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ULNRC-2381

Gentlemen:

TAC No. 79969

DOCKET NUMBER 50-483
CALLAWAY PLANT
ENGINEERED SAFETY FEATURES ACTUATION SYSTEM

Union Electric Company herewith transmits an application for amendment to Facility Operating License No. NPF-30 for the Callaway Plant.

This amendment application includes revisions to Technical Specification Tables 3.3-1, 4.3-1, 3.3-3, and 4.3-2 and associated Bases to extend the allowable out-of-service times (AOTs) and surveillance test intervals (STIs) for the analog channels of the Engineered Safety Features Actuation System (ESFAS). Extended AOTs are also requested for the ESFAS actuation logic and actuation relays of the Solid State Protection System (SSPS). These changes are similar in nature to those previously reviewed and approved for the Reactor Trip System (RTS) via References 1 and 2. Editorial changes to Table 3.3-6 are also requested.

Changes are included for the STI and AOT associated with the analog channels for Functional Unit 6.d of Tables 3.3-3 and 4.3-2, Steam Generator Water Level Low-Low (for auxiliary feedwater actuation) and Functional Unit 7.b of Tables 3.3-3 and 4.3-2, RWST Level Low-Low Coincident with Safety Injection (for automatic switchover to the containment sump). The generic Westinghouse Owners Group Technical Specification Optimization Program (WOG TOP) did not analyze for the effects on unavailability and core damage frequency associated with the Environmental Allowance Modifier (EAM) and Trip Time Delay (TTD) added to the steam generator level analog channel circuitry, as discussed in References 6-8, nor did that program evaluate the effects

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associated with the RWST Level/automatic switchover function. Reference 5 demonstrates that the effects of the analog channel AOT and STI changes have a minimal impact on overall reliability and risk, based on the small relative contribution of analog channels in general to RTS/ESFAS unavailability. Changes for these Functional Units are discussed further in the attached safety evaluation.

The Callaway Plant On-Site Review Committee and the Nuclear Safety Review Board have reviewed this amendment application. Attachments 1 through 3 provide the Safety Evaluation, Significant Hazards Evaluation, and draft Technical Specification mark-ups, respectively, in support of this amendment request. This amendment application may result in a slight increase in the probability of core damage accidents over and above that previously evaluated in the FSAR; however, this small potential increase in accident probability has been accepted by the Staff and is insignificant when compared to the uncertainties in defining the core damage frequency. Implementation of these Technical Specification changes will not endanger the health or safety of the general public. It has been determined that this amendment application does not involve a significant hazard consideration as determined per 10CFR50.92.


The following is a list of references used in this cover letter and in Attachment 1, Safety Evaluation, of this amendment application:

1. ULNRC-1174 dated 10-16-85
2. Amendment No. 17 to Facility Operating License NPF-30 dated 9-8-86
3. USNRC letter from C.E. Rossi to R.A. Newton dated 2-22-89 (NRC Safety Evaluation for WCAP-10271 Supplement 2 and Supplement 2, Revision 1)
4. USNRC letter from C.E. Rossi to G.T. Goering dated 4-30-90 (NRC Supplemental Safety Evaluation for WCAP-10271 Supplement 2, Revision 1)
5. Westinghouse Owners Group letter to NRC OG-90-38 dated 7-20-90 (transmitting WCAP-10271, Supplement 2, Revision 1-P-A (updated), "Evaluation of Surveillance Frequencies and Out of Service Times for the Engineered Safety Features Actuation System")
6. ULNRC-1822 dated 8-30-88
7. ULNRC-1905 dated 2-7-89
8. Amendment No. 43 to Facility Operating License NPF-30 dated 4-14-89

9. ULNRC-2196 dated 4-12-90
10. Amendment No. 57 to Facility Operating License
NPF-30 dated 9-20-90

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

Very truly yours,


for Donald F. Schnell

GGY/dls

Attachments: 1 - Safety Evaluation
2 - Significant Hazards Evaluation
3 - Draft Technical Specification Mark-ups

STATE OF MISSOURI)
) S S
CITY OF ST. LOUIS)

Alan C. Passwater, of lawful age, being first duly sworn upon oath says that he is Manager, Licensing and Fuels (Nuclear) 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 Alan C. Passwater
Alan C. Passwater
Manager, Licensing and Fuels
Nuclear

SUBSCRIBED and sworn to before me this 19th day
of March, 1991.

