Ernest J. Kapopoulos, Jr.
H. B. Robinson Steam
Electric Plant Unit 2
Site Vice President

Duke Energy
3581 West Entrance Road
Hartsville, SC 29550

O: 843 951 1701
F: 843 951 1319
Ernie.Kapopoulos@duke-energy.com

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United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/RENEWED LICENSE NO. DPR-23

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 - REQUEST FOR ADDITIONAL INFORMATION REGARDING APPLICATION TO REVISE TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENT FREQUENCIES TO SUPPORT 24-MONTH FUEL CYCLES

Ladies and Gentlemen:

By letter dated November 20, 2017, the NRC requested that Duke Energy Progress, LLC respond to a request for additional information (RAI) regarding Technical Specification Surveillance Requirement Frequencies to support 24-Month Fuel Cycles at H. B. Robinson Steam Electric Plant, Unit No. 2 (HBRSEP2).

The Duke Energy Progress, LLC response to this request (RAI EICB-1 through EICB-19) is provided in the attachment to this letter. In addition, HBRSEP2 requests an implementation date of 120 days following completion of Refueling Outage 31.

There are no regulatory commitments made in this submittal. If you have any questions regarding this submittal, please contact Mr. Kevin Ellis, Manager – Nuclear Regulatory Affairs, at (843) 951-1329.

I declare under penalty of perjury that the foregoing is true and correct.

Executed On: 08 JAN 2018

Sincerely,

Ernest J. Kapopoulos, Jr.
Site Vice President

EJK/jmw

Attachment: RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION REGARDING TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENT FREQUENCIES TO SUPPORT 24-MONTH FUEL CYCLES (RAI EICB-1 THROUGH EICB-19)

cc: NRC Regional Administrator, NRC, Region II
D. Galvin, NRC Project Manager, NRR
NRC Resident Inspector, HBRSEP Unit No. 2
S. E. Jenkins, Manager, Infectious and Radioactive Waste Management Section (SC)
A. Gantt, Chief, Bureau of Radiological Health (SC)
A. Wilson, Attorney General (SC)

United States Nuclear Regulatory Commission
Attachment to Serial: RNP-RA/17-0085
29 Pages (including cover page)

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION REGARDING TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENT FREQUENCIES TO SUPPORT 24-MONTH FUEL CYCLES (RAI EICB-1 THROUGH EICB-19)

EICB-1:

Step 1 of GL 91-04 states that the licensee should confirm that instrument drift as determined by as-found and as-left calibration data from surveillance and maintenance records has not, except on rare occasions, exceeded acceptable limits for a calibration interval.

In the evaluation of Step 1 of GL 91-04, the licensee defined how the terms "except on rare occasions" and "exceeded acceptable limits" are used in the LAR. The licensee states, "equipment associated with uncertainty/setpoint calculations will use the calculated as-found tolerances as the acceptable limits," in the LAR. If the as-found value is found to exceed the as-found tolerance, it is likely due to excessive drift. The licensee added the proviso "as-found values, which are found to be out-of-tolerance in a conservative direction with respect to Allowable Values, will not be considered to exceed acceptable limits." The term "except on rare occasions" is applicable if instruments were found to exceed acceptable limits on two consecutive occurrences. If as a result of failures on more than rare occasions the instrument was fixed or replaced, and the acceptable limits are no longer exceeded, then the issue was no longer considered to be a factor in the determination of an extended calibration interval. The licensee is requested to respond to the following clarification questions:

a. Acceptance of two consecutive failures is dependent on the number of readings being evaluated for the subject instrument. Please state the minimum number of acceptable readings for using this criteria as well as the basis. Also explain how the stated criteria will meet the 95/95 criteria (i.e., 95% probability with 95% confidence) of Regulatory Guide (RG) 1.105, "Setpoints for Safety-Related Instrumentation" (Reference 6). What additional measures will be taken to track the performance of instruments with two consecutive failures if the number of readings is insufficient?

b. The LAR states that if the problem was fixed after repair or replacement of the instrument and acceptable limits were no longer exceeded, the issue was no longer considered to be a factor in the determination to extend the calibration interval. If the instrument is repaired or replaced successfully how many good successive readings are required before the instrument is considered acceptable? A single good or bad reading after repair/replacement does not determine the trend or the reliability of data to meet the guidance of GL 91-04. For example, SR 3.3.4.3 Item 3.a - RCS [reactor coolant system] Hot Leg Temperature indicator TI-413B was found to have a significant drift after replacement, which was attributed to the settling of the indicator.

   What is the licensee's plan to ensure a successful trend for acceptance of repaired and/or replaced instruments? Please state the basis for your response.

c. Conservative out-of-tolerance readings may not impair the equipment functionality; however, if the out-of-tolerance value is excessive then it indicates the instrument may not be functioning per its specified limits, and its functionality should be confirmed. In addition, two consecutive failures in either direction may indicate potential problems with the instrument reliability. How will such out-of-tolerance readings be evaluated to confirm that the instrument is functioning within its specified limits?

EICB-1 Response:

EICB-1a Response:

In the application of GL 91-04, Enclosure 2, Item 1, as-found and as-left calibration data from surveillance maintenance records has been reviewed to confirm that instrument drift has not, except on rare occasions, exceeded acceptable limits for a calibration interval. Maintenance records for each function starting in approximately 2005 and continuing over more than ten years were selected for review. A minimum of six calibrations for each function were reviewed. The review interval was selected for consistency with other 24-month fuel cycle LAR submittals. As RNP defined in the LAR, two consecutive failures of the instrument as-found data to meet the calculated tolerance would represent a condition where the instrument drift exceeds acceptable limits more frequently than rare occasions. RNP Procedure MMM-006, Calibration Program, is utilized to evaluate all out of tolerance readings found during calibrations. Any out of calibration condition is entered in the Corrective Action Program. Additionally, the system engineer is procedurally required to perform a technical review that includes review of prior calibration data sheets to identify whether repetitive failure exists in addition to other elements.

Regulatory Guide (RG) 1.105 specifies the 95/95 tolerance limit as an acceptable criteria for combining uncertainties in determining a trip setpoint and its allowable values. The determination of analytical drift from as-found and as-left calibration data based on application of GL 91-04, Enclosure 2, Item 2 confirms that the values of drift for each instrument type and application have been determined with a high probability and a high degree of confidence. RNP used the methodology described in EPRI TR-103335 to collect instrument drift data, scrub the data for statistical relevance, and perform the mean drift extension. The methodology employs the 95/95 tolerance limit to establish the analytical drift.

GL 91-04, Enclosure 2, Item 1 requires RNP to confirm that instrument drift as determined by as-found and as-left calibration data has not, except on rare occasions, exceeded acceptable limits for a calibration interval. The determination of whether the instrument drift exceeded acceptable limits is a PASS/FAIL test. Application of 95/95 tolerance limit for binary data requires a much larger sample size than used, with zero failures allowed; in the event of just one failure, the sample size increases by an order of magnitude to achieve 95% success with 95% confidence. RNP did not apply a 95/95 tolerance limit to the binary test of whether the instrument drift determined from as-found calibration data exceeded acceptable limits to determine whether the event was a rare occasion.

Since RNP defined two consecutive out-of-tolerance events that exceed acceptable limits as more frequent than a rare occasion, a minimum number of calibrations with as found data within acceptable limits was not specified. Instruments where the as-found error exceeds acceptable limits on consecutive calibrations are unlikely to meet acceptable limits with a longer interval between calibrations. Defining more than rare occasions as two consecutive events provides reasonable assurance that the extended calibration interval will not adversely affect instrument performance.

EICB-1b Response:

Repair or replacement of an instrument is expected to restore the instrument to the performance levels specified by the vendor. It is agreed that a single good or bad reading after repair or replacement does not represent acceptable performance. Acceptable performance is more appropriately based on the level of performance that occurred prior to the degradation or event that necessitated maintenance, as well as the performance of like instruments in similar applications. In the event that an engineered replacement is needed (due to obsolescence or other reasons), the evaluation of the replacement is required to demonstrate that acceptable performance will be realized including drift. It is possible that validation measures such as drift monitoring would be specified, but the details of these would be determined on an individual basis.

In regards to TI-413B, the temperature indicator was found out-of-tolerance in 2009 and satisfactory calibration could not be achieved. The instrument was replaced at that time and calibrated with satisfactory results. The new TI-413B was found out-of-tolerance at the subsequent calibration in 2010, and was adjusted to within tolerance. TI-413B has not received any adjustments over the subsequent four calibrations.

The plan to ensure a successful trend for acceptance of repaired and/or replaced instruments is application of the RNP Calibration Program, which is described in RNP Procedure MMM-006.

Per MMM-006, upon completion of **any** calibration task, the calibration records shall be reviewed by the Maintenance Supervisor or designee. The Maintenance Supervisor is required to assess the calibration and condition of the instrument. Based on the results of this assessment, the Maintenance Supervisor may initiate additional actions or reviews. If the instrument was found to be out of calibration, the Maintenance Supervisor is required to generate a Condition Report. If as-found data was outside of tolerance, or there was some technical difficulty completing the calibration, the System Engineer is required to perform a Technical Review of the out-of-tolerance condition. The Technical Review consists of the following elements:

- Review calibration data sheet tolerance and revise as necessary
- Determine impact of out-of-tolerance on system to perform its intended function, considering the need to evaluate instruments in other similar loops/trains
- Review prior completed Calibration Data Sheets for instruments to identify whether a repetitive failure exists
- Determine whether the instrument is defective or otherwise not performing within specifications
- Determine whether the condition found is reportable
- Determine instrument disposition (calibrate, repair, replace)

EICB-1c Response:

RNP Procedure MMM-006 is used to evaluate out-of-tolerance readings, to confirm the instrument is functioning within its specified limits when out-of-tolerance readings are obtained.

