



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

October 15, 2009

LICENSEE: Union Electric Company
FACILITY: Callaway Plant, Unit 1
SUBJECT: SUMMARY OF SEPTEMBER 17, 2009, MEETING WITH REPRESENTATIVES OF UNION ELECTRIC COMPANY, LICENSEE FOR CALLAWAY PLANT, UNIT 1 ON PROPOSED RISK-INFORMED LICENSE AMENDMENT

On September 17, 2009, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of Union Electric Company, the licensee for Callaway Plant, Unit 1, at NRC Headquarters, One White Flint North, 11555 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to discuss the licensee's plan and approach to submit a risk-informed license amendment request (LAR) to extend the completion time for certain balance of plant (BOP) engineered safety feature actuation system (ESFAS) actuation signals. A list of attendees is provided as Enclosure 1.

In its presentation, the licensee stated that the BOP ESFAS provides signals to initiate ESFAS to control and mitigate consequences of fault conditions in actuation signals for containment purge isolation, fuel building ventilation isolation, auxiliary/feedwater actuation, low suction pressure, and steam generator blowdown sample isolation. The licensee plans to request the LAR to address its inability to perform repairs in the allowed outage times. The licensee stated that on February 19, 2009, its power supply SA036D PS-1 failed and resulted in a plant shut down to Mode 3 due to its inability to replace the failed power supply in 6 hours of allowed outage time. To avoid future such shutdowns or requests for enforcement discretions, the licensee plans to request an extension of completion time from 6 hours to 24 hours, using the risk-informed rationale for acceptability of the change. The licensee's presentation viewgraphs are provided in Enclosure 2.

The licensee's presentation included its plans for submitting the risk-informed LAR. The licensee plans to upgrade its probabilistic risk assessment (PRA) capability to Regulatory Guide (RG) 1.200, "An Approach for Deterring the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," guidance, and submit LARs for risk-informed initiative 4b, "Risk Managed Technical Specifications," and risk-informed initiative 5b, "Surveillance Frequency Control Program."

The licensee stated that the approval of LARs would obviate the need to ask NRC for discretions of regulatory enforcements, or shutting down the plant when recovery actions cannot be completed in the allowed outage times (completion times).

The NRC staff expressed appreciation for the licensee's presentation, and offered insights on expectations for PRA upgrade to RG 1.200 guidance, and on licensee's plans to submit LARs for risk-informed initiatives 4b and 5b. The NRC staff discussed its experience with the approval of pilot amendments for both initiatives.

There were no public participants present, and no Public Meeting Feedback forms were submitted at the meeting.

If there are any questions or comments, please direct inquiries to me by telephone at 301-415-1476 or by electronic mail to Mohan.Thadani@nrc.gov.



Mohan C. Thadani, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosures:

1. List of Attendees
2. Licensee presentation

cc w/encl: Distribution via Listserv

LIST OF ATTENDEES

U.S. NUCLEAR REGULATORY COMMISSION

CATEGORY 1 MEETING ON SEPTEMBER 17, 2009, WITH

REPRESENTATIVES OF UNION ELECTRIC COMPANY

Name	Affiliation	Telephone
Union Electric Company		
Michael Hudson	Ameren UE	573-676-8863
Scott Sandbothe	Ameren UE	573-676-8528
Scott Maglio	Ameren UE	573-676-8719
Bert Yates	Ameren UE	314-225-1702
Mark Walz	Scientech	618-281-4881
Hogbing Jians	Ameren UE	314-974-8609
U.S. Nuclear Regulatory Commission		
Barry Marcus	NRR/DE/EICB	301-415-2823
Greg Casto	NRR/DSS/SBPB	301-415-4072
Cliff Douth	NRR/DLR/RER2	301-415-2847
Donnie Harrison	NRR/DRA/APLA	301-415-2470
Mohan Thadani	NRR/DORL/LPL4	301-415-1476

CALLAWAY PLANT
RISK-INFORMED AMENDMENT
REQUEST
24-HOUR BOP ESFAS
COMPLETION TIME



AGENDA

Meeting between NRC and Union Electric Company (AmerenUE)