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ATTACHMENT 1
SAFETY EVALUATION
FOR
ESFAS OPTIMIZATION

SAFETY EVALUATION

Background

In response to growing concerns over the impact of current testing and maintenance requirements on plant operation, particularly as related to instrumentation systems, the Westinghouse Owners Group (WOG) initiated a program to develop a justification to be used to revise generic and plant-specific instrumentation technical specifications. Operating plants have experienced many inadvertent reactor trips and safeguards actuations during performance of instrumentation surveillances, causing unnecessary transients and challenges to safety systems. Significant time and effort on the part of operating staffs have been devoted to performing, reviewing, documenting, and tracking the various surveillance activities, which in many instances seemed unwarranted based on the high reliability of the equipment. Therefore, significant benefits for operating plants appeared to be achievable through revision of instrumentation test and maintenance requirements.

On February 3, 1983, the WOG submitted WCAP-10271, "Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System" to the NRC as the first step in gaining approval of the Instrumentation Program. WCAP-10271 justifies revisions to plant-specific technical specifications. The justification consists of the deterministic and numerical evaluation of the effects of particular technical specification changes with consideration given to such things as safety, equipment requirements, human factors, and operational impact. The objective was to reach a balance in which safety and operability are ensured. The technical specification revisions evaluated were increased test and maintenance times, less frequent surveillance, and testing in bypass.

In July 1983, the NRC requested additional information from the WOG (letter from C.O. Thomas to J.J. Sheppard dated July 28, 1983). The WOG responded in October 1983 with Supplement 1 to WCAP-10271, which contained the additional information requested. Specifically, Supplement 1 demonstrates the applicability of the justification contained in WCAP-10271 to the Reactor Trip System (RTS) for two, three, and four loop plants with either relay or solid state logic. Additionally, this supplement extends the evaluation to topics not addressed in the original WCAP, such as the interdependence of surveillance intervals and hardware failure rates.

References 1 and 2 revised the Callaway RTS Instrumentation Technical Specification Tables 3.3-1 and 4.3-1 to increase the allowable out-of-service time (AOT) for the RTS analog channels and to extend the surveillance test interval (STI) for the analog channel operational tests (ACOTs). These changes were in accordance with WCAP-10271 and its Supplement 1, as per the NRC

Safety Evaluation Report (SER) dated February 21, 1985 which approved the following for RTS analog channels only:

- a) Quarterly STIs on a staggered test basis
- b) 6 hours to place an inoperable channel in a tripped mode
- c) increased AOTs for test (4 hours) and maintenance (12 hours), and
- d) testing in bypass

This SER specifically stated that for analog channels shared by the RTS and Engineered Safety Features Actuation System (ESFAS), the approved relaxations applied only to the RTS function.

In a letter dated July 24, 1985, from the NRC to L.D. Butterfield, Chairman of the WOG, comments were provided on the draft "Guidelines for Preparing Submittals Requesting Revision of Reactor Protection System Technical Specifications." Enclosure 3 of that letter provided a broader relaxation of the surveillance for shared components, subject to proper annotation of the surveillance requirements.

On March 20, 1986, the WOG submitted WCAP-10271, Supplement 2, "Evaluation of Surveillance Frequencies and Out of Service Times for the Engineered Safety Features Actuation System." On May 12, 1987, the WOG submitted WCAP-10271, Supplement 2, Revision 1. Supplement 2 and Supplement 2, Revision 1 specifically demonstrate the applicability of the justification contained in WCAP-10271 to the ESFAS for two, three, and four loop plants with either relay or solid state systems.

In Appendix D of WCAP-10271, Supplement 2, Revision 1, the results for extending the AOTs for testing and maintenance on the reactor trip breakers and the logic cabinets were presented.

On February 22, 1989, the NRC issued their SER for WCAP-10271, Supplement 2 and Supplement 2, Revision 1 (Reference 3). This SER approved the above changes a) - d) for the ESFAS analog channels. Staggered testing was not required for ESFAS analog channels and the requirement was removed from the RTS analog channels. In addition, the following changes were approved for the ESFAS automatic actuation logic and actuation relays:

- e) increased AOT for testing (4 hours for Solid State Protection System (SSPS) plants)
- f) increased AOT for maintenance (12 hours for both SSPS and relay system plants)

The ESFAS functions approved in the Reference 3 SER were those presented in Appendix A1 of Reference 5. These functions are included in the Westinghouse Standard Technical Specifications (STS).

On April 30, 1990, the NRC issued a Supplemental SER (SSER) on WCAP-10271, Supplement 2, Revision 1 (Reference 4). This SSER approved the AOT and STI extensions for the non-STS ESFAS functions that were included in Appendix A2 of Reference 5. The SSER also approved the above changes e) and f) for the RTS actuation logic. No changes were approved for the test and maintenance AOTs for the reactor trip breakers.

With the issuance of References 3 and 4, the relaxations for the analog channels of the RTS and ESFAS are now the same. The AOTs for test and maintenance of RTS and ESFAS actuation logic are also now the same.

