units 2 and 3
Docket Nos. 50-247 and 50-286
License Nos. DPR-26 and DPR-64

REFERENCE:

1. NRC SECY-12-0093, "Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance", dated July 9, 2012

2. SRM-NRC SECY-12-0093, "Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance", dated December 14, 2012

3. NRC letter to NEI, "Nuclear Regulatory Commission Review of Generic Safety Issue-191 Nuclear Energy Institute Revised Schedule for Licensee Submittal of Resolution Path", dated November 21, 2012

Dear Sir or Madam:

The NRC staff recommended three closure options to the Commission for resolving GSI-191 [Ref. 1] and the Commission approved the staff's recommendation to allow licensees to choose any of the three options [Ref. 2]. The closure options included Option 2 – "Mitigate Measures and Alternate Methods Approach (Deterministic or Risk-Informed)" and Entergy, for Indian Point Units 2 and Unit 3, has selected this option utilizing a deterministic approach. In accordance with NRC requirements [Refs. 1 and 3], Entergy is submitting this selected closure option and the associated implementation schedule as detailed in the Attachment to this letter.

There are no new commitments being made in this submittal.

Should you have any questions or require additional information, please contact Mr. R. Walpole, Manager, Licensing at (914) 254-6710.

A116
NRR

I declare under penalty of perjury that the foregoing is true and correct. Executed on 5-16-13

Sincerely,

Patrick W. Conway, acting for John A. Ventosa

JAV/rw

Attachment: Closure Option for Generic Safety Issue 191

cc: NRC Resident Inspector's Office
Mr. Douglas Pickett, Senior Project Manager, NRC NRR DORL
Mr. William M. Dean, Regional Administrator, NRC Region 1
Mr. Francis J. Murray Jr., President and CEO, NYSERDA
Ms. Bridget Frymire, New York State Dept. of Public Service

ATTACHMENT TO NL-13-012

Closure Option for Generic Safety Issue 191

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

Closure Option for Generic Safety Issue - 191

Introduction

On July 9, 2012 the NRC staff issued SECY-12-0093, "Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance" [Ref. 1], presenting three closure options to the Commission all of which are considered to be viable paths for resolving GSI-191. These options are: Option 1 – "Compliance with 10 CFR 50.46 Based on Approved Models", Option 2 – "Mitigate Measures and Alternate Methods Approach (Deterministic or Risk-Informed)", and Option 3 – "Different Regulatory Treatment for Suction Strainer and In-Vessel Effects (Deterministic or Risk-Informed)". The Commission approved the staff's recommendation to allow licensees to choose any of the three closure options [Ref. 2].

Entergy has selected Option 2a utilizing a deterministic methodology for both strainer and in-vessel effects for both Indian Point Unit 2 (IP2) and Unit 3 (IP3). The deterministic resolution of strainer effects has been fully documented in previous submittals to the NRC [Refs. 3 and 4]. The deterministic resolution of the in-vessel effects will be accomplished in accordance with the resolution strategy proposed by the Pressurized Water Reactor Owners Group (PWROG) as discussed below.

In order to support continued operation for the time period required to complete the necessary analyses, testing and plant modifications (if necessary), Entergy has evaluated the design and procedural capabilities that exist to prevent, detect and mitigate sump strainer and in-vessel blockage. A summary of these prevention, detection and mitigative measures are provided later in this attachment.

Characterization of Current Containment Fiber Status

From the Debris Generation Calculations, Debris Transport Calculations and the Test Debris Amounts Calculation, Entergy has conservatively determined the fiber debris amounts that would be transported to the IP2 and IP3 Internal Recirculation (IR) sumps during a LBLOCA and the IP2 and IP3 Vapor Containment (VC) sumps during a 6 inch nominal pipe size LOCA as follows:

Fiber Transported to Sumps		
Unit	**Sump**	**Fibrous Debris amount (lb_m)**
IP2	IR	807.25
	VC	130.81
IP3	IR	1134.10
	VC	267.02

The IR sump is analyzed to mitigate all size LOCAs. In the event of a passive failure, 24 hours after event initiation, recirculation will be performed by the VC sump. Additionally, the VC sump is qualified for up to a 6 inch LBLOCA, from event initiation. Additional information is provided in Reference 3 for the break size qualifications of the IR and VC sumps.

