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GNRO-2015/00063

October 28, 2015

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

**SUBJECT:** Grand Gulf Nuclear Station Response to Request for Additional Information Regarding License Amendment Request to Revise Technical Specifications for Containment Leak Rate Testing  
Grand Gulf Nuclear Station, Unit 1  
Docket No. 50-416  
License No. NPF-29

- REFERENCES:**
1. Grand Gulf Nuclear Station, Unit 1 - Request for Additional Information Regarding License Amendment Request to Revise Technical Specifications for Containment Leak Rate Testing (TAC NO. MF6310)
  2. Entergy Letter, "Application to Revise Technical Specifications for Permanent Extension of Type C Leak Rate Testing Frequency and Reduction of Type B and C Grace Intervals," GNRO-2015/00026, dated May 27, 2015 (ADAMS Accession No. ML15147A599).
  3. Grand Gulf Nuclear Station, Unit 1 - Issuance of Amendment Regarding Maximum Extended Load Line Limit Analysis PLUS (TAC NO. MF2798), dated August 31, 2015

Dear Sir or Madam:

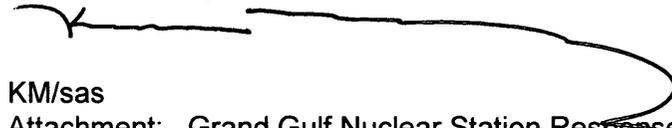
Entergy Operations, Inc. is providing, in the Attachment, responses to the Reference 1 Request for Additional Information (RAI). The Significant Hazards Consideration determination provided in Reference 2 is not altered by the additional information provided in the attached RAI responses.

Additionally, Entergy Operations, Inc. plans to implement License Amendment 205 regarding Maximum Extended Load Line Limit Analysis PLUS within 180 days from the date of issuance of the amendment. License Amendment 205 will reduce the containment peak accident pressure from 14.8 pounds per square inch gauge (psig) to 12.1 psig. The RAI responses provided, in the Attachment, only address the Reference 1 RAI.

This letter contains no new commitments. If you have any questions or require additional information, please contact Mr. James Nadeau at 601-437-2103.

I declare under penalty of perjury that the foregoing is true and correct; executed on October 28, 2015.

Sincerely,

A handwritten signature in black ink, consisting of a series of connected loops and a final horizontal stroke.

KM/sas

Attachment: Grand Gulf Nuclear Station Response to Request for Additional Information Regarding License Amendment Request to Revise Technical Specifications for Containment Leak Rate Testing

cc: with Attachment

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**Attachment to GNRO-2015/00063  
Grand Gulf Nuclear Station Response to Request for Additional Information  
Regarding License Amendment Request to Revise Technical Specifications for  
Containment Leak Rate Testing**

By application dated May 27, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15147A599), Entergy Operations, Inc. (Entergy or the licensee) requested changes to the technical specifications (TS) for Grand Gulf Nuclear Station, Unit 1 (GGNS). The proposed changes would permit the existing Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," Type C Local Leak Rate Test (LLRT) frequency to be extended from 5 years up to 75 months on a permanent basis and a permanent reduction of 10 CFR 50, Appendix J, Type B and Type C test grace intervals.

The U.S. Nuclear Regulatory Commission (NRC) staff has determined that additional information is needed to complete its review of the subject license amendment request (LAR). The following questions constitute the NRC's request for additional information (RAI). GGNS provides its responses subsequent to each NRC RAI question, as follows:

RAI-1:

The regulation at 10 CFR Section 50.54(o), requires primary reactor containments for water-cooled power reactors to be subject to the requirements of Appendix J to 10 CFR Part 50, "Leakage Rate Testing of Containment of Water Cooled Nuclear Power Plants." Appendix J specifies containment leakage testing requirements, including the types of tests required to ensure the leak-tight integrity of the primary reactor containment, systems, and components that penetrate the containment. In addition, Appendix J discusses leakage rate acceptance criteria, test methodology, frequency of testing, and reporting requirements for each type of test.

