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2CAN081007

August 24, 2010

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Request for Additional Information
Implementation of a Risk-Informed Inservice Inspection Program Based on ASME Code Case N-716
Arkansas Nuclear One, Unit 2
Docket No. 50-368
License No. NPF-6

REFERENCES:

1. Entergy letter to the NRC, dated January 20, 2010, "Implementation of a Risk-Informed Inservice Inspection Program Based on ASME Code Case N-716" (2CAN011001) (TAC No. ME3128)

2. Entergy letter to the NRC, dated January 28, 2010, "Supplement to Request for Alternative – Implementation of a Risk-Informed Inservice Inspection Program Based on ASME Code Case N-716" (2CAN011005)

3. Email from Kaly Kalyanam (NRC) to David B. Bice (Entergy), dated August 4, 2010, "Request for Additional Information" (TAC No. ME3678)

Dear Sir or Madam:

In letter dated January 20, 2010, Entergy Operations (Entergy) submitted a Request for Alternative to implement a risk-informed Inservice Inspection Program based on ASME Code Case N-716 (Reference 1). This letter was supplemented in its entirety due to an incorrect Inservice Inspection (ISI) sequence reference by letter dated January 28, 2010 (Reference 2).

During continued review of the request, the NRC determined that further information was required to complete the Staff's evaluation (Reference 3). Attachment 1 of this submittal contains the Reference 3 Request for Additional Information (RAI) along with Entergy's response.

In addition to the technical questions issued in Reference 3, the NRC also requested updated commitment attachments to the Reference 1 and 2 letters above due to an inconsistency with the Arkansas Nuclear One (ANO) unit referenced in the attachments. Replacement pages for the Reference 1 and 2 letters are included in Attachments 2 and 3 of this letter. Please replace Attachment 2 of the Reference 1 and 2 letters with the pages included in Attachments 2 and 3 of this submittal, respectively.

This letter contains no new commitments; however, the Reference 1 and 2 attachments containing the original commitments have been corrected to reference the correct ANO unit number.

If you have any questions or require additional information, please contact me.

Sincerely,

Original signed by Mark A. Giles

MAG/dbb

Attachments:

1. Response to Request for Additional Information Related to Implementation of a Risk-Informed Inservice Inspection Program Based on ASME Code Case N-716
2. Replacement Page for Entergy Letter Dated January 20, 2010, Attachment 2 (2CAN011001)
3. Replacement Page for Entergy Letter Dated January 28, 2010, Attachment 2 (2CAN011005)

cc: Mr. Elmo E. Collins
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U. S. Nuclear Regulatory Commission
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Attachment 1 to

2CAN081007

**Response to Request for Additional Information
Related to Implementation of a Risk-Informed Inservice Inspection Program
Based on ASME Code Case N-716**

**Response to Request for Additional Information
Related to Implementation of a Risk-Informed Inservice Inspection Program
Based on ASME Code Case N-716**

1. In Appendix 1 of the submittal, the disposition to IF-A1-01 states that the ANO-2 internal flooding analysis has been completed and has been performed in accordance with the accepted methodology used at Waterford-3 and therefore the issue is considered to be resolved. Based on the information provided in the submittal, the staff does not have sufficient information to characterize the quality of the internal flooding PRA for ANO-2. Since this application is dependent on the flooding portion of the PRA, the staff requests that, based on RG 1.200 guidelines, the licensee perform a focus-scope gap assessment on the internal flooding portion of the updated PRA model. The gap assessment should assess the capability category for each supporting requirement for the updated internal flooding PRA based on the ASME standard. In addition, provide a disposition related to this application for any supporting requirements that are not met.

The methodology adopted in this internal flooding analysis is in broad accord with the requirements of the ASME PRA Standard and the EPRI Guidelines. In general, Capability Category II requirements have been met although Capability Category III supporting requirements are met in some instances. Some instances are more conservative than the guidelines suggest (e.g., consideration of the effect of spray over and above flooding, and allowance for spray to reach equipment at a 30' distant from the point of rupture rather than the 10' or 20' suggested by the EPRI Guidelines. The basis for the information presented below was obtained from the ANO-2 Internal Flooding Analysis. Since the ANO-1 and ANO-2 flooding analyses were performed sequentially using the same basic approach, the Capability Category provided in the table below is based upon: 1) the peer review findings from the ANO-1 Internal Flooding Analysis, and 2) Entergy's review of each of the supporting requirements (SRs) in relation to the ASME/ANS standard. In some cases, the Capability Category presented below for ANO-2 differed from that of ANO-1 peer review findings. This difference is due to lessons learned that were implemented during the ANO-2 analysis. Those differences are identified and discussed in the table below.