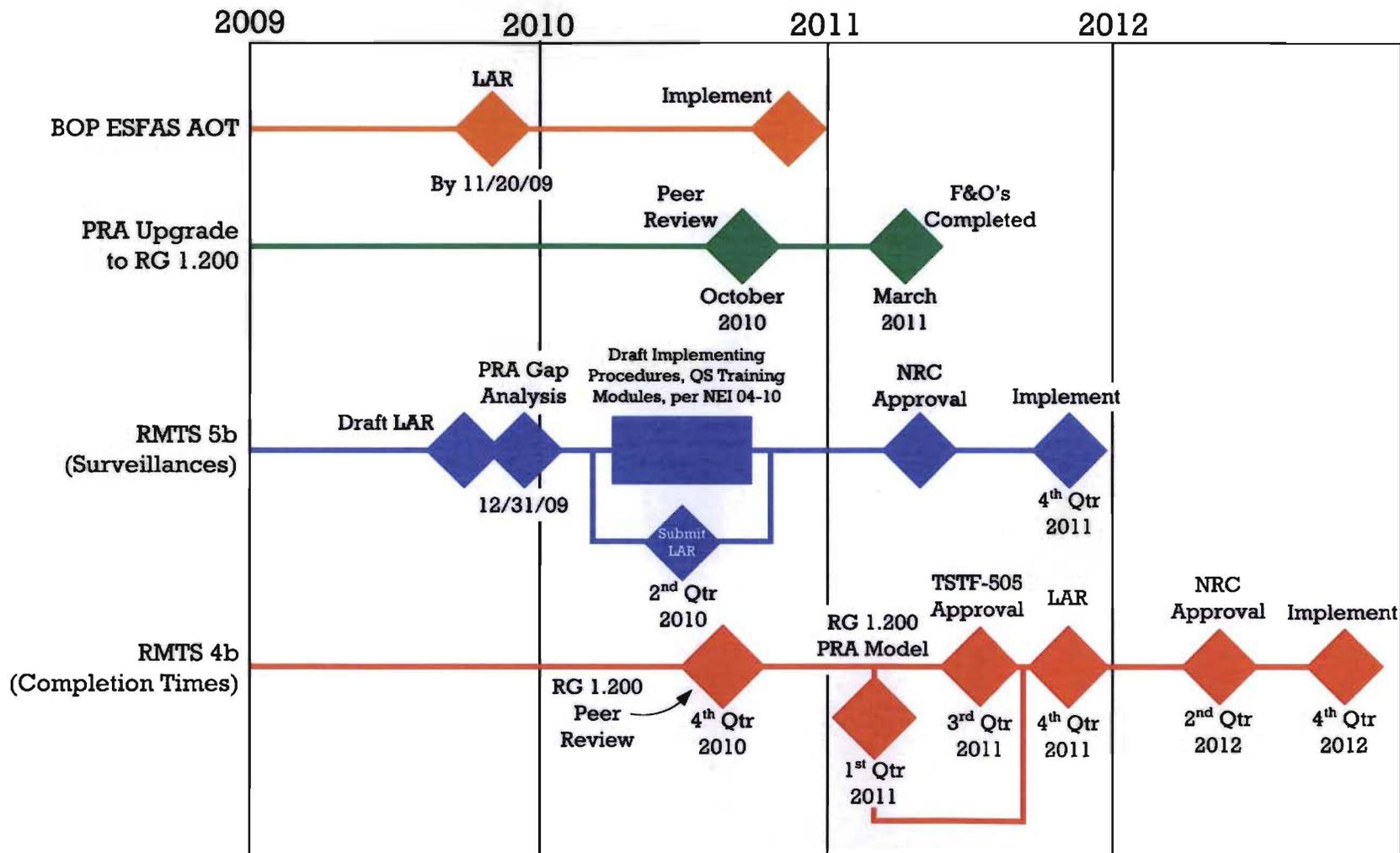
Thursday, September 17, 2009

8:30 AM – 10:30 AM

- Introductions
- Callaway's Integrated Plan to Transition to Risk-Managed Technical Specifications (TSs)
- Balance-of-Plant Engineered Safety Features Actuation System (BOP ESFAS) Design and Power Supply Issues
- License Amendment Request – Draft TSs and Bases Changes
- Probabilistic Risk Assessment
- Questions and Answers
- Comments from Public
- Adjourn

CALLAWAY PLANT RISK-INFORMED AMENDMENT REQUEST 24-HOUR BOP ESFAS COMPLETION TIME

Regulatory Affairs Strategic Planning



**CALLAWAY PLANT
RISK-INFORMED AMENDMENT REQUEST
24-HOUR BOP ESFAS COMPLETION TIME**

BOP ESFAS

- BOP ESFAS provides signals to initiate actuation of the Engineering Safety Features systems in order to control and mitigate the consequences of such faults as Condition II, III and IV events defined in ANSI N18.2-1973.