A bypass test with a single strainer was developed based on actual IR and VC strainer areas, the fibrous debris loads, and the maximum flow rates. This resulted in a debris bypass ratio of 2.8 $lb_m/1000ft^2$ and 5.2 $lb_m/1000ft^2$ for the IR and VC sumps, respectively. The sum of the ratios multiplied by the respective IR and VC sump strainer areas equates to 14.98 lb_m fiber bypass across both strainers. This equates to an approximate value of 35 g/Fuel Assembly (FA). This amount of fiber is in excess of the WCAP 16793 Revision 2 [Ref. 5] upper fiber limit (15 g/FA).

It should be noted that the 35 g/FA is the total fiber bypass of both the Recirculation and Containment sumps combined, which is conservative because, at any one time, only one of the two sumps would be operating during a Design Basis Accident. In addition, this value does not take into account the amount of fiber that is in the flow diverted to the recirculation containment spray system flow path. Therefore, all of the bypassed fiber is conservatively assumed to be directly transported to the reactor fuel.

The fibrous debris sources considered in these analyses were Nukon™, Temp-Mat™, Mineral Wool, Fiberglass, Thermal Wrap™, Fiber Tags, and Latent Fiber.

Characterization of Strainer Head Loss Status

Entergy has previously submitted the results of strainer head loss testing, including the impact of chemical effects to the NRC [Ref. 3 and 4]. This testing, together with the associated NPSH evaluations, demonstrated acceptable results with regard to allowable strainer head loss.

Characterization of In-Vessel Effects

Entergy intends to follow the resolution strategy proposed by the PWROG for establishing in-vessel fiber limits. The objective of this program is to establish a range of fiber acceptance limits and applicability criteria for plant specific evaluation for GSI-191 closure by deterministic methods. The intent of the program is to improve upon the WCAP 16793 acceptance limit (15 g/FA) that is currently applicable to all plants [Ref. 5]. The PWROG resolution strategy includes the following four Project Authorizations:

1. PA-SEE-0872, "GSI-191 Comprehensive Program Plan Support"
2. PA-SEE-1072, "Addressing Boric Acid Precipitation to Support GSI-191 Closure and EM Development"
3. PA-SEE-1088, "Independent Third-Party Review of PWROG GSI-191 Test Programs"
4. PA-SEE-1090, "Comprehensive Analysis and Test Program for GSI-191 Closure"

The resolution schedule is provided below.

Licensing Basis Commitments

Entergy currently has no open commitments within the IP2 and IP3 commitment management system to provide additional updates or information to the NRC regarding GL 2004-02. However, in accordance with the resolution schedule detailed below, Entergy will submit a final updated supplemental response to support closure of GL 2004-02 for IP2 and IP3.

In Reference 3 Entergy stated that it would identify and report to the NRC any corrective actions that may apply to potential chemical and downstream effects within the reactor core within 90 days of issuance of the NRC Safety Evaluation Report on WCAP-16793-NP. The current submittal meets that obligation.

Resolution Schedule

Entergy will achieve closure of GSI-191 and address GL 2004-02 in accordance with the following schedule.

Physical Design Changes

- Insulation measurements are planned to be performed during the next refueling outages (RFOs) for both IP2 and IP3 currently scheduled for March 2014 for IP2 (2R21) and March 2015 for IP3 (3R18). These measurements would be taken to support a contingency action in the event that the PWROG program is not successful in increasing the fiber limit above the plant specific values determined for IP2 and IP3. The contingency action would be to fabricate non fibrous insulation based on the measurements taken and perform any necessary replacement or remediation by the completion of the third refueling outage following January 1, 2013 (Spring 2017 and Spring 2018 for IP3 and IP2, respectively).

The RFOs cited above represent the first opportunities in which to take insulation measurements. The March 2013 IP3 RFO was not considered a viable opportunity due to outage planning constraints. Nevertheless, as stated above, any necessary IP3 modifications will be completed by the third RFO after January 1, 2013. This schedule meets the NRC staff's expectation of SECY-12-0093 (Ref. 1).

PWROG Program Schedule

- The PWROG resolution strategy includes testing and analysis that are planned to be conducted in accordance with the following schedules:

  PA-SEE-1072, "Addressing Boric Acid Precipitation to Support GSI-191 Closure and EM Development"

  - Complete testing February 21, 2014
  - Issue final WCAP June 30, 2014

  and,

  PA-SEE-1090, "Comprehensive Analysis and Test Program for GSI-191 Closure"

  - Complete testing February 25, 2014
  - Issue final WCAP May 12, 2014

Licensing Basis Schedule

- Within six months of establishing a final determination of the scope of insulation replacement, remediation, or model refinements, Entergy will submit a final updated supplemental response to support closure of GL 2004-02 for IP2 and IP3. Based on the PWROG Program Schedule Entergy expects to submit the final updated response by June 30, 2015.