Per MMM-006, upon completion of **any** calibration task, the calibration records shall be reviewed by the Maintenance Supervisor or designee. The Maintenance Supervisor is required to assess the calibration and condition of the instrument. Based on the results of this assessment, the Maintenance Supervisor may initiate additional actions or reviews. If the instrument was found to be out of calibration, the Maintenance Supervisor is required to generate a Condition Report. If as-found data was outside of tolerance, or there was some technical difficulty completing the calibration, the System Engineer is required to perform a Technical Review of the out-of-tolerance condition. The Technical Review consists of the following elements:

- Review calibration data sheet tolerance and revise as necessary
- Determine impact of out-of-tolerance on system to perform its intended function, considering the need to evaluate instruments in other similar loops/trains
- Review prior completed Calibration Data Sheets for instruments to identify whether a repetitive failure exists
- Determine whether the instrument is defective or otherwise not performing within specifications
- Determine whether the condition found is reportable
- Determine instrument disposition (calibrate, repair, replace)

EICB-2:

Step 2 of GL 91-04 states that the licensee should confirm that the values of drift for each instrument type (make, model, and range) and application have been determined with a high probability and a high degree of confidence. Step 2 of GL 91-04 further states that the licensee should provide a summary of the methodology and assumptions used to determine the rate of instrument drift with time based upon historical plant calibration data.

In the evaluation of Step 2 of GL 91-04, the LAR states that instruments that are calibrated every 18 months, but are also subject to a SR Channel Operability Test (COT) and SR Channel Check, were not included in the drift analysis. The U.S. Nuclear Regulatory Commission (NRC) staff notes that the COT does not determine the instrument drift because the transmitter calibration is not included in the COT. In addition, if the COT tolerances are greater than the calibration tolerances then the loop drift could be excessive. Why haven't instruments that require periodic calibration testing been included in the drift evaluation to assure that they are not drifting excessively? Are the COT tolerances greater than or less than the calibration tolerances?

EICB-2 Response:

Instruments that are periodically subjected to COT testing are excluded from drift analysis because these instruments will continue to be checked and adjusted as necessary at the interval specified for the COT. The tolerance for the COT is equal to or narrower than the tolerance for the channel calibration. The COT maintains the instrument within tolerance at a more frequent interval compared to the channel calibration. Transmitters have not been excluded from drift analysis based on COTs.

EICB-3:

Step 3 of GL 91-04 states that the licensee should confirm that the magnitude of instrument drift has been determined with a high probability and a high degree of confidence for a bounding calibration interval of 30 months for each instrument type (make, model and range) and [each instrument] application [for instruments] that perform a safety function.

In order to evaluate the high probability and high confidence in the determination of the bounding calibration interval, the licensee is requested to provide or make available for audit the results of the evaluation of data for all loops. The data should include but not be limited to the number of data points, drift for each data point, mean value, standard deviation, and permitted as-found drift.

EICB-3 Response:

The following drift calculations have been prepared per the methodology described in Attachment 7 of the LAR:

RNP-I/INST-1201	ABB 27N UNDERVOLTAGE RELAYS (VOLTAGE FUNCTION) INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1202	ABB 27N UNDERVOLTAGE RELAYS (TIME DELAY FUNCTION) INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1203	HALLIBURTON NUS SAM800 MODULE INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1204	ROSEMOUNT 3051NG5 SERIES DIFFERENTIAL PRESSURE TRANSMITTERS INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1205	WESTINGHOUSE CV-7 UNDERVOLTAGE RELAYS 480V VOLTAGE FUNCTION INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1206	WESTINGHOUSE CV-7 UNDERVOLTAGE RELAYS (4KV VOLTAGE FUNCTION) INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1207	WESTINGHOUSE CV-7 UNDERVOLTAGE RELAYS (TIME DELAY FUNCTION) INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1208	WESTINGHOUSE KF UNDERFREQUENCY RELAYS INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1209	ROSEMOUNT 1151 AND 1153 GAGE PRESSURE TRANSMITTERS (RANGE CODES 6 AND 8) INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1210	ROSEMOUNT 1154DP6 STEAM FLOW TRANSMITTERS INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1211	ROSEMOUNT 1154HP5 RCS FLOW TRANSMITTERS INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1212	ROSEMOUNT 1154DP4 AND 1154HP5 PRESSURIZER AND STEAM GENERATOR NARROW RANGE LEVEL TRANSMITTERS INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1213	ROSEMOUNT 1151GP9, 1152GP9, 1153GA9, and 1154GP9 MS HEADER, RCS NARROW RANGE AND PZR OVERPRESSURE TRANSMITTERS INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1214	ROSEMOUNT 1154GP9 PRESSURIZER PRESSURE PROTECTION TRANSMITTERS INSTRUMENT DRIFT ANALYSIS
RNP-I/INST-1215	DRIFT ANALYSIS FOR INTERNATIONAL INSTRUMENTS MODEL 2520 INDICATORS

The latest revision level of all calculations listed above is revision 000.

The calculations listed above were provided separately.

EICB-4:

Step 5 of GL 91-04 states that the licensee should, "confirm that the projected instrument errors caused by drift are acceptable for control of plant parameters to affect a safe shutdown with the associated instrumentation." The NRC staff has several questions regarding the licensee's evaluation of Step 5.

a. It is not clear what subset of the safe shutdown instrumentation is addressed by the licensee in the Step 5 evaluation. Please confirm that the TS functions listed from items 1.a through 4.c are the only functions required to achieve safe shutdown and have SRs whose surveillance frequencies are being changed. If there are any missing functions identify them and explain how they conform to the Step 5 evaluation.

b. The licensee states that a separate drift analysis is not performed for the Remote Shutdown instruments based upon the design of the Remote Shutdown instruments and equipment history. Please explain why a separate drift analysis has not been conducted for the Remote Shutdown instruments or clarify if the Remote Shutdown instruments have been addressed under a separate drift analysis.

c. The licensee states that only calculations RNP-I/INST-1064 and RNP-I/INST-1063 for Functions 3.a and 3.b have been updated. Have the calculations pertaining to the remaining safe shutdown functions been updated? If not, justify why the other calculations related to the same extension have not been updated.

d. The licensee states that no accuracy requirements exist for the functions listed for Remote Shutdown. Please justify why no accuracy requirements apply to remote shutdown instruments. The licensee has further stated that existing calibration tolerances will be used. Please explain the basis for accepting the existing tolerances.

EICB-4 Response:

EICB-4a Response:

The LAR lists the following functions from Table B 3.3.4-1 of the Technical Specification Bases:

1.a - Source Range Neutron Flux, N-51 or N-52
2.a - Pressurizer Pressure, Loop, PI-607E-1 or PI-607E-2
3.a - RCS Hot Leg Temperature Wide Range Loop A, TI-413A or TI-413B
3.b - RCS Cold Leg Temperature Wide Range Loop A, TI-410A or TI-410B
3.d - SG Pressure, PIC-477 and PIC-487 and PIC-497
3.e - SG Level (Wide Range), (LI-607A-1 or LI-607A-2) and (LI-607B-1 or LI-607B-2) and (LI-607C-1 or LI-607C-2)
3.f - Condensate Storage Tank Level, LI-1454C
4.a - Pressurizer Level, LI-607D-1 or LI-607D-2
4.c - Refuel Water Storage Tank Level, LIC-947

The list of functions above has been confirmed. The listed functions are the only instrumentation required to achieve safe shutdown and have SRs whose frequencies are being proposed for change and are applicable to the evaluations of Step 5 of Enclosure 2 of GL 91-04.

EICB-4b Response:

All Remote Shutdown setpoints to which uncertainty was applied have been reviewed and, where applicable, extended drift intervals have been taken into account.

RNP does not have uncertainty calculations specifically for the purpose of Remote Shutdown functions. Some components credited for Remote Shutdown have uncertainty calculations prepared for other purposes, such as Post Accident Monitoring. Where uncertainty is required for a Remote Shutdown function, the uncertainty may be utilized from the following sources:

- Uncertainty calculations associated with the components, but created for another purpose (as discussed in the previous sentence),
- Uncertainty calculations for other safety-related instrument loops, but of the same make and model components and similar installations.

Extended drift intervals have been applied to the calculations mentioned above; therefore, extended drift intervals have been applied to Remote Shutdown functions in all applications where drift is currently considered.

Calculation RNP-I/INST-1119 develops the setpoints used in the Remote Shutdown Procedures. That calculation obtains uncertainty values from the sources listed above. That calculation has been reviewed to ensure extended drift intervals have been considered for all setpoints used in Remote Shutdown procedures.

EICB-4c Response:

All setpoints used in Remote Shutdown procedures are determined in setpoint calculation RNP-I/INST-1119. Calculation RNP-I/INST-1119 setpoints were specifically reviewed for application of uncertainty values. Any uncertainty values used in the calculation were reviewed and updated by way of updating the uncertainty values in the governing uncertainty and setpoint calculations.

EICB-4d Response:

The statement that no accuracy requirements, for the functions listed for Remote Shutdown, exist pertains to Technical Specification Allowable Values and Analytical Limits. It is acknowledged that uncertainty must be applied to the setpoint values used in Remote Shutdown procedures, where applicable.