All High Level Requirements (HLR) for the Internal Flood Analysis have been met for ANO-2. The SRs discussed in the table below provide validation that these HLRs are met. Entergy has identified a reasonable set of plant flood areas, identified and characterized flood sources, developed flood scenarios and propagation paths, identified applicable SSCs with their appropriate flood induced failure modes, calculated the frequencies of flood events, and quantified the scenarios per the ASME/ANS standard. While enhancements are required relating to documentation of uncertainties, the results of our analysis remain valid and do not impact the request for approval of the fourth ten-year interval Inservice Inspection (ISI) Program.

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFPP-A1: define flood areas	Potential flood zones were identified by dividing the major buildings and areas into “room areas” according to their elevations and whether they are enclosed. Structural considerations, such as walls and doors were used to identify the boundaries. While flood zones have some degree of independence, particularly with regard to spraying and environmental effects, they may also have interconnections (doors, drains, etc.) that lead to flood propagation. In the analysis, individual rooms were not necessarily considered to be individual flood zones, if there is no impediment to the propagation of floodwater into adjoining areas. The flood areas are identified by building (auxiliary, turbine, intake), elevation, then a unique number.	All
IFPP-A2: define flood areas at the level of individual rooms or combined rooms	Flood areas defined at the level of individual rooms or combined rooms for which plant design features exist to restrict flooding.	II/III
IFPP-A3: for multi-unit sites with shared systems or structures, include multi-unit areas	Fire water pumps are shared between both units; Units 1 and 2 are physically connected on multiple elevations. The spent fuel area for Units 1 (flood zone AB404-159) and 2 (flood zone AB404-2151) are continuous. Floodwater released into either spent fuel pool area will flow preferentially into the Unit 1 spent fuel pool. Although a 4” curb surrounds the pool, this curb has numerous gaps and would not prevent even small releases from entering the fuel pool. Also, service water return piping for Unit 2 traverses the 335’ elevation of Unit 1.	All
IFPP-A4: use plant information sources used to reflect the as-built as-operated plant to support development of flood areas	Plant architectural, construction and drain drawings were used in conjunction with a plant walkdown to identify flood areas. Plant drawings are included in the internal flood documentation.	All

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFPP-A5: conduct a plant walkdown	A plant walkdown was conducted. Notes were developed from the walkdown, a review of plant drawings, and a review of other documents. It should be noted that for operational and health reasons, not all rooms were entered. For those rooms not entered, architectural drawings were utilized.	All
IFPP-B1: document plant partitioning	Flood zones resulting from plant partitioning are documented by list and visually on plant drawings contained in the internal flood analysis.	All
IFPP-B2: document process to identify flood areas	The process to define flood zones is documented in the internal flood analysis. The process started with rooms and then combined rooms, if the rooms are interconnected through drains or other means.	All
IFPP-B3: document sources of uncertainty and assumptions	The plant walkdowns provide confirmation of the plant partitioning and the interconnections of the various rooms in the plant. The assumptions on flood barriers are clearly documented in the internal flood analysis as well as the flood propagation pathways. However, sources of model uncertainty and related assumptions were not documented for the internal flood analysis. While documenting and understanding sources of model uncertainty is critical in ultimately ensuring that application results are understood and utilized in a manner that is defensible in relation to the application. This SR, although important for developing a thorough understanding of the results, does not affect the ANO-2 results for the following reasons and will be included in future revisions to the Internal Flood Analysis: (continued)	Not Met

