AmerenUE
Callaway Plant

PO Box 620
Fulton, MO 65251

May 26, 2005

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

ULNRC-05145

Ladies and Gentlemen:

**DOCKET NUMBER 50-483**
**UNION ELECTRIC COMPANY**
**CALLAWAY PLANT**
**TECHNICAL SPECIFICATION REVISIONS ASSOCIATED WITH THE**
**STEAM GENERATOR REPLACEMENT PROJECT**

References: 1. ULNRC-05056 dated September 17, 2004
2. NRC Request for Additional Information Letter dated May 4, 2005 (TAC No. MC4437)

In Reference 1 above, AmerenUE transmitted an application for amendment to Facility Operating License Number NPF-30 for the Callaway Plant. In Reference 2, NRC requested additional information to support their review of the amendment application. The Enclosures and Attachment 1 to this letter provide the responses to the first six (6) of those questions which deal with instrumentation and control issues. The remainder of the questions in Reference 2 will be addressed in separate correspondence prior to June 10, 2005.

Westinghouse Electric Company LLC has determined that Attachment 1 hereto is proprietary and is supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR 2.390. Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR 2.390.

Correspondence with respect to the copyright or proprietary aspects of Attachment 1 or the supporting Westinghouse affidavit should reference CAW-05-1998 and be addressed to J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company, LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

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Enclosure 1 contains the responses to questions 1 through 6 of Reference 2. Attachment 1 contains the proprietary and non-proprietary versions of the setpoint methodology related portion of the response to questions 1 and 2 of Reference 2. Enclosure 2 contains drawings requested in question 3 of Reference 2 related to the Trip Time Delay circuitry elimination. Enclosure 3 contains changes to TS Tables 3.3.2-1 and 3.3.2-1 and associated TS Bases that are required to reflect the responses to question 1 and 2. None of the Enclosure 3 changes impact the findings of the evaluations contained in Attachment 1 of Reference 1.

Enclosure 4 contains the Westinghouse application for withholding, including authorization letter CAW-05-1998 with accompanying affidavit, Proprietary Information Notice, and Copyright Notice.

If you have any further questions on this amendment application, please contact us.

Very truly yours,

Keith D. Young

Keith D. Young
Manager-Regulatory Affairs

Enclosures:
1) Response to Request for Additional Information
2) TTD Elimination Drawings
3) TS and Bases Changes
4) Westinghouse Application for Withholding

Attachment 1: Setpoint Methodology Portion of the Response to Request for Additional Information, Questions 1 and 2 (Proprietary and Non-Proprietary Versions) cc:

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CATHY J. CRISP
MY COMM. EXP.
NOTARY
SEAL
NOTARY
PUBLIC
JAN. 29, 2006
STATE OF MISSOURI

Cathy J. Crisp
Notary Public
State of Missouri
Expiration 1-29-06

STATE OF MISSOURI )
)SS
COUNTY OF CALLAWAY )

Keith D. Young, of lawful age, being first duly sworn upon oath says that he is Manager, Regulatory Affairs, for Union Electric Company; that he has read the foregoing document and knows the content thereof; that he has executed the same for and on behalf of said company with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By Keith D. Young
Keith D. Young
Manager, Regulatory Affairs

SUBSCRIBED and sworn to before me this 26th day of May, 2005.

ENCLOSURE 1

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REQUEST FOR ADDITIONAL INFORMATION

RELATED TO THE CALLAWAY STEAM GENERATOR REPLACEMENT

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

By letter dated September 17, 2004, Union Electric Company (the licensee) requested NRC approval for changes to the Technical Specifications (TSs) for the Callaway Plant, Unit 1 (Callaway) to support the installation of the replacement steam generators (RSGs) in the Fall of 2005 in Refueling Outage 14. Based on its review of the licensee's application dated September 17, 2004, in the areas of instrumentation and controls, and reactor systems, the NRC staff requests the following additional information.

Instrumentation and Controls Review:

1. Provide the setpoint calculation documentation for the following protection functions which have allowable values (AVs) being revised in this license amendment request:

   (1) Steam Generator Water Level Low-Low (TS Table 3.3.1-1 Functions 14.a and 14.b, and TS Table 3.3.2-1 Function 5.e.(1), 5.e.(2), 6.d.(1) and 6.d.(2))

   (2) Steam Line Pressure Low (TS Table 3.3.2-1 Functions 1.e and 4.e.(1))

   (3) Steam Generator Water Level High-High (TS Table 3.3.2-1 Function 5.c)

Response to question 1:

The methodology for calculation of the uncertainties is a Square Root Sum of the Squares (SRSS) approach which is an acceptable approach per ANSI / ISA 67.04.01-2000, and is described in Attachment 1. Also contained in Attachment 1 are tables which provide the SRSS equation, the value for each uncertainty term and the calculation results for the safety related setpoints that are changing for the RSG program. Note that the Results Summary Section 3.0 of Attachment 1 identifies a round-off error in the Allowable Value for ESFAS Trip Function 1.e, Safety Injection on Steam Line Pressure - Low, and ESFAS Trip Function 4.e.(1), Steam Line Isolation on Steam Line Pressure - Low. The Allowable Value proposed in ULNRC-05056 was ≥ 609 psig. The Allowable Value for both Trip Functions should be ≥ 610 psig.

2. The TSs define Limiting Safety System Settings (LSSS) as an allowable value (AV). During reviews of proposed license amendments that contain changes to LSSS setpoints, the NRC staff identified concerns regarding the method used by some licensees to determine the AVs. AVs are identified in the TSs as LSSS to provide acceptance criteria for determination of instrument channel operability during periodic surveillance testing. The NRC staff's concern relates to one of the three methods for determining the AV as described in the Instrument Society of America (ISA) recommended practice ISA-RP67.04-1994, Part II, "Methodologies for Determination of Setpoints for Nuclear Safety-Related Instrumentation."

   The NRC staff has determined that to ensure a plant will operate in accordance with the assumptions upon which the plant safety analyses have been based, additional information is required regardless of the methodology used to establish LSSS values in technical specifications. Details about the NRC staff's concerns are available on the NRC's public website under ADAMS Accession Numbers ML041690604, ML041810346, and ML050670025.

   In order for the NRC staff to assess the acceptability of your license amendment request related to this issue, the NRC staff requests the following additional information:

   a. Describe the setpoint methodology used to establish AVs associated with LSSS setpoints.

   b. In discussing the methodology used, address the following questions regarding the use of the methodology:

      (1) Discuss how the methodology and controls you have in place ensure that the analytical limit (AL) associated with an LSSS will not be exceeded (the AL is a surrogate that ensures the safety limits will not be exceeded). Include in your discussion information on the controls you employ to ensure the trip setpoint established after completing periodic surveillances satisfies your methodology. If the controls are located in a document other than the TS, discuss how those controls satisfy the requirements of 10 CFR 50.36.

      (2) Discuss how the TS surveillances ensure the operability of the instrument channel. This should include a discussion on how the surveillance test results relate to the technical specification AV and describe how these are used to determine the operability of the instrument channel. If the requirements for determining operability of the LSSS instrument being

tested are in a document other than the TS (e.g., plant test procedure), discuss how this meets the requirements of 10 CFR 50.36.

c. In discussing the methodology, the following explicit regulatory commitments and proposed TS changes are needed for the NRC staff to complete its review of the methodology:

(1) Commitment is provided to adopt the final Technical Specification Task Force (TSTF) Technical Specification change adopted by NRC for plant TSs to come into conformance with the existing understanding of the requirements of 10 CFR 50.36.

(2) Commitment to assess the operability of tested instrumentation based on the previous as-left instrument setting and accounting for the uncertainties associated with the test or calibration.

(3) A revision to the TSs for the LSSS being changed by the license amendment request to incorporate a footnote that states: "The as-left instrument setting shall be returned to a setting within the tolerance band of the trip setpoint established to protect the safety limit."

Response to question 2:

<u>Setpoint Methodology for RTS and ESFAS Trip Functions Affected by RSG</u>

The methodology to determine the Allowable Values for the Callaway RSG submittal is not based on any of the methods as described in the ISA recommended practice document (ISA-RP67.04-1994, Part II or ISA-RP67.04.02-2000). The Westinghouse method used for the Callaway RSG program determines a performance-based Allowable Value. As noted in Attachment 1 to this letter, the Allowable Value is satisfied by verification that the channel "as left" condition about the nominal trip setpoint is within the Rack Calibration Accuracy. The methodology for the uncertainty calculations and the Allowable Values used for the Callaway RSG program was previously reviewed by the staff via Westinghouse WCAPs for Millstone Unit 3, Beaver Valley Units 1 and 2, and recently for the Seabrook Station Power Uprate (SPU) program. The WCAP reference for Millstone Unit 3 is WCAP-10991 Rev. 5, "Westinghouse Setpoint Methodology for Protection Systems, Millstone Nuclear Power Station Unit 3, 24 Month Fuel Cycle Evaluation," dated August 1997. Upon conclusion of this review the staff issued Amendment 159 to the facility operation license NPF-49 via a May 26,1998 letter titled, "ISSUANCE OF AMENDMENT - MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3 (TAC NO. M99796)". The WCAP for Beaver Valley Unit 1 is WCAP-11419 Rev. 2, "Westinghouse Setpoint Methodology for Protection Systems Beaver Valley Power Station - Unit 1" dated December 2000, and the WCAP for Beaver Valley Unit 2 is WCAP-11366 Rev. 4, "Westinghouse Setpoint Methodology for Protection Systems Beaver Valley Power Station - Unit 2" dated December 2000. Upon conclusion of this review the staff issued Amendment 239 to facility license DRP-66 and Amendment 120 to facility license NPF-73 via a July 30, 2001 letter titled, "BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 - REVISED IMPLEMENTATION PERIOD FOR LICENSE AMENDMENT NOS. 239 AND 120, (TAC NOS. MB0848 AND MB0849)." No specific WCAP was issued for the Seabrook SPU, instead a separate NRC request for additional information was prepared. Upon conclusion of the review, the NRC staff issued Amendment No. 101 to facility license NPF-86 via a February 28, 2005 letter titled "SEABROOK STATION, UNIT NO. 1 - ISSUANCE OF AMENDMENT RE: 5.2 PERCENT POWER UPRATE (TAC NO. MC2364)." The methodology used in the above WCAPs and the Seabrook SPU is the same methodology used for the Callaway RSG program.