The existing as-found tolerances will be used in calibration procedures. If linear drift is expected of the instrumentation in question, then it should result in a larger deviation from setpoint over an extended calibration interval. The existing as-found tolerances assume normal drift over a period of time up to 22.5 months. If the instrument is calibrated less frequently, it is expected that the drift would be greater and therefore, the as-found tolerances could be adjusted to account for that greater drift. Leaving the as-found tolerances the same as the existing tolerances results in a more restrictive tolerance with respect to the expected drift. This results in a more conservative approach to identifying equipment which may be experiencing greater drift than expected, which is the basis for accepting the existing tolerances.

EICB-5:

Step 6 of GL 91-04 states that the licensee should, "confirm that all conditions and assumptions of the setpoint and safety analyses have been checked and are appropriately reflected in the acceptance criteria of plant surveillance procedures for channel checks, channel functional tests and channel calibrations."

As described in the subsection, "EST-047/WCAP-11889/SR 3.4.1.3," of the licensee's evaluation of Step 6, WCAP-11889, "RTD [Resistance Temperature Detector] Bypass Elimination Licensing Report for H. B. Robinson Unit 2," (Reference 7) supported the installation of a then new reactor coolant temperature measurement system. WCAP-11889 also included the licensee's determination of the RCS flow uncertainty (i.e., 2.6%, with the new reactor coolant temperature measurement system). The discussion in the LAR under Step 6 provides the licensee's justification for retaining the RCS flow uncertainty of 2.6% while extending the fuel cycle from 18 to 24 months. The licensee, in part, states that neither the methodology nor the basis for the uncertainty values were provided to RNP as part of the WCAP [WCAP-11889]; therefore, RNP typically evaluates the impact to the WCAP by qualitative assessment. Please briefly describe the qualitative assessment of the impact to the WCAP that was performed.

In another paragraph the licensee states that "The values used to calculate TLUIND are obtained from RNP-I/INST-1128, which means they will include drift considering a 30-month calibration interval." Please explain the rationale for this statement. Has this calculation been revised to reflect the 24-month fuel cycle (i.e., 30-month drift)? If not, please justify the statement. In addition, please state if the drift numbers used in the calculation (1) included the drift of all flow, temperature, and other instruments in the loop and (2) were recalculated based on 24-month fuel cycle.

EICB-5 Response:

Qualitative Assessment

GL 91-04, Enclosure 2, Item 6 states that the licensee should confirm all conditions and assumptions of the setpoint and safety analyses have been checked and are appropriately reflected in the acceptance criteria of plant surveillance procedures.

WCAP-11889, RTD Bypass Elimination Licensing Report, provides the uncertainty of the precision heat balance used to verify the Reactor Coolant System (RCS) total flow rate in accordance with RNP Technical Specification (TS) Surveillance Requirement (SR) 3.4.1.4. The impact of the change to a 24 month cycle on the uncertainty presented by WCAP-11889 is evaluated by qualitative assessment.

WCAP-11889 was reviewed for conditions and assumptions that would be affected by the change to a 24-month fuel cycle. The qualitative assessment of the impact of changing to a 24-month fuel cycle is summarized in RNP-RA/17-0068, Response to NRC Request for Additional Information Related to License Amendment Request Regarding Technical Specification Surveillance Requirement Frequencies to Support 24-Month Fuel Cycles, dated 9/28/17. "SRXB RAI – 1 Response" describes that online calibrations will continue to be performed at their current periodicities, such that the possible interval between the instrument calibration and the performance of EST-047 "Reactor Coolant Flow Test (18 Months)" is not increased by transitioning to a 24-month fuel cycle. "SRXB RAI – 1 Response" also considers instruments that are calibrated during the refueling outage, and once again the possible interval between the instrument calibration and the performance of EST-047 is not increased by the proposed change. Since the interval between the calibration and the EST-047 is not increasing, the time dependent portions of the flow calorimetric uncertainty are unaffected by the change to 24-month fuel cycle.

The LAR discusses EST-047 and WCAP-11889 in terms of the conditions and assumptions of the setpoint and safety analyses. The conclusions were reviewed and are appropriately reflected in the acceptance criteria of plant surveillance procedures. In this review it was identified that an additional conservatism was provided. It was determined that the conservatism would be retained rather than use a value that was different from WCAP-11889. The conservatism is currently present and is not impacted by the LAR.

RNP-I/INST-1128

The purpose of RNP Calculation RNP-I/INST-1128 is to compute the loop uncertainties associated with the indication and trip functions provided by the Reactor Coolant (RC) System Flow instrumentation loops. The loop consists of the differential pressure transmitter, loop power supply, RC Low Flow Trip comparator, signal isolator, Main Control Board indicator, and computer input. This calculation has been revised to incorporate a calibration interval of 30 months into the drift terms for the affected instruments.

TLUIND is the total loop uncertainty associated with the RC Flow Indicator located on the Main Control Board. The total loop uncertainty includes the following errors:

- Primary Element Error
- Total Device Uncertainty – Transmitter
- Total Device Uncertainty – Isolator
- Total Device Uncertainty – Indicator
- Flow Calorimetric Uncertainty
- Process Density Effects

Primary Element Error and Process Density Effects involve physical effects that are not related to time-based drift. The Total Device Uncertainty for the transmitter, isolator, and indicator have been reviewed for impact based on calibrations at up to thirty months. For the transmitter and the indicator, historical as-found and as-left data from calibrations were evaluated to determine a bounding 30 month analyzed drift value. For the isolator, a default value of +/-1% span was applied for drift; this value bounds the vendor specification of +/-0.2% upper range limit (URL) over an 18-month period, the 18-month drift extrapolated to +/-0.283% URL over 30 months, as well as long term drift testing that found the drift to be less than +/-0.20% over 36 months.

In summary, RNP-I/INST-1128 has been revised to incorporate a 30-month calibration interval, such that the errors associated with TLUIND include drift considering a 30-month calibration interval. The drift numbers include the drift of applicable components based on a 24-month fuel cycle.

EICB-6:

SR 3.3.1.1 Item 9.a and 9.b - Reactor Coolant Flow, Low

The licensee states that differential pressure transmitters in 2007, FT-436, and in 2010, FT-416, were found out-of-tolerance but were determined to be functional for performing their safety function. The statement, "found out-of-tolerance but determined to be functional" is not clear because it does not state if the out-of-tolerance exceeded the allowed tolerance limits (as-found tolerance) or not. Please clarify why these out-of-tolerance instances are acceptable. The licensee states that FT-415 was replaced in 2012 and the replaced transmitter was found out-of-tolerance (high) after that. How many good successive data points are available after the transmitter was replaced given that the very first calibration was out-of-tolerance. Please explain why the SR extension for FT-415 is justified given the very first surveillance was out-of-tolerance.

EICB-6 Response:

Calibration As-Found Versus Calculated As-Found
Regarding the out-of-tolerance condition of FT-436 in 2007, the transmitter was found out-of-tolerance (OOT) with respect to the as-found calibration tolerance, meaning the tolerance seen by the technician on the calibration data sheet; however, comparison of the as-found value compared to the calculated as-found tolerance of calculation RNP-I/INST-1128 “RCS Flow Instrument Uncertainty and Scaling Calculation” determined the transmitter was within the allowable tolerance. The difference between calibrated as-found tolerance and calculated as-found tolerance is that the as-left tolerance determined in RNP-I/INST-1128 is used for both as-found and as-left tolerances on the calibration data sheets. The use of as-found tolerance equal to as-left tolerance provides a lower threshold for technical review of instrument performance. This approach is in accordance with the definition given in Attachment 6 of the LAR, which states: “Therefore, equipment associated with uncertainty/setpoint calculations will use the calculated as-found values as the acceptable limits for this evaluation.”

When the evaluation included in Attachment 6 “Review of Historical Surveillance Records for Instrumentation” was performed, any components found outside of the calibration tolerance were included in the discussion to provide the mechanism to document review of the OOT against the calculation as-found tolerance. However, if the as-found value was within the calculated as-found tolerance of the applicable uncertainty calculation, it was determined to meet acceptable limits per the definition given in the LAR.

The following is an example using the as-found values of transmitter FT-436 (Reactor Coolant System Loop “C”, Channel III, Flow Transmitter):

- Calculation RNP-I/INST-1128 determined the setpoint and uncertainty values of all Reactor Coolant System flow transmitters including FT-436. Section 9.1 of RNP-I/INST-1128 summarizes the as-found tolerances for FT-436 based on the calculated uncertainty numbers from the body of that calculation. Section 9.1 indicates an as-found tolerance of +/- 0.032 Vdc. As long as the calculated as-found tolerance listed in Section 9.1 of RNP-I/INST-1128 is not exceeded, then it is ensured the acceptable limits have not been exceeded.

The calibration data sheets that fulfilled SR 3.3.1.10 Items 9.a and 9.b for FT-436 in 2007 listed the as-found tolerance as +/- 0.020 Vdc which is more restrictive than the calculated tolerance from RNP-I/INST-1128. The evaluation in Attachment 6 of the LAR indicates the transmitter was out-of-tolerance at the lowest calibration point, then proceeds to evaluate that condition. The transmitter was (-) 0.022 Vdc from setpoint. Since this is less than the calculated tolerance of calculation RNP-I/INST-1128, which is +/- 0.032 Vdc, it did not exceed acceptable limit as defined in the LAR.