- Actuation Signals
 - Containment Purge Isolation Signal (CPIS)
 - Fuel Building Ventilation Isolation Signal (FBVIS)
 - Control Room Ventilation Isolation Signal (CRVIS)
 - Auxiliary Feedwater Actuation Signal (AFAS)
 - Low Suction Pressure (LSP)
 - Steam Generator Blowdown Sample Isolation Signal (SGBSIS)

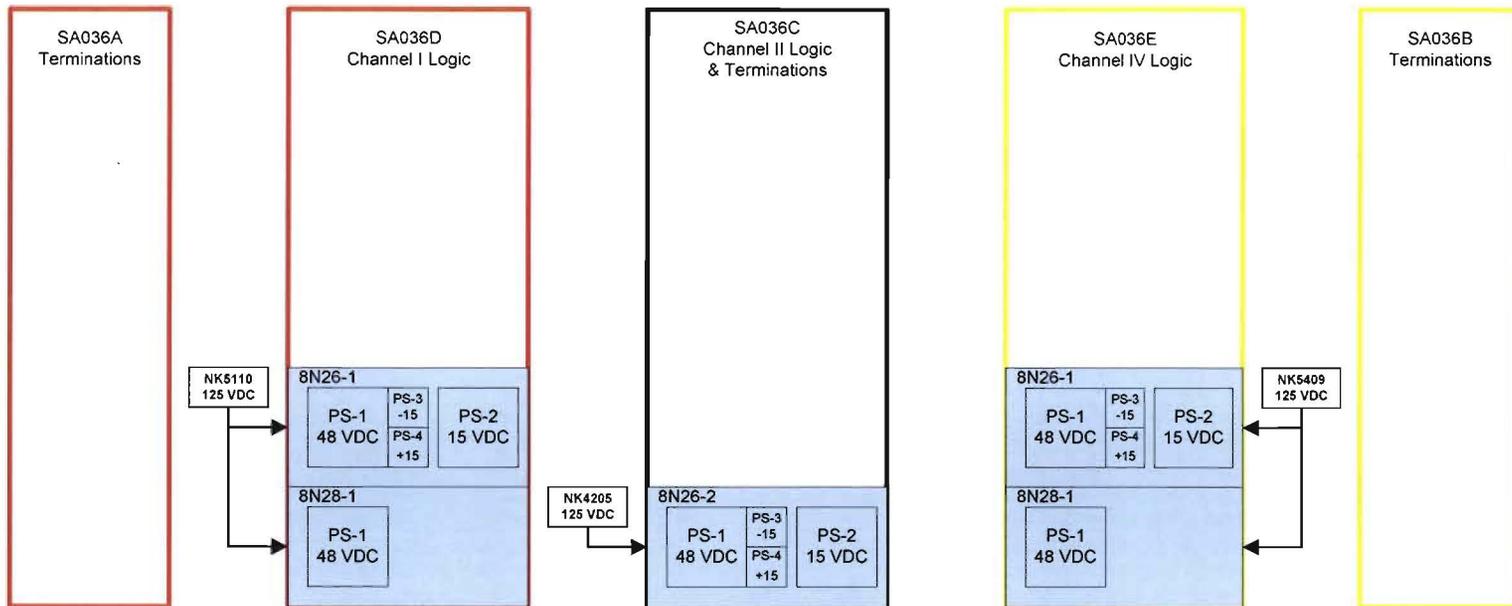
**CALLAWAY PLANT
RISK-INFORMED AMENDMENT REQUEST
24-HOUR BOP ESFAS COMPLETION TIME**

BOP ESFAS Power Supply Failure

- SA036D PS-1 power supply failed at 0228 on 2/19/09, resulting in a plant shutdown to Mode 3 due to the inability to replace it within 6 hours.
 - The shutdown was completed at 0817. The BOP ESFAS system was restored at 1009.
- The two Sorensen model power supplies (PS-1 and PS-2) are both obsolete.
- Both models are being reverse engineered for comprehensive replacement during Refuel 17.
- The requested amendment would obviate the need for any future request for enforcement discretion (NOED) due to BOP ESFAS failure.