Option B to 10 CFR Part 50, Appendix J, requires that test intervals for Type A, Type B, and Type C testing be determined by using a performance-based approach. Performance-based test intervals are based on consideration of operating history of the component and resulting risk from its failure. 'Performance-based' for Appendix J refers to both the performance history necessary to extend test intervals and the criteria necessary to meet the requirements of Option B.

The NRC staff approved the Nuclear Energy Institute (NEI) 94-01, Revision 3, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," (ADAMS Accession No. ML12221A202) by NRC final safety evaluation report dated June 8, 2012 (ADAMS Accession No. ML121030286). Accordingly, if a licensee considers an extended test interval of greater than 60 months, the review to establish the surveillance test intervals should include programmatic controls to provide additional assurance that the increased probability of component leakage is kept to a minimum.

In Attachment 1 of Entergy's application, "Evaluation of the Proposed Change," Section 3.4.2, "Use of Grace in the Deferral of Type B and Type C Testing," the licensee notes: "For routine scheduling of tests at intervals over 60 months, refer to the additional requirements of Section 11.3.2" (i.e., of NEI 94-01, Revision 3-A (ADAMS Accession No. ML12221A202)). However, the evaluation does not address how the recommended "additional considerations" (i.e., "as-found tests," "schedule," and "review") of Section 11.3.2 were applied to the Type B and Type C LLRT data contained in LAR Attachment 1, Tables 3.3.1-1 and 3.3.1-2.

The staff requests that Entergy provide the information related to the programmatic controls to support extended Type C LLRT test intervals beyond 60 months.

GGNS Response to RAI-1:

In response to RAI-1, GGNS first provides clarification that the above referenced statement: "Notes: For routine scheduling of tests at intervals over 60 months, refer to the additional requirements of Section 11.3.2" was simply a quoted portion from three paragraphs excerpted from NEI 94-01, Revision 3-A, Section 10.1, related to schedular grace, extracted and inserted into LAR Section 3.4.2, "Use of Grace in the Deferral of Type B and Type C Testing," to show that GGNS would be applying the 9-month grace period to both Types B and C testing only. This LAR section was not intended to address specific details for implementation of programmatic controls to support extending Type C LLRT test intervals beyond 60 months.

Per the guidance provided in NEI-94-01, Revision 3-A, GGNS addressed the programmatic controls during its eligibility analysis performed for each potentially eligible Type C component, and the documentation of such is available for internal/external review in accordance with NEI 94-01, Revision 3-A, Section 12.2, Records. NEI-94-01, Revision 3-A, Section 3.2, states in part, that, "If a licensee considers extended test intervals of greater than 60 months for a Type B or a Type C tested component, the review to establish surveillance test intervals should include the additional considerations: ..." and then it provides information related to the "As-found Tests," "Schedule," and "Review." These programmatic controls are addressed as follows:

*As-Found (AF) Tests:* The entire population of containment isolation valves (CIVs) subject to LLRT at GGNS was evaluated to identify successful past performance as determined by the AF leak-rate of each successive periodic LLRT being compared to and verified as being less than the associated administrative leakage limit. Three consecutive AF tests were utilized as the acceptance criteria for successful past performance as per section 11.3.2, as added conservatism and assurance that CIV performance warranted extending the test interval from 60 to 75 months.

*Schedule:* The entire population of CIVs subject to LLRT at GGNS was evaluated to assess the effectiveness of scheduling of LLRTs on the extended interval, both currently at 60 months and in the future at 75 months. The GGNS work management system employs repetitive work tasks that schedule CIV LLRTs. The resultant schedule is such that an approximate evenly distributed number of CIVs are tested each refueling outage with all components being AF-tested at the maximum extended test interval. A number of CIVs are tested while the plant is in operation (Operating Modes 1, 2 Or 3) adding to the overall even distribution of LLRTs.

*Review:* The GGNS Containment Leak Rate Testing Program and its implementation processes and procedures were reviewed to ensure consideration of plant-specific CIV performance histories, data review and analysis, establishment of appropriate LLRT frequencies and risk-impact assessment were present and ongoing in terms of evaluating existing or new proposed extended test intervals. The existing programmatic guidance was determined to be present and effective in maintaining, reducing or extending LLRT test intervals as warranted.

