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W3F1-2022-0054 10 CFR 50.90

November 1, 2022

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

Subject: Revise Technical Specification 3/4.3.2 to Remove Exemption From Testing Certain Relays at Power to Support Elimination of Potential Single Point Vulnerability

Waterford Steam Electric Station, Unit 3
NRC Docket No. 50-382
Renewed Facility Operating License No. NPF-38

In accordance with Title 10 of the Code of Federal Regulations (10 CFR) Part 50.90, "Application for amendment of license, construction permit, or early site permit," Entergy Operations, Inc. (Entergy) is submitting a request for an amendment to the Technical Specifications (TSs) for the Waterford Steam Electric Station, Unit 3 (Waterford 3). The proposed amendment would revise TS 3/4.3.2 Table 4.3-2, "Engineered Safety Features Actuation System Instrumentation Surveillance Requirements," Table Notation (3), to remove the exemption from testing relays K114, K305, and K313 at power.

On September 29, 2022, a public Observation Meeting (Reference 1) was held between the U.S. Nuclear Regulatory Commission (NRC) staff and representatives of Entergy to discuss the proposed change to TS 3/4.3.2 Table 4.3-2. The proposed change supports the Engineered Safety Features Actuation System (ESFAS) single point vulnerability (SPV) trip hardening modification which will reduce the likelihood of an inadvertent component actuation caused by a single failure.

Entergy had previously submitted a license amendment request (LAR) on December 6, 2017 (Reference 2), supplemented by letter dated June 29, 2018 (Reference 3), to revise TS 3/4.3.2 Table 4.3-2, Table Notation (3), to support the ESFAS SPV trip hardening modification. However, the LAR was subsequently withdrawn on December 20, 2018 (Reference 4) due to delays in obtaining the components to complete the modification. In the NRC withdrawal acknowledgement letter (Reference 5), it was identified that a partial review of the technical aspects of the request was conducted and documented in ADAMS Accession No.

ML18362A312 (not publicly available). The change proposed in this LAR is technically consistent with the LAR that was withdrawn and documented in Reference 5.

Entergy has concluded that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92, "Issuance of amendments."

This letter contains no new regulatory commitments.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b), a copy of this letter, with Enclosure and attachments, is being provided to the designated State Officials.

Entergy requests approval of the proposed license amendment by September 30, 2023, to support implementation of the SPV trip hardening modification during Refueling Outage 25 (RF25), which is scheduled for Fall 2023. Once approved, the amendment will be implemented prior to startup from RF25.

Should you have any questions or require additional information, please contact Leia Milster, Regulatory Assurance Manager, Waterford 3, at 504-739-6250.

I declare under penalty of perjury, that the foregoing is true and correct.
Executed on November 1, 2022.

Respectfully,

Philip Couture

Digitally signed by Philip Couture
Date: 2022.11.01 15:27:39 -05'00'

Phil Couture

PC/cdm

Enclosure: Analysis of Proposed Technical Specification Change

Attachments to Enclosure

1. Technical Specification Page Markup
2. Technical Specification Page Retyped
3. Cross Reference of Current to Historical Equipment Descriptions and Designations Related to ESFAS Single Point Vulnerability Trip Hardening Modification

References:

1) U.S. Nuclear Regulatory Commission (NRC) "Notice of Meeting with Entergy Operations, Inc. Regarding Waterford Steam Electric Station, Unit 3," (ADAMS Accession No. ML22272A046), dated September 29, 2022

2) Entergy Operations, Inc. (Entergy) letter to NRC, "License Amendment Request to Remove Technical Specification 3/4.3.2 Table 4.3-2 Note 3 Exemption for Testing Relays K114, K305, and K313," (ADAMS Accession No. ML17340B321), dated December 6, 2017