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFPP-B3: document sources of uncertainty and assumptions (continued)	1) The sizes of flood sources were first determined assuming guillotine breaks of lines or the catastrophic rupture of valves, tanks, gaskets, fittings and heat exchangers. This approach is consistent with the NRC Standard Review Plan, Sections 3.6.1 and 3.6.2, for high-energy lines and components, but is more conservative than the NRC Standard Review Plan for the medium energy lines that are of principal concern in this analysis. 2) No flood area was screened out based upon the basis of operator action. 3) Flow rates were taken as a maximum flow capacity for the propagation path. 4) A plant scram was assumed for each flood scenario. 5) In general floods were allowed to persist for long periods of time (~ 12 to 24 hours) unless the flood source is finite. 6) Uncertainty analysis does not affect the results.	
IFSO-A1: identify the potential sources of flooding	The potential sources of flooding were identified from drawings, walkdowns, and lists of systems and equipment in each flood zone. Propagation from adjacent rooms is included. The Dardanelle Reservoir was considered as an external flood source.	All
IFSO-A2: for multi-unit sites with shared systems or structures, include potential sources with multi- or cross-unit impact	Rupture scenario involving Unit 2 service water return as it traverses the 335' elevation of Unit 1 is addressed in the internal flood analysis. See also IFPP-A3.	All

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFSO-A3: screen out areas with no potential source of flooding	Areas with no flood source have been screened out (except as a potential flood propagation path).	All
IFSO-A4: for each potential source of flooding identify the flooding mechanisms	Flooding mechanisms were not identified in the internal flood analysis. A conservative approach was taken to assume a flood is always possible; the flood rupture frequencies assumed incorporate all sources of flooding.	N/A
IFSO-A5: for each source and its failure mechanism identify the characteristic of the release and capacity of the source	The sizes of flood sources were first determined assuming guillotine breaks of lines or the catastrophic rupture of valves, tanks, gaskets, fittings and heat exchangers; where the volume of floodwater that might be released is finite, this fact was noted in the analysis. A flood source flows at full flow until it is isolated or its water supply is limited or exhausted.	All
IFSO-A6: conduct a plant walkdown	A plant walkdown was conducted. The internal flood analysis contains the notes developed from this and the review of plant drawings and other documents. It should be stressed that for operational and health reasons, not all rooms were entered. For those rooms not entered architectural drawings were utilized.	All
IFSO-B1: document the internal flood sources	The source of each flood scenario including the pipe segment or equipment, system, rupture type and capacity is described in the description of each scenario in the analysis.	All
IFSO-B2: document process to identify flood sources	The potential flood sources were identified and documented in relation to the flood areas where the source is located.	All
IFSO-B3: document uncertainty and assumptions	The analysis assumes that all flooding sources are included in the calculation of the flood frequency. By considering the guillotine rupture of lines, it is ensured to address the fact that catastrophic failures capture the failures associated with operator error or design and construction errors, corrosion, erosion, impact and hanger failure, and other noted causes of line rupture, and the possibility of lesser cracks growing to guillotine ruptures. if subjected to dynamic loads. Also see response to IFPP-B3.	Not Met

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFSN-A1: for each defined flood area and flood source, identify the propagation path from the flood source area and its area of accumulation	The propagation path(s) from each flood source area to its area of accumulation are identified and presented in schematics within the internal flood analysis.	All
IFSN-A2: for each flood area and each source, identify plant design features able to terminate or contain the flood propagation	Plant design features able to terminate or contain the flood propagation have been identified and discussed in relation to the flood area or flood scenario where they affect the movement of floodwater.	All
IFSN-A3: for each flood area and each source, identify automatic or operator responses able to terminate or contain the flood propagation	Automatic or operator responses able to terminate or contain the flood propagation were identified in conjunction with the flood scenario that necessitates the automatic or human response. However, only four specific cases were evaluated to take credit for an operator action to stop the flooding. In these specific cases, criteria were established for utilizing an operator action for mitigating the flood. Those criteria are 1) Operations must have obvious indication in the control room that a problem exists, 2) the flood condition is easily identified, 3) procedures exist for mitigating the flood scenario, and 4) the actions taken by the operators are not significantly affected by the flood condition. All other scenarios took no credit for terminating the flood. The flooding was assumed to continue for 12-24 hours or until the volume of the source had been depleted.	All
IFSN-A4: estimate the capacity of drains and the amount of water retained by sumps, etc.	The amount of water retained by sumps etc. were accounted for in determining the consequences of internal flooding. In general, drains were assumed to not function unless their functioning exacerbates the situation.	All
IFSN-A5: identify the SSCs addressed in the PRA in each flood area	The structures, systems, and components (SSCs) addressed in the PRA in each flood area and their susceptibility to flooding and spray damage were identified in the flooding analysis.	All