RAI-2:

The staff notes that on July 18, 2012, the NRC approved License Amendment No. 191 (ADAMS Accession No. ML121210020) for GGNS to increase the maximum steady state reactor core power level by approximately 15 percent from the original licensed thermal power level of 3,833 megawatt thermal (i.e., extended power uprate (EPU)). The license was also amended to include a new License Condition 2.C.(44), which states, in part, that leak rate tests associated

with surveillance requirements required by TS 5.5.12 are not required to be performed until their next scheduled performance dates.

License Condition 2.C.(44) states that the leak rate tests required in refueling outage RF-18 (i.e. spring of 2012) were to be performed at the EPU calculated peak containment pressure or within EPU drywell bypass leakage limits, as appropriate. License Amendment No. 191 changed the license basis " $P_a$ " of 11.5 pounds per square inch gauge (psig) to the current license basis (CLB) " $P_a$ " of 14.8 psig as reflected in current TS 5.5.12.

The staff requests additional information regarding the LLRT  $P_a$  values used to perform Type B and Type C tests contained in LAR Attachment 1, Table 3.3.1-1 "Types B and C LLRT Combined As-Found/As-Left Trend Summary."

- 1) How many of the 78 component Type B tests and of the 151 component Type C tests were performed at the CLB  $P_a$  value of 14.8 psig during 2012 (RF-18) and 2014 (RF-19)?

GGNS Response to RAI-2-1):

For clarification, Refueling Outage RF-18 occurred in the spring of 2012. Thirty-two (32) of the 78 component Type B tests and 143 of the 151 component Type C tests were performed at the CLB  $P_a$  value of 14.8 psig during 2012 (RF-18) and 2014 (RF-19). These values include Type B and C component tests performed during Cycle 19 (Operating Modes 1, 2 or 3).

- 2) Were any of the Type B component and Type C component tests performed at the CLB  $P_a$  value of 14.8 psig before RF-18 (2012)?

GGNS Response to RAI-2-2):

No Type B component or Type C component tests were performed at the CLB  $P_a$  value of 14.8 psig prior to the start of RF-18 (2012).

- 3) How many Type B penetration tests and Type C containment isolation valve test have yet to be performed at the CLB  $P_a$  value of 14.8 psig?

GGNS Response to RAI-2-3):

The number of Type B penetration tests yet to be performed at the CLB  $P_a$  value of 14.8 psig is forty-six (46). The number of Type C CIV tests yet to be performed at the CLB  $P_a$  value of 14.8 psig is four (4).

- 4) When was the last 10 CFR 50, Appendix J, Type A ILRT performed on the containment at GGNS? What was the ILRT leakage (i.e., total of Type A+B+C) rate for this ILRT? What was the range of the containment internal test pressure,  $P_a$ , during this ILRT?

GGNS Response to RAI-2-4):

The last 10 CFR 50, Appendix J, Type A ILRT performed on the containment at GGNS was in 2008. The ILRT leakage (i.e., total of Type A+B+C) rate for this ILRT was

120,624 sccm. The range of the containment internal test pressure,  $P_a$ , during this ILRT was 12.48 psig to 12.5 psig.

- 5) The last paragraph of LAR Section 3.3.1, Attachment 1 (page 11 of 26), reads: "Table 3.3.1-1 provides the LLRT data trend summaries for GGNS since 2005 and encompasses previous ILRTs." This would imply that more than one ILRT was performed between the years of 2005 and 2014. If more than one ILRT was performed during this timeframe, please provide the ILRT leakage rate and the range of the containment internal test pressure,  $P_a$ , recorded during the ILRT(s) performed.