3) Entergy letter to NRC, "Supplemental Information Supporting the License Amendment Request to Remove Technical Specification 3/4.3.2 Table 4.3-2 Note 3 Exemption for Testing Relays K114, K305, and K313," (ADAMS Accession No. ML18180A271), dated June 29, 2018

4) Entergy letter to NRC, "Withdrawal of License Amendment Request to Remove Technical Specification 3/4.3.2 Table 4.3-2 Note 3 Exemption for Testing Relays K114, K305, and K313," (ADAMS Accession No. ML18354B283), dated December 20, 2018

5) NRC letter to Entergy, "Waterford Steam Electric Station, Unit 3 – Withdrawal of Amendment Request to Revise Technical Specification 3/4.3.2 to Relocate Surveillance Frequency Requirements for Engineered Safety Feature Actuation System Subgroup Relays to the Surveillance Frequency Control Program," (ADAMS Accession No. ML19009A362), dated January 24, 2019

cc: NRC Region IV Regional Administrator
NRC Senior Resident Inspector – Waterford Steam Electric Station, Unit 3
NRC Project Manager Waterford Steam Electric Station, Unit 3
Louisiana Department of Environmental Quality

Enclosure

W3F1-2022-0054

Analysis of Proposed Technical Specification Change

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Waterford 3 Steam Electric Station
Analysis of Proposed Technical Specification Change

1.0 DESCRIPTION

In accordance with Title 10 of the Code of Federal Regulations (10 CFR) Part 50.90, "Application for amendment of license, construction permit, or early site permit," Entergy Operations, Inc. (Entergy) is submitting a request for an amendment to the Technical Specifications (TSs) for the Waterford Steam Electric Station, Unit 3 (Waterford 3). The proposed amendment would revise TS 3/4.3.2 Table 4.3-2, "Engineered Safety Features Actuation System Instrumentation Surveillance Requirements," Table Notation (3) (hereinafter referred to as Note 3), to remove the exemption from testing relays K114, K305, and K313 at power.

On September 29, 2022, a public Observation Meeting (Reference 1) was held between the U.S. Nuclear Regulatory Commission (NRC) staff and representatives of Entergy to discuss the proposed change to TS 3/4.3.2 Table 4.3-2. The proposed change supports the Engineered Safety Features Actuation System (ESFAS) single point vulnerability (SPV) trip hardening modification which will reduce the likelihood of an inadvertent component actuation caused by a single failure.

Entergy had previously submitted a license amendment request (LAR) on December 6, 2017 (Reference 2), supplemented by letter dated June 29, 2018 (Reference 3), to revise TS 3/4.3.2 Table 4.3-2, Note 3, to support the ESFAS SPV trip hardening modification. However, the LAR was subsequently withdrawn on December 20, 2018 (Reference 4) due to delays in obtaining the components to complete the modification. In the NRC withdrawal acknowledgement letter (Reference 5), it was identified that a partial review of the technical aspects of the request was conducted and documented in ADAMS Accession No. ML18362A312 (not publicly available). The change proposed in this LAR is technically consistent with the LAR that was withdrawn and documented in Reference 5.

The hardware changes associated with the ESFAS SPV trip hardening modification will be implemented in accordance with 10 CFR 50.59, "Changes, tests, and experiments." NRC approval of the TS 3/4.3.2 Table 4.3-2, Note 3, change supports the 50.59 evaluation because after the modification, relays K114, K305, and K313 will be capable of being tested at power. This LAR includes information on the ESFAS SPV trip hardening modification to aid the NRC in evaluating the acceptability of the TS change.

For this submittal, the subgroup relays for Train A (K114A, K305A, and K313A) and Train B (K114B, K305B, and K313B) are referred to collectively as K114, K305, and K313 for simplicity. Where used, the simplified designator refers to both trains (e.g., K114 = K114A and K114B).

2.0 PROPOSED CHANGE

The change to TS 3/4.3.2 Table 4.3-2, Note 3, removes ESFAS relays K114, K305, and K313.