CALLAWAY PLANT RISK-INFORMED AMENDMENT REQUEST 24-HOUR BOP ESFAS COMPLETION TIME

BOP ESFAS Power Supplies



<u>Cabinets</u>	<u>48 VDC Sorensen</u>	<u>15 VDC Sorensen</u>	<u>+/- 15 VDC SCI Module</u>
SA036C	8N26-2, PS-1	8N26-2, PS-2	8N26-2, PS3 & PS4
SA036D	8N26-1, PS-1	8N26-1, PS-2	8N26-1, PS3 & PS4
	8N28-1, PS-1		
SA036E	8N26-1, PS-1	8N26-1, PS-2	8N26-1, PS3 & PS4
	8N28-1, PS-1		

**CALLAWAY PLANT
RISK-INFORMED AMENDMENT REQUEST
24-HOUR BOP ESFAS COMPLETION TIME**

LAR Background

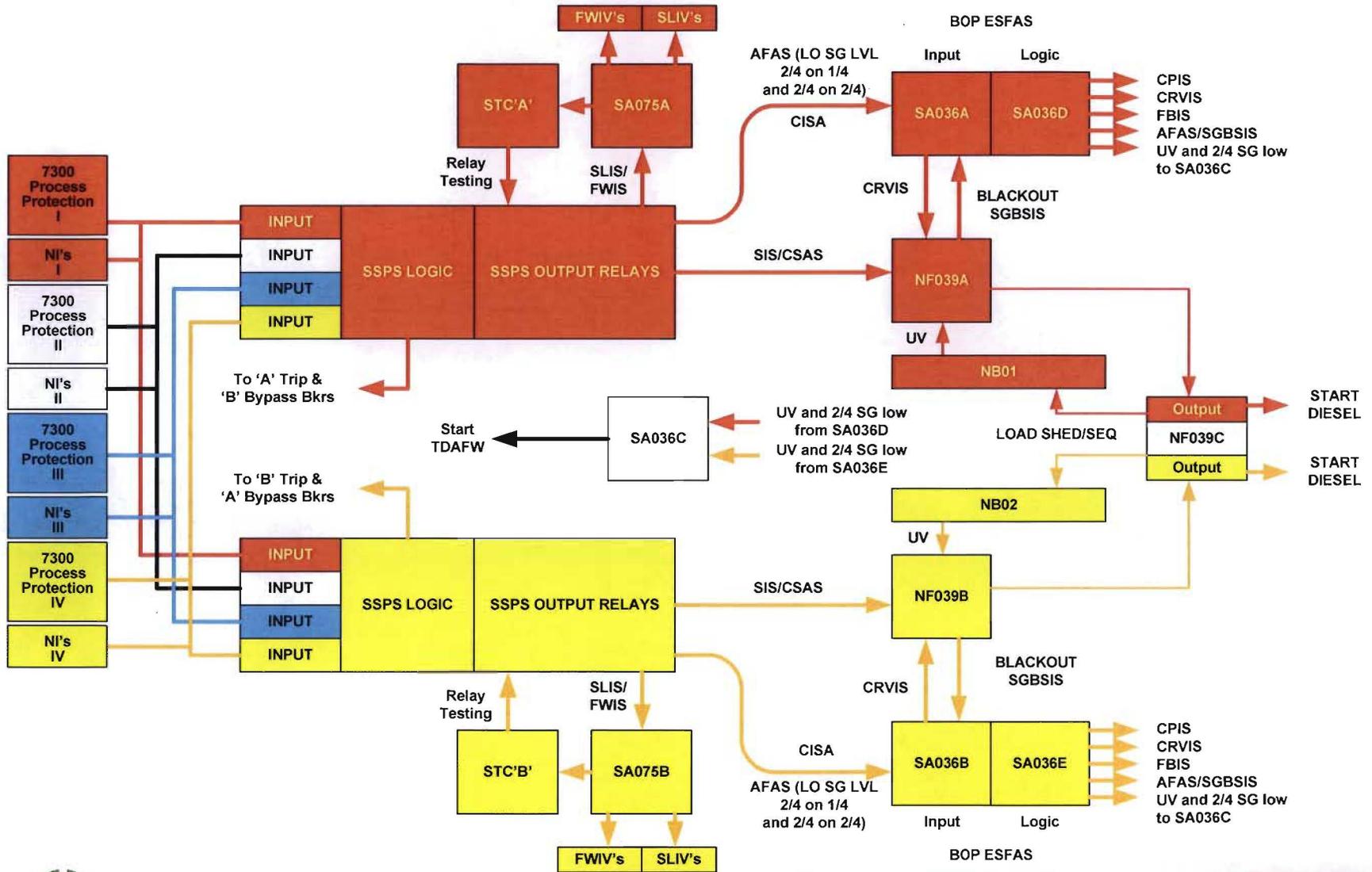
- WCAP-14333-P-A (TSTF-418-A)
- SSPS Maintenance Completion Time (CT) extended from 6 hours to 24 hours
- Callaway LA165 dated 1-31-05 (TAC No. MC1756)
- BOP ESFAS – Function 6.c TS Table 3.3.2-1, Condition 3.3.2.Q