GGNS Response to RAI-2-5):

There has only been one Type A test performed between the years of 2005 and 2014 and it was performed in 2008. The last paragraph of LAR Section 3.3.1 (Attachment 1, Page 11 of 26) reads, "Table 3.3.1-1 provides the LLRT data trend summaries for GGNS since 2005 and encompasses previous ILRTs." This sentence contains a typographical error in that "ILRTs" should be "ILRT" and is revised for clarification as follows: "Table 3.3.1-1 provides the LLRT data trend summaries for GGNS since 2005 and encompasses the previous ILRT."

RAI-3:

The staff notes that an e-mail from Entergy to the NRC dated August 24, 2011 (ADAMS Accession No. ML112370085), predicted an increase in the total Type B + Type C leakage rate of 13.75 percent (i.e.,  $0.182 \pm 0.160$ ), due to the change in the license basis " $P_a$ " of 11.5 psig to the CLB " $P_a$ " of 14.8 psig. Upon review and analysis of the data contained in LAR Attachment 1, Table 3.3.1-1, the staff notes that the aggregate "AF Min Path" Type B + Type C LLRT leakage has gone up by 65 percent since the NRC issued License Amendment No. 191.

$$\{(5918+12885+18984+18057) \div 4\} \div \{(24453+21595) \div 2\} = 1.65$$

Performing a similar calculation, larger ratios of 2.57 for the "AL Max Path" and 2.43 for the "AL Min Path" are obtained from the data contained in Table 3.3.3-1 of the LAR.

The staff requests that Entergy provide an explanation of these ratios in light of the GGNS prediction.

GGNS Response to RAI-3:

The subject e-mail (ML112370085) provided a mathematical extrapolation of the Type A test results of 2008 from a performance test pressure of 11.5 psig to the CLB " $P_a$ " of 14.8 psig. The text of the e-mail is as follows:

"An evaluation was performed to confirm that leakage test results based on the former  $P_a$  would still be expected to satisfy the appropriate acceptance criteria when tested at the new higher  $P_a$ . Basically, the leakage was scaled by a factor of 1.134 based on the relationship of the leakage rate to the square root of the pressure. A review of the testing results at GGNS demonstrates that substantial margin exists between the extrapolated results and the relevant acceptance criteria. All the increased leakage rates were found to comply with the current Tech Spec requirements that include margin

to La. Thus, adequate margin is still available for the higher test pressure. A summary of key results from that presentation is presented below.”

Test	Units	Measured @ 11.5 psig	Predicted @ 14.8 psig	Limit	Basis for Limit
Type A	wt%/day	0.210	0.238	0.5115	0.75La per TS SR
Type B+C	wt%/day	0.160	0.182	0.4092	0.6La per TS SR 3.6.1.1.1
Type A+B+C	wt%/day	0.370	0.420	0.682	La per TS SR 3.6.1.1.1
MSIV (Worst-Case MSL)	scfh	76.7	87.0	100	TS SR 3.6.1.3.8
MSIVs (All MSLs)	scfh	166.3	188.6	250	TS SR 3.6.1.3.8

The subject e-mail is also referenced in Enclosure 2, Section 3.1.2, of the GGNS EPU license amendment No. 191 safety evaluation (Reference GGNS - Issuance of Amendment re: Extended Power Uprate (TAC No. ME4679), Enclosure 2: Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 191 to Facility Operating License No. NPF-29 (ML121210020)). Enclosure 2, Section 3.1.2, “Leak Rate Test: New License Condition 2.C.(44),” states the following:

“3.1.2 Leak Rate Test: New License Condition 2.C.(44)

In the EPU LAR (Reference 1 [ML102660409]), the licensee proposed to add the following new license condition. Accordingly, Facility Operating License No. NPF-29 would be revised to add new paragraph 2.C.(44), which would state:

- (44) Leak rate tests associated with Surveillance Requirements (SR) 3.6.1.1.1, 3.6.1.3.5, and 3.6.1.3.9, as required by TS 5.5.12 and in accordance with 10 CFR 50, Appendix J, Option B, and SRs 3.6.5.1.1 and 3.6.5.1.2 are not required to be performed until their next scheduled performance dates. The tests will be performed at the EPU calculated long-term peak containment pressure or within EPU drywell bypass leakage limits, as appropriate.