Note 3 currently states:

> A subgroup relay test shall be performed which shall include the energization/deenergization of each subgroup relay and verification of the OPERABILITY of each subgroup relay. Relays K109, K114, K202, K301, K305, K308 and K313 are exempt from testing during power operation but shall be tested in accordance with the Surveillance Frequency Control Program and during each COLD SHUTDOWN condition unless tested within the previous 62 days

Note 3 is revised to state:

> A subgroup relay test shall be performed which shall include the energization/deenergization of each subgroup relay and verification of the OPERABILITY of each subgroup relay. Relays K109, K202, K301 and K308 are exempt from testing during power operation but shall be tested in accordance with the Surveillance Frequency Control Program and during each COLD SHUTDOWN condition unless tested within the previous 62 days.

An editorial change is proposed by adding a period (".") to the last sentence in Note 3.

Attachments 1 and 2 to this Enclosure contain the marked-up and clean retyped TS pages for this proposed change.

Once the ESFAS SPV trip hardening modification is implemented, the ESFAS relays K114, K305, and K313 (and the Main Steam Isolation Signal (MSIS) and Containment Spray Actuation Signal (CSAS) relays added by the modification) will be tested online. Therefore, the exemption from testing at power will no longer be needed. The ESFAS relays K114, K305, and K313 (and the added MSIS and CSAS relays) will be controlled in accordance with the Surveillance Frequency Control Program. The Waterford 3 Surveillance Frequency Control Program was approved by the NRC in Amendment No. 249 (Reference 6). Specifically, with the removal of the exemption, the MSIS subgroup relays will be covered by Technical Specification Table 4.3-2 Item 4.d and the CSAS subgroup relays will be covered by Technical Specification Table 4.3-2 Item 2.c. The ESFAS relays K114, K305, and K313 (and the added MSIS and CSAS relays) will be initially designated such that each train or logic channel shall be tested at least every 62 days on a staggered test basis under the Surveillance Frequency Control Program.

Attachment 3 to this Enclosure contains a cross reference between historical and current equipment descriptions and designations for the equipment related to the ESFAS SPV trip hardening modification.

3.0 BACKGROUND

3.1 ESFAS Single Point Vulnerability Trip Hardening

The ESFAS is designed to provide initiating signals for components which require automatic actuation following a design basis accident. The safety related function of the ESFAS consists of electrical and mechanical devices and circuitry generating those signals to automatically actuate the appropriate Engineered Safety Features (ESF) systems to mitigate the effects of certain accidents. As described in the Waterford 3 Updated Final Safety Analysis Report (UFSAR) (Reference 7), Section 7.3.1, the actuation systems consist of the sensors, logic, and actuation circuits that monitor selected plant parameters and provide an actuation signal to each individual actuated component in the ESF system if these plant parameters reach preselected setpoints.

ESFAS actuation subgroup relays associated with the Main Steam Isolation Valves (MSIVs) and Main Feedwater Isolation Valves (MFIVs) (relays K305 and K313) and the Component Cooling Water (CCW) isolation valves (relay K114) were identified as SPVs because a single failure of one of these relays could cause an ESFAS actuation. ESFAS actuation subgroup relays K305 and K313 are actuated on the receipt of an MSIS and ESFAS actuation subgroup relay K114 is actuated on receipt of a CSAS. The actuation of these relays would have undesirable consequences for the plant. Following this change, any single failure of the affected actuation subgroup relays will neither cause a spurious ESFAS actuation nor prevent a proper ESFAS actuation.

As described in UFSAR Section 10.3.1, the Main Steam Supply System is designed to convey steam generated in the two Steam Generators (SGs), through the containment vessel in two separate lines, to the high pressure turbine and to other auxiliary equipment for power generation. Main steam isolation is achieved by actuating the MSIVs. In UFSAR Section 7.3.1.1.5, the MSIS is described as providing both main steam isolation and main feedwater supply isolation. The Condensate and Feedwater Systems (CFWS) are isolated from the SGs by closing the hydraulic/pneumatic operated MFIVs upon receipt of an MSIS, as described in UFSAR Section 10.4.7.2. The configuration of the MFIVs is similar to that of the MSIVs.