The criterion for the performance-based Allowable Value is controlled by both plant procedures and the Technical Specifications. In the Callaway Plant Technical Specifications, Sections 3.3.1 and 3.3.2, the requirement is to verify that the instrumentation is OPERABLE. This verification is performed every 184 days by performance of the CHANNEL OPERABILITY TEST (COT) confirming that the channel meets the stated Allowable Value. Because the Allowable Values for the RSG program are based on the Rack Calibration Accuracy, it then follows that the as-found condition of the channel must be within the calibration accuracy to be considered OPERABLE. As noted in Section 2 of Attachment 1 to this letter, the setpoint methodology assumes that the channel is always returned to within the Rack Calibration Accuracy. Since the Allowable Value is based on the Rack Calibration Accuracy, this assumption must be met in order for the channel to be considered OPERABLE.

The RSG setpoint methodology is also discussed in ULNRC-05056 Attachment 1, page 41, and in Attachment 4, Bases Inserts B 3.3.1.A, B 3.3.1.B, B 3.3.2.A, and B 3.3.2.B.

<u>Surveillance Testing of RTS and ESFAS Trip Functions Affected by RSG</u>

Section 2.0 of Attachment 1 to this letter describes the application of the setpoint methodology to those RTS and ESFAS Trip Functions that are affected by the replacement steam generators. Included in that discussion are requirements that must be met for demonstrating operability during periodic CHANNEL OPERATIONAL TESTS and CHANNEL CALIBRATIONS. Procedural requirements that are currently in place require that as-left trip setpoints be within a two-sided calibration tolerance band on either side of the Nominal Trip Setpoint. Both the calibration tolerance band and the Nominal Trip Setpoint are established based on the setpoint methodology to assure that the safety analysis limit is protected.

In order to address the 10 CFR 50.36 aspects of this question, the following footnote will be added to those Trip Functions in TS Tables 3.3.1-1 and 3.3.2-1 that have Allowable Value revisions included in this amendment application (i.e., Trip Functions 14.a and 14.b in TS Table 3.3.1-1; Trip Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) in TS Table 3.3.2-1):

> "If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit."

AmerenUE will trend as-found and as-left setpoint data obtained during CHANNEL OPERATIONAL TESTS (COTs) for these specific Trip Functions to demonstrate that the rack drift assumptions used in the plant setpoint methodology are valid. If the trending evaluation determines that a channel is performing inconsistent with the uncertainty allowances applicable to the periodic surveillance test being performed (e.g., whether it be a COT, CHANNEL CALIBRATION, etc.), the channel will be evaluated under the corrective action program. If the channel is not capable of performing its specified safety function, it shall be declared inoperable.

AmerenUE will also adopt the appropriate provisions of the industry traveler to be developed by the Setpoint Methodology Task Force; however, the information provided above and the changes included in Enclosure 3 to this letter should provide an adequate basis for NRC to approve this amendment application without conditioning the license to include a commitment to adopt a traveler that has yet to be initiated.

3. In Attachment 1 to the application, Page 7 of 51, Section 3.2, "TTD Elimination," states that upon NRC approval of the amendment request, the 7300 Process Protection System will be modified to eliminate the trip time delay (TTD) circuitry. Provide detailed justification and related protection system logic changes including any markup drawings for the proposed changes. Is there any precedent for these changes?

Response to question 3:

The trip time delay (TTD) circuitry was added to the original design under an NRC-approved modification which was installed during the spring outage of 1989. The trip time delay was installed to provide a short time delay before a reactor trip signal was generated by low-low steam generator level. This time delay gave the reactor operator time to manually regain control of steam generator levels thereby avoiding a reactor trip.

The new steam generator design is much less susceptible to level fluctuations and, therefore, the trip time delay is no longer required.

Justification for the TTD elimination is presented in Sections 3.2 (pages 7 and 8 of 51) and 4.2 (pages 20 and 21 of 51) of Attachment 1 to ULNRC-05056. Deleting the TTD circuitry will result in less design complexity and less required surveillance testing. Parts obsolescence concerns with these 7300 Process Protection System cards will be reduced by eliminating this circuitry from the design. Reduced surveillance testing will result in substantial man-hour savings since we will no longer have to verify 32 PROM logic card time delays (16 channels x 2 power level - dependent time delays) at least every 6 months during channel COTs.

As for precedence, Callaway was licensed and operated from 1984 until the implementation of Amendment 43 dated April 14, 1989 without the TTD circuitry. Our original licensing basis did not include the TTD circuitry. Amendment 43 approved the amendment application submitted via ULNRC-1822 dated August 30, 1988.

Enclosure 2 to this letter includes mark-ups to the simplified circuit diagrams in FSAR Section 7.2. In addition, Enclosure 2 also includes changes to one functional diagram and one process control block diagram that provide additional information regarding the TTD circuitry elimination.

4. Discuss and identify any safety-related instrumentation change for this steam generator replacement.

Response to question 4:

There are no functional changes to any safety-related instrumentation associated with this steam generator replacement other than the independent decision to eliminate the Trip Time Delay (TTD) circuitry discussed under question 3 above. There are, however, changes to the steam generator water level instrumentation and the reactor coolant system flow instrumentation as a result of steam generator replacement.

<u>Steam Generator Water Level Instrumentation</u>

The steam generator water level instrumentation is being modified in three fundamental ways: (1) elimination of all shared impulse tubing; (2) replacement of all associated root valves; and (3) accommodation of new RSG tap locations.

(1) Each steam generator is instrumented with four narrow range water level, one wide range water level and two steam flow measurement devices. Each of the water level instruments have a process leg and reference leg piped up to each steam generator, whereas the steam flow instruments each have a reference leg piped up to the steam generator and a process leg piped up (to the steam outlet piping) downstream of the SG flow restrictor . On the original Westinghouse steam generator, these seven reference legs are shared between four upper taps. The RSG has been designed with a sufficient number of taps to eliminate all shared arrangements. Each of the four safety-related narrow range water level and each wide range water level instruments will have discrete reference legs and process legs. In addition, each of the two steam flow instruments that previously shared a reference leg with a narrow and/or wide range instrument now has its own discrete reference leg. The impetus behind eliminating all shared instrumentation is to prevent instrument interaction when removing and returning an instrument from/to service.

(2) The existing root valves have experienced a higher than average rate of packing leakage and will be replaced by a more reliable design of stainless steel construction. Due to the valve material type change from carbon steel to stainless steel, it was decided to replace all piping and condensate pots associated with the steam generator narrow range, wide range and steam flow instrumentation with stainless steel. All of these design upgrades are intended to improve system integrity and reliability.

(3) Azimuthally, the wide and narrow range instruments taps on the RSG are positioned in the same general vicinity as exists on the Westinghouse steam generator. Vertically, there have been some fundamental changes to the narrow range and wide range SG level taps. Table 1 summarizes these changes.

Table 1 - OSG vs. RSG Tap Location

| **Tap** | **OSG Elevation** | **RSG Elevation** | **Difference** | **OSG Quantity** | **RSG Quantity** |
|---|---|---|---|---|---|
| **Upper Narrow Range, Upper Wide Range, Steam Flow** | **2070'-4"** | **2072'-1"** | **↑ 20.9"** | **4** | **7** |
| **Lower Narrow Range** | **2059'-8¼"** | **2059'-7"** | **↓ 1.3"** | **4** | **4** |
| **Lower Wide Range** | **2023'-9"** | **2024'-3"** | **↑ 6.0"** | **1** | **1** |

Table 2 summarizes the impact of these changes on the narrow range and wide range level instrument spans.

Table 2 - OSG vs. RSG Level Instrument Span

| Instrument | OSG Span | RSG Span | Difference |
|---|---|---|---|
| Narrow Range | ~128" | ~150" | ↑ 22" |
| Wide Range | ~559" | ~574" | ↑ 15" |

The increase in narrow range span provides for more operational margin for accommodating shrink and swell of the secondary side inventory following plant transients.

The resultant change in narrow range and wide range instrument spans requires the procurement of 16 new narrow range and 4 new wide range level transmitters. These new transmitters will be installed in the same locations as the existing transmitters using existing cabling and conduit. The new safety-related transmitters will be the same Barton Model 764 as are currently installed.

RCS Flow Instrumentation

Due to the anticipated increase in Reactor Coolant System flow, spare flow transmitters are being procured that have a slightly wider range in the event that the existing RCS flow transmitters have insufficient range to accommodate the corresponding increase in differential pressure. The new transmitters will be installed in the same locations as the existing transmitters using existing cabling and conduit. The new safety-related transmitters will be the same Barton Model 752 as are currently installed.

5. Describe the locations of the new steam generator level instrument tapes [sic] and their impact to the steam generator level setpoint calculation described in item 1 above.

Response to question 5:

The lower narrow range taps are still located above the downcomer region (the tube bundle shroud / wrapper) of the steam generator and the upper narrow range water level taps are located slightly above the outlet of the primary moisture separators. As noted above in the response to question 4, the location is such that the tap to tap distance for the RSG is slightly larger than the OSG, resulting in a slightly larger instrument span. As part of the uncertainty analysis, the tap locations were considered when determining the necessary Process Measurement Accuracy (PMA) terms for the uncertainty analysis. As noted on the tables in Attachment 1 to this letter, the effect and magnitude of each appropriate PMA term is included. Therefore, the new tap locations for the RSG were considered and accounted for in the uncertainty calculations for the narrow range level protection setpoints.