- Entergy will update the current licensing basis following NRC acceptance of the updated supplemental response for IP2 and IP3 and completion of the identified removal or modification of insulation debris sources in containment.

Summary of Actions Completed To Address GL 2004-02

Entergy's approach to achieving compliance with the requirements of GL 2004-02 consists of a combination of analyses and evaluations, testing, physical design changes, licensing basis changes, and administrative changes supported by conservative analytical and testing approaches. Taken together these provide reasonable assurance that the ECCS and CSS recirculation functions will be in compliance with the regulatory requirements of the GL once all corrective actions are complete.

To support closure of GSI-191 and to address GL 2004-02, Entergy has completed the following actions for IP2 and IP3. These actions are fully described in previous submittals [Refs. 3 and 4].

Completed Analyses and Evaluations

- Break Selection
- Debris Generation
- Debris Characterization
- Latent Debris Identification
- Debris Transport
- Head Loss and Vortexing
- Net Positive Suction Head
- Coatings Evaluation
- Debris Source Term
- Sump Screen Modification
- Sump Structural Analysis
- Upstream Effects
- Downstream Effects
- Downstream Effects – Fuel and Vessel
- Chemical Effects

Completed Testing

- Strainer testing including debris head loss and chemical effects testing
- Cal-Sil and asbestos dissolution testing
- Fiber erosion testing
- Sump strainer fibrous debris bypass testing

Completed Physical Design Changes

The following physical changes have been made that increase the debris handling capabilities of the sump screens/strainers (increased area and reduced hole size), significantly reduce the predicted quantity of debris reaching the strainers (flow channeling), reduce the magnitude of strainer fiber bypass (bypass eliminator), and significantly reduce the predicted impact of chemical effects (buffer replacement).

- Installation of passive strainer assemblies in the Internal Recirculation (IR) and Vapor Containment (VC) Sumps of both Indian Point units.

  The original IP2 IR and VC sump screens ($48ft^2$ and $14ft^2$, respectively) were replaced by strainer assemblies with effective areas of 3156 ft^2 and 1182 ft^2, respectively, and, the original IP3 IR and VC sump screens ($48ft^2$ and $32ft^2$, respectively) were replaced by strainer assemblies with effective areas of 3156 ft^2 and 1058 ft^2, respectively.

  In addition to the significant increase in screen surface area, the new strainers assemblies feature 3/32" diameter holes and a bypass eliminator. The bypass eliminator significantly reduces the amount of fiber that can pass through the strainers.

- Installation of vortex suppressors over all IR and VC sump strainers in both Indian Point units.

- Installation of flow channeling barriers in both Indian Point units.

- Installation of a trash rack over the Refueling Canal drain in both Indian Point units.

- Replacement of the IP2 Tri-Sodium Phosphate (TSP) and IP3 Sodium Hydroxide (NaOH) pH buffers with Sodium Tetraborate (NaTB).

- Removal of Kaowool insulation from inside the IP3 crane wall.

Completed Licensing Basis Changes

The following licensing basis changes were made to ensure that the predicted impact of chemical effects is significantly reduced (buffer replacement), that the debris handling capability of the VC sump meets new passive failure requirements and that ECCS valves whose single failure could cause loss of the ECCS function are in the required position with ac power removed so that misalignment or single failure cannot prevent completion of the ECCS function.

- Licensing Basis Change Regarding the Containment Sump pH Buffering Agent (IP2 and IP3 Amendments 253 and 236, respectively).

- Licensing Basis Change Regarding Passive Failure Analyses (IP2 and IP3 Amendments 257 and 238, respectively).

- Licensing Basis Change Regarding Emergency Core Cooling System Valve Surveillance Requirements (IP2 Amendment 263).