The 2010 out-of-tolerance condition of FT-416 was out-of-tolerance at its highest calibration point. This point is representative of 120% of flow while the trip setpoint is 94.26%. At all other calibration points the transmitter was within the calculated tolerances of calculation RNP-I/INST-1128 including the calibration points closest to and above/below the trip setpoint. Therefore, this condition does not represent an equipment issue which would result in failure of a safety function. If it is assumed this condition exceeded acceptable limits, there is only one occurrence of any issue with this transmitter; therefore, it does not exceed the criteria for except on rare occasions. The condition “except on rare occasions” as defined by RNP is two consecutive occurrences that exceed acceptable limits.
FT-415 was considered to exceed acceptable limits on two occasions. In 2010 the transmitter was found out-of-tolerance at all calibration points. This condition exceeded acceptable limits and the transmitter was replaced at that time. The next calibration in 2012 also found the transmitter to exceed acceptable limits. These issues are not dependent of one another since they are associated with two separate pieces of hardware. Since the issues are considered independent of one another, they are not considered repetitive and do not meet the criteria for more than rare occasion.

In light of this RAI, an expansion of the prior review of this function has been performed. The number of calibrations reviewed for this function has been expanded to include the last two calibration periods. No additional issues have been identified. Seventy-two calibrations have taken place during the review period for this TS function (2005 through 2017). These 72 calibrations include all transmitters credited for this function (FT-414, FT-415, FT-416, FT-424, FT-425, FT-426, FT-434, FT-435, FT-436). Only the two issues associated with FT-415 resulted in a safety related function exceeding its TS Allowable Value on one channel. All transmitters associated with this function are of the same make and model: Rosemount 1154HP5. Extension of the CHANNEL CALIBRATION SR for this function will not result in more than a minimal increase in risk to safety.

EICB-7:

SR 3.3.1.10 Item 12 - RCP [reactor coolant pump] Underfrequency

The licensee states that there were two failures of relay 811/1 after replacement and one failure of relay 811/2 after it was replaced in 2007. Please explain if failure means exceeded the "as-found tolerance" per the licensee acceptance criteria or something else. If some other acceptance criteria is used then please describe and justify the use of the alternate acceptance criteria. In addition, please describe what steps are taken by plant operating procedures to ensure that the relay failures are adequately evaluated and necessary steps are taken to ensure that the relays continue to operate in an acceptable manner without jeopardizing future safe operation of these relays.

EICB-7 Response:

The RCP Underfrequency (UF) relays are Westinghouse type KF underfrequency relays. The calibration of these relays is based on Westinghouse Installation, Operation, and Maintenance Instructions I.L. 41-503F, effective May 1968. The voltage versus frequency setpoint response is relatively flat between 120VAC and 40VAC as shown below:

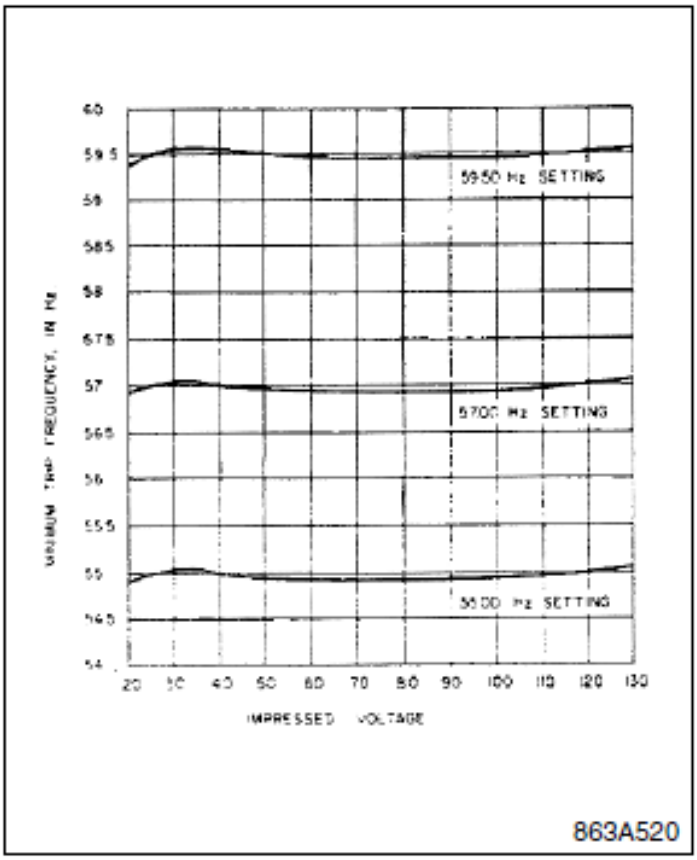

Figure 7: Typical Voltages vs. Minimum Frequency Curves 60 Hertz KF Underfrequency Relay

The vendor maintenance instructions include verification that the frequency trip setpoint is between 0.06Hz and 0.08Hz above the desired trip frequency when the applied voltage is reduced from 120VAC to 40VAC. This verification of frequency trip point over varying voltages (120VAC and 40VAC) is referred to in the discussion below as consistency of trip setpoint. RNP Calibration Procedure PIC-806, Westinghouse Type KF Underfrequency Relay, provides a desired trip setpoint of 58.20Hz for 120VAC applied voltage, with a tolerance of 58.00Hz to 58.40Hz. At the 40VAC applied voltage, the desired trip setpoint is 0.07Hz greater than the 120VAC frequency setpoint, and a tolerance of 0.060Hz to 0.080Hz above the 120VAC frequency setpoint.

RNP Technical Specifications Table 3.3.1-1, Item 12, provides a Nominal Trip Setpoint of 58.2Hz, and an Allowable Value of greater than or equal to 57.84Hz. The Allowable Value is applied for the evaluation of calibration as-found data to determine whether the instrument drift exceeded acceptable limits.

The events for relays 811/1 and 811/2 are characterized as follows:

- 2007 (Work Order (WO) 00782776) – Relay 811/1 was found out-of-tolerance for consistency of trip setpoint between 120VAC and 40VAC. The AS-FOUND trip frequency for 120VAC was 58.15Hz, and for 40VAC was 58.27Hz. The AS-FOUND trip frequency at both voltages satisfies the Allowable Value of ≥57.84Hz. The AS-FOUND values for 120VAC and 40VAC differed by 0.12Hz, exceeding the expected performance of 0.06Hz to 0.08Hz. The relay could not be adjusted to within the desired AS-LEFT tolerance. The event is conservatively identified as a failure because the component could not be adjusted within expected tolerance which could be indicative of age related degradation, and may not have been detected by means other than the calibration. A Technical Review of the out-of-tolerance condition was performed per RNP Procedure MMM-006, Calibration Program. The Technical Review of the out-of-tolerance condition determined that the relay would have operated within the setpoint range (above Technical Specifications (TS) Nominal Trip Setpoint (NTS)), allowing the system to perform its intended function. Since the relay could not be adjusted to within the more restrictive AS-LEFT tolerance, the Technical Review identified the proper action as replacement of the relay.
- 2008 (WO 01064106) – Relay 811/1 was found out-of-tolerance for consistency of trip setpoint between 120VAC and 40VAC. The AS FOUND trip frequency for 120VAC was 58.350Hz, and for 40VAC was 58.515Hz. The AS FOUND trip frequency at both voltages satisfies the Allowable Value of ≥57.84Hz. The AS FOUND values for 120VAC and 40VAC differed by 0.165Hz, exceeding the expected performance of 0.06Hz to 0.08Hz. The Technical Review of the out-of-tolerance condition determined that the relay would have picked up sooner (Allowable Value satisfied) on a decreasing frequency condition, and identified the proper action as calibrating the relay to within tolerance. This event does not represent instrument drift that exceeded acceptable limits.
- 2013 (WO 02010241) – Relay 811/1 was found out-of-tolerance for consistency of trip setpoint between 120VAC and 40VAC. The AS FOUND trip frequency for 120VAC was 58.29Hz, and for 40VAC was 58.41Hz. The AS FOUND trip frequency at both voltages satisfies the Allowable Value of ≥57.84Hz. The AS FOUND values for 120VAC and 40VAC differed by 0.12Hz, exceeding the expected performance of 0.06Hz to 0.08Hz. The relay would have picked up sooner (above TS NTS) on a decreasing frequency condition, and the proper action was calibrating the relay to within tolerance. This event does not represent instrument drift that exceeded acceptable limits.

- 2008 (WO 01064106) – Relay 811/2 was found out-of-tolerance for consistency of trip setpoint between 120VAC and 40VAC. The AS FOUND trip frequency for 120VAC was 58.170Hz, and for 40VAC was 58.260Hz. The AS FOUND trip frequency at both voltages satisfies the Allowable Value of ≥57.84Hz. The AS FOUND values for 120VAC and 40VAC differed by 0.090Hz, exceeding the expected performance of 0.06Hz to 0.08Hz. The Technical Review of the out-of-tolerance condition determined that the relay would have picked up sooner (above TS NTS) on a decreasing frequency condition, and identified the proper action as calibrating the relay to within tolerance. This event does not represent instrument drift that exceeded acceptable limits.

For each of these events, the relay was found outside the expected tolerance for consistency over the range of applied voltage. For Relay 811/1 in 2007, the event is conservatively treated as a failure to meet acceptable limits even though the as found data was within the Allowable Value, because the relay could not be adjusted within tolerance. The remaining events found the relay within the Allowable Value and therefore the instrument drift was within acceptable limits.

Procedure PIC-806 provides the instructions for performing the calibration check of the RCP UF relays. In the event that the as found values are outside the allowable tolerance range, the relay technician is required to notify the Instrument and Electrical (I&E) Supervisor.