As described in UFSAR Section 7.3.1.1.3, the Containment Spray System (CSS) is designed to operate during accident conditions to remove heat from the containment atmosphere, and containment spray is automatically actuated by a CSAS from the ESFAS. The CCW penetrations servicing the Reactor Coolant Pump (RCP) and Control Element Drive Mechanism coolers are automatically closed on a CSAS, as described in Section 6.2.4.1.1 of the UFSAR.

The ESFAS SPV trip hardening modification installs permissive relays to create a parallel 2 out of 2 logic scheme. A key component in the design is utilizing both trip legs of ESFAS. As shown on UFSAR Figures 7.2-17 and 7.3-5 (Reference 7), there are two separate "trip legs" within the Auxiliary Relay Cabinets (ARCs). The left half of the UFSAR Figures consists of components physically mounted in ARC bays 1, 2, 7, and 8. The right half is a separate trip leg, consisting of components mounted in bays 5, 6, 3, and 4. Additional immunity from inadvertent actuation will be provided by combining the existing actuation relay and permissive relays from the different actuation groups (trip legs). The negative polarity return to the ESFAS ARC power supplies is "split" on the bottom, such that loss of a power supply pair, opening of a power supply breaker, or shorting across a subgroup relay on one trip leg will actuate the components on that leg, but will not impact the other leg, as shown on the UFSAR Figures. This was done to provide some immunity to component failures such that a complete train actuation will not occur unless both trip legs are deenergized. In cases where two components are required to effect an actuation function, such as starting of a High Pressure Safety Injection (HPSI) pump and opening of the cold leg HPSI header isolation valves on a Safety Injection Actuation Signal (SIAS), the intent is to assign the pump to one trip leg and the valves to the other, so that relay or associated component failures in a single trip leg will not cause a full ESFAS function actuation. The subgroup relays (K305, K313, and K114) identified as SPVs were not configured in this manner. Deenergization of a single subgroup relay would actuate the associated components, and the configuration of these components is such that the full component actuation would occur without the need to actuate another relay. This makes the associated components (e.g., MSIVs) susceptible to actuation upon a single failure.

The ESFAS SPV trip hardening modification incorporates permissive relays K105, K205, and K404 for the MSIS components actuated by relays K305 and K313, and incorporates permissive relays K208, K405 and K406 for the CSAS components actuated by relay K114. This change provides similar immunity to inadvertent actuation as that already provided to other ESFAS components by virtue of the "valve group" and "pump group" ESFAS design feature. By using 4 relays, 2 from each group, an OR feature ("parallel" logic) for parallel 2 out of 2 logic is created thereby eliminating the possibility that a single relay failure can prevent ESF actuation when necessary.

The following table lists the subgroup relays that have been selected for trip hardening along with the components that are actuated when the associated relay is deenergized:

Subgroup Actuation Relays and Affected Components

Actuation Relay	Subgroup	ESF Component	ESF Description
K305A	MSIS MSIS MSIS MSIS	MS-124A FW-184A FW -173A FW-166A	Main Steam Isolation Valve 1 SG1 Main Feedwater Isolation Valve SG1 Main Feedwater Regulating Valve SG1 Startup Feedwater Regulating Valve
K313A	MSIS MSIS MSIS MSIS	MS-124B FW-184B FW -173B FW-166B	Main Steam Isolation Valve 2 SG2 Main Feedwater Isolation Valve SG2 Main Feedwater Regulating Valve SG2 Startup Feedwater Regulating Valve
K114A	CSAS	CC-710	CCW Return Header Inside Containment Isolation Valve
K305B	MSIS MSIS MSIS MSIS	MS-124A FW-184A FW -173A FW-166A	Main Steam Isolation Valve 1 SG1 Main Feedwater Isolation Valve SG1 Main Feedwater Regulating Valve SG1 Startup Feedwater Regulating Valve
K313B	MSIS MSIS MSIS MSIS	MS-124B FW-184B FW -173B FW-166B	Main Steam Isolation Valve 2 SG2 Main Feedwater Isolation Valve SG2 Main Feedwater Regulating Valve SG2 Startup Feedwater Regulating Valve
K114B	CSAS CSAS	CC-713 CC-641	CCW Return Header Outside Containment Isolation Valve CCW to Containment Outside Containment Isolation Valve