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFSN-A6: determine for the SSCs addressed in the PRA their susceptibility to flooding and spray damage	The susceptibility to flood and spray damage was considered; with jet impingement, pipe whip, temperature, and humidity considered in High Energy Line Breaks. Specifically, jet impingement is considered as a result of main feedwater line breaks in the steam pipe and water heater area; pipe whip is considered as a result of main steam system ruptures in the steam pipe area; temperature and humidity are considered as a result of main steam system ruptures in the steam piping area, upper north piping penetration area, electrical equipment room, chiller room, heat exchanger area, Emergency Feedwater (EFW) B pump room, electrical switchgear area, water heater and compressor areas, main feedwater line ruptures in the chiller equipment room, pipeway, water heater area, upper north piping penetration area and hallways, and ruptures of the chemical and volume control system in the piping penetration area and heat exchanger rooms.	III This SR was identified as not met in the ANO-1 Peer Review. However, the ANO-2 analysis addressed the identified weakness in development of the analysis.
IFSN-A7: take credit only as appropriate for the availability of SSCs	Credit taken as appropriate. Each class of component (motor-operated valves (MOV), air-operated valves (AOV), hydraulic valves, manual and check valves, motor and turbine pumps, compressors, fans diesel engines, instrumentation, electrical equipment, cables, junction boxes, heat exchangers, tanks, piping, ductwork, room air coolers, heaters, air ejectors, oil separators, etc) is assessed under submergence, spray and steam failure mechanisms. In addressing the rupture of high energy lines we have relied extensively on the analysis of pipe whip, jet impingement and other HELB issues in the Safety Analysis Report (SAR).	All
IFSN-A8: identify inter-area propagation	Inter-area propagation identified including doors, hatches, drains, and other penetrations. It was assumed that at low water depths, flow into a drain resembles flow over a broad-crested weir. Flow through constriction across the floor in a given zone was modeled as flow through an open channel.	II

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFSN-A9: perform any necessary engineering calculations for flood rate, etc	Engineering calculations were performed as necessary to assess capability of SSCs. The analysis relies on some outside calculations (i.e. when a door will fail due to differential water height and flow through drains and across flood areas)	All
IFSN-A10: develop flood scenarios	Flood scenarios were developed including flood area, source, flood rate, operator actions, and SSC damage (due to flood and independent causes). Propagation paths were included in the development as well as the SSCs in the propagation path susceptible to the flood progression.	All
IFSN-A11: for multi-unit sites with shared systems or structures, include multi-unit scenarios	Fire water pumps in Unit 1 intake structure serve both units. Ruptures involving these pumps, a rupture scenario involving Unit 2 service water return as it traverses the 335' elevation of Unit 1, and the propagation of floodwater across 404' elevation are addressed in the ANO-1 internal flooding analysis. See also IFPP-A3	All
IFSN-A12/IFSN-A13: Screen out flood areas	No flood areas were screened out	All
IFSN-A14: do not screen out flood areas based on a reliance on operator actions	No flood areas were screened out	III
IFSN-A15: screen out flood sources based on specific conditions	No flood sources were screened out	All
IFSN-A16: do not screen out flood sources based on a reliance on operator actions	No flood sources screened out in this instance because the mitigating effects of the inspection and replacement programs were not addressed (i.e. there is no data to quantify these effects).	III
IFSN-A17: conduct a plant walkdown	A plant walkdown was conducted. The internal flood analysis contains the notes developed from the waldown and the review of plant drawings and other documents.	All