RNP Procedure MMM-006 documents that one responsibility of the Maintenance Supervisor is to notify the Control Room Shift Manager when calibration data is out-of-tolerance. Procedure MMM-006 indicates the System Engineers are responsible for evaluating calibration data from instrument found out of calibration. In the event that an instrument is found to be out of calibration, the maintenance supervisor ensures that the appropriate personnel are notified and that a Nuclear Condition Report (NCR) is generated to document the out-of-tolerance condition. Procedure MMM-006 provides guidance for the calibration data Technical Review, and generates documentation of the technical review. The technical review includes review for system impacts, repetitive failure, instrument integrity, reportability, and determines actions to be taken.

EICB-8:

SR 3.3.8.4 Item 3 – Auxiliary Feedwater Start - E1/E2 Loss of Voltage

The licensee states that, “In 2010, both relays of the E2 bus were found out-of-tolerance high (time setting); however, they are found at approximately 0.81 seconds which is below the Surveillance Requirement specified time of ≤ 1 second. Since the SR specified value was met there was no loss of safety function.” Please state the basis for and the value of the tolerance that was exceeded.

EICB-8 Response:

The calibration procedure PIC-805 “Westinghouse Type CV-7 Undervoltage Relays” list the setpoint and as-found values for Loss of Voltage relays 271/E2(480V) and 272/E2(480V). The desired actuation time (setpoint) during performance of the CHANNEL CALIBRATION is 0.75 seconds with an as-found tolerance of +/- 0.038 seconds. Calculation RNP-E-8.002 “AC Auxiliary Electrical Distribution System Voltage/Load Flow/Fault Current Study” states the relays’ tolerance of +/- 0.038 seconds is based on the manufacturer’s instruction manual. From calculation RNP-E.8.002, the basis for the setpoint is as follows:

1. Ensure that the emergency power supply isolates from the preferred power source with minimum time delay upon detection of voltage levels which indicate that the normal voltage source has been lost,
2. Ensure that the emergency power supply is not unnecessarily isolated from the preferred power source due to normal transient voltage dips, and
3. Ensure that the time delay is sufficiently long to ensure that the temporary loss or decay of voltage which occurs on a fast dead bus transfer or during a feeder overload or fault (until feeder breaker trips) does not cause separation from the preferred power source.

In order to meet the above bases, the relay setpoint must be long enough to allow the bus to ride through a fast dead bus transfer which takes a maximum of 100 milliseconds and a feeder breaker instantaneous or short time trip which takes a maximum of 180 milliseconds. Both of these actions occur simultaneously.

Therefore, the setpoint is set to prevent unnecessarily isolation from the preferred power source (duration greater than 180 milliseconds) and less than the TS Nominal Trip Setpoint (less than or equal to 1 second) to ensure minimum delay upon detection of loss of the preferred power source.

Both relays evaluated in Attachment 6 “Review of Historical Surveillance Records for Instrumentation” of the LAR had an as-found of less than 0.81 seconds during calibration in 2010. They exceeded the calibration tolerance indicated on the calibration data sheets; however, they still meet the TS requirement to actuate less than or equal to 1 second. This TS function does not have an uncertainty calculation associated with it. Also, there is no Allowable Value. Per the evaluation in Attachment 6 of the LAR: “Since there is no TS Allowable Value for this function, the review will use the tolerance specified in the TS Surveillance Requirement as the ‘acceptable limit’.” In all cases the as-found data was within the TS nominal trip setpoint of <or= 1 sec, meeting acceptable limits.

EICB-9:

SR 3.4.15.5 - Containment Fan Cooler Condensate Flow Rate Monitor

The licensee states that in 2005 LT-702 and LT-703 were found out-of-tolerance and all four level transmitters were found out-of-tolerance in 2010. More failures were noted in 2008, 2012, 2013, and 2015. In each case, the licensee states that the transmitters were still capable of responding to an increase in level. The licensee is requested to clarify why the capability of transmitters to respond to a change in level is acceptable when the out-of-tolerance readings do not meet the guidance of GL 91-04 and the licensee acceptance criteria for surveillance extension? Further, the licensee states that there is no TS setpoint but mentions that the transmitters were out of setpoint tolerance. What is the allowed out-of-tolerance and what is the basis. Please state the actions that have been taken to correct these out-of-tolerances and to justify why this SR extension should be allowed.

EICB-9 Response:

Each Containment Fan Cooler Condensate Flow is monitored by a differential pressure type level transmitter. The fan cooler condensate drains to a standpipe which drains to the sump. The transmitter measures standpipe level, providing indication on a level indicator. The expected level is 0%; a HIGH level alarm is provided at 1 ft (6.25% span), and a HIGH-HIGH level alarm is provided at 15 ft. (93.75% span). Containment fan cooler condensate flow is one of three diverse means of RCS Leakage Detection identified by RNP Technical Specifications 3.4.15.

The level transmitters are calibrated to an AS-LEFT tolerance of +/-0.5%, which is the accuracy standard established by RNP Procedure MMM-006, Calibration Program. The level alarms (similar to signal comparators) are also calibrated to an AS-LEFT tolerance of +/-0.5%, consistent with MMM-006. There are no Technical Specifications Setpoints or Allowable Values associated with the condensate flow monitor, and as such instrument uncertainty calculations have not been developed.

The approach to address GL 91-04 Enclosure 2 Item 1 for functions with no uncertainty calculation is to use the calibration tolerance or alternate criteria as specified within the evaluations included in Attachment 6 of the LAR, Review of Historical Surveillance Records for Instrumentation. For the flow rate monitor function, the criteria selected to determine whether the instrument drift exceeded acceptable limits for a calibration interval is whether the drift would have interfered with the ability for the instrument to respond to an increase in level.

The following out of tolerance conditions were identified during the review:

- 2005 (WO 00534575) – LT-702 was found out of tolerance at the 100% calibration point only, with a maximum error of +0.6% compared to the desired value
- 2005 (WO 00534575) – LT-703 was found out of tolerance at the 75% and 100% calibration points, with a maximum error of +0.65% compared to the desired value
- 2008 (WO 01060411) – LT-701 was found out of tolerance at the 100% calibration point only, with a maximum error of -0.65% compared to the desired value
- 2008 (WO 01060411) – LT-702 was found out of tolerance at the 100% calibration point only, with a maximum error of -0.625% compared to the desired value

- 2008 (WO 01060411) – LT-703 was found out of tolerance at the 50%, 75%, and 100% calibration points, with a maximum error of -1.1% compared to the desired value
- 2008 (WO 01060411) – LT-704 was found out of tolerance at the 75% and 100% calibration points, with a maximum error of -0.65% compared to the desired value
- 2010 (WO 01446515) – LT-701 was found out of tolerance at the 100% calibration point only, with a maximum error of +0.525% compared to the desired value
- 2010 (WO 01446515) – LT-702 was found out of tolerance at the 50%, 75%, and 100% calibration points, with a maximum error of +0.925% compared to the desired value
- 2010 (WO 01446515) – LT-703 was found out of tolerance at the 50%, 75%, and 100% calibration points, with a maximum error of +1.15% compared to the desired value
- 2010 (WO 01446515) – LT-704 was found out of tolerance at the 75% and 100% calibration points, with a maximum error of +0.775% compared to the desired value
- 2012 (WO 01778542) – LI-704 was found out of tolerance for the HIGH-HIGH alarm, with an error of +0.7% compared to the desired value
- 2013 (WO 02007195) – LT-703 was found out of tolerance at the 100% calibration point only, with a maximum error of -0.725% compared to the desired value
- 2013 (WO 02007195) – LT-704 was found out of tolerance at the 50%, 75%, and 100% calibration points, with a maximum error of -1.0% compared to the desired value
- 2015 (WO 02295991) – LT-703 was found out of tolerance at the 75% and 100% calibration points, with a maximum error of +1.175% compared to the desired value

The largest error found by the review was +1.175%. During normal plant operation, the indication is expected to remain at 0%, with an increase indicating a potential leak inside containment. The HIGH alarm at 1 ft. (6.25% span) actuates a control room alarm which prompts actions listed in procedure APP-002, Annunciator Panel Procedure for Engineering Safeguards. The maximum error found represents an error of 0.19 ft., which is within the error of +/-0.5 ft. shown in APP-002.

For out-of-tolerance as-found data, the as-found errors were consistently in the upper half of the range, at the 50% span points and above. The initial threshold for action is at just 6.25% of span, well below the point where the instrument has been found outside the calibration tolerance. Since the error is small, within the expected error of the alarm response procedure, and occurs at a point well in excess of the initial action point in the alarm response procedure, the transmitters remain capable of responding to changes in level and providing information that can be used in response to the alarm. It is concluded that the as-found error has not exceeded acceptable limits.

The allowed tolerance for the subject instruments is +/-0.5%. The conditions found were as-found data exceeded the tolerance described in the RNP calibration procedures. The out-of-tolerance conditions were corrected by adjusting the instrument back into the acceptable range. Procedure MMM-006 provides guidance for the Technical Review of out-of-tolerance calibration data. The Technical Review scope includes tolerance review, system impact, repetitive failure, instrument integrity, and reportability; and the procedure also includes determination of actions to be taken. The Technical Review determines the impacts and identifies the actions necessary to resolve the out-of-tolerance condition.

EICB-10:

SR 3.3.3.2 Item 3 - RCS Hot Leg Temperature
SR 3.3.4.3 Item 3.a - RCS Hot Leg Temperature

The licensee lists instruments for Post Accident Monitoring (SR 3.3.3.2) and Remote Shutdown (SR 3.3.4.3) for monitoring RCS Hot Leg Temperature. A comparison of the lists show one shared RTD (TE-413-1) and two shared associated rack equipment (TM-413, TY-413). However, the licensee discusses an out-of-tolerance instrument (i.e., TI-413A) that is not included on either list. Please correct the lists of applicable instruments and update the discussion of out-of-tolerances accordingly.