**CALLAWAY PLANT
RISK-INFORMED AMENDMENT REQUEST
24-HOUR BOP ESFAS COMPLETION TIME**

LAR Background

- SG low level (2/4 in 1/4 SG for MDAFP start, 2/4 in 2/4 SGs for TDAFP start)
- BOP ESFAS also processes ESF bus undervoltage inputs for TDAFP start
- Survey of PWROG stations – only Callaway and Wolf Creek have this TS Condition (WC pursuing digital modification fall 2012)
- 24-hour CT for one inoperable SSPS logic train inconsistent with immediate MODE 4 shutdown track for one inoperable logic train of BOP ESFAS
- 7300 channels have a 72-hour CT, SSPS trains have a 24-hour CT, MSFIS cabinets (SA075A/B) have a 6-hour CT but 1/3 PLCs in each train can be inoperable without Condition 3.3.2.S entry, LSELS cabinets (NF039A-C) have a 12-hour CT (see next figure), yet BOP ESFAS has no restoration CT

CALLAWAY PLANT RISK-INFORMED AMENDMENT REQUEST 24-HOUR BOP ESFAS COMPLETION TIME



CALLAWAY PLANT RISK-INFORMED AMENDMENT REQUEST 24-HOUR BOP ESFAS COMPLETION TIME

BOP ESFAS TS and Bases markups

Information only (No changes proposed)

ESFAS Instrumentation
3.3.2

Table 3.3.2-1 (page 7 of 9)
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 SR 3.3.2.4 SR 3.3.2.6	NA
c. Automatic Actuation Logic and Actuation Relays (BOP ESFAS)	1,2,3	2 trains	O	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 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 20.6% ^(a) of Narrow Range Instrument Span
(2) Steam Generator Water Level Low-Low (Normal Containment Environment)	1 ^(a) , 2 ^(b) , 3 ^(b)	4 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 16.6% ^(a) of Narrow Range Instrument Span

- (a) The Allowable Value defines the limiting safety system setting except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 8.d.(1), and 8.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions). See the Bases for the Nominal Trip Setpoints.
- (f) Except when the Containment Pressure – Environmental Allowance Modifier channels in the same protection sets are tripped.
- (g) 1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test acceptance criteria band, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service. If the as-found instrument channel setpoint is not conservative with respect to the Allowable Value, the channel shall be declared inoperable.
2. The instrument channel setpoint shall be reset to a value that is within the as-left setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