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFSN-B1: document flood scenarios	Flood scenarios are documented individually including the source, SSCs affected, and operator actions.	All This SR was identified as not met in the ANO-1 Peer Review. However, the ANO-2 analysis addressed the identified weakness in development of the analysis.
IFSN-B2: document process to identify applicable flood scenarios	The process to identify flood scenarios is explained in the internal flood analysis before any of the scenarios are described. The process includes identification of flood area, flood source, propagation path, SSCs in that path, and human actions that can be credited.	All
IFSN-B3: document uncertainty and assumptions	Assumptions made in the process to identify flood scenarios are listed after the description of the identification process. The list includes assumptions on flood flow rates, the radius of damage for spray scenarios, treatment of drains, etc. Also, in general, no credit was taken for drains as a way in which floods might be mitigated. Their blockage so as to allow water to flow between flood zones on a given elevation was considered. Also see response to IFPP-B3.	Not Met

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFEV-A1: for each flood scenario identify the corresponding plant initiating event group	The corresponding plant initiating event group is listed in each scenario description in the internal flooding analysis.	All
IFEV-A2: group flooding scenarios	Flooding scenarios were not grouped in the internal flooding analysis.	III
IFEV-A3: group or subsume flood scenarios with an existing plant initiating event group.	Grouped flood scenarios with an existing plant initiating event group when applicable (e.g. %T19 "Loss of Component Cooling Water Loop II", %T5-A, B and C, Feedwater line break initiators, %RCP "Reactor coolant pump seal LOCA); however, no scenarios were subsumed.	I/II This SR was identified as not met in the ANO-1 Peer Review. However, the ANO-2 analysis addressed the identified weakness in development of the analysis.
IFEV-A4: for multi-unit sites with shared systems or structures include multi-unit impacts	Rupture scenario involving Unit 2 service water return as it traverses the 335' elevation of Unit 1 is addressed in the internal flooding analysis. See also IFPP-A3	All
IFEV-A5: determine the flood initiating event frequencies	Rupture frequencies were calculated for each line or piece of equipment that might rupture, using EPRI's "Pipe Rupture Frequency for Internal Flooding PRAs" in which a number of flood flow rates and matching rupture frequencies are presented for lines of different size and in different service and for other equipment.	All

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFEV-A6: gather and use plant-specific information in determining flood initiating event frequencies	Plant-specific information was used in determining flood initiating event frequencies. The specific line size and length was used with the EPRI method to determine flood initiating event frequency.	II/III This SR was identified as not met in the ANO-1 Peer Review. However, the ANO-2 analysis addressed the identified weakness in development of the analysis.
IFEV-A7: include a consideration of human induced floods during maintenance through the application of generic data	By considering the guillotine rupture of lines, we ensure that we address the fact that catastrophic failures capture the failures associated with operator error (e.g., maintenance-induced floods) or design and construction errors (such as water hammer, the improper handling of dynamic loads, or undetected fabrication errors), corrosion, erosion, impact and hanger failure and other noted causes of line rupture and the possibility of lesser cracks growing to guillotine ruptures if subjected to dynamic loads. While maintenance-induced floods and water hammer-induced valve or pipe rupture resulting from the creation of voids in containment spray and low pressure safety injection systems are of particular concern and while the need to assess human induced floods in relation to the application of the generic data is important for ensuring that the flood frequency is inclusive, the inclusion of these human induced floods has no bearing on the susceptible damage mechanisms associated with ISI examinations. (continued)	Not Met

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFEV-A7: include a consideration of human induced floods during maintenance through the application of generic data (continued)	EPRI TR-1013141 "Pipe Rupture Frequencies for Internal Flooding PRAs" was used to develop the rupture frequency for piping. This document, states, "All piping system pressure boundary failures have been included including failures in pipe base metal, welds, and other metallic pressure boundary components such as valve bodies, heat exchangers, and fittings. Human induced causes of flooding that do not involve piping system pressure boundary failure such as overfilling tanks and inappropriate valve operations that release fluid from the system are not included. Such events are expected to be included in the human reliability analysis for the internal flood PRA as they are design and procedure specific, and should not be "buried" in the component failure data". This SR will be addressed in a future update to the Internal Flood Analysis. This SR has no affect on the RI-ISI submittal for ANO-2 since the generic data includes all piping system pressure boundary failures including those that are human induced. Also, IFEV-A7 is not considered required per EPRI 1018427, Table 2-2, for technical adequacy of PRAs used to develop RI-ISI programs.	