Proposed Changes

This amendment application and Amendment No. 43 to the Callaway Facility Operating License (Reference 8) add new action statements to tables in Section 3/4.3 of the Technical Specifications. In order to avoid confusion, the action statement numbering is being revised to eliminate the duplicate use of action statement numbers (e.g., Action Statement 27(a) becomes Action Statement 35). The matrix below provides a listing of the new action statements, the changes from the numbering used in Amendment No. 43, and a change to avoid the duplicate use of number 27 in Tables 3.3-3 and 3.3-6. The action statement references given in the Technical Specifications have been changed to correspond to the following action statement numbers:

Table 3.3-1

Action Statement 31 - new number

Table 3.3-3

Action Statement 32 - new number

Action Statement 33 - new number

Action Statement 34 - new number

Action Statement 35 - Revised from number 27(a)
in Amendment No. 43

Action Statement 36 - Revised from number 27(b)
in Amendment No. 43

Action Statement 37 - Revised from number 27(c)
in Amendment No. 43

Table 3.3-6

Action Statement 38 - Revised from number 27 to
avoid duplication with
Table 3.3-3

These numbering changes are purely administrative in nature and do not represent any technical change to the manner in which the Technical Specifications are applied. They are intended to make the Technical Specifications more user-friendly.

Given the above background, this amendment application proposes to revise Technical Specification Tables 3.3-1, 4.3-1, 3.3-3, 4.3-2, and 3.3-6 as follows:

1. Tables 3.3-1 and 4.3-1, Functional Unit 14

Notes 1 and 15 are deleted from Tables 3.3-1 and 4.3-1, respectively, for Functional Unit 14. These notes deal with channels that are shared by both the RTS and ESFAS; however, Functional Unit 14 of Tables 3.3-1 and 4.3-1 (RCP Undervoltage Reactor Trip) is unrelated to Functional Units 6.f and 8 of Tables 3.3-3 and 4.3-2 (Loss of Offsite Power-Start Turbine Driven Auxiliary Feedwater Pump and Loss of Power). The former deals with 13.8 kV power supplies (buses PA01 and PA02) whereas the latter deal with 4.16 kV power supplies (buses NB01 and NB02). These notes were inadvertently added to Functional Unit 14 via References 1 and 2. It is noted that Table 3.6-9 of Reference 5 analyzed for unavailability effects on auxiliary feedwater pump start associated with RCP bus undervoltage and that this functional relationship is included in the standard Technical Specifications; however, this design does not apply to Callaway.

2. Table 3.3-1, Functional Units 17 and 20

Per Reference 4 and Appendix D to Reference 5, test and maintenance AOTs for SSPS logic cabinets are extended. New Action Statement 31 provides for these test and maintenance AOT extensions. The extended test AOT for the RTS logic surveillance includes bypassing the associated reactor trip breaker (i.e., racking in the bypass breaker) for 4 hours. Since Functional Unit 17 is implemented in the SSPS logic, given that the action statement changes on page D-7 of Reference 5 were approved in Reference 4, this new Action Statement 31 applies to both the RTS safety injection input from ESF as well as the automatic trip and interlock logic. Current Action Statement 9 will apply only to the reactor trip breakers, Functional Unit 19, and has been clarified as such.

3. Tables 3.3-1 and 4.3-1

With the approval of the ESFAS changes discussed in References 3-5, the AOT and STI for RTS and ESFAS analog channels are now the same. Note 1 of Table 3.3-1 and Note 15 of Table 4.3-1 have been revised appropriately.

4. Table 4.3-1

Per References 3 and 5, staggered testing is no longer required for RTS analog channels. Note 14 has been deleted appropriately.

5. Table 3.3-3

Per Reference 3 (which approved changes for ESFAS functions in the Westinghouse Standard Technical Specifications (STS), as given in Appendix A1 of Reference 5, i.e., Callaway Functional Units 1.c, 1.d, 2.c, and 3.b.3)) and Reference 4 (which approved changes for non-STs ESFAS functions, as given in Appendix A2 of Reference 5, i.e., Callaway Functional Units 1.e, 4.c, 4.d, 4.e, 5.b, and 6.d), AOTs for ESFAS analog channels are extended. Revised Action Statement 16 provides for an extended AOT (from 2 hours to 4 hours) for surveillance testing of analog channels of Functional Units 2.c and 3.b.3). New Action Statement 33 provides for 6 hours to place an inoperable channel in the tripped mode as well as an extended AOT (from 2 hours to 4 hours) for surveillance testing of analog channels of Functional Units 1.c, 1.d, 1.e, 4.c, 4.d, 4.e, 5.b, and 6.d (see item 11 below). New Action Statement 32 provides similar AOT extensions for Functional Unit 7.b, as further discussed in item 12 below. Current Action Statement 19 remains applicable to Functional Units 6.g, 8.a and 8.b which are associated with the Balance-of-Plant ESFAS (BOP-ESFAS) and the Load Shedding and Emergency Load Sequencing (LSELS) systems. These systems were not included in the Reference 5 analyses (see the discussion on ESFAS SER item 1.a below).