CALLAWAY PLANT RISK-INFORMED AMENDMENT REQUEST 24-HOUR BOP ESFAS COMPLETION TIME

BOP ESFAS TS and Bases markups

ESFAS Instrumentation
3.3.2

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
P. One or more channel(s) inoperable.	P.1 Declare associated auxiliary feedwater pump(s) inoperable.	Immediately
Q. One train inoperable.	<p style="text-align: center;">----- NOTE -----</p> <p style="text-align: center;">One train may be bypassed for up to 2 hours for surveillance testing provided the other train is OPERABLE.</p> <p><i>INSERT 1</i> →</p> <p>Q.1.2.1 Be in MODE 3.</p> <p><u>AND</u> →</p> <p>Q.2.2.2 Be in MODE 4.</p>	<p>6 hours</p> <p><u>30</u></p> <p>42 hours</p> <p><u>36</u></p>
R. One or both train(s) inoperable.	<p>R.1 Restore train(s) to OPERABLE status.</p> <p><u>OR</u></p> <p>R.2.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>R.2.2 Be in MODE 4.</p>	<p>48 hours</p> <p>54 hours</p> <p>60 hours</p>

(continued)

INSERT 1

REQUIRED ACTION	COMPLETION TIME
Q.1 Restore train to OPERABLE status.	24 hours
<u>OR</u>	

CALLAWAY PLANT RISK-INFORMED AMENDMENT REQUEST 24-HOUR BOP ESFAS COMPLETION TIME

BOP ESFAS TS and Bases markups

ESFAS Instrumentation
B 3.3.2

BASES

ACTIONS
(continued)

N.1, N.2.1, and N.2.2

Condition N applies to the Environmental Allowance Modifier (EAM) circuitry for the SG Water Level - Low Low trip Functions in MODES 1, 2, and 3. With one or more EAM channel(s) inoperable, they must be placed in the tripped condition within 72 hours. Placing an EAM channel in trip automatically enables the SG Water Level - Low Low (Adverse Containment Environment) bistable for that protection channel, with its higher SG level Trip Setpoint (a higher trip setpoint means a feedwater isolation or an AFW actuation would occur sooner). The Completion Time of 72 hours is based on Reference 18. If the inoperable channel cannot be placed in the tripped condition within the specified Completion Time, the unit must be placed in a MODE where this Function is not required to be OPERABLE. The unit must be placed in MODE 3 within an additional six hours and in MODE 4 within the following six hours.

O.1 and O.2

Condition O applies to the Auxiliary Feedwater Pump Suction Transfer on Suction Pressure - Low trip Function. The Condensate Storage Tank is the highly reliable and preferred suction source for the AFW pumps. This function has a two-out-of-three trip logic. Therefore, continued operation is allowed with one inoperable channel until the performance of the next monthly COT on one of the other channels, as long as the inoperable channel is placed in trip within 1 hour.

P.1

Condition P applies to the Auxiliary Feedwater Manual Initiation trip Function. The associated auxiliary feedwater pump(s) must be declared inoperable immediately when one or more channel(s) is inoperable. Refer to LCO 3.7.5, "Auxiliary Feedwater (AFW) System."

Q.1, Q.2.1, and Q.2.2
~~Q.1 and Q.2~~

Condition Q applies to the Auxiliary Feedwater Balance of Plant ESFAS automatic actuation logic and actuation relays. ~~With one train inoperable, the unit must be brought to MODE 3 within 6 hours and MODE 4 within the following 6 hours. The Required Actions are modified by a Note that allows one train to be bypassed for up to 2 hours for surveillance testing provided the other train is OPERABLE.~~

INSERT 3.3.2.Q

INSERT 3.3.2.Q

If one train is inoperable, 24 hours are allowed to restore the train to OPERABLE status. The 24 hours allowed for restoring the inoperable train to OPERABLE status is justified in Reference 23. The specified Completion Time is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the inoperable train cannot be restored to OPERABLE status within 24 hours,

(continued)

CALLAWAY PLANT RISK-INFORMED AMENDMENT REQUEST 24-HOUR BOP ESFAS COMPLETION TIME

BOP ESFAS TS and Bases markups

ESFAS Instrumentation
B 3.3.2

BASES

- | | |
|---------------------------|---|
| REFERENCES
(continued) | 17. Letter from Mel Gray (NRC) to Garry L. Randolph (UE), "Revision 20 of the Inservice Testing Program for Callaway Plant, Unit 1 (TAC No. MA4469)," dated March 19, 1999. |
| | 18. WCAP-14333-P-A, Revision 1, "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times," October 1998. |
| | 19. WCAP-15376-P-A, Revision 1, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times," March 2003. |
| | 20. Westinghouse letter SCP-04-90 dated August 27, 2004. |
| | 21. ULNRC-03748 dated February 27, 1998. |
| | 22. IDP-ZZ-00017. |
| | <u>23. Callaway License Amendment XXX dated</u> |