By letter dated September 9, 2011 (Reference 28 [ML112521284]), the licensee revised the proposed license condition 2.C.(44) to delete "long-term" from the phrase "EPU calculated long-term peak containment pressure." Accordingly, Facility Operating License No. NPF-29 would be revised to add new paragraph 2.C.(44), which would state:

- (44) Leak rate tests associated with Surveillance Requirements (SR) 3.6.1.1.1, 3.6.1.3.5, and 3.6.1.3.9, as required by TS 5.5.12 and in accordance with 10 CFR 50, Appendix J, Option B, and SRs 3.6.5.1.1 and 3.6.5.1.2 are not required to be performed until their next scheduled performance dates. The tests will be performed at the EPU calculated peak containment pressure or within EPU drywell bypass leakage limits, as appropriate.

NRC Staff Evaluation

*10 CFR [50], Appendix J Leak Rate Testing*

By letter dated September 9, 2011 (Reference 28 [ML112521284]), the licensee revised the proposed license condition (paragraph 2.C.(44) of NPF-29) to delete "long-term" from the phrase "EPU calculated long-term peak containment pressure" and to add the following sentence to TS 5.5.12:

The calculated peak containment internal pressure for the design basis loss of coolant accident,  $P_a$ , is 14.8 psig.

These changes were made as result of the NRC staff conclusion that the licensee's interpretation of "long-term peak containment pressure" was inconsistent with the Appendix J criteria. As such, the licensee proposed to perform the 10 CFR 50 Appendix J testing per TS SRs 3.6.1.1.1, 3.6.1.3.5, and 3.6.1.3.9 at the revised value of  $P_a$  (14.8 psig) at the next scheduled test date instead of at the time of EPU implementation. The licensee justified this proposal by an evaluation (Reference 207 [ML112370085]) demonstrating that the leakage test results based on a former  $P_a$  (11.5 psig) would still be expected to satisfy the appropriate acceptance criteria when tested at the EPU value of  $P_a$  (14.8 psig). The NRC staff considers the evaluation acceptable because the licensee has shown that the predicted leakages at the EPU value of  $P_a$  of 14.8 psig are bounded by the acceptable leakage limits per 10 CFR 50 Appendix J. The NRC staff therefore considers it acceptable for the licensee to perform the above SR tests at the next scheduled date."

The extrapolation is only valid for the single point in time that it was performed. The data provided in the table shown above "predicted" what the measured test results would be at 14.8 psig for the values measured at 11.5 psig. The use of this extrapolated value as a predictor of future ILRT and LLRT results is inappropriate and is outside the scope of the information provided by the e-mail. In addition, the data in the e-mail could not take into account future changes in the performance of Type B and Type C components as displayed in LAR Table 3.3.1-1. The major contributors to the increase in LLRT leakage were identified and discussed in LAR Table 3.3.1-2.

As stated in the LAR Section 3.3.1, the review of the Types B and C test results from 2005 through 2014 for GGNS has shown an exceptional amount of margin between the actual As-Found (AF) and As-left (AL) outage summations and the regulatory requirements as described below:

The AF minimum pathway leak rate average for GGNS shows an average of 8.58% of  $0.6 L_a$  with a high of 12.35% of  $0.6 L_a$  or  $0.074 L_a$ .

The AL maximum pathway leak rate average for GGNS shows an average of 28.49% of  $0.6 L_a$  with a high of 47.0% of  $0.6 L_a$  or  $0.282 L_a$ .

LAR Table 3.3.1-1 provided the LLRT data trend summaries for GGNS since 2005 and encompasses the previous ILRT. This summary shows that there has been no As-Found failure that resulted in exceeding the TS 5.5.12 limit of  $0.6 L_a$  (198,000 sccm) and demonstrates a history of successful tests. The AF minimum pathway summations represent the high quality of maintenance of Types B and C tested components while the AL maximum pathway summations

represent the effective management of the Containment Leakage Rate Testing Program by the program owner.