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFEV-A8: screen out flood scenarios based on quantitative and other criteria	Conservative screening rules were used to eliminate internal flooding events with a limited potential for core damage. Releases from normally isolated lines were not developed, if they would not precipitate a plant shutdown. Flooding scenarios were not eliminated, however, because of their low probability of occurrence or because they could be subsumed into other initiating events. The predicted frequency of a rupture was not used to screen out any accident scenario.	All This SR was identified as not met in the ANO-1 Peer Review. However, the ANO-2 analysis addressed the identified weakness in development of the analysis.
IFEV-B1: document flood induced initiating events	Every flood scenario is either assumed to cause a plant trip or is grouped with an initiator that has identical consequences to plant systems.	All
IFEV-B2 document process to identify flood induced initiating events	The supporting documents for the internal flood analysis contain the flood frequencies and the flood unique data.	All
IFEV-B3: document uncertainty and assumptions	See response to IFPP-B3	Not Met

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFQU-A1: review accident sequences to confirm applicability	The quantification of the internal flood model is performed by application of specific flag files in the base internal events model. This is documented in the internal flooding analysis. The accident sequences for the flood events are similar to those sequences used in the base internal events model and were confirmed to align with the initiating events used in each flooding scenario. Resultant cutsets were used to verify the expected accident progressions.	All
IFQU-A2: Modify systems analysis to include flood induced failures	System failures are set using flags in the Internal Flooding Analysis. Use of flags in the base PRA model ensures that the same level of detail is provided from the systems analysis as is used in quantification of the baseline PRA.	All
IFQU-A3: Limit the use of quantitative screening of flood areas	No quantitative screening of scenarios was performed in the internal flood analysis. A 10^{-12}/ry truncation limit was applied in quantification. Once quantified, the results of the individual scenarios were incorporated into the overall results.	N/A No quantitative screening was performed
IFQU-A4: perform additional analysis of SSC data if necessary	Additional analysis of door failure was used from ANSI/BHMA calculations that prove to be the industry standard.	All

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFQU-A5: add human reliability analysis if necessary	It is generally assumed that if operators have indication of a flooding event, that in may cases they would be capable of isolating the flow within 15 minutes. However, the internal flood analysis conservatively assumes that the flooding will proceed for 12 to 24 hours or to the capacity of the flood source in all but four cases. For those four cases, criteria were established for utilizing an operator action for mitigating the flood. Those criteria are 1) Operations must have obvious indication in the control room that a problem exists, 2) the flood condition is easily identified, 3) procedures exist for mitigating the flood scenario, and 4) the actions taken by the operators are not significantly affected by the flood condition.	All This SR was identified as not met in the ANO-1 Peer Review. However, the ANO-2 analysis addressed the identified weakness in development of the analysis.
IFQU-A6: include scenario specific PSFs on human reliability analysis	This SR is interpreted to imply that any mention of the use of operator actions to isolate flooding sources in a given amount of time should undergo some type of human reliability analysis. Only two new Human Reliability Analyses (HRAs) were added to the model to credit isolation of the flooding source. Operator interviews were conducted, the HRA toolbox was used, and the criteria discussed in IFQU-A5 were used to ensure that a reasonable probability of failure was calculated for these two events.	All
IFQU-A7: perform sequence quantification	Flood scenario quantification was performed with CAFTA and PRAQuant. The results are reported extensively in the internal flood analysis documentation.	All

