Entergy

Entergy Operations, Inc.
River Bend Station
5485 U.S. Highway 61N
St. Francisville, LA 70775

RBG-47236

May 2, 2012

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

SUBJECT: Response to Request for Additional Information on License Amendment Request 2011-05
River Bend Station – Unit 1
Docket No. 50-458
License No. NPF-47

REFERENCES:

1. Entergy letter to NRC, dated December 8, 2011, License Amendment Request 2011-05, Degraded Voltage Surveillance Frequency Extension and Allowable Value Changes (Letter No. RBG-47193)

2. NRC letter to Entergy (via email), dated March 16, 2012, Request for Additional Information

RBF1-12-0056

Dear Sir or Madam:

On December 8, 2011, Entergy Operations, Inc. (Entergy) submitted a request to extend the frequency of a surveillance requirement and revise the allowable value for degraded voltage relays (Reference 1). During their review, the NRC staff determined that additional information is needed to complete the processing and approval of Entergy's request. The request for that information was transmitted to Entergy per Reference 2. The attachment to this letter contains the requested information.

This letter contains no commitments. If you have any questions on this matter, please contact Joey Clark, Manager – Licensing, at 225-381-4177.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 2, 2012.

Sincerely,

Harry A. Goodman
Director - Engineering

HAG/dhw

A001
N122

Attachment 1: Response to Request for Additional Information
Attachment 2: Calculations

cc: Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
1600 E. Lamar Blvd.
Arlington, TX 76011-4511

NRC Senior Resident Inspector
River Bend Station

U. S. Nuclear Regulatory Commission
Attn: Mr. Alan Wang
MS 8-G14
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Department of Environmental Quality
Office of Environmental Compliance
Radiological Emergency Planning and Response Section
JiYoung Wiley
P.O. Box 4312
Baton Rouge, LA 70821-4312

Ms. Tracie Lowery
Public Utility Commission of Texas
1701 N. Congress Ave.
Austin, TX 78711-3326

Attachment 1
RBG-47236

Response to Request for Additional Information

REQUEST No. 1

For each of the functions in TS 3.3.8.1 for which the Allowable Value (AV) is being modified provide: (a) the results of the drift analysis performed indicating the total periods for which the drift data was collected, the magnitude of drifts observed, the drifts permitted by the existing setpoint calculations, the outliers rejected in the drift evaluation with the explanation for rejecting them, and the normality tests performed. Also include justifications for the methodology used to calculate the projected drift values corresponding to 30 months interval (based on application of the 25% extension) from drift values available from the surveillance tests.

RESPONSE

1) Function 1.a, Divisions 1 and 2 – 4.16 kV Emergency Bus Undervoltage, Loss of Voltage – 4.16 kV Basis:

   - Total periods for which drift analysis was collected:

     Approximately 10 years, which equates to more than six (6) of the present 18-month calibration cycles (or five (5) of the proposed 24-month calibration cycles).

   - Magnitude of the drifts observed:

     Final Data Set:

     Mean: 0.0022 VAC
     Standard Deviation: 0.1216 VAC
     Minimum: -0.40 VAC
     Maximum: 0.30 VAC

   - Drift permitted by setpoint calculation for 30 months:

     Relay Drift: ±0.392 VAC

   - Outliers rejected in the drift evaluation with the explanation for rejecting them:

     Outlier Drift Value: 0.72 VAC. Rejected based on utilization of the t-Test (Extreme Studentized Deviate (T)) applying a critical value of 2.92 for sample sizes ≤45. The drift value of 0.72 VAC has an Extreme Studentized Deviate (T) = 4.288. This was the only outlier value rejected as allowed per the NRC approved methodology.

   - Normality tests performed:

     The W Test was performed. The calculated W statistic of 0.9569 is greater than the critical W value of 0.9410; therefore, the test does not reject the assumption of normality for this data set and the data set is established as normally distributed.

- Methodology used to calculate the projected drift values corresponding to 30 months interval from drift values available from the surveillance tests.