With the exception of the trip hardening of the cited relays to improve reliability, the ESFAS functionality remains identical to that described in the Waterford 3 UFSAR (Reference 7). Since the hardware required for safety is located in the Train A and Train B ARCs, there is no change to the qualification envelope or environment. The devices being used are qualified for their intended purpose. From an actuation logic perspective, the permissive relay coil is connected in parallel with the existing primary relay coil; therefore, the response times for the MSIS and CSAS functions are unchanged and remain as defined in Waterford 3 Technical Requirements Manual Table 3.3-5, which is the licensee controlled document where the current ESF response time limits reside. The revised ESFAS design remains in compliance with the 10 CFR Part 50, Appendix A, General Design Criteria (GDCs); Institute of Electrical and Electronics Engineers (IEEE) Standard 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations," IEEE Standard 338-1971, "Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems," and Regulatory Guide (RG) 1.22, "Periodic Testing of Protection System Actuation Functions" (Reference 8), as described in the UFSAR Section 7.3.2 ESFAS and instrumentation analysis.

3.2 Technical Specification 3/4.3.2 Table 4.3-2, Note 3, History

The existing TS 3/4.3.2 Table 4.3-2, Note 3, was included in the Waterford 3 TSs as originally provided in the Waterford 3 Low Power TSs (NUREG-0973) (Reference 9) and High Power TSs (NUREG-1117) (Reference 10). It was included as the result of a review performed following an NRC request (Reference 11) that Waterford 3 review its ESFAS testing commitments against the provisions of RG 1.22 and IEEE 338-1971. Specifically, it was asked that Waterford 3 provide a list of any ESFAS actuation devices, and actuated equipment associated with each, that cannot be tested during plant operation.

In letter W3P83-2273 (Reference 12), Waterford 3 responded to the NRC’s request, stating that the system complies with GDC 21, "Protection system reliability and testability," in that the protection system as defined by IEEE 279-1971 and RG 1.22 is designed to permit testing (up to the input to the actuation devices) with the reactor in operation. However, it was also necessary to explain that a few subgroup relays could not be tested during reactor operation at power without adverse consequences for plant safety and/or operability, and an exemption from the RG 1.22 at-power testing requirement was requested for the affected actuation devices (subgroup relays). The actuated equipment listed in the response letter could not be operated during reactor operation without adverse and unwarranted impact on plant safety and/or operability. The equipment could be tested when the reactor is shutdown. Additionally, letter W3P84-1328 (Reference 13) documented a meeting between Waterford 3 and the NRC’s Instrumentation and Controls Branch (ICSB) to discuss ESFAS subgroup relay testing. As stated in the letter, the meeting resulted in ICSB concurrence with the Waterford 3 ESFAS subgroup relay test program. The letter also updated letter W3P83-2273 to include a current listing of subgroup relays that are not tested at power but are tested during applicable cold shutdown periods.

In addition, also note the following supplemental information:

- Relay K114 was listed in letter W3P83-2273 as "not used" but was included in the update letter W3P84-1328.

- Additional relays are listed in TS 3/4.3.2 Table 4.3-2, Note 3, and in letter W3P83-2273; however, these relays are not associated with the ESFAS SPV trip hardening modification and, therefore, are not included in this discussion.