6. Table 3.3-3

Per Reference 3, AOTs for the ESFAS automatic actuation logic and actuation relays in the SSPS are extended. Revised Action Statement 14 provides for these test and maintenance AOT extensions for Functional Units 1.b, 2.b, 3.a.2), 3.b.2), and 7.a. New Action Statement 34 provides the same test and maintenance AOT extensions for Functional Units 4.b and 6.b. Current Action Statement 21 remains applicable to Functional Unit 6.c which is associated with the BOP-ESFAS, not included in the Reference 5 analyses (see the discussion on ESFAS SER item 1.a below). Revised Action Statement 27, applicable only to Functional Unit 5.a, also provides for the above test and maintenance AOT extensions. The requirement to be in at least HOT STANDBY within 12 hours in revised Action Statements 14 and 27 as well as in new Action Statements 31 and 34 reflects the approved 12 hour maintenance AOT.

7. Table 3.3-3, Functional Unit 6.g

The de-energization of one train of BOP-ESFAS actuation logic and actuation relays will render two of the four main feedwater pump pressure switches inoperable. This situation impacts both Functional Units 6.c and 6.g. Action Statement 21 for Functional Unit 6.c provides for operation with an AOT with one BOP-ESFAS logic train de-energized. However, operation is not permitted under current Action Statement 19 for Functional Unit 6.g with two pressure switches inoperable. As such, Specification 3.0.3 would be entered. Therefore, for clarification, a new *** footnote has been added that states that Action Statement 21 applies to both Functional Units 6.c and 6.g in this situation (i.e., applies to both the BOP-ESFAS logic and to the AFW start on trip of both main feedwater pumps if one train of BOP-ESFAS logic is de-energized).

8. Table 3.3-3, Action Statement 22

Action Statement 22 is clarified regarding the sequence of actions in a manner similar to Action Statements 1, 10, and 18.

9. Table 3.3-3, Action Statement 35

Action Statement 35 (previously 27(a) in Reference 8) is grammatically corrected such that the plurality of the object of a prepositional phrase matches that of the subject being described (i.e., "...channels in the affected protection sets..."). This is consistent with Action Statements 7 and 36 (previously 27(b) in Reference 8) and represents the changes as requested in Reference 7.

10. Table 4.3-2

As discussed in the background for item 5 above, quarterly STIs for analog channel operational testing (ACOT) were approved in References 3-5. Therefore, the STI for Functional Units 1.c, 1.d, 1.e, 2.c, 3.b.3), 4.c, 4.d, 4.e, 5.b, 6.d and 7.b (see item 11 below), and 11.a is changed from monthly to quarterly.

11. Tables 3.3-3 and 4.3-2, Functional Units 6.d and 7.b

AOT extensions for surveillance testing and STI extensions for the ACOT of analog channels of Functional Unit 7.b, RWST Level Low-Low Coincident with Safety Injection (for Automatic Switchover to Containment Sump), were not approved as a part of the generic Technical Specification Optimization Program (TOP) discussed in References 3-5 nor did the generic

program consider the effects of the Environmental Allowance Modifier (EAM) and Trip Time Delay (TTD) added to the steam generator level analog channel circuitry as discussed in References 6-8.

A separate evaluation was performed that demonstrates that the unavailability and risk results presented in Reference 5 for the AOT and STI increases analyzed therein are indicative of, or conservative with respect to, the results expected for increasing the AOT and STI of the analog channels of Functional Unit 7.b. Reference 5 demonstrates that the effects of the analog channel changes have a minimal impact on overall reliability and risk, based on the small relative contribution of analog channels in general to RTS/ESFAS unavailability. The unavailability of the RWST low-low-1 (2 out of 4) signal would be expected to be on the same order of magnitude as that for the OT-Delta T, OP-Delta T, and High Pressurizer Pressure reactor trip signals due to similarities in logic coincidence and circuit cards in the instrument loops. Table 4.4-3 of WCAP-10271-P-A establishes this value as $1\text{E-}4$. This approximate unavailability for the RWST low-low-1 signal is generally an order of magnitude less than the Case 1 SI signal unavailabilities given on Table 3.6-6 of Reference 5. Therefore, this separate evaluation concludes that the AOT and STI extensions for Functional Unit 7.b should be acceptable since the safety injection signal (SIS) unavailability, increases to which were reviewed and accepted by the Staff, would be expected to dominate the automatic switchover signal unavailability (i.e., slight increases in RWST level signal unavailability would be outweighed by the SIS unavailability whose coincidence is necessary for automatic switchover).