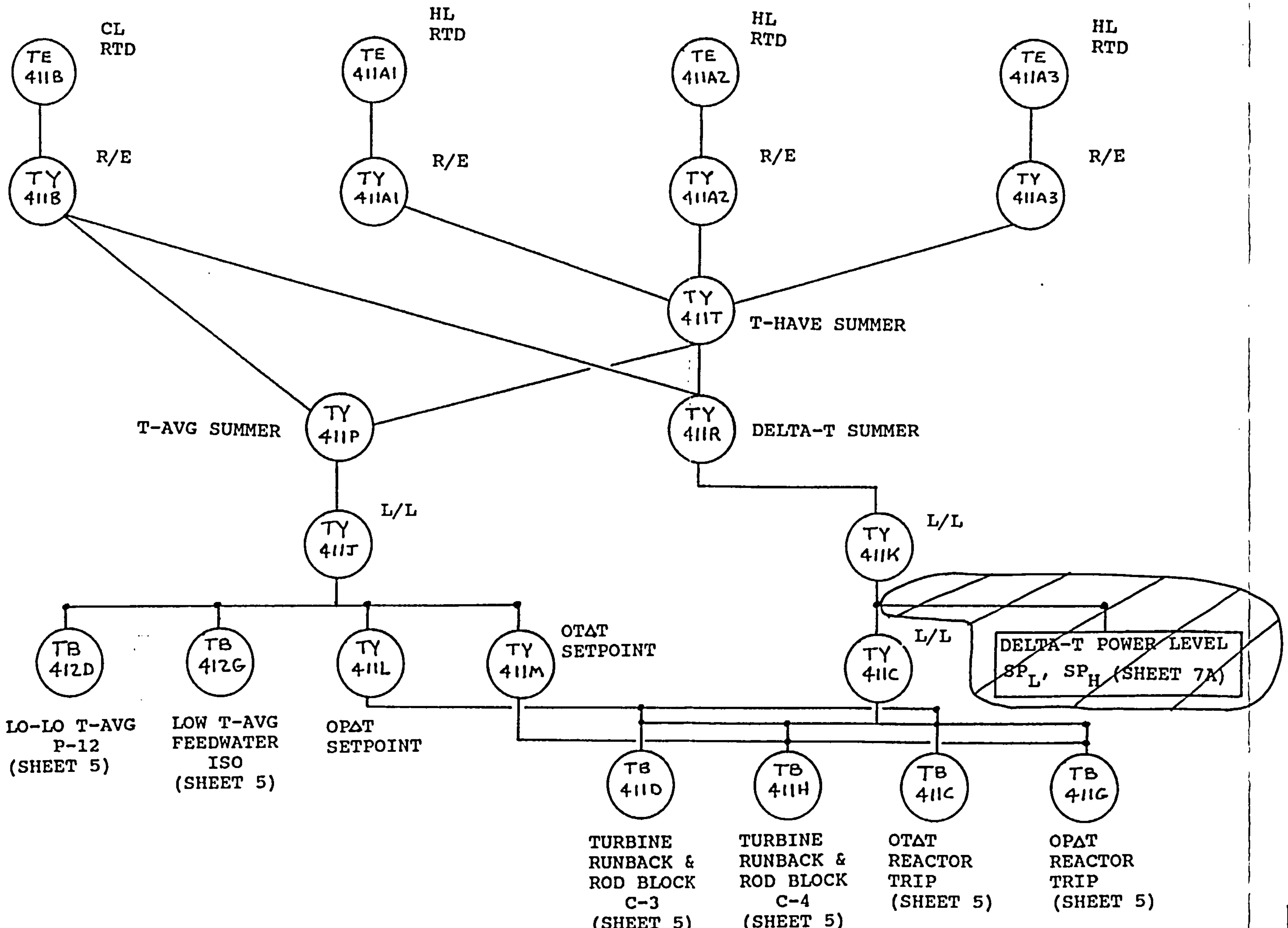
6. Identify any environmental data change (include reference leg data) after the steam generator replacement and discuss the impact on the steam generator level setpoint calculation described in item 1 above.

Response to question 6:

As part of the RSG program, changes in the environmental conditions were determined and included in the uncertainty calculations. It is noted that the RSG program did not affect the expected ambient temperature environment on the reference legs. As part of the uncertainty calculation process, the effect of ambient temperature changes on the reference legs was taken into account for each event analyzed. The temperature effect on the reference leg is analyzed for both normal containment conditions and adverse containment conditions. As noted on the tables in Attachment 1 to this letter, the reference leg error is calculated as a PMA term for the steam generator level high-high function and included as an environmental allowance for the low-low function. Therefore, the environmental data was reviewed for the RSG program and the ambient temperature conditions on the reference legs were accounted for in the uncertainty calculations.

# ENCLOSURE 2

# TTD ELIMINATION DRAWINGS




NOTES:

1. Typical for Loop 1, Protection Set I. Other loops are configured in the same manner, with the second digit in the instrument circuit identification corresponding to the RCS loop.

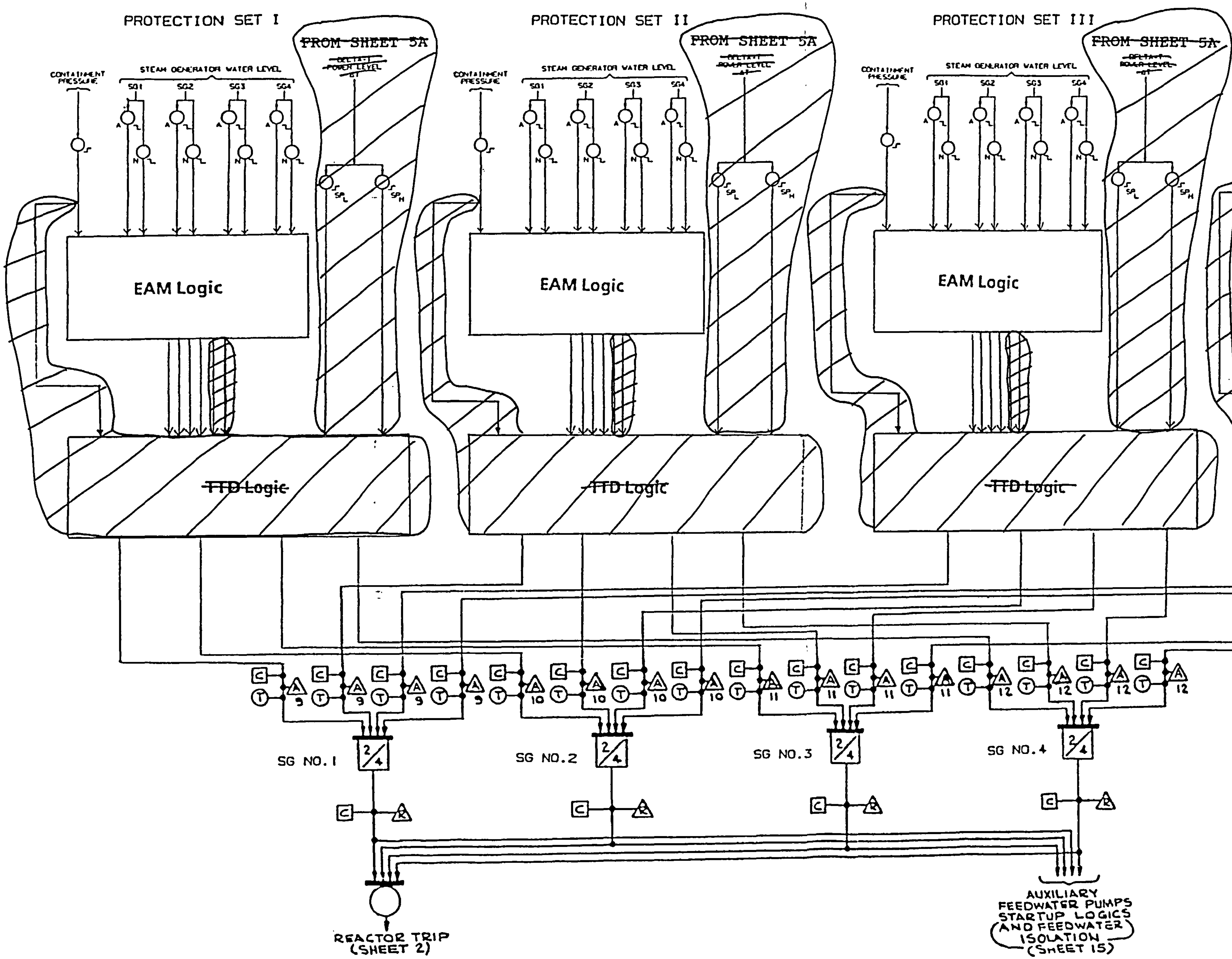
2. For further details of test points, computer inputs, indicators, annunciators, and control circuit interfaces, see drawing 8756D37 sheets 7-10.