Completed Administrative Changes

Enhancements were made to the following procedures to ensure materials used in the Containments will not result in an increase of the debris loading beyond the analyzed values. This includes controls for foreign material exclusion, aluminum control, containment coatings, labels, insulation, and dust and latent debris as well as design controls on Engineering activities:

- EN-MA-118 "Foreign Material Exclusion"
- OAP-007 "Containment Entry and Egress"
- ENN-EE-S-010-IP2 "Electrical Separation Design Criteria"
- ENN-EE-S-008-IP "Electrical Installation Standard"
- EN-DC-115, "Engineering Change Development"
- ENN-DC-150, "*Condition Monitoring of Maintenance Rule Structures*"

Summary of Margins and Conservatisms for Completed Actions For GL 2004-02

The following provides a summary description of the margins and conservatisms associated with the resolution actions taken to date. These margins and conservatisms provide support for the extension of time required to address GL 2004-02 for IP2 and IP3.

Analytical Conservatisms in the Refueling Water Storage Tank (RWST) and Containment Water Level

The following conservatisms result in additional water level not credited in analysis that will directly increase NPSH available for the pumps, and also provide additional submergence margin for the vortex suppressors.

- Minimum RWST volumes credited
- Maximum RWST and accumulator temperatures
- Minimized flood-up
- Maximized Containment open volume

Analytical Conservatisms in the Debris Generation Evaluations

The following debris generation analysis assumptions conservatively maximized the quantity of debris generated for any LOCA. This then maximizes the head losses across the strainer, thereby minimizing NPSH, structural, and flow margins.

- Spherical Zone of Influence (ZOI) method employed
- Combination of break locations to maximize debris generation
- All un-qualified coatings fail
- Additional coatings margin included in the downstream analyses (including pumps).

Analytical Conservatisms in the Debris Transport Evaluations

The following debris transport analysis assumptions provided conservative values for transport of debris to both the IR and VC Sumps in excess of quantities that would be generated.

- Maximum flow rates applied
- Transport based on velocity and Turbulent Kinetic Energy
- Maximized velocity, minimizing settling
- Debris hold-up not credited
- Flow barriers not credited
- Debris settling not credited

Analytical Conservatisms in the Net Positive Suction Head (NPSH) Determination Evaluations

The NPSH analyses maximized the debris loads and pump flow rates through the strainers, while minimizing the sump water level available. These conservatisms ensure margin in all plant recirculation operations.

- No credit for Containment over pressure
- Employed SBLOCA levels and LBLOCA flows
- Debris head loss applied immediately

Analytical Conservatisms in the Downstream Effects Evaluations

The following downstream effects evaluation assumptions maximize the potential for wear and/or blockage of equipment downstream of the strainers and employ the high pump flow rates of low head recirculation.

- All particulate bypasses strainers
- Maximum flow rates employed
- Strainer perforations enlarged for analysis

- No credit for bed filtration
- Time effects not considered

Testing Approach Conservatisms:

The head loss across the installed sump screens has been determined via testing using a "test for success" testing methodology in the areas of debris head loss testing and chemical effects testing conducted in accordance with the NRC's March 2008 guidance document [Ref. 8].

Conservatisms in the testing approach include:

- Strainer testing with fines
- Full WCAP-16530 chemicals
- Bounding flow rates
- Bounding extrapolations for head losses

Overall Conclusion Regarding Conservatisms

The aforementioned conservatisms, in addition to the overall NEI methodology conservatisms applied throughout the mechanistic analyses for the Generic Letter resolution and numerous conservatisms not individually enumerated herein, will ensure successful ECCS pump operation at IP2 and IP3.

Summary of Margins and Conservatisms for On-going Actions for GL 2004-02

The following provides a summary description of the margins and conservatisms associated with the resolution actions that remain on-going. These margins and conservatisms provide support for the extension of time required to address the in-vessel issues of GL 2004-02 for IP2 and IP3.

Conservatisms considered for in-vessel

- Chemical Precipitation Occurs After Hot Leg Switch-Over (HLSO)

  As described in References 3 and 4, chemical precipitation occurs after hot leg switch-over for both IP2 and IP3. WCAP-16793-NP [Ref. 5] demonstrated that if plants can delay the formation of chemical precipitates until after HLSO, a greater amount of fiber will be able to enter the core without impeding long term core cooling. Therefore, a larger fiber limit can be tolerated since chemicals do not develop in the sump pool water until after transfer to HLSO. After switchover both IP2 and IP3 remain on the lower flow, HL flow path.