In addition to the generic conclusions regarding the relative insignificance of the analog channels to ESFAS unavailability, the AOT and STI extensions for Functional Unit 6.d are supported by the following considerations:

- i) As discussed in Section 3.4.2 of WCAP-11883, submitted via Reference 6 for the EAM/TTD modification, and as described in Section 5.5 of the RTD Bypass Licensing Report attached to Reference 9 (re: Delta-T input to TTD), the mean time between failure (MTBF) values for the 7300 printed circuit cards used in these modifications are sufficiently high that the reliability of the protection systems is not degraded.
- ii) Although the TTD timer modules are unique to Functional Unit 6.d (see also Functional Unit 13.c of Table 3.3-1), they are disabled above 20% rated thermal power as discussed in Reference 6.

- iii) Extended AOTs and STIs were approved for RTS Functional Unit 13 of Tables 3.3-1 and 4.3-1, Steam Generator Water Level Low-Low, in References 2 and 8. Since these level channels are common to both RTS and ESFAS, consistent AOTs and STIs are desirable. See the discussion of RTS SER item 2.d below.

12. Table 3.3-3, Functional Unit 7.b

New Action Statement 32 provides for 6 hours to place an inoperable channel in the tripped mode as well as an extended AOT (from 2 hours to 4 hours) for surveillance testing of analog channels of Functional Unit 7.b, if the channel is inoperable for any reason other than surveillance testing. The inoperable channel must be restored to OPERABLE status within 72 hours or the plant must be shut down. If the channel is inoperable because it is being tested, the channel may be tripped for up to 4 hours for the surveillance testing. Current Action Statement 16 does not apply to Functional Unit 7.b since testing or operation in bypass, other than as discussed in response to RTS SER item 2.c below, is not applicable to the RWST level channels due to the absence of bypass indication in the control room. Prior surveillance testing of these normally de-energized, energize-to-actuate channels has been performed with the tested channel's bistable in the tripped condition.

This new Action Statement would limit the duration that an RWST level channel could be tripped, due to its being inoperable or for testing, in order to limit the probability for automatic switchover to an empty containment sump upon receipt of an inadvertent safety injection signal (SIS) coincident with a single failure of another RWST level channel. This sequence of events, as shown in FSAR Figure 7.6-3, would start the RHR pumps, open the containment sump RHR suction valves and, after meeting the sump suction valve open position interlock, the RWST RHR suction valves would close. The 72 hour restoration time for an inoperable channel is consistent with that given in other Technical Specifications affecting RHR operability, e.g., 3.5.2 for one ECCS train inoperable and 3.8.1.1 for one diesel generator inoperable.

13. BASES 3/4.3.1 and 3/4.3.2

References 3-5 were added to the BASES with regard to ESFAS surveillance intervals and allowed outage times. A discussion of analog channel bypass testing was also added for clarification, consistent with the discussion of RTS SER item 2.c below.

14. Table 3.3-6

Action Statement 27 is renumbered to 38 as discussed above.

RTS and ESFAS SER Conditions

The proposed changes above are consistent with the NRC Staff letters cited as References 3 and 4. The Staff has stated that approval of these changes is contingent upon confirmation that certain conditions are met. Although WCAP-10271 Supplement 2 and Supplement 2, Revision 1 apply to the ESFAS instrumentation, it is our interpretation that conditions imposed in the SER for RTS instrumentation (WCAP-10271 and its Supplement 1) shall also be applied to the ESFAS where appropriate. Our responses to these SER conditions are provided below.

1. ESFAS SER Conditions (February 22, 1989):

- a. SER Condition - Confirm the applicability of the generic analyses to the plant.

Response - The methodology of WCAP-10271 and its supplements was applied to specific RTS and ESFAS functions implemented via the Westinghouse Solid State Protection System (SSPS).

At Callaway Plant, selected ESFAS functions are implemented via plant-specific features, such as the BOP ESFAS or the Load Shedding and Emergency Load Sequencing (LSELS) system. These systems are included on Technical Specification Tables 3.3-3 and 4.3-2.

A review was performed to assure that the functions used in the generic analysis and the employment of the SSPS to perform ESFAS functions, as described in the generic analysis, are applicable to the Callaway design. Based on this review, Action Statements and STIs for the following Functional Units in Tables 3.3-3 and 4.3-2 have not been changed:

- (1) Functional Unit 3.c (Containment Purge Isolation) - Implemented via the BOP ESFAS.
- (2) Functional Unit 6 (Auxiliary Feedwater) - Most of these sub-functions are implemented via the BOP ESFAS. Therefore, no changes are requested to Functional Units 6.c, 6.f, 6.g, and 6.h. Manual functions are not affected by the WOG program, thus Functional Unit 6.a is unchanged. Functional Units 6.b and 6.d are changed as described above. Functional Unit

6.e, Safety Injection, is changed by virtue of its Functional Units 1.c, 1.d, and 1.e being changed.