RAI-4:

LAR Attachment 1 (page 17 of 26), Section 3.4.1, "Limitations and Conditions Applicable to NEI 94-01, Revision 3-A," second paragraph of "Response to Condition 2, ISSUE 1" reads in part:

When the potential leakage understatement adjusted leak rate total for those Type C components being tested on a 75-month extended interval is summed with the non-adjusted total of those Type C components being tested at less than the 75-month interval and the total of the Type B tested components, if the MNPLR is greater than the GGNS administrative leakage summation limit of 0.50  $L_a$ , but less than the regulatory limit of 0.6  $L_a$ , then an analysis and corrective action plan shall be prepared to restore the leakage summation value to less than the GGNS administrative leakage limit.

This paragraph could be interpreted to mean that a component tested at 70 months would not be adjusted for the understatement adjustment factor of 1.25, which would not be consistent with the intent of NEI 94-01, Revision 3-A. Please clarify the meaning of the cited paragraph.

GGNS Response to RAI-4:

GGNS provides clarification to the original LAR response to NEI 94-01, Revision 3-A, Condition 2, ISSUE 1. Specifically, Condition 2, ISSUE 1 states: "Extending the Type C, LLRT intervals beyond 5 years to a 75-month interval should be similarly conservative provided an estimate is made of the potential understatement and its acceptability determined as part of the trending specified in NEI TR 94-01, Revision 3, Section 12.1." Therefore, for clarification, the response to Limitations and Conditions, Condition 2, ISSUE 1 is revised, as follows (Note: mark-up in this RAI response shows new text as **bolded** and underlined for clarification):

"The change in going from a 60-month extended test interval for Type C tested components to a 75-month interval, as authorized under NEI 94-01, Revision 3-A, represents an increase of 25% in the LLRT periodicity. As such, GGNS will conservatively apply a potential leakage understatement adjustment factor of 1.25 to the actual As-Left leak rate, which will increase the As-Left leakage total for each Type C component **currently on greater than a 60-month test interval up to the 75-month extended test interval**. This will result in a combined conservative Type C total for all 75-month LLRTs being "carried forward" and will be included whenever the total leakage summation is required to be updated (either while on-line or following an outage).

When the potential leakage understatement adjusted leak rate total for those Type C components being tested on **greater than a 60-month test interval up to the 75-month extended test interval** is summed with the non-adjusted total of those Type C components **being tested at less than or equal to a 60-month test interval**, and the total of the Type B tested components, if the MNPLR is greater than the GGNS administrative leakage summation limit of 0.50  $L_a$ , but less than the regulatory limit of 0.6  $L_a$ , then an analysis and corrective action plan shall be prepared to restore the leakage summation value to less than the GGNS administrative leakage limit. The corrective action plan shall focus on those components which have contributed the most to the increase in the leakage summation value and what manner of timely corrective action, as deemed appropriate, best focuses on the prevention of future component leakage performance issues."

RAI-5:

NEI 94-01, Revision 3-A, Section 11.3.2, reads, in part:

If a licensee considers extended test intervals of greater than 60 months for a Type B or a Type C tested component, the review to establish surveillance test intervals should include the additional considerations:

- As-found Tests - In order to provide additional assurance that the increased probability of component leakage is kept to a minimum, and is reasonably within the envelope of industry data, a licensee should consider requiring three successive periodic as-found tests to determine adequate performance.”

LAR Attachment 1 (page 15 of 26), Section 3.3.2, “Type B and Type C Tested Components on Extended Intervals,” reads:

The percentage of the total number of GGNS Type B tested components (78) that are on 120 month extended performance-based test interval is 65%.

The percentage of the total number of GGNS Type C tested components (151) that are on 60 month extended performance-based test interval is 58%.

GGNS’s May 27, 2015, proposed amendment will change the licensing basis for the plant by referencing NEI 94-01, Revision 3-A, in TS 5.5.12, “10 CFR 50, Appendix J, Testing Program.”