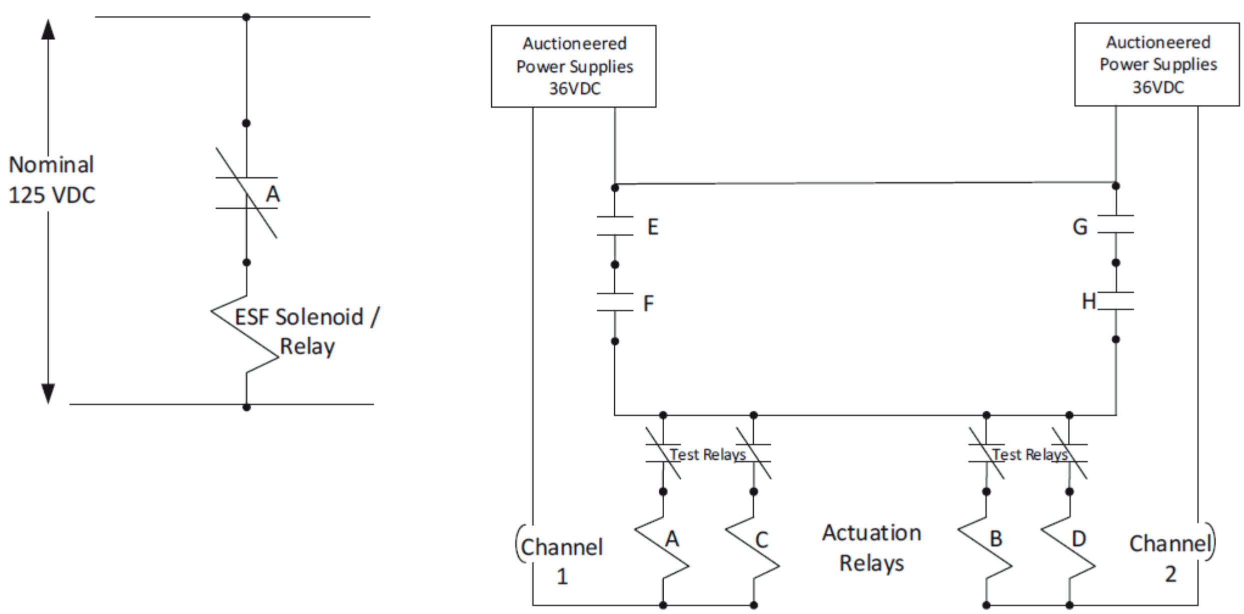
- The descriptions and designations of the valves affected as stated in letters W3P83-2273 and W3P84-1328 differ from that currently in use. A cross reference is provided in Attachment 3 to this Enclosure.

The Waterford 3 original Low Power TSs (Reference 9) and High Power TSs (Reference 10) listed relays K305, K313, and K114 in TS 3/4.3.2 Table 4.3-2, Note 3, as "exempt from testing during power operation but shall be tested at least once per 18 months and during each COLD SHUTDOWN condition unless tested within the previous 62 days." The phrase "at least once per 18 months" was replaced with "in accordance with the Surveillance Frequency Control Program” by License Amendment No. 249 (Reference 6).