REV. OL-5
6/91

CALLAWAY PLANT

FIGURE 7.2-1
FUNCTIONAL DIAGRAMS
(PRIMARY COOLANT SYSTEM
TRIP SIGNALS)

(SHEET 5A)

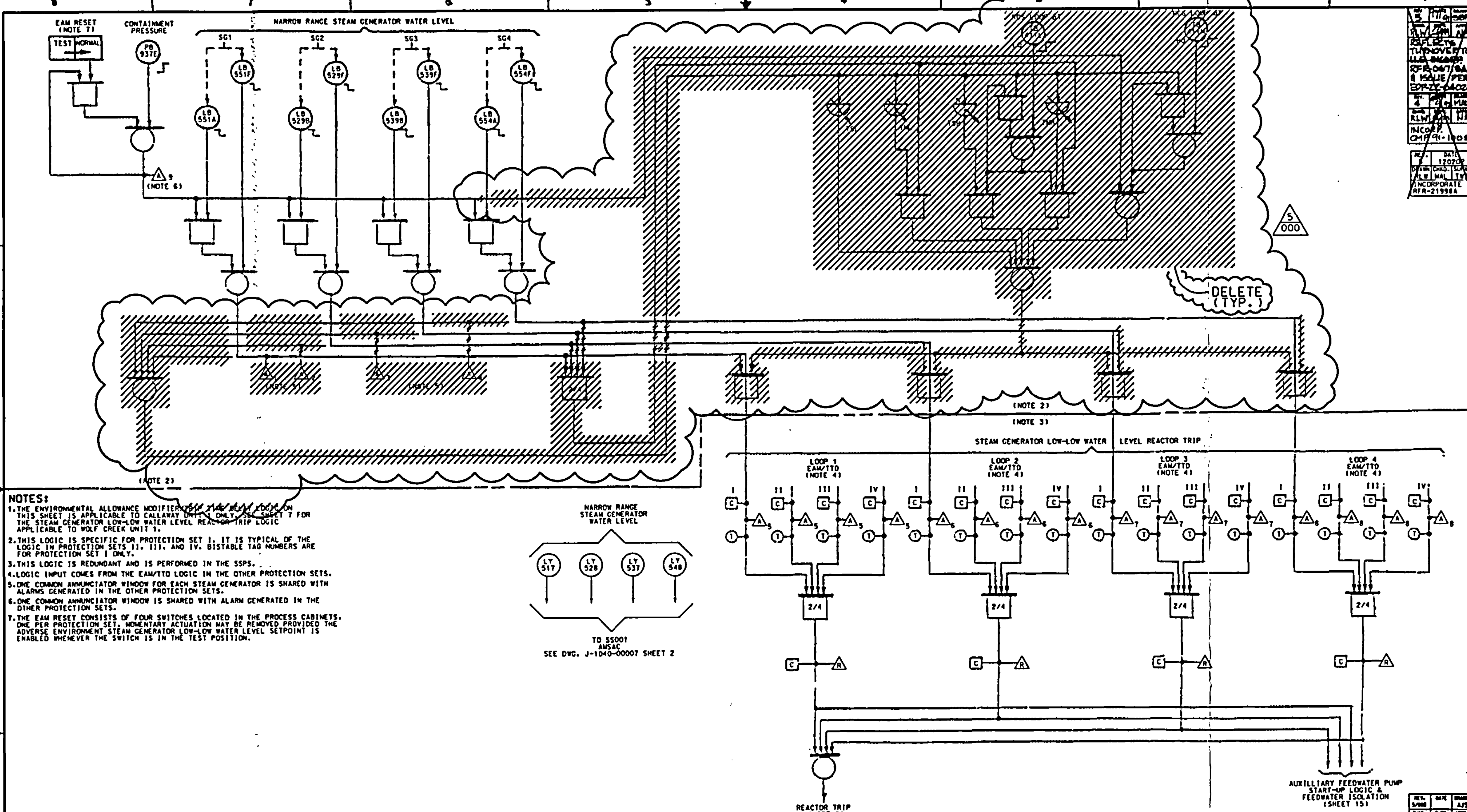



A - Adverse containment environment
N - Normal containment environment
$S_{pl}$ - Low power
$S_{ph}$ - High power

REV. OL-7
5/94

**CALLAWAY PLANT**

FIGURE 7.2-1
FUNCTIONAL DIAGRAMS
(STEAM GENERATOR
TRIP SIGNALS)
(SHEET 7A)




NOTES:

1. THE ENVIRONMENTAL ALLOWANCE MODIFIER/TRIP TIME DELAY LOGIC ON THIS SHEET IS APPLICABLE TO CALLAWAY UNIT 1 ONLY. SEE SHEET 7 FOR THE STEAM GENERATOR LOW-LOW WATER LEVEL REACTOR TRIP LOGIC APPLICABLE TO WOLF CREEK UNIT 1.
2. THIS LOGIC IS SPECIFIC FOR PROTECTION SET I. IT IS TYPICAL OF THE LOGIC IN PROTECTION SETS II, III, AND IV. BISTABLE TAG NUMBERS ARE FOR PROTECTION SET I ONLY.
3. THIS LOGIC IS REDUNDANT AND IS PERFORMED IN THE SSPS.
4. LOGIC INPUT COMES FROM THE EAM/TTD LOGIC IN THE OTHER PROTECTION SETS.
5. ONE COMMON ANNUNCIATOR WINDOW FOR EACH STEAM GENERATOR IS SHARED WITH ALARMS GENERATED IN THE OTHER PROTECTION SETS.
6. ONE COMMON ANNUNCIATOR WINDOW IS SHARED WITH ALARM GENERATED IN THE OTHER PROTECTION SETS.
7. THE EAM RESET CONSISTS OF FOUR SWITCHES LOCATED IN THE PROCESS CABINETS, ONE PER PROTECTION SET. MOMENTARY ACTUATION MAY BE REMOVED PROVIDED THE ADVERSE ENVIRONMENT STEAM GENERATOR LOW-LOW WATER LEVEL SETPOINT IS ENABLED WHENEVER THE SWITCH IS IN THE TEST POSITION.



TOLERANCE & MACHINE NOTES

THIRD ANGLE PROJECTION

| MP No. | DWG. No. | REV. | SEQ. |
|---|---|---|---|
| 04-1004 | 7250D64-S019 | 5 | 000 |

STANDARDIZED NUCLEAR UNIT POWER PLANT SYSTEM PROJECTS
UNIT: SCP S.O.: 300 SPIN: AASFED
STATUS: TURNED OVER TO U.E.

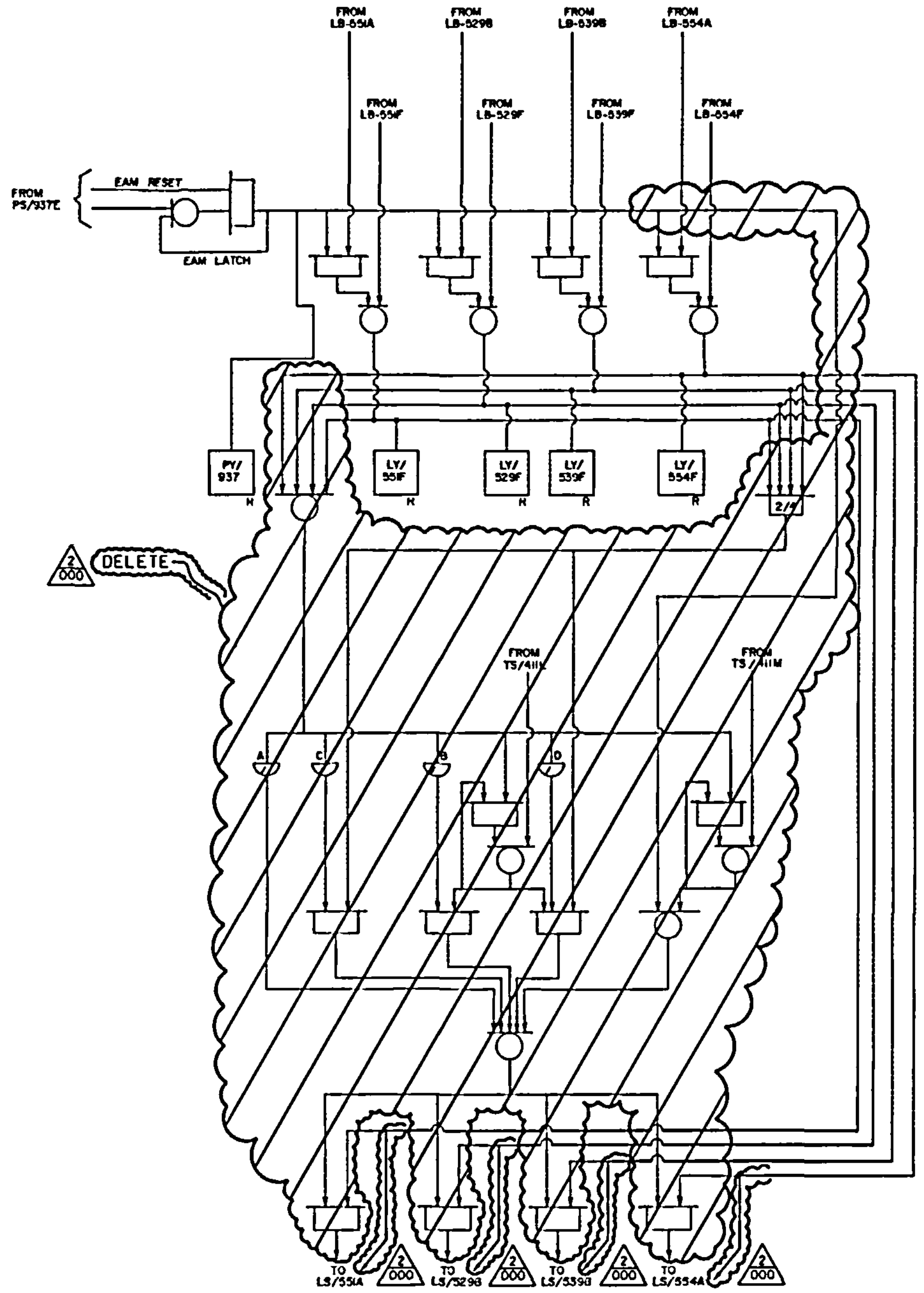
DRAWING NO. ~~7250D64-S019~~ REV. ~~5~~

INITIAL ISSUE PER MOD 04-1004

Westinghouse Electric Corporation
WATER REACTOR DIVISIONS - MONROEVILLE PA. U.S.A.