- (3) Functional Unit 8 (Loss of Power) - Not evaluated in Reference 5.
- (4) Functional Unit 9 (Control Room Isolation) - Implemented via the BOP ESFAS.
- (5) Functional Unit 10 (Solid State Load Sequencer) - Not evaluated in Reference 5.

A review was performed of the impact of extending the AOTs for those SSPS functions (i.e., steam generator level low-low, phase A containment isolation, safety injection, and SSPS logic) which provide input to plant-specific design features such as BOP ESFAS. Implementation of the following plant-specific functions is affected by any change in signal availability to or from the BOP ESFAS:

- (a) containment purge isolation (Functional Unit 3.c)
- (b) auxiliary feedwater initiation (Functional Unit 6.d)
- (c) control room ventilation isolation (Functional Unit 9)

No changes are proposed to the Technical Specification requirements for the BOP ESFAS actuation logic and relays (i.e., no changes are proposed for Functional Units 3.c.3), 6.c, or 9.c) and the unavailability of the BOP ESFAS itself remains unchanged. For the above functions (a) through (c), overall function unavailability is made up of two separate components representing SSPS unavailability and BOP ESFAS unavailability, the latter remaining unchanged. As reported in Tables 3.6-6 and 3.6-9 of Reference 5, typical unavailabilities for safety injection and auxiliary feedwater pump start increased by a factor of 3 to 6. Given that the BOP ESFAS unavailability does not change, the overall function unavailability increase would be bounded by the factor of 3 to 6 increase in SSPS unavailability, regardless of what value is assigned to the BOP ESFAS unavailability (typical value is $5E-04$). Similar conclusions can also be drawn for Functional Units 4 and 5 which are implemented via the Main Steam / Main Feedwater Isolation Actuation System.

Therefore, the overall impact of the changes in SSPS unavailability resulting from the generic technical specification changes on the affected plant-specific ESFAS functions remains within the bounds of the generic analysis.

- b. SER Condition - Confirm that any increase in instrument drift due to the extended STIs is properly accounted for in the setpoint calculation methodology.

Response - U.E. implemented a program to evaluate setpoint drift of RTS channels in accordance with the commitment in Reference 1. Based on this program, the values used in the setpoint methodology properly account for RTS channel drift associated with the extended STIs. For those ESFAS channels with extended STIs herein, a review of "as found" and "as left" data for each affected channel will be collected over a one year period after quarterly testing is begun. If necessary, setpoints and allowable values will be changed if this data indicates a need to do so. Based on our experience to date, we do not foresee this being the case.

2. RTS SER Conditions (February 21, 1985):

- a. SER Condition - The NRC Staff stated in the RTS SER, dated February 21, 1985, that approval of an increase in STI for the analog channel operational tests from once per month to once per quarter is contingent upon performance of the testing on a staggered test basis.

Response - In the ESFAS SER, this provision was not required for ESFAS channels and the requirement was removed from the RTS channels. The proposed changes remove the staggered testing requirement from the RTS analog channel operational tests.

- b. SER Condition - The Staff stated in the RTS SER that approval of items related to extending STIs is contingent upon procedures being in place to require evaluation of RTS channel failures for common cause and to require additional testing if necessary.

Response - As stated in Reference 1, U.E. has implemented procedures to evaluate failures of RTS channels with quarterly ACOTs for common cause. If common cause failures are found, additional testing is required. These procedures will now be applied to both the RTS and ESFAS channels with quarterly ACOTs.

- c. SER Condition - The NRC Staff stated in the RTS SER that approval of routine channel testing in a bypassed condition is contingent upon the capability of the RTS design to allow such testing without lifting leads or installing temporary jumpers.

Response - With the exception of the containment pressure (High-3) channels (see Action Statement 16) for containment spray actuation and phase B containment isolation, Callaway does not have the capability to perform surveillance testing on a routine basis.

with an analog instrumentation channel in a bypassed condition. Therefore, the proposed changes to the ESFAS Technical Specifications do not provide for the routine testing of channels in bypass when the use of jumpers or lifted leads is required. New Action Statements 32 and 33 have been added to Table 3.3-3 to allow up to a 4 hour bypass of an inoperable channel in order to perform surveillance testing of other channels in the same functional unit. With regard to existing Action Statement 19 and to new Action Statements 32 and 33 for ESFAS, as well as to Action Statements 2 and 6 for RTS, the testing in bypass allowance is based on an interpretation that this applies to cases where the bypassed condition is the state when a failed channel can be taken out of the test mode (in which a channel trip was forced on the protection system) and returned to operation. Due to the failed nature of the channel, the channel cannot be assumed to be operable and is, therefore, considered to be in a state of bypass when the channel failure is such that its bistable is not tripped.