Per the above, Section 11.3.2 of NEI 94-01, Revision 3-A, requires at least two successive tests to be successful at the CLB  $P_a$  value of 14.8 psig to extend Type B and Type C test intervals beyond 60 months:

- a. Does Entergy plan to re-baseline the subset (i.e., 65 percent of 78) of GGNS Containment Type B penetrations currently on 120-month extended performance-based test interval at the EPU peak containment pressure of 14.8 psig?

Will Entergy use the proposed licensing basis criteria of at least two successive, successful Type B penetration tests before increasing the test interval frequency beyond 60 months for this subset of individual containment penetrations?

GGNS Response to RAI-5 a.:

No - Entergy does not plan to re-baseline the subset of GGNS Containment Type B penetrations currently on the 120-month extended performance-based test interval at the EPU peak containment pressure of 14.8 psig. Refer to the GGNS Response to RAI-3, which provides discussion of the NRC staff position which previously established the acceptability of GGNS to perform required TS Type B local leak rate tests at the revised  $P_a$  value of 14.8 psig at the next scheduled test date. The current LLRT schedule for those Type B components currently not on extended interval will continue to be implemented to determine as-found test results as conducted at the test pressure of 14.8 psig to assess eligibility for interval extension up to the maximum allowed 120 months.

At least two successive, successful as-found Type B tests will continue to be the criteria used when determining eligibility for interval extension.

- b. Does Entergy plan to re-baseline the subset (i.e., 58 percent of 121) of GGNS Containment Type C containment isolation valve penetrations currently on 60-month extended performance-based test interval at the EPU peak containment pressure of 14.8 psig?

Will Entergy use the proposed licensing basis criteria of at least two successive, successful Type C containment isolation valve penetration tests before increasing the test interval frequency beyond 60 months for this subset of individual containment penetrations?

GGNS Response to RAI-5 b.:

No - Entergy does not plan to re-baseline the subset of GGNS Containment Type C CIV penetrations currently on the 60-month extended performance-based test interval at the EPU peak containment pressure of 14.8 psig. Refer to GGNS Response to RAI-3, which provides discussion of the NRC staff position which previously established the acceptability of GGNS to perform required TS Type C local leak rate tests at the revised  $P_a$  value of 14.8 psig at the next scheduled test date. The current LLRT schedule for those Type C components currently not on extended interval will continue to be implemented to determine as-found test results as conducted at the test pressure of 14.8 psig to assess eligibility for interval extension up to the maximum allowed 75 months.

At least two successive, successful as-found Type C tests will continue to be the criteria used when determining eligibility for interval extension.

RAI-6:

LAR Table 3.3.1-2, "Types B and C LLRT Program Implementation Review," Attachment 1 (page 13 of 26), contains a listing of the respective containment isolation valve LLRT failures from the last two refueling outages (RF-18 in 2012 and RF-19 in 2014):

- 1) With respect to the "Administrative Limit SCCM" column of Table 3.3.1-2, the staff requests clarification for its safety evaluation as to whether the GGNS 10 CFR 50, Appendix J, Testing Program, already contains individual component administrative limits that are constrained so as to achieve the GGNS administrative summation limit of  $0.50 L_a$ .

GGNS Response to RAI-6-1):

No. The current GGNS component Administrative limits are not constrained in any manner. The GGNS pathway administrative limit of  $0.50 L_a$  is a separate entity being implemented to provide a margin management tool to the regulatory-based limit of  $0.60 L_a$  and used to validate the acceptability of the extension of Type C components to the 75-month maximum LLRT interval.

- 2) LAR Section 3.3.2, "Type B and Type C Tested Components on Extended Intervals" reads: "The percentage of the total number of GGNS Type B tested components (78) that are on 120-month extended performance-based test interval is 65%." Based on this, one could conclude that 35 percent of the total population of Type B penetrations did not successfully pass two consecutive Type B test without failure. However, Table

3.3.1-2 does not list any failures of Type B penetration tests for the two most recent GGNS refueling outages (RF-18 and RF-19). The staff requests that Entergy provide the implied additional historical information about the Type B test failures experienced at GGNS since 2005.