TITLE SNUPPS PROJECTS
FUNCTIONAL DIAGRAM
ENVIROMENTAL ALLOWANCE MODIFIER
TRIP TIME DELAY LOGIC

SIZE D SCALE NTS DIMENSIONS IN INCHES
DRAWING NUMBER. ~~7250D64-2~~ REV., SHEET ~~SHEET 19~~

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| PROT. I | PROT. II | PROT. III | PROT. IV |
|---|---|---|---|
| LDY-529A | LDY-519A | LDY-518A | LDY-517A |
| LDY-529B | LDY-519B | LDY-518B | LDY-517B |
| | | | |
| | | | |
| TS/411R | TS/421R | TS/431R | TS/441R |
| TS/411L | TS/421L | TS/431L | TS/441L |
| | | | |
| | | | |
| LB-551A | LB-519B | LB-518B | LB-517B |
| LB-551F | LB-519F | LB-518F | LB-517F |
| LB-554F | LB-549F | LB-548F | LB-547F |
| LB-554A | LB-549B | LB-548B | LB-547B |
| LB-529B | LB-552A | LB-528B | LB-527B |
| LB-529F | LB-552F | LB-528F | LB-527F |
| LB-539F | LB-553F | LB-538F | LB-537F |
| LB-539B | LB-553A | LB-538B | LB-537B |
| | | | |
| | | | |
| PS/937E | PS/936E | PS/935E | PS/934E |
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| PY/937 | PY/936 | PY/935 | PY/934 |
| | | | |
| | | | |
| LS/551A | LS/519B | LS/518B | LS/517B |
| LS/554A | LS/549B | LS/548B | LS/547B |
| LS/529B | LS/552A | LS/528B | LS/527B |
| LS/539B | LS/553A | LS/538B | LS/537B |
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| LY/551F | LY/519F | LY/518F | LY/517F |
| LY/529F | LY/552F | LY/528F | LY/527F |
| LY/539F | LY/553F | LY/538F | LY/537F |
| LY/554F | LY/549F | LY/548F | LY/547F |
| | | | |

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NOTES :

1 THIS SHEET APPLICABLE TO CALLAWAY (SCP) ONLY.
2. ALL SIGNAL INPUTS INTO PROM LOGIC AND ALL OUTPUTS TO ANNUNCIATORS ARE AT PROM CARD LDY-529A.
3. PROM OUTPUTS WHICH ARE SG LO-LO 2/4 LOGIC TRIP SIGNALS TO SSPS ARE FROM PROM CARD LDY-529B.

| REV. 2/000 | DATE | DRAWN AJS |
|---|---|---|
| CHKD. WHB | SUPV. | APPD. |
| INITIAL ISSUE MOD 04-1004 | | |

SNUPPS CALLAWAY SCP
STATUS CUSTOMER APPROVED
CERTIFICATION PCR-SCPO-40500, CAP 87-1032, EAI 89-P0200
ITEM - 10 SHOP ORDER 370

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DELETE

WESTINGHOUSE REV —

| MP No. | DWG. No. | REV. | SEQ. |
|---|---|---|---|
| 04-1004 | 8756D37-S043 | 2 | 000 |

EAM TTO PROM INTERFACE
PROTECTION I
(TYPICAL OF II, III & IV)

DRAWN NA
CHKD NA
SUPV NA
APPD NA
LOCATION CALLAWAY PLANT
UNION ELECTRIC COMPANY ST LOUIS, MO
~~8756D37-S043~~ REV ~~2~~

# ENCLOSURE 3

# TECHNICAL SPECIFICATION AND BASES CHANGES

Table 3.3.1-1 (page 3 of 8)
Reactor Trip System Instrumentation

| | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE[a] |
|---|---|---|---|---|---|---|
| 9. | Pressurizer Water Level - High | 1[g] | 3 | M | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10 | ≤ 93.8% of instrument span |
| 10. | Reactor Coolant Flow - Low | 1[g] | 3 per loop | M | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≥ 88.8% ~~(m)~~ of indicated loop flow |
| 11. | Not Used | | | | | |
| 12. | Undervoltage RCPs | 1[g] | 2/bus | M | SR 3.3.1.9<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≥ 10105 Vac |
| 13. | Underfrequency RCPs | 1[g] | 2/bus | M | SR 3.3.1.9<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≥ 57.1 Hz |
| 14. | Steam Generator (SG) Water Level Low-Low[l] | | | | | |
| | a. Steam Generator Water Level Low-Low (Adverse Containment Environment) | 1, 2 | 4 per SG | E | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≥ ~~25.2%~~ 20.6% (q) of Narrow Range Instrument Span |
| | b. Steam Generator Water Level Low-Low (Normal Containment Environment) | 1[p], 2[p] | 4 per SG | E | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.10<br>SR 3.3.1.16 | ≥ ~~40.8%~~ 16.6% (q) of Narrow Range Instrument Span |

(continued)

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(g) Above the P-7 (Low Power Reactor Trips Block) interlock.
(l) The applicable MODES for these channels in Table 3.3.2-1 are more restrictive.
(m) ~~% of loop minimum measured flow (MMF = 95,660 gpm).~~ Not used.
(p) Except when the Containment Pressure – Environmental Allowance Modifier channels in the same protection sets are tripped.
(q) INSERT 1

INSERT 1

If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.

Table 3.3.2-1 (page 1 of 8)
Engineered Safety Feature Actuation System Instrumentation

| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE[(a)] |
|---|---|---|---|---|---|
| 1. Safety Injection | | | | | |
| a. Manual Initiation | 1,2,3,4 | 2 | B | SR 3.3.2.8 | NA |
| b. Automatic Actuation Logic and Actuation Relays (SSPS) | 1,2,3,4 | 2 trains | C | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6<br>SR 3.3.2.13 | NA |
| c. Containment Pressure - High 1 | 1,2,3 | 3 | D | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ 4.5 psig |
| d. Pressurizer Pressure - Low | 1,2,3[(b)] | 4 | D | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ 1834 psig |
| e. Steam Line Pressure - Low | 1,2,3[(b)] | 3 per steam line | D | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ ~~571~~ psig[(c)] (5)<br>~~609~~<br>610 |
| 2. Containment Spray | | | | | |
| a. Manual Initiation | 1,2,3,4 | 2 per train, 2 trains | B | SR 3.3.2.8 | NA |
| b. Automatic Actuation Logic and Actuation Relays (SSPS) | 1,2,3,4 | 2 trains | C | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6 | NA |
| c. Containment Pressure High - 3 | 1,2,3 | 4 | E | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ 28.3 psig |

(continued)

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(b) Above the P-11 (Pressurizer Pressure) interlock and below P-11 unless the Function is blocked.
(c) Time constants used in the lead/lag controller are $\tau_1 \geq 50$ seconds and $\tau_2 \leq 5$ seconds.

(5) INSERT 1

INSERT 1

If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.

Table 3.3.2-1 (page 3 of 8)
Engineered Safety Feature Actuation System Instrumentation

| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE(a) |
|---|---|---|---|---|---|
| 4. Steam Line Isolation | | | | | |
| a. Manual Initiation | 1,2(i), 3(i) | 2 | F | SR 3.3.2.8 | NA |
| b. Automatic Actuation Logic and Actuation Relays (SSPS) | 1,2(i), 3(i) | 2 trains | G | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6 | NA |
| c. Automatic Actuation Logic and Actuation Relays (MSFIS) | 1, 2(i),3(i) | 2 trains(o) | S | SR 3.3.2.3 | NA |
| d. Containment Pressure - High 2 | 1,2(i), 3(i) | 3 | D | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ 18.3 psig |
| e. Steam Line Pressure | | | | | |
| (1) Low | 1,2 (i), 3(b)(i) | 3 per steam line | D | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ ~~571~~ psig(c) (s)<br>~~609~~<br>610 |
| (2) Negative Rate - High | 3(g)(i) | 3 per steam line | D | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ 124 psi(h) |

(continued)

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(b) Above the P-11 (Pressurizer Pressure) Interlock and below P-11 unless the Function is blocked.
(c) Time constants used in the lead/lag controller are $\tau_1 \geq 50$ seconds and $\tau_2 \leq 5$ seconds.
(g) Below the P-11 (Pressurizer Pressure) Interlock; however, may be blocked below P-11 when safety injection on low steam line pressure is not blocked.
(h) Time constant utilized in the rate/lag controller is ≥ 50 seconds.
(i) Except when all MSIVs are closed.
(o) Each train requires a minimum of two programmable logic controllers to be OPERABLE.

(s) INSERT 1

INSERT 1

If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.

Table 3.3.2-1 (page 4 of 8)
Engineered Safety Feature Actuation System Instrumentation

| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE[a] |
|---|---|---|---|---|---|
| 5. Turbine Trip and Feedwater Isolation | | | | | |
| a. Automatic Actuation Logic and Actuation Relays (SSPS) | 1,2[j], 3[j] | 2 trains | G | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6<br>SR 3.3.2.14 | NA |
| b. Automatic Actuation Logic and Actuation Relays (MSFIS) | 1, 2[j], 3[j] | 2 trains[o] | S | SR 3.3.2.3 | NA |
| c. SG Water Level - High High (P-14) | 1,2[j] | 4 per SG | I | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ ~~70.8%~~ 91.4%[s] of Narrow Range Instrument Span |
| d. Safety Injection | Refer to Function 1 (Safety Injection) for all initiation functions and requirements. | | | | |
| e. Steam Generator Water Level Low-Low[q] | | | | | |
| (1) Steam Generator Water Level Low-Low (Adverse Containment Environment) | 1, 2[j], 3[j] | 4 per SG | D | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ ~~25.2%~~ 20.6%[s] of Narrow Range Instrument Span |

(continued)

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(j) Except when all MFIVs are closed.
(o) Each train requires a minimum of two programmable logic controllers to be OPERABLE.
(q) Feedwater isolation only.