  The random portion of the Analyzed Drift is determined from multiplying the standard deviation of the binned values by the Tolerance Interval Factor (TIF) and extrapolating as required to a calibration interval of 30 months. The random portion of the drift has been determined to be moderately time-dependent for the purpose of extrapolation. For conservatism, the standard deviation of the binned values is used with the average observed time interval of the binned values as the starting point. Based on sample size, a TIF of 2.445 is used for a 95/95 significance.

2) Function 1.d, Divisions 1 and 2 – 4.16 kV Emergency Bus Undervoltage, Degraded Voltage – Time Delay, No LOCA:

- Total periods for which drift analysis was collected:

  Approximately 10 years, which equates to more than six (6) of the present 18-month calibration cycles (or five (5) of the proposed 24-month calibration cycles).

- Magnitude of the drifts observed:

  Final Data Set:
  Mean: -0.0056 percent of setpoint
  Standard Deviation: 0.6449 percent of setpoint
  Minimum: -1.30 percent of setpoint
  Maximum: 1.67 percent of setpoint

- Drift permitted by setpoint calculation for 30 months:

  Relay Drift: ±2.072 percent of setpoint

- Outliers rejected in the drift evaluation with the explanation for rejecting them:

  No outliers were detected.

- Normality tests performed:

  Since the Final Data Set contains less than 50 samples, the W Test was performed. The calculated W statistic of 0.9576 is greater than the critical W value of 0.9420; therefore, the test does not reject the assumption of normality for this data set and the data set is established as normally distributed.

- Methodology used to calculate the projected drift values corresponding to 30 months interval from drift values available from the surveillance tests.

  The random portion of the Analyzed Drift is determined from multiplying the standard deviation of the binned values by the Tolerance Interval Factor (TIF) and extrapolating as required to a calibration interval of 30 months. The random portion of the drift has been determined to be moderately time-

dependent for the purpose of extrapolation. For conservatism, the standard deviation of the binned values is used with the average observed time interval of the binned values as the starting point. Based on sample size, a TIF of 2.445 is used for a 95/95 significance.

3) Function 2.a, Division 3 – 4.16 kV Emergency Bus Undervoltage, Loss of Voltage – 4.16 kV Basis:

- Total periods for which drift analysis was collected:

  Approximately 16 years, which equates to approximately ten (10) of the present 18-month calibration cycles (or eight (8) of the proposed 24-month calibration cycles).

- Magnitude of the drifts observed:

  Final Data Set:
  Mean: 0.1928 VAC
  Standard Deviation: 2.1370 VAC
  Minimum: -4.10 VAC
  Maximum: 6.31 VAC

- Drift permitted by setpoint calculation for 30 months:

  Relay Drift: ±5.823 VAC

- Outliers rejected in the drift evaluation with the explanation for rejecting them:

  Outlier Drift Value: -7.20 VAC. Rejected based on utilization of the t-Test (Extreme Studentized Deviate (T)) applying a critical value of 3.03 for sample sizes ≤60. The drift value of -7.20 VAC has an Extreme Studentized Deviate (T) = 3.123. This was the only outlier value rejected as allowed per the NRC approved methodology.

- Normality tests performed:

  Since the Final Data Set contains greater than 50 samples, the D-Prime Test was performed. The calculated D' (T/S) value of 123.7 is within the acceptable range of Critical D' Values (Min = 119.9; Max = 126.5); therefore, the test does not reject the assumption of normality for this data set and the data set is established as normally distributed.

- Methodology used to calculate the projected drift values corresponding to 30 months interval from drift values available from the surveillance tests.

  The random portion of the Analyzed Drift is determined from multiplying the standard deviation of the Final Data Set by the Tolerance Interval Factor (TIF) and extrapolating as required to a calibration interval of 30 months. Since the random portion of the drift has been determined to be moderately time-dependent for the purpose of extrapolation, the standard deviation of the Final Data Set is used with the maximum observed time interval of the binned

values as the starting point. Based on sample size, a TIF of 2.354 is used for a 95/95 significance.

4) Function 2.d, Division 3 – 4.16 kV Emergency Bus Undervoltage, Degraded Voltage – Time Delay, No LOCA:

- Total periods for which drift analysis was collected:

  Approximately 10 to 16 years (depending on data availability), equating to approximately ten (10) of the present 18-month calibration cycles (or eight (8) of the proposed 24-month calibration cycles).