GGNS Response to RAI-6-2):

The LAR Table 3.3.1-2 delineates the only as-found LLRT failures that have occurred during RF-18 (2012) and RF-19 (2014), all of which were Type C components. Similarly, there have not been any Type B component as-found administrative limit LLRT failures since 2005.

RAI-7:

The staff notes that NEI 94-01, Revision 3-A, Section 11.3.1, "Performance Factors," indicates that prior to determining and implementing extended test intervals for Type B and Type C components, an assessment of the plant's containment penetration and valve performance should be performed and documented. Factors that should be considered during the assessment include, but are not limited to: "past component performance"; "service"; "design"; "safety impact"; and "cause determination". However, the technical evaluation section of the LAR does not address how these factors will be incorporated into the GGNS plant-specific 10 CFR 50, Appendix J, Testing Program. The staff requests that Entergy provide the details of how GGNS considered, or plans to consider, these factors in its 10 CFR 50, Appendix J, Testing Program.

GGNS Response to RAI-7:

The following NEI 94-01, Revision 3-A, Performance Factors, were addressed during the eligibility analysis performed for each potentially eligible Type C component in GGNS to determine if the extended LLRT interval extension of greater than 60 months but less than 75 months could be implemented. (Please note that the results of the following reviews were documented for retention in accordance with NEI 94-01, Revision 3-A, Section 12.2, Records.):

*Past Component Performance:* The entire population of CIVs subject to LLRT at GGNS was evaluated to identify successful past performance as determined by the AF leak rate of each successive periodic LLRT being compared to and verified as being less than the associated administrative leakage limit. Three consecutive AF tests were utilized as the acceptance criteria for successful past performance as per section NEI 94-01, Revision 3-A 11.3.2. This criteria provides an added amount of conservatism and assurance that CIV performance warranted extending the test interval from 60 months to 75 months.

*Service:* The entire population of CIVs subject to LLRT at GGNS was evaluated to identify LLRT failures as determined by the AF leak rate being greater than the associated administrative leakage limit. For each identified failure, the associated Condition Report, Cause Determination and maintenance work order was reviewed to assess and identify contributions that service conditions, frequency of valve cycling, or age-related degradation mechanisms may have had on the failure. If the review identified any such contributions, they were noted and recommendations were made concerning their impact on eligibility for the extended test interval of 75 months.

*Design:* The entire population of CIVs subject to LLRT at GGNS was evaluated to identify LLRT failures as determined by the AF leak rate being greater than the associated administrative leakage limit. For each identified failure, the associated Condition Report, Cause Determination and maintenance work order was reviewed to assess and identify contributions that valve design related issues (wrong design for the service conditions, excessive cycling, non-enforcement of vendor recommendations related to maintenance/component life, etc.) may have had on the failure. If the review identified any such contributions, then they were noted and recommendations were made concerning their impact on eligibility for the extended test interval of 75 months.

*Safety Impact:* The entire population of CIVs subject to LLRT at GGNS was evaluated for safety impact in terms of potential impact of failure in limiting releases from Containment under accident conditions. A review of the GGNS Level-1 Model, Revision 3, PSA Summary Report and associated clarification documentation pertaining to the scope of CIVs classified as high-risk, and discussion with the GGNS PRA Engineer determined that the relative importance (risk significance) of a total of four (4) CIVs in the GGNS LLRT population warranted consideration for not extending their LLRT interval to the maximum interval of 75 months. As such, these four (4) CIVs will remain on their current LLRT interval and be excluded from further test interval extensions regardless of future LLRT performance.

*Cause Determination:* The entire population of CIVs subject to LLRT at GGNS was evaluated to identify LLRT failures as determined by the AF leak rate being greater than the associated administrative leakage limit. For each identified failure, the associated Condition Report, Cause Determination or equivalent corrective action process report was reviewed to assess identification of common-mode failure and creation and implementation of corrective action to prevent failure reoccurrence. If the review identified any deficiencies, they were noted and recommendations were made concerning their impact on eligibility for the extended test interval of 75 months.