EICB-10 Response:

It is appropriate to include TI-413A in the list of indications for SR 3.3.4.3 Item 3.a. Addition of TI-413A for the Remote Shutdown indication does not affect the discussion of out-of-tolerance conditions, because the only out-of-tolerance condition for TI-413A is already included in the discussion (reference Work Order WO 01097416, 2009).

The following represents correction of the lists of instruments reviewed shown in LAR Attachment 6, Review of Historical Surveillance Records for Instrumentation:

> *SR 3.3.4.3 Item 3.a – RCS Hot Leg Temperature: This function is performed by one RTD (TE-413-1), associated rack equipment (TM-413, TY-413) and indications (TI-413A, TI-413B). Evaluation of RTDs was performed generically and will not be repeated here.*

EICB-11:

SR 3.3.3.2 Item 7 - Containment Sump Level. Wide Range
SR 3.4.15.3 Containment Sump Monitor

Two level transmitters (LT-801, LT-802) and the associated indication (LI-801, LI-802) provide this function.

The licensee states that the level transmitters are not calibrated based on the design of the components. Since the components are not calibrated, explain the basis for the calibration extension. The stated explanation should be consistent with GL-91-04, step 3.

EICB-11 Response:

Level transmitters LT-801 and LT-802 are GEMS Model XM-54853 transmitters. Each transmitter is a tubular sensor containing reed relays sealed inside, along the length of the stem. A floating permanent magnet moves along the stem closing reed switches adjacent to the magnet. Sensor drift is negligible for the transmitters based on the unique design of the sensor used for this function. All voltage sources, adjustable components and electronics which make up the instrument loop are contained in the indicators.

The evaluation of transmitters LT-801 and LT-802 should have been included in Attachment 8 of the LAR and is being provided in the following paragraphs. All other components associated with this function have been evaluated in Attachment 6 of the LAR.

Level transmitters LT-801 and LT-802 provide a resistance relative to the measured water level in Containment, including the Containment Sump. Those transmitters are functionally checked during every refueling outage per procedures LP-303 “Containment Water Level Channel 801” and LP-303-1 “Containment Water Level Channel 802”. All performances of those procedures from 2005 through 2017 were reviewed to identify any issues with those transmitters. Corrective Maintenance Work Orders and Condition Reports associated with these components were also reviewed over the same time period. Only one issue was discovered associated with level transmitter LT-801. No issues were discovered associated with LT-802.

In 2015, LT-801 was found reading high. Based on Condition Report 00755381, this issue was not found by any surveillance. The problem was found during incidental Operator observations while the plant was shutdown for a refueling outage. Per Work Order 13535984, the transmitter returned to normal operation following a functional check.

Per Condition Report 00755381, the deviation exceeded the criteria of procedure OST-023 “Monthly Surveillances”. OST-023 performs the monthly CHANNEL CHECK per TS Surveillance Requirement 3.3.3.1; therefore, this issue was discovered while the surveillance was current and would have been discovered during the next month surveillance. Changing the frequency of SR 3.3.3.2 from 18-month to 24-months would not have resulted in a reduction of safety since the issue would have been discovered during the next performance of monthly Surveillance Requirement 3.3.3.1 per procedure OST-023. The paragraph below Step 1 in Enclosure 2 of GL 91-04 states the following regarding other surveillance tests: “The surveillance and maintenance history for instrument channels should demonstrate that most problems affecting instrument operability are found as a result of surveillance tests other than the instrument calibration.”

Surveillance testing excludes the transmitter; therefore, calibration data is not collected. The transmitter is not provided with any adjustments and if performance is unsatisfactory the transmitter will be replaced. The transmitter response is inherently verified in the monthly Channel Check required by SR 3.3.3.1. Since the transmitter is only functionally tested and not subject to calibration, GL 91-04 Enclosure 2, Item 3 has not been applied to this function.

EICB-12:

SR 3.3.3.2 Item 14 - Condensate Storage Level

The licensee states that two transmitters, LT-1454A and LT-1454B, and associated indicators provide this function. The licensee states that both transmitters were replaced based on work orders issued after a December 2012 failure. The licensee states that there is no data or history of operation since the transmitters were replaced. The request for SR extension to 24 months does not meet the guidance of GL 91-04 due to a lack of successful data. Please provide a justification for the requested extension.

EICB-12 Response:

In the evaluation of SR 3.3.3.2 Item 14 , it was discussed that level transmitters LT-1454A and LT-1454B experienced excessive drift. This issue was identified during the monthly CHANNEL CHECK per SR 3.3.3.1, not the 18-month CHANNEL CALIBRATION per 3.3.3.2 (ref. Condition Report 00437681).

The paragraph below Step 1 in Enclosure 2 of GL 91-04 states the following regarding other surveillance tests: “The surveillance and maintenance history for instrument channels should demonstrate that most problems affecting instrument operability are found as a result of surveillance tests other than the instrument calibration.”

The transmitters were replaced as a result of these issues (ref. Work Orders 11862167 and 11856817, performed 12/2010). These out-of-tolerance conditions were identified by more frequent surveillance requirements, as recommended in Step 1 in Enclosure 2 of GL 91-04; therefore, extension of the calibration frequency for SR 3.3.3.2 from 18-months to 24-month would not result in an increased risk to safety.

Specifically, WO 01605051 does not contain calibration data for LT-1454A and LT-1454B. Since these transmitters were replaced, the calibration data is contained in WOs 11862167 and 11856817 instead. These transmitters have experienced four successful calibrations each since that time (ref. Work Orders 11870201, 12101352, 13313822 and 13514644). There have been no out-of-tolerance conditions or any other issues associated with these transmitters since that time. Based on the issues being identified by a more frequent TS Surveillance Requirement and four successful calibrations since replacement, these components are considered acceptable for calibration extension.

EICB-13:

SR 3.3.3.2 Item 19 - Auxiliary Feedwater Flow

The LAR identifies four occasions where pressure transmitters for this SR were found out-of-tolerance but then states that, "all of the calibration points were found within the calculated tolerance; therefore, this is not considered an issue for this evaluation."

Please define what is considered as "out-of-tolerance" in this case. Is it as-found tolerance or some other tolerance? The licensee's stated acceptance criteria is "not exceeding the as-found tolerance." Please justify the out-of-tolerance values if they exceeded the allowed out-of-tolerance values.

EICB-13 Response:

The differential pressure transmitters for SR 3.3.3.2 Item 19 identified with out of tolerance data are FT-1426A, FT-1426B, FT-1426C. RNP Procedure LP-366, Auxiliary Feedwater Flow Indication Channels 1425A, 1425B, 1425C, 1426A, 1426B, and 1426C, is applicable to the calibration of these instruments. The tolerance for these instruments from LP-366 is +/-0.5% or +/- 0.020VDC, for both as-found and as-left data. RNP defined out-of-tolerance as AS-FOUND data that exceeds the procedural acceptance criteria.

RNP Calculation RNP-I/INST-1055, Auxiliary Feedwater Flow Instrument Uncertainty Calculation (FT-1425A, 1425B, 1425C, 1426A, 1426B & 1426C) determined the uncertainty for the Auxiliary Feedwater (AFW) flow instruments. The calculation determined the AS-FOUND tolerance of +/-1.23% or +/-0.0492VDC which includes the effects of drift and calibration uncertainties. Since the instrument uncertainty calculation determined the expected AS-FOUND tolerance, the expected AS-FOUND tolerance is appropriate to apply to determine whether the as-found calibration data exceeds acceptable limits. This approach is in accordance with the definition given in Attachment 6 of the LAR, which states: "Therefore, equipment associated with uncertainty/setpoint calculations will use the calculated as-found values as the acceptable limits for this evaluation."

The out-of-tolerance conditions for the events described in the LAR are as follows:

- 2013 (Work Order WO 02083264) – FT-1426A was found out of tolerance at the 75% and 100% calibration points, with a maximum error of -0.875% compared to the desired value
- 2013 (Work Order WO 02083266) – FT-1426B was found out of tolerance at the 75% and 100% calibration points, with a maximum error of -0.85% compared to the desired value
- 2012 (Work Order WO 01865481, 01865480) – FT-1426C was found out of tolerance at the 100% calibration point only, with a maximum error of +0.575% compared to the desired value
- 2013 (Work Order WO 02083265) – FT-1426C was found out of tolerance at the 25%, 50%, 75%, and 100% calibration points, with a maximum error of -1.225% compared to the desired value

Based on this information, some of the AS-FOUND calibration data exceeded the tolerance of calibration procedure LP-366. However, in the review of calibration data consisting of 7 calibrations for each of the instrument loops, none of the calibration data exceeded the AS-FOUND tolerance determined by instrument uncertainty calculation RNP-I/INST-1055. Therefore, for this function none of the calibrations found a condition where the instrument drift exceeded acceptable limits.

EICB-14:

SR 3.3.4.3 Item 2.a - Pressurizer Pressure

The LAR identifies only one instrument with two indicators for this SR. Therefore, the number of readings will be limited. Since the LAR identifies that there were two readings that exceeded the tolerances at all points it is not clear how the extension is justified. Provide a justification of the extension with pertinent data (i.e., total number of indicator readings), all failures during the review period, and how the data meets the high probability and high confidence criteria per Step 3 of GL 91-04.