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFQU-A8: include flooding failures with independent causes	The effect of each flooding scenario is dependent on the flood induced failures specific to the scenario and on the independent failures of components necessary for the mitigation of the flood scenario. The independent failures can be due to maintenance unavailability or common cause or other source.	All
IFQU-A9: include effects of flooding	Direct and indirect effects are considered. The effects of spraying and splashing from a flood were assumed to be restricted to within 30'of the source. Pipe whip is considered for failures (ex. letdown lines). It is noted that the SAR is relied upon for indirect effects from high energy lines.	All
IFQU-A10: review LERF analysis to confirm applicability	The ANO-2 PRA model links the Level 1 and Level 2 results into a single fault tree file. The top gates for Level 1 is CORE DAMAGE and the top gate for Level 2 is Large Early Release Frequency (LERF). The flag files are set during the quantification for Level 1 and Level 2 results. Since the LERF portion of the tree is quantified in a similar manner to that for Level 1, the flag files used in the quantification are the same, and the LERF sequences are not altered by the flood analysis (only the flood failures affecting the probability of a Level 1 endstate and the flood failures affecting the LERF mitigation components are affected in the flood analysis), the quantification of the Level 2 results are valid. The results of the LERF analysis when related to the corresponding Core Damage Frequency (CDF) provide additional validation of the relative nature of the results.	All This SR was identified as not met in the ANO-1 Peer Review. However, the ANO-2 analysis addressed the identified weakness in development of the analysis.
IFQU-A11: conduct walkdowns	A plant walkdown was conducted. The internal flood analysis contains the notes developed from this and the review of plant drawings and other documents.	All

Matching of Supporting Requirements in the ASME PRA Standard		
Supporting Requirement Index No.	**How Addressed**	**Capability Category**
IFQU-B1: document accident sequences and quantification	The flooding scenarios are documented including the flood source, type of source, mitigation efforts (automatic and human), affected SSCs and affect on the plant of the system made unavailable by the flood event.	All
IFQU-B2: document process to define accident sequences and quantification	The quantification process including how the flag files are used, how the top logic is modified and how each scenario is quantified is described in detail in the methodology section of the Quantification appendix of the internal flood analysis.	All
IFQU-B3: document uncertainty and assumptions	See response to IFPP-B3.	Not Met

2. Were new examination locations identified, if so, were the new examination locations included in the change in risk estimate? Using an upper-bound estimate for new locations would be non-conservative. Please demonstrate that this non-conservative approach, if corrected, would not exceed the delta risk guidelines

New locations were added. The following is stated on Page 16 of 25 in Attachment 1 of the request:

> "Also, for cases where the RIS_B selections exceeded SXI selections in Table 3.4-1, they were set equal to SXI to confirm that the use of conservative CCDP and CLERP are not non-conservative relative to meeting the acceptance criteria."

To expound, certain Chemical and Volume Control (CH), Main Feedwater (MFW), Reactor Coolant (RCS), and Safety Injection (SI) entries in Table 3.4-1 indicate the risk-informed / safety-based ISI (RIS_B) selections to be greater than those of ASME Code Section XI (SXI) (i.e., the "Delta" column has a positive number). These entries were revised by setting the positive Delta values to zero. This conservative change in risk sensitivity calculation was performed in lieu of a lower bound calculation to show that the acceptance criteria is met with the use of conservative Conditional Core Damage Probability (CCDP) and Conditional Large Early Release Probability (CLERP) and that the number of RIS_B selections not allowed to exceed SXI.

Attachment 2 to

2CAN081007

Replacement Page for Entergy Letter Dated January 20, 2010, Attachment 2 (2CAN011001)

LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
ANO-2 is in the process of evaluating MRP-146, *Materials Reliability Program: Management of Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant System Branch Lines*, and these results will be incorporated into the RIS_B Program, as warranted.	✓		June 30, 2011
The request for alternative pertaining to the use of Code Case N-578 will be withdrawn for use at ANO-2 upon NRC approval of the RIS_B Program submittal.	✓		Upon NRC approval of this request for alternative
Upon approval of the RIS_B Program, procedures that comply with the guidelines described in EPRI TR-112657 will be prepared to implement and monitor the program.	✓		Upon NRC approval of this request for alternative

Attachment 3 to

2CAN081007

Replacement Page for Entergy Letter Dated January 28, 2010, Attachment 2 (2CAN011005)

LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
ANO-2 is in the process of evaluating MRP-146, *Materials Reliability Program: Management of Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant System Branch Lines*, and these results will be incorporated into the RIS_B Program, as warranted.	✓		June 30, 2011
The request for alternative pertaining to the use of Code Case N-578 will be withdrawn for use at ANO-2 upon NRC approval of the RIS_B Program submittal.	✓		Upon NRC approval of this request for alternative
Upon approval of the RIS_B Program, procedures that comply with the guidelines described in EPRI TR-112657 will be prepared to implement and monitor the program.	✓		Upon NRC approval of this request for alternative