- Magnitude of the drifts observed:

  Final Data Set:
  Mean: -0.0719 percent of setpoint
  Standard Deviation: 1.1848 percent of setpoint
  Minimum: -2.667 percent of setpoint
  Maximum: 2.149 percent of setpoint

- Drift permitted by setpoint calculation for 30 months:

  Relay Drift: ±3.725 percent of setpoint

- Outliers rejected in the drift evaluation with the explanation for rejecting them:

  Outlier Drift Value: -5.103 percent of setpoint. Rejected based on utilization of the t-Test (Extreme Studentized Deviate (T)) applying a critical value of 2.96 for sample sizes ≤50. The drift value of -5.103 percent of setpoint has an Extreme Studentized Deviate (T) = 3.584. This was the only outlier value rejected as allowed per the NRC approved methodology.

- Normality tests performed:

  Since the Final Data Set contains less than 50 samples, the W Test was performed. The calculated W statistic of 0.9584 is greater than the critical W value of 0.9470; therefore, the test does not reject the assumption of normality for this data set and the data set is established as normally distributed.

- Methodology used to calculate the projected drift values corresponding to 30 months interval from drift values available from the surveillance tests.

  The random portion of the Analyzed Drift is determined from multiplying the standard deviation of the binned values by the Tolerance Interval Factor (TIF) and extrapolating as required to a calibration interval of 30 months. Since the random portion of the drift has been determined to be moderately time-dependent for the purpose of extrapolation, the standard deviation of the binned values is used with the average observed time interval of the binned values as the starting point. Based on sample size, a TIF of 2.408 is used for a 95/95 significance.

REQUEST No. 2

For each of the functions in TS 3.3.8.1 for which the Allowable Value (AV) is being modified provide: (b) details of the setpoint calculation methodology used with representative setpoint calculations to establish the analytical limit, total loop uncertainties, the nominal trip set point, as-found tolerance, and as-left tolerance. Especially, if a correction factor of 1.645/2 is used in calculating the loop uncertainty, provide justification of this correction factor for the proposed TS AVs.

RESPONSE

Applicable Calculations:

1) G13.18.3.6*016 Rev. 2, EC-31715 Markup, Degraded Voltage Calculation for Class IE Buses and 480V Motor Operated Valves. This calculation establishes the Analytical Limit for the Loss of Voltage Relays

2) G13.18.3.1-004 Rev. 0 LAR Markup, Degraded Voltage Relay Setpoints for ENS-SWG01A and ENS-SWG01B. This calculation markup provides the Degraded Voltage Relay NO-LOCA time delay and Loss of Voltage Relay dropout voltage setpoints and Technical Specification and TRM limits.

   Supporting Calcs:

   - G13.18.6.2-ENS*002 Rev. 2, Instrument Loop Uncertainty / Setpoint Determination for the ABB Model 27H Undervoltage Relay. This calculation determines the uncertainty associated with the Safety-Related 4.16 kV Loss of Voltage relays for Divisions I & II.
   - G13.18.6.2-ENS*006 Rev. 1, Loop Uncertainty Determination for Div I and Div II Under Voltage Time Delay Relays – ABB Model 62K and 62L Time Delay Relays. This calculation determines the uncertainty associated with the Division I & II, Safety-Related, 4.16 kV undervoltage time delay relays.

3) G13.18.3.1-005 Rev. 0 LAR Markup, Degraded Voltage Relay Setpoints for E22-S004. This calculation markup provides the Degraded Voltage Relay NO-LOCA time delay and Loss of Voltage Relay dropout voltage setpoints and Technical Specification and TRM limits.

   Supporting Calcs:

   - G13.18.6.2-ENS*004 Rev. 1, Loop Uncertainty Determination for Div III Loss of Voltage Relays – GE Model NGV Undervoltage Relay. This calculation determines the uncertainty associated with the existing Division III, Safety-Related, 4.16 kV Loss of Voltage relays.
   - G13.18.6.2-ENS*007 Rev. 1, Loop Uncertainty Determination for Div III Undervoltage Time Delays – Agastat ETR14 Time Delay Relay. This calculation determines the uncertainty associated with the Division III, Safety-Related, 4.16 kV undervoltage time delay relays.