- d. SER Condition - The Staff stated in the RTS SER that for channels which provide dual inputs to other safety-related systems, such as ESFAS, the approval of items that extend STIs and AOTs applies only to the RTS function.

Response - The extensions now approved for the ESFAS analog channels are the same as for RTS. Therefore, Tables 3.3-1 and 4.3-1 have been revised accordingly, as discussed above.

- e. SER Condition - Same as ESFAS SER Condition 1.b above.

Response - Same response as provided for ESFAS SER Condition 1.b above.

3. SSER Conditions (April 30, 1990):

- a. SSER Condition - Same as ESFAS SER Condition 1.a above.

Response - Same response as provided for ESFAS SER Condition 1.a above.

- b. SSER Condition - Same as ESFAS SER Condition 1.b above.

Response - Same response as provided for ESFAS SER Condition 1.b above.

Evaluation

The extension of AOTs and STIs for the ESFAS analog channels and AOTs for the actuation logic and relays may result in a slight increase in the probability of core damage accidents over and above that previously evaluated in the FSAR.

Implementation of the proposed changes may result in a small increase in ESFAS unavailability which could manifest itself in a slight increase in core damage frequency (CDF). This small potential increase in accident probability has been accepted by the Staff (References 3 and 4) when compared to the range of uncertainty in the CDF and to the net benefits to be gained by these changes.

In WCAP-10271 and its supplements, the WOG evaluated the impact of the proposed STI and AOT changes on CDF and public risk. The NRC Staff concluded in its evaluation of the WOG analyses that an overall upper bound of the CDF increase due to the proposed STI/AOT changes is less than 6 percent for Westinghouse PWRs. The Staff also concluded that actual CDF increases for individual plants are expected to be substantially less than 6 percent. The Staff considered this CDF increase to be small when compared to the range of uncertainty in the CDF analyses and, therefore, acceptable.

Additionally, the Staff concluded that a staggered test strategy need not be implemented for ESFAS analog channel testing and is no longer required for RTS analog channel testing. This conclusion was based upon the small relative contribution of the analog channels to RTS/ESFAS unavailability, process parameter signal diversity, and normal operational testing sequencing. In addition, the commitment to evaluate channel failures for common cause will address this issue.

The change to add new Action Statement 32 to Functional Unit 7.b of Table 3.3-3 will reduce the probability for an automatic switchover to an empty containment sump in the event that, while an RWST level channel were inoperable or were being tested with its bistable tripped, an inadvertent safety injection signal occurred along with a single failure of a second RWST level channel. These channels do not have the design for operation or testing in bypass needed for Action Statement 16 to be applicable. These channels do not have a bypass switch position nor would control room indication be given for any temporary bypass (e.g., by pulling cards). In changing to new Action Statement 32, there is now a limit on the duration that a channel could be inoperable or be in test with its bistable tripped.

The possibility of an accident or malfunction of a different type than any previously evaluated in the FSAR is not created.

The proposed changes do not involve any design changes or hardware modifications. Increased SFTs and AOTs and allowed testing in the bypass mode will be accomplished with the present plant configuration. With the exception of the containment pressure High-3 channels, Callaway does not have the capability to perform surveillance testing on a routine basis with an analog instrumentation channel in a bypassed condition. In the future, should we elect to provide additional bypass testing capabilities, plant modifications will be required. Any future bypass testing modification would be accomplished without reliance upon lifted leads or jumpers and status indication would be provided to plant operators in the control room.

There will be no reduction in the margin of safety as defined in the basis of any technical specification. The proposed changes do not alter the manner in which safety limits, limiting safety system settings, or limiting conditions for operation are determined. The impact of reduced testing, other than as described above, is to allow a longer time interval over which instrument uncertainties (e.g., drift) may act. The commitment to monitor the effects of drift addresses this concern.

As discussed in WCAP-10271, increasing the STI for the ESFAS instrumentation minimizes the potential number of inadvertent ESFAS actuations and reactor trips during surveillance testing. Less frequent surveillance testing has been estimated by Westinghouse to result in 0.5 fewer inadvertent reactor trips, per unit, per year. Also, increasing the surveillance interval enhances the operational effectiveness of plant personnel. The amount of time plant personnel spend performing surveillance testing will be reduced. This allows manpower to be used for other tasks, such as preventive maintenance. The increased AOTs have been shown to result in fewer human factor errors, since more time is allowed to perform the needed actions.