- ECCS Flow < bounding test value of 44.7 gpm/FA

  WCAP-16793-NP [Ref. 5] results were reported at a high, bounding flow rate of 44.7 gpm/FA (approximately equivalent to an 8600 gpm core flow at IP2 and IP3). These test results show that as the fuel assembly flow rate decreases the fiber limit can increase. Maximum flow rates (considering Recirculation or VC Sump operation) prior to HLSO are on the order of 29 gpm/FA and 12 gpm/FA for IP2 & IP3, respectively. Once on the long term HLSO alignment, flows are no greater than 7 gpm/FA, which is less than $1/6^{th}$ of the test rate.

- Fiber Load < 21 g/FA for a minimum period of 24 hours post LOCA

  As previously mentioned, IPEC determined a fiber bypass amount of 35 g/FA during bypass testing. The amount of debris bypass (14.98 lb_m) was determined by multiplying the measured debris bypass amount by the strainer surface area at the bounding approach velocity, which was then divided by 193 fuel assemblies. This equates to 0.078 lb_m/fuel assembly (FA) or 35.38 grams/FA. Conservative assumptions were made during bypass testing which yielded this fiber bypass amount.

  - A maximum approach velocity for each sump (0.006 ft/s for IR and 0.020 ft/s for VC) was used in the strainer bypass tests. A higher approach velocity forces more fiber to pass through the Top Hat strainer perforations, resulting in a conservatively greater bypass amount. For the VC strainers, the maximum approach velocity of 0.020 ft/s occurs at IP2 with no sump strainer extension installed. The extension was later installed at IP2 and greatly increased the effective area of the IP2 VC sump, thereby beneficially reducing the actual maximum velocity to 0.007 ft/s. The IP2 VC sump approach velocity bounds the IP3 velocity. The as tested VC strainer approach velocity is approximately twice the expected maximum approach velocity.

    In addition, the maximum velocities are based on the cold leg recirculation flow rates applicable at the start of recirculation. After the transition to hot leg recirculation the flow rates and approach velocities are significantly reduced.

  - The fibrous debris bypass amount was determined to be 2.8 lb_m/ (1000 ft^2) and 5.2 lb_m/ (1000 ft^2) for the IR Sump and the VC Sump, respectively. These amounts are bounding for all fibrous debris types and both IP2 and IP3 sump strainers.

  - The 35.38 g/FA value was conservatively determined as the sum of debris bypass for the IR (20.77 g/FA) and VC (14.42 g/FA) sumps even though the IR and VC sumps are not required to operate simultaneously during any design basis event. During the recirculation phase of a LOCA the IR pumps would take suction from the IR Sump throughout the event in the absence of a design basis passive failure. The residual heat removal pumps taking suction from the VC sump would be used if backup capacity to the internal recirculation loop is required in the event of a passive failure 24 hours or later after event initiation. Therefore, for the first 24 hours, only fiber that bypasses the IR sump strainers could result in fuel blockage (20.77 g/FA). Should there not be a design basis passive failure then the maximum fiber load would be limited to 20.77 g/FA.

- The 35.38 g/FA value was conservatively determined assuming that all the strainer bypass fiber is transported to the core. However, for some events, a significant amount of the recirculation flow would be diverted to the Containment Spray System. Any fiber entrained in the diverted flow would not contribute to fuel assembly blockage.

- In the unlikely event of a passive failure after the initial 24 hours, recirculation would be transferred from the IR to the VC sump. After transfer there is a potential for an additional 14.42 g/FA to bypass the VC strainer. However, when the system is aligned for hot leg recirculation the VC sump approach velocity would be significantly less than the as tested value resulting in a fiber bypass amount less than predicted. In addition, after the initial 24 hour period the core cooling requirements are decreased due to a significant reduction in decay heat removal requirements.

Summary of Defense-In-Depth (DID) Measures

The following describes the plant specific design features and procedural capabilities that exist for prevention, detection and mitigating a strainer blockage or fuel blockage condition.

Strainer Blockage

- IP2 and IP3 have within their Emergency Operating Procedure (EOP) framework, specific steps for monitoring for indications of sump strainer blockage and actions to be taken if this condition occurs. These actions are described in the response to NRC Bulletin 2003-01 [Ref. 6] and the subsequent response to the NRC request for additional information [Ref. 7]. The actions taken in response to the Bulletin are still in effect at IP2 and IP3.

Fuel (Core) Blockage

- Prevention

  The IP2 and IP3 post LOCA sump temperatures remain elevated (above the precipitation temperature for chemical effects) until after the transition to hot leg recirculation. The minimum possible temperature of the post-LOCA containment sump pool at 7 hours after a LOCA is 122°F and 123°F for IP2 and IP3, respectively. The corresponding precipitation point temperatures are 118°F and 121°F. Therefore, precipitation is not expected to occur prior to the switchover to hot leg recirculation which is required to be completed no later than 6.5 hours into the LOCA. After this procedurally required switchover to the hot leg recirculation pathway, the pump flow rate is significantly reduced.