The analytical limit is calculated for G13.18.3.6*016 EC-31715 Markup using the Electrical Transient Analysis Program (ETAP) employing the methodology contained in IEEE 741-1997.

The total loop uncertainties are calculated in G13.18.6.2-ENS*002, G13.18.6.2-ENS*004, G13.18.6.2-ENS*006 and G13.18.6.2-ENS*007 in accordance with NRC approved General Electric Setpoint Methodology (NEDC-31336P-A). A correction factor of 1.645/2 is used in calculating loop uncertainty in accordance with the approved setpoint methodology for safety functions that approach a trip in only one direction. The loss of voltage relay trips on a decreasing value and the time delay relay is an increasing value.

The nominal trip setpoints and Allowable Values are calculated in G13.18.3.1-004 and G13.18.3.1-005 in accordance with NRC approved General Electric Setpoint Methodology (NEDC-31336P-A).

REQUEST No. 3

For each of the functions in TS 3.3.8.1 for which the Allowable Value (AV) is being modified provide: (c) documentation to demonstrate that the drifts values for all the devices used in the setpoint calculations are valid for a minimum of 95/95 confidence level proposed in RG 1.105., i.e. - 2σ to 2σ.

RESPONSE

The drift analyses performed for the applicable components closely adheres to the methodology described in EPRI TR-103335R1, Statistical Analysis of Instrument Calibration Data – Guidelines for Instrument Calibration Extension/Reduction Programs, October, 1998. The methodology uses a Tolerance Interval Factor (TIF) based on sample pool size that ensures a 95/95 confidence level (i.e., $\pm 2\sigma$) when determining the Analyzed Drift term, thus complying with RG 1.105. Normality Tests performed on the data sets have established the data as normally distributed.

REQUEST No. 4

Describe the measures to be taken to ensure that the associated instrument channels are capable of performing their specified safety functions in accordance with applicable design requirements and associated safety analysis used in clauses 3.a and 3.b. Include in your discussion: (A) information on the controls you employ to ensure that the as-left trip settings after completion of periodic surveillances are consistent with your setpoint calculation methodology.

RESPONSE

The Surveillance Test Procedures (STPs) establish minimum and maximum values for the given safety function trip setpoints which reflect the allowable Loop Calibration Tolerance. The setpoint calculation methodology allows for using the Loop Calibration Tolerance instead of Loop Reference Accuracy to determine Loop Uncertainty when the Loop Calibration Tolerance is greater that the Loop Reference Accuracy. This reflects an additional conservatism in the Total Loop Uncertainty calculation and establishes calibration values (i.e., 'As-Left' values) in the STPs that will ensure a 95/95 confidence that the instruments will perform their intended safety functions during the specified calibration interval. For the functions applicable to this LAR, the STP 'As-Found' and 'As-Left' calibration tolerance is the same and the STPs require calibration of the instruments if the values are not within the specified 'As-Left' values.

REQUEST No. 5

Describe the measures to be taken to ensure that the associated instrument channels are capable of performing their specified safety functions in accordance with applicable design requirements and associated safety analysis used in clauses 3.a and 3.b. Include in your discussion: (B) the plant corrective action processes (including plant procedures) for restoring channels to operable status when channels are found to be outside the acceptable as-found values and when they are found to be outside AV's, especially, when they cannot be reset within the acceptable as-left values.

RESPONSE

The Surveillance Test Procedures require calibrating the instrument when the 'As-Found' value is outside the specified acceptable limits. Additionally, the STP requires initiating a Condition Report and performing an engineering evaluation if the 'As-Found' setpoint value is below the STP minimum value. Per administrative procedural requirements (ADM-0015), if the 'As-Found' value is outside the Allowable Value, the performer informs Maintenance Supervision and Operations Shift Manager/Control Room Supervisor and a Condition Report is initiated to document the out of tolerance condition. If the instrument cannot be calibrated within the acceptable as-left values, the STP cannot be completed satisfactorily and a Condition Report is initiated to correct the condition and evaluate operability.