(s) INSERT 1

# INSERT 1

If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.

Table 3.3.2-1 (page 5 of 8)
Engineered Safety Feature Actuation System Instrumentation

| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE[a] |
|---|---|---|---|---|---|
| 5. Turbine Trip and Feedwater Isolation | | | | | |
| e. Steam Generator Water Level Low-Low[q] (continued) | | | | | |
| (2) Steam Generator Water Level Low-Low (Normal Containment Environment) | 1[r], 2[j,r], 3[j,r] | 4 per SG | D | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ ~~19.8%~~ 16.6%[(s)] of Narrow Range Instrument Span |
| (3) ~~Vessel ΔT Equivalent including delay timers - Trip Time Delay~~ Not used. | | | | | |
| ~~(a) Vessel ΔT (Power-1)~~ | ~~1, 2[j]~~ | ~~4~~ | ~~M~~ | ~~SR 3.3.2.1~~<br>~~SR 3.3.2.5~~<br>~~SR 3.3.2.9~~<br>~~SR 3.3.2.10~~ | ~~≤ Vessel ΔT Equivalent to 13.9% RTP[k]~~ |
| ~~(b) Vessel ΔT (Power-2)~~ | ~~1, 2[j]~~ | ~~4~~ | ~~M~~ | ~~SR 3.3.2.1~~<br>~~SR 3.3.2.5~~<br>~~SR 3.3.2.9~~<br>~~SR 3.3.2.10~~ | ~~≤ Vessel ΔT Equivalent to 23.9% RTP[l]~~ |
| (4) Containment Pressure - Environmental Allowance Modifier | 1, 2[j], 3[j] | 4 | N | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≤ 2.0 psig |

(continued)

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(j) Except when all MFIVs are closed.
(k) ~~With a time delay ≤ 240 seconds.~~ Not used.
(l) ~~With a time delay ≤ 130 seconds.~~ Not used.
(q) Feedwater isolation only.
(r) Except when the Containment Pressure – Environmental Allowance Modifier channels in the same protection sets are tripped.
(s) INSERT 1

# INSERT 1

If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.

Table 3.3.2-1 (page 6 of 8)
Engineered Safety Feature Actuation System Instrumentation

| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE(a) |
|---|---|---|---|---|---|
| 6. Auxiliary Feedwater | | | | | |
| a. Manual Initiation | 1, 2, 3 | 1/pump | P | SR 3.3.2.8 | NA |
| b. Automatic Actuation Logic and Actuation Relays (SSPS) | 1,2,3 | 2 trains | G | SR 3.3.2.2<br>SR 3.3.2.4<br>SR 3.3.2.6 | NA |
| c. Automatic Actuation Logic and Actuation Relays (BOP ESFAS) | 1,2,3 | 2 trains | Q | SR 3.3.2.3 | NA |
| d. SG Water Level Low-Low | | | | | |
| (1) Steam Generator Water Level Low-Low (Adverse Containment Environment) | 1, 2, 3 | 4 per SG | D | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ ~~25.2%~~ 20.6% (s) of Narrow Range Instrument Span |
| (2) Steam Generator Water Level Low-Low (Normal Containment Environment) | 1(r), 2(r), 3(r) | 4 per SG | D | SR 3.3.2.1<br>SR 3.3.2.5<br>SR 3.3.2.9<br>SR 3.3.2.10 | ≥ ~~19.0%~~ 16.6% (s) of Narrow Range Instrument Span |

(continued)

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(r) Except when the Containment Pressure – Environmental Allowance Modifier channels in the same protection sets are tripped.

(s) INSERT 1

INSERT 1

If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.

BASES (continued)

BACKGROUND

Reactor Trip Switchgear (continued)

output voltage signal is removed, the undervoltage coils are de-energized, the breaker trip lever is actuated by the de-energized undervoltage coil, and the RTBs and bypass breakers are tripped open. This allows the shutdown rods and control rods to fall into the core. In addition to the de-energization of the undervoltage coils, each reactor trip breaker is also equipped with an automatic shunt trip device that is energized to trip the breaker open upon receipt of a reactor trip signal from the SSPS. Either the undervoltage coil or the shunt trip mechanism is sufficient by itself, thus providing a diverse trip mechanism.

The decision logic matrix Functions are described in the functional diagrams included in Reference 1. In addition to the reactor trip or ESF, these diagrams also describe the various "permissive interlocks" that are associated with unit conditions.

Each train has a built in testing device that can test the decision logic matrix Functions and the actuation devices while the unit is at power. When any one train is taken out of service for testing, the other train is capable of providing unit monitoring and protection until the testing has been completed. The testing device is semiautomatic to minimize testing time.

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

The RTS functions to maintain the applicable Safety Limits during all AOOs and mitigates the consequences of DBAs in all MODES in which the Rod Control System is capable of rod withdrawal or one or more rods are not fully inserted.

Each of the analyzed accidents and transients can be detected by one or more RTS Functions. The accident analysis described in Reference 2 takes credit for most RTS trip Functions. RTS trip Functions not specifically credited in the accident analysis are qualitatively credited in the safety analysis and the NRC staff approved licensing basis for the unit. These RTS trip Functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate Function performance. They may also serve as backups to RTS trip Functions that were credited in the accident analysis.

The LCO requires all instrumentation performing an RTS Function, listed in Table 3.3.1-1 in the accompanying LCO, to be OPERABLE. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the affected Functions.^

INSERT B 3.3.1-6

(continued)

INSERT B 3.3.1-6

The Allowable Value column for Trip Functions 14.a, Steam Generator Water Level Low-Low (Adverse Containment Environment), and 14.b, Steam Generator Water Level Low-Low (Normal Containment Environment) in TS Table 3.3.1-1 is modified by a Note that requires the as-left condition for a channel in those Trip Functions to be within the established calibration tolerance band for that channel on either side of the Nominal Trip Setpoint. This assures that the assumptions in the plant setpoint methodology (Reference 17) are satisfied in order to protect the safety analysis limit. As-found and as-left setpoint data for these specific Trip Functions obtained during CHANNEL OPERATIONAL TESTS are trended to demonstrate that the rack drift assumptions used in the plant setpoint methodology are valid. If the trending evaluation determines that a channel is performing inconsistent with the uncertainty allowances applicable to the periodic surveillance test being performed (e.g., whether it be a COT, CHANNEL CALIBRATION, etc.), the channel will be evaluated under the corrective action program. If the channel is not capable of performing its specified safety function, it shall be declared inoperable.

BASES

BACKGROUND (continued)

Balance of Plant (BOP) ESFAS

The BOP ESFAS processes signals from SSPS, signal processing equipment (e.g., LSELS), and plant radiation monitors to actuate certain ESF equipment. There are two redundant trains of BOP ESFAS (separation groups 1 and 4), and a third separation group (separation group 2) to actuate the Turbine Driven Auxiliary Feedwater pump and reposition automatic valves (turbine steam supply valves, turbine trip and throttle valve) as required. The separation group 2 BOP-ESFAS cabinet is considered to be part of the end device (the Turbine Driven Auxiliary Feedwater pump) and its OPERABILITY is addressed under LCO 3.7.5, "Auxiliary Feedwater (AFW) System." The redundant trains provide actuation for the Motor Driven Auxiliary Feedwater pumps (and reposition automatic valves as required, i.e., steam generator blowdown and sample line isolation valves, ESW supply valves, CST supply valves), Containment Purge Isolation, Control Room Emergency Ventilation, and Emergency Exhaust Actuation functions.

The BOP ESFAS has a built-in automatic test insertion (ATI) feature which continuously tests the system logic. Any fault detected during the testing causes an alarm on the main control room overhead annunciator system to alert operators to the problem. Local indication shows the test step where the fault was detected.

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

Each of the analyzed accidents can be detected by one or more ESFAS Functions. One of the ESFAS Functions is the primary actuation signal for that accident. An ESFAS Function may be the primary actuation signal for more than one type of accident. An ESFAS Function may also be a secondary, or backup, actuation signal for one or more other accidents. For example, Pressurizer Pressure - Low is a primary actuation signal for small loss of coolant accidents (LOCAs) and a backup actuation signal for steam line breaks (SLBs) outside containment. Functions such as manual initiation, not specifically credited in the accident safety analysis, are qualitatively credited. These Functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate Function performance. These Functions may also serve as backups to Functions that were credited in the accident analysis (Ref. 3). INSERT B 3.3.2-5

The LCO requires all instrumentation performing an ESFAS Function to be OPERABLE. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the affected Functions. (start new paragraph)

The LCO generally requires OPERABILITY of three or four channels in each instrumentation function and two channels in each logic and manual initiation function. The two-out-of-three and the two-out-of-four

(continued)

INSERT B 3.3.2-5

The Allowable Value column for Trip Functions 1.e (Safety Injection on Steam Line Pressure - Low), 4.e.1 (Steam Line Isolation on Steam Line Pressure - Low), 5.c (Turbine Trip and Feedwater Isolation on Steam Generator Water Level High-High), 5.e.1 (Feedwater Isolation on Steam Generator Water Level Low-Low - Adverse Containment Environment), 5.e.2 (Feedwater Isolation on Steam Generator Water Level Low-Low - Normal Containment Environment), 6.d.1 (Auxiliary Feedwater Actuation on Steam Generator Water Level Low-Low - Adverse Containment Environment), and 6.d.2 (Auxiliary Feedwater Actuation on Steam Generator Water Level Low-Low - Normal Containment Environment) in TS Table 3.3.2-1 is modified by a Note that requires the as-left condition for a channel in those Trip Functions to be within the established calibration tolerance band for that channel on either side of the Nominal Trip Setpoint. This assures that the assumptions in the plant setpoint methodology (Reference 18) are satisfied in order to protect the safety analysis limit. As-found and as-left setpoint data for these specific Trip Functions obtained during CHANNEL OPERATIONAL TESTS are trended to demonstrate that the rack drift assumptions used in the plant setpoint methodology are valid. If the trending evaluation determines that a channel is performing inconsistent with the uncertainty allowances applicable to the periodic surveillance test being performed (e.g., whether it be a COT, CHANNEL CALIBRATION, etc.), the channel will be evaluated under the corrective action program. If the channel is not capable of performing its specified safety function, it shall be declared inoperable.