EICB-14 Response:

The Remote Shutdown Reactor Coolant System (RCS) pressurizer pressure loop consists of a loop power supply, pressure transmitter, and two indicators. One indicator (PI-607E-1) is located in the charging pump room control panel, and the other indicator (PI-607E-2) is located at the secondary control panel. The tolerance for these indicators is +/-2.0% based on RNP Procedure MMM-006, Calibration Program. For purposes of evaluating the instrument performance for the LAR, the tolerance of +/-2.0% is applied to determine whether the as found error exceeded acceptable limits.

The complete list of Remote Shutdown instrumentation is provided in RNP Technical Specifications (TS) Bases Table B 3.3.4-1. Per RNP TS Bases Table B 3.3.4-1, the required number of functions for RCS pressurizer pressure is one. Per RNP procedure OST-918, Dedicated Shutdown Equipment and Instrumentation Check (monthly),pressurizer pressure indication requires either PI-607E-1 or PI-607E-2. OST-918 provides the instructions for performing the monthly checks for remote shutdown instrumentation. The monthly checks consist of comparison of the remote shutdown instruments to control room instruments, ensuring alignment within +/- 120 psig for the RCS pressurizer pressure function.

The out-of-tolerance conditions for the events described in the LAR are as follows:

- 2008 (Work Order WO 01068832) – PI-607E-2 was found out of tolerance at all calibration points, with a maximum error of +125 psig or +4.17% compared to the desired value
- 2013 (Work Order WO 02013725) – PI-607E-2 was found out of tolerance at all calibration points, with a maximum error of +75 psig or +2.5% compared to the desired value

There were two events associated with indicator PI-607E-2, and in each case the instrument error exceeded acceptable limits. RNP TS Bases and RNP procedure OST-918 both indicate that only one of PI-607E-1 or PI-607E-2 are required. RNP concluded that extension of the calibration interval is justified because the out of tolerance conditions were limited to PI-607E-2, and that PI-607E-1 was found within tolerance at that time. Furthermore, since the out of tolerance conditions were separated by two calibrations that found the instrument was within acceptable limits, the instrument drift did not exceed acceptable limits except on rare occasions. A total of seven calibrations were considered in the review, represented by the seven work orders listed for SR 3.3.4.3 Item 2.a in the LAR.

Fleet procedure AD-EG-ALL-1107, Quality Classifications, provides the criteria, instructions and evaluation process for performing quality classifications of Systems, Structures, and Components (SSCs) at RNP. SSCs may be classified as Safety Related, Augmented Quality, or Non-Safety Related. Remote shutdown capability outside the control room is non-safety related. Remote shutdown indicators PI-607E-1 and PI-607E-2 do not perform any safety functions and are classified as Augmented Quality based on their support of remote shutdown.

GL 91-04, Enclosure 2, has been applied to remote shutdown indicators PI-607E-1 and PI-607E-2. The discussion provided in the LAR Attachment 6 summarizes application of GL 91-04, Enclosure 2, Item 1, to the surveillance and maintenance history for these remote shutdown indicators. GL 91-04, Enclosure 2, Item 3 applies to instruments that perform a safety function. Since these remote shutdown indicators are classified as Augmented Quality and perform no safety function, GL 91-04, Enclosure 2, Item 3 has not been applied to PI-607E-1 and PI-607E-2. The justification for the extension of the calibration interval is based on GL 91-04, Enclosure 2. Review of as found calibration data for remote shutdown indicators PI-607E-1 and PI-607E-2 found that instrument drift has not exceeded acceptable limits except on rare occasions.

EICB-15:

SR 3.3.4.3 Item 3.d - SG [Steam Generators] Pressure

This section discusses three pressure indicator/controllers (PICs) associated with SR 3.3.4.3 Item 3.d. The last sentence in the first paragraph talks about "steam line pressure pointers." This seems to be typographical error. Please correct it as appropriate, or explain what is meant by pressure pointers.

The second and third paragraphs describe the failure(s) in 2005 of the PICs. These paragraphs are unclear as they can be read that there were three PIC failures based on the work order notes or there was one PIC failure based on the calibration data sheets. Clarify the actual failure(s) and explain how the failure(s) in 2005 meet(s) the guidance of rare occurrence? Also provide the calibration span of PIC-477.

EICB-15 Response:

The terminology of “pressure pointer” is used in the technical manual and the procedure, and was carried forward into the evaluation of equipment performance. The Remote Shutdown Steam Generators (SG) Pressure instruments are tag numbers PIC-477, PIC-487, and PIC-497. These instruments are Taylor Instruments Model 442R pressure indicating controller. The PICs are single duty pneumatic instruments which measure, indicate, and control process variables. The instruments are equipped with a pressure measuring element that drives the pressure pointer via mechanical linkages. The instruments are also equipped with a pneumatic controller which controls the process variable based on the difference between the pressure pointer and the setpoint pointer.

In terms of Remote Shutdown, the pressure pointer provides the local indication of steam generator pressure.

RNP Procedure PIC-840, S/G PORV Steam Line Pressure Input, calibrates these instruments. The calibrated spans of PIC-477, PIC-487, and PIC-497 are 0-1500 psig. The procedure provides the instructions for calibration of both the setpoint pointer and the pressure pointer, as well as controller response checks. The setpoint pointer and controller are not part of the remote shutdown indication. The AS FOUND tolerance of +/-2% from the calibration procedure was used to determine whether the instrument drift exceeded acceptable limits.

In 2005, the remote shutdown pressure instruments were calibrated per PIC-840 (reference WO 00534580). The work order includes a database field for the instrument technician to report the as found condition of the affected equipment. This field is entered into the equipment history for trending. This field indicates that PIC-477, PIC-487, and PIC-497 were all found out of tolerance and calibrated satisfactory. Review of the calibration data sheets reveals the following:

- PIC-477 pressure pointer AS FOUND was outside allowable tolerance of +/-2% at one of the 75% data points, with a maximum error of +2.33%; the instrument was adjusted to within the AS LEFT allowable tolerance.
- PIC-487 pressure pointer AS FOUND was within the allowable tolerance, however at the 100% data point the as found error of -1% was at the limit of the AS LEFT allowable tolerance and as such the instrument was adjusted to reduce error. The database field was conservatively reported as found out-of-tolerance to represent that the instrument was adjusted. However, the maximum as found error was -1% and as such the instrument drift did not exceed acceptable limits.
- PIC-497 pressure pointer AS FOUND was outside allowable tolerance at 0%, reading below scale; the AS FOUND allowable tolerance at 0% is +2%/-0%, which does not allow for the pointer to read below 0 psig. The instrument was adjusted to within the AS LEFT allowable tolerance.

Based on the information from the calibration records, PIC-487 was found within tolerance and as such was not found outside acceptable limits. PIC-477 and PIC-497 were found outside acceptable limits and adjusted to within the AS LEFT allowable tolerance. The subsequent calibration and all other calibrations in the review period found the instruments within the AS FOUND tolerance. Since the instruments did not experience consecutive out of tolerance events and no other out of tolerance events for the review period, the AS FOUND out-of-tolerance in 2005 for PIC-477 and PIC-497 represents a rare occasion and meets the criteria from GL 91-04 Enclosure 2 for extension of the calibration interval.

EICB-16:

SR 3.3.4.3 Item 3.e - SG Level. Wide Range

The LAR indicates that a work order was completed in 2015 for calibration of indication components but calibration data was not provided. The licensee then states that the calibrations meet acceptable limits.

The licensee is requested to explain how a satisfactory completion conclusion was determined without documentation. Please explain the rationale for the determination. The rationale should include positive data and/or information.

EICB-16 Response:

The Remote Shutdown Instruments Steam Generator Level (Wide Range) are LI-607A-1, LI-607A-2, LI-607B-1, LI-607B-2, LI-607C-1 and LI-607C-2. These indicators are located at the charging pump room remote shutdown panel, and at the secondary remote shutdown panel. RNP Technical Specifications Bases Table B 3.3.4-1 indicates the required number of functions is 1 per steam generator. RNP Procedure OST-918, Dedicated Shutdown Equipment and Instrumentation Check (Monthly), indicates that either of the remote shutdown level instruments on each steam generator (LI-607A-1 OR LI-607A-2; and LI-607B-1 OR LI-607B-2; and LI-607C-1 OR LI-607C-2) may be used to satisfy RNP Technical Specifications LCO 3.3.4.

Completed calibration work orders typically contain the completed calibration data sheets and a code indicating the condition of components calibrated. Work Order (WO) 02285900 does not include calibration data sheets for Remote Shutdown Instruments LI-607A-1, LI-607B-1, and LI-607C-1; however the completed work order is coded to indicate the completion was satisfactory and no recalibration or maintenance was required.

RNP Procedure OST-918 is performed on a monthly basis. This procedure performs the CHANNEL CHECK of this function per TS SR 3.3.4.1. At prevailing plant conditions, the subject level instruments are compared to instruments in the control room and a criteria applied to determine whether the indication is acceptable. For the Steam Generator Level (Wide Range) function, the Remote Shutdown instrument must agree with the control room instrument within +/-5%. The completed OST-918 procedures immediately before and after the calibration were reviewed. The subject level instruments were all found to be consistent with the control room instruments, with the largest error being +1.3%. While this check is only at a single point, the result does not refute the action taken category code recorded in the work order representing that the instruments were found within tolerance and no adjustments were made.

The data sheets for the previous calibration (reference WO 02009963) and the subsequent calibration (reference WO 13495832) indicate that the instruments were found within the allowable tolerance range and no adjustments were made. In the unlikely event that the instruments were actually out of tolerance at the calibration for which there are no data sheets (WO 02285900), the adjacent calibrations found the instruments within allowable tolerance and instrument drift could not have exceeded acceptable limits on two consecutive calibrations.