**CALLAWAY PLANT
RISK-INFORMED AMENDMENT REQUEST
24-HOUR BOP ESFAS COMPLETION TIME**

PRA Model Discussion

- Current PRA Update for RG 1.200 Rev. 1
- Peer Review F&O impacts
 - One Significance Level A F&O, but flooding risk will be addressed in this BOP ESFAS LAR
 - None of the 30 open Significance Level B F&Os have a demonstrable effect on the presented risk information.

**CALLAWAY PLANT
RISK-INFORMED AMENDMENT REQUEST
24-HOUR BOP ESFAS COMPLETION TIME**

PRA Modeling

- Current Callaway PRA Model Includes Internal Events at Power
- Internal Flooding and Fire Modeling Under Development
 - PRA Model Upgrade will Integrate Internal Flooding and Internal Fire Events into the Callaway PRA
 - Similar approach used for ESW AOT amendment (i.e., areas screened out based on initiating event frequency or impact on AFW or ESW systems)
- External Events
 - Qualitatively addressed
 - Similar approach used for ESW AOT amendment

**CALLAWAY PLANT
RISK-INFORMED AMENDMENT REQUEST
24-HOUR BOP ESFAS COMPLETION TIME**

Preliminary Integrated Risk Results

- The yearly risk contribution from a single TS 3.3.2 Condition Q 24-hour entry per year

Risk Metric	Acceptance Guidance	Callaway Result			
		Internal	Flood	Fire	Total
ΔCDF	<1E-06 yr ⁻¹ – very small RG 1.174	7.205E-09	3.652E-09	5.478E-09	1.634E-8
ΔLERF	<1E-07 yr ⁻¹ – very small RG 1.174	2.466E-10	7.344E-12	1.102E-11	2.650E-10

**CALLAWAY PLANT
RISK-INFORMED AMENDMENT REQUEST
24-HOUR BOP ESFAS COMPLETION TIME**

Preliminary Integrated Risk Results

- The yearly risk contribution based on plant experience, failure rate is 0.22 event/year

Risk Metric	Acceptance Guidance	Callaway Result			
		Internal	Flood	Fire	Total
ΔCDF	<1E-06 yr ⁻¹ – very small RG 1.174	1.585E-09	8.035E-10	1.205E-09	3.594E-09
ΔLERF	<1E-07 yr ⁻¹ – very small RG 1.174	5.425E-11	1.616E-12	2.424E-12	5.829E-11

**CALLAWAY PLANT
RISK-INFORMED AMENDMENT REQUEST
24-HOUR BOP ESFAS COMPLETION TIME**

Preliminary Integrated Risk Results

- The single event risk contribution (i.e., one TS 3.3.2 Condition Q entry with 24-hour Completion Time)

Risk Metric	Acceptance Guidance	Callaway Result			
		Internal	Flood	Fire	Total
ICCDP	<5E-07 – RG 1.177	7.205E-09	3.652E-09	5.478E-09	1.634E-8
ICLERP	<5E-08 – RG 1.177	2.466E-10	7.344E-12	1.102E-11	2.650E-10

**CALLAWAY PLANT
RISK-INFORMED AMENDMENT REQUEST
24-HOUR BOP ESFAS COMPLETION TIME**

Meeting Conclusion

- Comments or Questions?
- Concluding Remarks

There were no public participants present, and no Public Meeting Feedback forms were submitted at the meeting.

If there are any questions or comments, please direct inquiries to me by telephone at 301-415-1476 or by electronic mail to Mohan.Thadani@nrc.gov.

/RA/

Mohan C. Thadani, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-483

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BMarcus, NRR/DE/EICB

CDoutt, NRR/DLR/RER2

CTucci, NRR

LTrocine, EDO RIV

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DATE	10/8/09	10/7/09	10/15/09	10/15/09

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