ENCLOSURE 4

WESTINGHOUSE APPLICATION FOR WITHHOLDING

Westinghouse

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Our ref: CAW-05-1998

May 26, 2005

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: LTR-SCS-05-44-P Attachment, Response to NRC Request for Additional Information on WCAP-16265-P, Rev. 0, "Callaway Replacement Steam Generator NSSS Licensing Report," dated May 23, 2005, (Proprietary) TAC No. MC4437

The proprietary information for which withholding is being requested in the above-referenced document is further identified in Affidavit CAW-05-1998 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by AmerenUE.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-05-1998, and should be addressed to J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

J. A. Gresham, Manager
Regulatory Compliance and Plant Licensing

Enclosures

cc: B. Benney
L. Feizollahi
S. Bloom, NRR/OWFN/DRPW/PD1V2 (Rockville, MD)

CAW-05-1998

# AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared J. A. Gresham, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

J. A. Gresham, Manager
Regulatory Compliance and Plant Licensing

Sworn to and subscribed
before me this 26th day
of May, 2005

Notary Public

Notarial Seal
Sharon L. Fiori, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires January 29, 2007
Member, Pennsylvania Association Of Notaries

(1) I am Manager, Regulatory Compliance and Plant Licensing, in Nuclear Services, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse "Application for Withholding" accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in LTR-SCS-05-44-P Attachment, "Response to NRC Request for Additional Information on WCAP-16265-P, Rev. 0, 'Callaway Replacement Steam Generator NSSS Licensing Report'," dated May 23, 2005 (Proprietary), being transmitted by AmerenUE Company letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted for use by AmerenUE for the Callaway Nuclear Plant is expected to be applicable for other licensee submittals in response to certain NRC requirements for protection system setpoint methodology and allowable value calculations.

This information is part of that which will enable Westinghouse to:

(a) Provide documentation of the methods for determining acceptable setpoints and allowable values.

(b) Provide the specific analysis or evaluation results related to calculation of the setpoints and allowable values.

(c) Assist the customer to obtain NRC approval.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of similar information to its customers for purposes of meeting NRC requirements for licensing documentation.

(b) Westinghouse can sell support and defense of the technology to its customers in the licensing process.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar calculation, evaluation and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

## PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

# Attachment 1

## 1.0 COMBINATION OF UNCERTAINTY COMPONENTS

This section describes the Westinghouse setpoint methodology for the combination of the uncertainty components utilized for Callaway. The methodology used in the determination of the overall CSA is described in Section 1.1. All appropriate and applicable uncertainties, as defined by a review of the Callaway baseline design input documentation have been included in each RTS/ESFAS trip function CSA calculation.

### 1.1 Methodology

The methodology used to combine the uncertainty components for a channel is an appropriate combination of those groups which are statistically and functionally independent. Those uncertainties that are not independent are conservatively treated by arithmetic summation and then systematically combined with the independent terms.

The basic methodology used is the square-root-sum-of-the-squares (SRSS) technique. As noted in the response to RAI 2, the methods used for the Callaway RSG program have been reviewed and approved by the NRC staff on other programs.

The generalized relationship between the uncertainty components and the calculated uncertainty for a channel is noted in Eq. 1.1:

$$CSA = \{(PMA)^2 + (PEA)^2 + (SRA)^2 + (SMTE + SD)^2 + (SMTE + SCA)^2 + (SPE)^2 + (STE)^2 + (RMTE + RD)^2 + (RMTE + RCA)^2 + (RTE)^2\}^{1/2} + EA + BIAS \qquad (Eq.\ 1.1)$$

where:

| | | |
|---|---|---|
| CSA | = | Channel Statistical Allowance |
| PMA | = | Process Measurement Accuracy |
| PEA | = | Primary Element Accuracy |
| SRA | = | Sensor Reference Accuracy |
| SMTE | = | Sensor Measurement and Test Equipment accuracy |
| SD | = | Sensor Drift |
| SCA | = | Sensor Calibration Accuracy |
| SPE | = | Sensor Pressure Effects |
| STE | = | Sensor Temperature Effects |
| RMTE | = | Rack Measurement and Test Equipment accuracy |
| RD | = | Rack Drift |
| RCA | = | Rack Calibration Accuracy |
| RTE | = | Rack Temperature Effects |
| EA | = | Environmental Allowance |
| BIAS | = | One directional, known magnitude allowance |

The terms of Eq. 1.1 are defined in reference 2 and are based on the following: 1) The sensor and rack measurement and test equipment uncertainties are treated as dependent parameters with their respective drift and calibration accuracy allowances. 2) While the environmental allowances are not considered statistically dependent with all other parameters, the equipment qualification testing generally results in large magnitude, non-random terms that are conservatively treated as limits of error which are added to the statistical summation. Westinghouse generally considers a term to be a limit of error if the term is a bias with an unknown sign. The term is added to the SRSS in the direction of conservatism. 3) Bias terms are one directional with known magnitudes (which may result from several sources, e.g., Steam Generator Level Process Measurement Accuracy terms) and are also added to the statistical summation. 4) The calibration terms are treated in the same radical with the other terms based on the assumption that general trending, i.e., drift and calibration data are evaluated on a periodic and timely basis. This evaluation should confirm that the distribution function characteristics assumed as part of treatment of the terms are still applicable. Consistent with the request of Regulatory Guide 1.105 Rev 3, the CSA value from Eq. 1.1 is believed to have been determined at a 95 % probability, at a 95 % confidence level (95/95). The results of the uncertainty calculations using the above methods are noted on the following tables.

## Table 1

**Steam Generator Water Level – Low-Low Adverse Containment Environment**

| **Parameter** | **Allowance*** |
|---|---|
| Process Measurement Accuracy | [ ]a,c |
| [ ]a,c | |
| Primary Element Accuracy (PEA) | |
| Sensor Calibration Accuracy (SCA) | |
| Sensor Reference Accuracy (SRA) | |
| Sensor Measurement & Test Equipment Accuracy (SMTE) | |
| Sensor Pressure Effects (SPE) | |
| Sensor Temperature Effects (STE) | |
| Sensor Drift (SD) | |
| Environmental Allowance<br>Transmitter Temperature Error ($EA_3$)<br>IR Degradation (IR)<br>Reference Leg Heatup ($EA_4$) | |
| Rack Calibration Accuracy (RCA) | |
| Rack Measurement & Test Equipment Accuracy (RMTE) | |
| Rack Temperature Effect (RTE) | |
| Rack Drift (RD) | |

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* In percent span (100 %)

**Table 1 (continued)**
**Steam Generator Water Level – Low-Low Adverse Containment Environment**

Channel Statistical Allowance =

$$\sqrt{PEA^2 + (SMTE+SD)^2 + (SMTE+SCA)^2 + SRA^2 + SPE^2 + STE^2 + (RMTE+RD)^2 + (RMTE+RCA)^2 + RTE^2}$$

$$+ PMA_{PP} + PMA_{FV} + PMA_{DL} + PMA_{ID} + PMA_{FR} + PMA_{SC} + PMA_{RL} + PMA_{PS} + EA_3 + EA_4 + IR$$

[ ] a,c

**Table 2**
**Steam Generator Water Level – Low-Low Normal Containment Environment**

| **Parameter** | **Allowance*** |
|---|---|
| Process Measurement Accuracy | |
| a,c | a,c |
| Primary Element Accuracy (PEA) | |
| Sensor Calibration Accuracy (SCA) | |
| Sensor Reference Accuracy (SRA) | |
| Sensor Measurement & Test Equipment Accuracy (SMTE) | |
| Sensor Pressure Effects (SPE) | |
| Sensor Temperature Effects (STE) | |
| Sensor Drift (SD) | |
| Environmental Allowance | |
| Transmitter Temperature Error ($EA_1$) | |
| IR Degradation (IR) | |
| Reference Leg Heatup ($EA_2$) | |
| Rack Calibration Accuracy (RCA) | |
| Rack Measurement & Test Equipment Accuracy (RMTE) | |
| Rack Temperature Effect (RTE) | |
| Rack Drift (RD) | |

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* In percent span (100 %)

**Table 2 (continued)**
**Steam Generator Water Level – Low-Low Normal Containment Environment**

Channel Statistical Allowance =

$$\sqrt{PEA^2 + (SMTE + SD)^2 + (SMTE + SCA)^2 + SRA^2 + SPE^2 + STE^2 + (RMTE + RD)^2 + (RMTE + RCA)^2 + RTE^2}$$

$$+ PMA_{PP} + PMA_{FV} + PMA_{DL} + PMA_{ID} + PMA_{FR} + PMA_{SC} + PMA_{RL} + PMA_{PS} + EA_1 + EA_2 + IR$$

a,c

**Table 3**
**Steam Generator Water Level – High-High**

| **Parameter** | **Allowance*** |
|---|---|
| Process Measurement Accuracy | |
| [ ] a,c | [ ] a,c |
| Primary Element Accuracy (PEA) | |
| Sensor Calibration Accuracy (SCA) | |
| Sensor Reference Accuracy (SRA) | |
| Sensor Measurement & Test Equipment Accuracy (SMTE) | |
| Sensor Pressure Effects (SPE) | |
| Sensor Temperature Effects (STE) | |
| Sensor Drift (SD) | |
| Rack Calibration Accuracy (RCA) | |
| Rack Measurement & Test Equipment Accuracy (RMTE) | |
| Rack Temperature Effect (RTE) | |
| Rack Drift (RD) | |