- Detection

  Multiple methods exist for detection of a core blockage condition as manifested by an inadequate Reactor Coolant System (RCS) inventory or RCS and core heat removal condition. The primary methods include Core Exit Thermocouples (CET) and Reactor Vessel Level Instrumentation System (RVLIS). This monitoring is initiated early in the event in the EOPs through the Critical Safety Function Status Trees which are monitored at a minimum frequency of every 10 to 20 minutes and continue until the plant status is

fully diagnosed. An additional method for detection of a core blockage condition includes monitoring of containment radiation levels by the Technical Support Center (TSC) staff.

- Mitigation

  Upon identification of an inadequate RCS inventory or core heat removal condition, the EOPs direct the operators to take actions to restore cooling flow to the RCS including:

  - Establish minimum Safety Injection flow to remove decay heat.
  - Refill the Refueling Water Storage Tank (RWST).
  - Depressurize the steam generators to depressurize the RCS.
  - Start RCPs.
  - Fill the RCS from alternate paths.

  The operators will also inform the TSC of the condition. The TSC will evaluate the condition and recommend the following actions, as necessary, to the operators to restore core heat removal:

  - Inject water into the RCS through any available path.
  - Makeup to the RWST from various plant water sources using a fire hose connection. These water sources include the following borated water sources; Volume Control Tank (VCT), Boric Acid Storage Tank (BAST), and non-borated water sources; all water tanks that reside on-site including Fire Water Storage Tank(s), Primary Water Storage Tank, Condensate Storage Tank, City Water Tank.
  - Consideration of the use of the unaffected unit's water supplies.
  - Flood containment using fire hydrants or portable pumps.

In addition to the above, Entergy notes that the PWROG Procedures Subcommittee has recommended that information regarding the potential for lower core region flow blockage due to in-vessel debris during the cold leg recirculation phase of safety injection, methods for detecting lower core region flow blockage, and potential mitigating actions be added to the Background Information for Emergency Response Guidelines (ERGs) ES-1.3, FR-C.1, FR-C.2 and CSF Status Tree F-0.2. The identified revisions to the ERGs will be evaluated by Entergy and will be incorporated, as necessary, into the corresponding IP2 and IP3 Emergency Operating Procedures.

Although these measures are not expected to be required based on the very low probability of an event that would challenge either the capability of the strainer to provide the necessary flow to the ECC and CS systems, or result in significant quantities of debris being transported to the reactor vessel that would inhibit the necessary cooling of the fuel, they do provide additional assurance that the health and safety of the public would be maintained. These measures provide support for the extension of time required to completely address GL 2004-02 for IP2 and IP3.

Conclusion

Entergy expects that the GSI-191 resolution path for IP2 and IP3 is acceptable, based on the information provided in this document. The execution of the actions identified in this document will result in successful resolution of GSI-191 and closure of GL 2004-02.

References

1) NRC SECY-12-0093, "Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance" dated July 9, 2012.

2) NRC SRM-SECY-12-0093, "Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance" dated December 14, 2012.

3) Entergy letter NL-09-138, 11/19/09, "Updated Supplemental Response to NRC Generic Letter 2004-02; "Potential Impact Of Debris Blockage On Emergency Recirculation During Design Basis Accidents At Pressurized-Water Reactors"".

4) Entergy letter NL-10-074, 07/27/10, "Response to Request for Additional Information Regarding Generic Letter 2004-02".

5) WCAP-16793-NP, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous and Chemical Debris in the Recirculating Fluid", Revision 2, October 2011.

6) Entergy Letter NL-03-128, 8/7/2003, "60-Day Response to NRC Bulletin 2003-01 Regarding Potential Impact of Debris Blockage of Emergency Sumps".

7) Entergy Letter NL-04-151, 12/8/2004, "Reply to RAI Regarding Bulletin 2003-01,"Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized Water Reactors"".

8) NRC Staff Review Guidance Regarding Generic Letter 2004-02, Closure in the Area of Strainer Head Loss and Vortexing, prepared by Safety Issue Resolution Branch, Division of Safety Systems, Office of Nuclear Reactor Regulation, March 2008.