In conclusion, there may be a slight increase in the probability of core damage accidents over and above that previously evaluated in the FSAR; however, any potential increase would be minimal when compared to the uncertainty ranges involved and has been accepted by the Staff. The possibility for an accident or malfunction of a different type than any previously evaluated in the FSAR is not created. There will be no reduction in the margin of safety as defined in the basis of any technical specification. The proposed revisions will reduce the number of ESFAS actuations and reactor trips and will allow better management of resources to maintain the plant. Additional changes of an editorial or clarification nature have been proposed as discussed in the Proposed Changes section above (i.e., changes 1, 7, 8, 9, and 14).

Based on the NRC evaluations of WCAP-10271 and its supplements and the discussion of the various SER conditions above, there is reasonable assurance that the proposed changes will not adversely affect or endanger the health or safety of the general public.

ULNRC- 2381

ATTACHMENT 2
SIGNIFICANT HAZARDS EVALUATION
FOR
ESFAS OPTIMIZATION

SIGNIFICANT HAZARDS EVALUATION

This amendment application includes revisions to Technical Specification Tables 3.3-1, 4.3-1, 3.3-3, 4.3-2, and 3.3-6 to extend the allowable out-of-service times (AOTs) and surveillance test intervals (STIs) for the analog channels of the Engineered Safety Features Actuation System (ESFAS). Extended AOTs for the ESFAS actuation logic and actuation relays in the Solid State Protection System (SSPS) are also requested. In addition, changes of an editorial or clarification nature have also been proposed. Union Electric has reviewed the requirements of 10CFR50.92 as they relate to the proposed Reactor Trip System (RTS) and ESFAS technical specification changes for Callaway Plant and has determined that no significant hazard consideration is involved.

The proposed changes do not involve a significant hazards consideration because operation of Callaway Plant in accordance with these changes would not:

- (1) Involve a significant increase in the probability or consequences of an accident previously evaluated. The determination that the results of the proposed changes are acceptable was established in the NRC Safety Evaluation Report (SER) and Supplemental SER (SSER) prepared for WCAP-10271 Supplement 2 and WCAP-10271 Supplement 2, Revision 1 (issued by letters dated February 22, 1989 and April 30, 1990). Implementation of the proposed changes is expected to result in an insignificant impact on total ESFAS unavailability. This impact, which is primarily due to less frequent surveillance, may result in a small increase (less than 6 percent) in core damage frequency (CDF). The values determined by the Westinghouse Owners Group (WOG) and presented in the above WCAP for the increase in CDF were verified by Brookhaven National Laboratory as part of an audit and sensitivity analyses for the NRC Staff. Based on the small value of the potential increase compared to the range of uncertainty in the CDF, the impact was considered to be acceptable. Applicability of these conclusions to Callaway has been verified through a plant-specific review and implementation of the generic analysis results in accordance with the NRC SER and SSER conditions.

Additionally, the NRC Staff concluded that a staggered test strategy need not be implemented for ESFAS analog channel testing and is no longer required for RTS analog channel testing. This conclusion was based upon the small relative contribution of the analog channels to RTS/ESFAS unavailability, process parameter signal diversity, and normal operational test sequencing. In addition, a commitment made to evaluate channel failures for common cause will address this issue.

The new Action Statement 32 for Functional Unit 7.b of Table 3.3-3, Automatic Switchover to Containment Sump on RWST Level Low-Low Coincident with Safety Injection, reflects current plant design and testing practice. It also limits the probability for an automatic switchover transient to an empty containment sump for a scenario involving a tripped RWST level channel, due to its being inoperable or being tested with its bistable tripped, followed by an inadvertent safety injection signal and a single failure of a second RWST level channel.

- (2) Create the possibility of a new or different kind of accident from any previously analyzed. The proposed changes will not result in physical alteration to any plant system nor will there be a change in the method by which any safety-related plant system performs its safety function.
- (3) Involve a significant reduction in a margin of safety. The proposed changes do not alter the manner in which safety limits, limiting safety system settings, or limiting conditions for operation are determined. The impact of reduced testing, other than as addressed above, is to allow a longer time interval over which instrument uncertainties (e.g., drift) may act. The commitment to monitor the effects of drift will address this concern. Implementation of the proposed changes is expected to result in an overall improvement in safety, as follows:
 - a. Reduced testing will result in fewer inadvertent reactor trips, less frequent actuation of ESFAS components, and less frequent distraction of operations personnel.
 - b. Improvements in the effectiveness of the operating staff in monitoring and controlling plant operation will be realized. This is due to less frequent distraction of the operators and shift supervisor to attend to instrumentation testing.
 - c. Longer repair times associated with increased AOTs will lead to higher quality repairs and improved reliability.

Based on the above discussions, it has been determined that the proposed Technical Specification revisions do not involve a significant increase in the probability or consequences of an accident previously evaluated; or create the possibility of a new or different kind of accident; or involve a significant reduction in a margin of safety. Therefore, this amendment application does not involve a significant hazards consideration.