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* In percent span (100 %)

**Table 3 (continued)**
**Steam Generator Water Level – High-High**

Channel Statistical Allowance =

$$\sqrt{\begin{array}{l}PEA^2 + (SMTE + SD)^2 + (SMTE + SCA)^2 + SRA^2 + SPE^2 + STE^2 + (RMTE + RD)^2 + \\ (RMTE + RCA)^2 + RTE^2\end{array}}$$

$$+ PMA_{PP} + PMA_{FV} + PMA_{DL} + PMA_{ID} + PMA_{FR} + PMA_{SC} + PMA_{RL} + PMA_{PS}$$

a,c

**Table 4**
**Steamline Pressure - Low**

| Parameter | Allowance* |
|---|---|
| | a,c |
| Process Measurement Accuracy (PMA) | |
| Primary Element Accuracy (PEA) | |
| Sensor Calibration Accuracy (SCA) | |
| Sensor Reference Accuracy (SRA) | |
| Sensor Measurement & Test Equipment Accuracy (SMTE) | |
| Sensor Pressure Effects (SPE) | |
| Sensor Temperature Effects (STE) | |
| Sensor Drift (SD) | |
| Environmental Allowance (EA) | |
| IR Degradation (IR) | |
| Rack Calibration Accuracy (RCA) | |
| Rack Measurement & Test Equipment Accuracy (RMTE) | |
| Rack Temperature Effect (RTE) | |
| Rack Drift (RD) | |

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* In percent span (1300 psig)

**Table 4 (continued)**
**Steamline Pressure - Low**

Channel Statistical Allowance =

$$\sqrt{\begin{aligned}&PMA^2 + PEA^2 + (SMTE + SD)^2 + (SMTE + SCA)^2 + SRA^2 + SPE^2 + STE^2 + \\ &(RMTE + RD)^2 + (RMTE + RCA)^2 + RTE^2\end{aligned}}$$

$$+ EA + IR$$

[ ] a,c

## 2.0 APPLICATION OF THE SETPOINT METHODOLOGY

### 2.1 Uncertainty Calculation Basic Assumptions/Premises

The equations noted in Section 1 and the Tables are based on several premises. These are:

5) The instrument technicians make reasonable attempts to achieve the Nominal Trip Setpoint (NTS) as the "as left" condition at the start of each process rack's surveillance interval.

6) The process rack drift will be evaluated (probability distribution function characteristics and drift magnitude) over multiple surveillance intervals.

7) The process rack calibration accuracy will be evaluated (probability distribution function characteristics and calibration magnitude) over multiple surveillance intervals.

8) The process racks, including the bistables, are verified/functionally tested in a string or loop process.

It should be noted for (1) above that it is not necessary for the instrument technician to recalibrate a device or channel if the "as left" condition is not exactly at the nominal condition but is within the plus or minus of nominal "as left" procedural tolerance. As noted above, the uncertainty calculations assume that the "as left" tolerance (conservative and non-conservative direction) is satisfied on a reasonable, statistical basis, not that the nominal condition is satisfied exactly. This evaluation assumes that the RCA and RD parameter values are satisfied on at least a 95 % probability / 95 % confidence level basis. It is therefore necessary for the plant to periodically reverify the continued validity of these assumptions. This prevents the institution of non-conservative biases due to a procedural basis without the plant staff's knowledge and appropriate treatment.

In summary, a process rack channel is considered to be "calibrated" when the two-sided "as left" calibration procedural tolerance is satisfied. An instrument technician may determine to recalibrate if near the extremes of the "as left" procedural tolerance, but it is not required. Recalibration is explicitly required any time the "as found" condition of the device or channel is outside of the "as left" procedural tolerance. A device or channel may not be left outside the "as left" tolerance without declaring the channel "inoperable" and appropriate action taken. Thus an "as left" tolerance may be considered as an outer limit for the purposes of calibration and instrument uncertainty calculations.

## 2.2 Process Rack Operability Determination Program and Criteria

The equations noted in Section 1 and the Tables are different from those used in previous Westinghouse uncertainty calculations. One aspect of the equations easily noted is the significance of the calibration process, i.e., it is treated as statistically independent of the drift determination. Another aspect is that if drift and calibration are independent processes, then the determination of equipment operability is changed, i.e., it is not the arithmetic sum of the two uncertainties. The parameter of most interest as a first pass operability criterion is drift ("as found" – "as left") found to be within RD, where RD is the 95/95 drift value assumed for that channel. However, this would require the instrument technician to record both the "as left" and "as found" conditions and perform a calculation in the field. This field calculation has been determined to be impracticable at this time since it would require having the "as left" value for that device at the time of drift determination and thus becomes a records availability/control problem. An alternative for the process racks is the use of a fixed magnitude, two-sided "as found" tolerance about the NTS. As a result, a more reasonable approach for the plant staff was determined. The "as found" criterion based on absolute magnitude is the same as the "as left" criterion, i.e., the allowed deviation from the NTS on an absolute indication basis is plus or minus the "as left" tolerance. A process loop found inside the "as left" tolerance on an indicated basis is considered to be operable. A channel found outside the "as left" tolerance is evaluated and recalibrated. If the channel can be returned to within the "as left" tolerance, the channel is considered to be operable. This criterion can then be incorporated into plant, function specific calibration and drift procedures as the defined "as found" tolerance about the NTS. At a later date, once the "as found" data is compiled, the relative drift ("as found" – "as left") can be calculated and compared against the RD value. This comparison can then be utilized to ensure consistency with the assumptions of the uncertainty calculations. A channel found to exceed this criterion multiple times should trigger a more comprehensive evaluation of the operability of the channel.

## 2.3 Application to the Plant Technical Specifications

The drift operability criteria suggested for the process racks in Section 2.2 would be based on a statistical evaluation of the performance of the installed hardware. Thus this criterion would change if the MTE is changed, or the procedures used in the surveillance process are changed significantly and particularly if the process rack modules themselves are changed, e.g., from analog to digital. Therefore, the operability criteria are not expected to be static. In fact they are expected to change as the characteristics of the equipment change. This does not imply that the criteria can increase due to increasingly poor performance of the equipment over time. But rather just the opposite. As new and better equipment and processes are instituted, the operability criteria magnitudes would be expected to decrease to reflect the increased capabilities of the replacement equipment. For example, if the plant purchased some form of equipment that allowed the determination of relative drift in the field, it would be expected that the rack operability would then be based on the RD value.

Sections 2.1 and 2.2 are basically consistent with the recommendations of the Westinghouse paper presented at the June 1994, ISA/EPRI conference in Orlando, FL (Reference 1). Therefore, consistent with the paper, Westinghouse recommends a revision to the plant technical specifications to redefine the Allowable Values on Table 3.3.1-1 "Reactor Trip System Instrumentation" and Table 3.3.2-1, "Engineered Safety Features Actuation System Instrumentation" for those functions affected by the RSG program. Also, the plant operability determination processes described in Sections 2.2 and 2.3 are consistent with the basic intent of the ISA paper (Reference 1).

## 2.4 Determination of Allowable Value

The Allowable Values (AVs) for the Callaway Technical Specifications are determined by adding (or subtracting) the calibration accuracy of the device tested during the Channel Operational Test to the NTS in the non-conservative direction (i.e., toward or closer to the SAL) for the application. For those channels that provide trip actuation via a bistable in the process racks, the calibration accuracy is defined by the RCA term. The magnitude of the calibration accuracy term is as specified in the station procedures.

An example AV calculation is as follows:

- *Steam Generator Level - Low-Low (Normal containment environment)*

NTS = 17 % span
SAL = 0 % span
RCA = 0.4 % span
SPAN = 100 % Level

AV = NTS - RCA

AV = 17 % - 0.4 %

AV = 16.6 % span

## 2.5 References/Standards


1. Tuley, C. R., Williams, T. P., "The Allowable Value in the Westinghouse Setpoint Methodology – Fact or Fiction?" presented at the Thirty-Seventh Power Instrumentation Symposium (4th Annual ISA/EPRI Joint Controls and Automation Conference), Orlando, FL, June, 1994.

2. Tuley, C. R., Miller, R. B., "The Significance of the Nominal Trip Setpoint in the Westinghouse Setpoint Methodology" Instrumentation, Controls, and Automation in the Power Industry, Vol. 34, pp. 133-140, June 1991.

## 3.0 Results Summary

The uncertainties, margins, and AVs for Steam Generator Level and Steamline Pressure are summarized as follows.

| Parameter | NTS | CSA | Margin a,c | Proposed Allowable Value |
|---|---|---|---|---|
| Steam Line Pressure-Low Steam Line Isolation | 615 psig | [ | ] | ≥ 610 psig |
| Steam Line Pressure-Low SI | 615 psig | | | ≥ 610 psig |
| Steam Generator Level Low-Low (Normal) | 17 % Span | | | ≥ 16.6% Span |
| Steam Generator Level Low-Low (Adverse) | 21.0% Span | | | ≥ 20.6% Span |
| Steam Generator Level High-High | 91.0% Span | | | ≤ 91.4% Span |

Notes:

1. Results based on inside containment steam line break.
2. Results based on outside containment steam line break.

Bracket [ ]$^{a,c}$ information designates data that is Westinghouse proprietary.