The calibration data review to support the LAR included 7 calibration cycles for each indicator, for a total of 21 calibration data sheets. There were no instances where LI-607A-1, LI-607B-1, or LI-607C-1 were out of tolerance. For these indicators, no events were found where the instrument drift exceeded acceptable limits.

EICB-17:

Table 3.3.1-1, Function 16: Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)
SR 3.3.1.14 Perform TADOT. Note: Verification of setpoint is not required.

Table 3.3.2-1, Function 1.b: Safety Injection – Automatic Actuation Logic and Actuation Relays
Table 3.3.2-1, Function 3.a.2: Containment Isolation - Phase A Isolation - Automatic Actuation Logic and Actuation Relays

Table 3.3.2-1, Function 5.a: Feedwater Isolation - Automatic Actuation Logic and Actuation Relays
SR 3.3.2.3 Perform MASTER RELAY TEST.
SR 3.3.2.5 Perform SLAVE RELAY TEST.

Table 3.3.2-1, Function 2.b: Containment Spray – Automatic Actuation Logic and Actuation Relays
Table 3.3.2-1, Function 3.b.2: Containment Isolation - Phase B Isolation - Automatic Actuation Logic and Actuation Relays
Table 3.3.2-1, Function 4.b: Steam Line Isolation - Automatic Actuation Logic and Actuation Relays
SR 3.3.2.3 Perform MASTER RELAY TEST.
SR 3.3.2.5 Perform SLAVE RELAY TEST.

Table 3.3.2-1, Function 1.a: Safety Injection – Manual Initiation
Table 3.3.2-1, Function 3.a.1: Containment Isolation – Phase A Isolation - Manual Initiation
SR 3.3.2.6 Perform TADOT. Note: Verification of setpoint is not required.

TS 3.3.3 Post Accident Monitoring (PAM) Instrumentation

Table 3.3.3-1, Function 9: Containment Isolation Valve Position
SR 3.3.3.3 Perform TADOT. Note: Verification of setpoint is not required.

In LAR Attachment 8, the licensee provides an evaluation that is applicable to a large number of SRs, several of which are listed above. These SRs were the subject of "General RAI-1" issued by the NRC staff on August 31, 2017 and responded to the licensee on September 28, 2017 (ADAMS Accession Nos. ML17248A018 and ML17272A015, respectively).

In its evaluation of the SRs in LAR Attachment 8, the licensee identified three unique failures, two of which were related to failure of K-6 relays in battery chargers. These two failures were resolved by replacing the battery chargers A-1 and B-1 in 2013. However, the LAR does not state whether or not K-6 relays are used in the replacement battery chargers. Confirm the absence of K-6 relays in the replacement battery chargers. If the relays are used in the new battery chargers, explain why failure of a K-6 relay will not result in failures similar to those previously experienced.

EICB-17 Response:

The replacement battery chargers installed in 2012 do not have the K6 relay. The original chargers were Ametek Model 3S-130B-3000 and were replaced per Master EC 277389 (REPLACE EXISTING A-1 AND B-1 BATTERY CHARGERS) with Ametek Model 85-CC3000-146 chargers which do not utilize the K6 relay. Battery Charger A-1 was replaced by WO 1747165 and Battery Charger B-1 was replaced by WO 1747166. EC 277389, Contents Section states, "Replacement of Battery Chargers A-1 and B-1 removes the existing K6 relay from service… Removal of the K6 relay eliminates the failure mechanism experienced in the past." A search of EDB shows no relay failures of this type since the new chargers were installed (2013).

EICB-18:

Bases Table B 3.3.4-1, Function 3.c: Decay Heat Removal via Steam Generators (SGs) - Motor Driven AFW Pump Controls
Bases Table B 3.3.4-1, Function 5.a: Support Functions - Component Cooling Water Pump Controls
Bases Table B 3.3.4-1, Function 5.b: Support Functions - Service Water Pump Controls
SR 3.3.4.2 Verify each required control circuit and transfer switch is capable of performing the intended function.

In LAR Attachment 8, the licensee identifies five failures in the surveillance history for these functions and the SR. Of the five failures one failure was event driven. The licensee states that the event driven failure was addressed by replacement of relay 24-1-DBS prior to the refueling outage and by subsequently fixing the incorrect wiring of the relay. Therefore, this failure will have no impact on an extension to a 24 month surveillance interval. The licensee states that the other four (4) failures would not have impacted the safety function. Please describe the type of failures and the reason why they would not have impacted the safety function.

EICB-18 Response:

The four (4) other failures (aside from the event driven failure) related to SR 3.3.4.2 Functions 3.c, 5.a, and 5.b due to failures of OST-906 (EMERGENCY CONTROL STATION TEST SECTION 8.1) were categorized as failures in which there was no impact on the ability of the component and/or system to perform its specific design/safety function. These were called Category "A" failures as reviewed in EC 407942 (24 MONTH FUEL CYCLE NON-CALIBRATION SURVEILLANCE FAILURE ANALYSIS REVIEW) and the identified failure(s) would not have prevented the performance of the required safety function of the equipment. Therefore, the failures would have no impact on an extension to a 24-month surveillance interval. The four occurrences are explained below:

1. 5/10/2007 – During performance of OST-906, DS Bus UV relay would not reset. This was the result of a seal in circuit which was not modified per plant drawings to prevent the issue from occurring. The protective function was not affected by the inability to reset the alarm and was documented in the Corrective Action Program. A method to reset the relay utilizing the relay knife switch was employed until the relay was modified to remove the seal in circuit. (Reference WO 11057077, WO 772530, NCR 409408, Drawing HBR2-07707)

2. 10/31/2008 – APP-036-J6 (Annunciator for Shutdown Equipment in Local Control) had intermittent response. This affected the Annunciator circuit only and not the operation of the tested equipment as detailed in the description for WR 10356602.

3. 3/12/2012 – HVS-6 (EDG ROOM "A" SUPPLY FAN) failed to start locally at the supply breaker switch. The fan had been started successfully during several diesel surveillance tests including OST-163 (SAFETY INJECTION TEST AND EMERGENCY DIESEL GENERATOR AUTO START ON LOSS OF POWER AND SAFETY INJECTION (REFUELING)), OP-604 (DIESEL GENERATORS "A" AND "B"), and OST-409-2 (EDG 'B' FAST SPEED START) with a rapid restart. WO 12055593 found that a wire on the local switch had come off. Wire was re-landed and the applicable portion of OST-906 was re-performed. AR 00523274 concluded that the EDG system remained operable as all automatic function surveillances were satisfactory.

4. 11/1/2013 – HVE-18 (EDG ROOM “A” EXHAUST FAN) did not start with local/remote switch in Fast position (locally from the key-switch at breaker). WO 1331001601 found that a jumper lead between terminals on the switch had come off. Lead was re-landed and the applicable portion of OST-906 was re-performed. AR 00639146 concluded that the as-found condition of the HVE-18 local key-switch did not impact the system’s ability to perform its safety related function. Cooling for the EDG Rooms is a long term concern per DSP-004-BD and therefore will not affect the safety function.

EICB-19:

By letter dated September 16, 2016 (ADAMS Accession No. ML16260A246), the licensee submitted its original request to revise certain TS SRs to support a 24-month fuel cycle. By letter dated November 10, 2016 (ADAMS Accession No. ML16315A242), the licensee requested to withdraw the application from NRC review. By letter dated November 21, 2016 (ADAMS Accession No. ML16295A060), the NRC staff acknowledged the request to withdraw the application and identified three topics to be addressed should the licensee resubmit the application. The third request involved the submittal of a representative instrument calculation to support the NRC staff review identified in Branch Technical Position (BTP) 7-12, Revision 6, "Guidance on Establishing and Maintaining Instrument Setpoints" of the Standard Review Plan of "NUREG-0800 "Review of Safety Analysis Reports for Nuclear Power Plants," dated August 2016 (ADAMS Accession No. ML16019A200). BTP 7-12 describes that the setpoint analysis methodology and assumptions should be reviewed by the NRC staff to confirm that an acceptable analysis method is used and that the analysis parameters and assumptions are consistent with the safety analysis, system design basis, technical specifications, plant design, and expected maintenance practices. The NRC staff requires this information as a basis to confirm with reasonable assurance that the TS setpoints, as a result of the SR changing from 18 to 24 months, continue to meet the guidance of RG 1.105 and are in compliance with 10 CFR 50.36(c). The NRC staff stated that as an alternate, a summary of the calculation, which documents the methodology, key assumptions, instrumentation data, and results in the calculation package, may be acceptable if the full calculation is available for subsequent audit.

In response to the above the request, the licensee on April 3, 2017 submitted (ADAMS Accession No. ML17093A796) a representative calculation. The NRC staff has reviewed the calculation and determined that it does not fully document the setpoint methodology but references Robinson procedure EGR-NGGC-0153, “Engineering Instrument Setpoints,” Revision 12. Since the setpoint methodology was not provided, the NRC staff is unable to determine compliance to GL 91-04, Step 4 with regard to ISA- A67-04, "Setpoints for Nuclear Safety-Related Instrumentation Used in Nuclear Power Plants," and RG 1.105. Please submit the setpoint methodology used to evaluate setpoints associated with the proposed 24-month fuel cycle.

EICB-19 Response:

Duke Energy procedure EGR-NGGC-0153 “Engineering Setpoint Methodology” is the procedure used by the legacy Progress Energy plants of the Duke Energy Nuclear Fleet to develop and maintain setpoint and uncertainty calculations. The latest revision level of that procedure is revision 012.

Procedure EGR-NGGC-0153, Revision 12 was provided separately.