4.0 TECHNICAL EVALUATION

4.1 ESFAS Single Point Vulnerability Trip Hardening

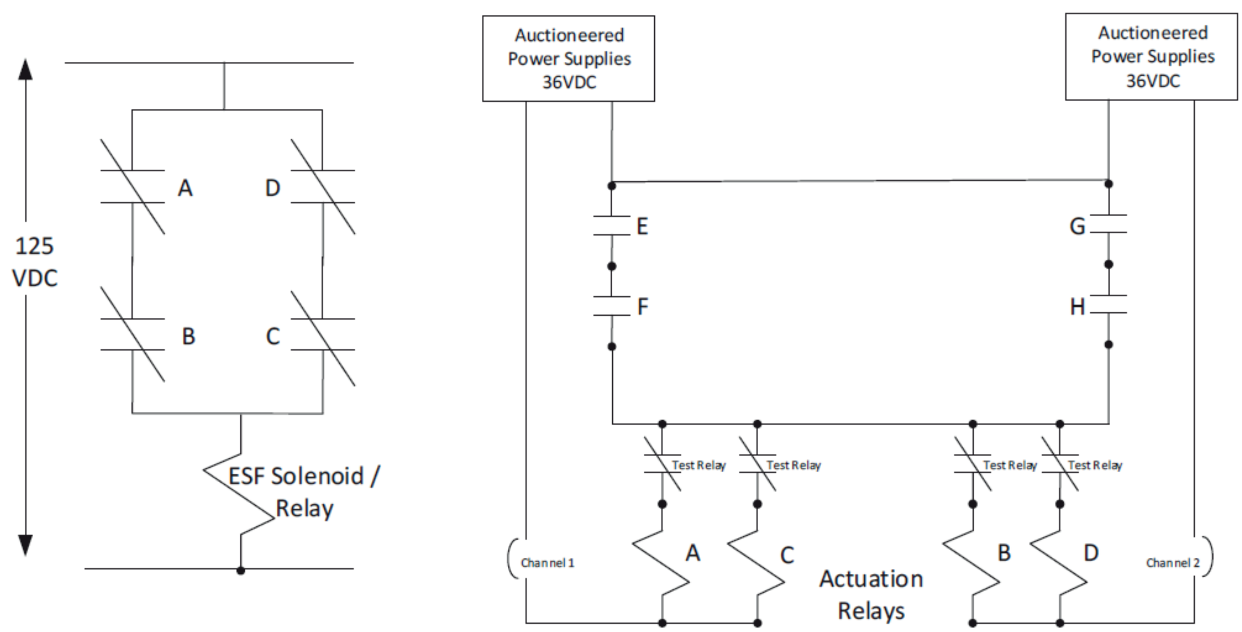
The following figure shows the simplified current configuration of the ESFAS SPV. This is a generic arrangement for explanation purposes. The specific relay changes will be shown in the next sections.



Note: This circuit diagram is not a design drawing and is provided for explanation purposes only.

The ESFAS SPV is associated with the power supply arrangement. If a short circuit were to occur across the relay A coil, power would be lost to the left half of the ESF bus resulting in the deenergization of relays A and C. Such failures would not affect relays B and D as these have a separate negative and circuit breaker. Under this scenario, the ESF equipment associated with relay A would actuate. This is the SPV identified for the MSIS relays K305 and K313, and for the CSAS relay K114.

The following figure shows the simplified configuration for the ESFAS SPV trip hardening modification. This is a generic arrangement for explanation purposes. The specific relay changes will be shown in the next sections.



Note: This circuit diagram is not a design drawing and is provided for explanation purposes only.

Assume relay A is the original relay. In series with the "A" contact is a newly installed "B" contact. If a short circuit were to occur across the relay A coil, this would not cause an actuation to occur due to relay B having a separate negative and circuit breaker. The "A" contact would close while the "B" contact would remain open, thus preventing the energization of the downstream ESF solenoid/relay. By providing a 2 out of 2 with a paralleled second 2 out of 2 logic actuation scheme, the actuation system can achieve a better result. The change in logic to address a failure to actuate (fail "on") is evaluated as equal to or better than that of the existing single subgroup relay. The existing configuration requires only one actuation relay per train to respond to its respective ESF actuation signal. The one actuation relay is actuated by both ESF trip legs (pump and valve groups, refer to UFSAR Figures 7.2-17 and 7.3-5). Failure of the pump or valve group trip leg would result in a failure of the actuation relay to respond. The ESFAS SPV trip hardening modification adds permissive relays to both trip legs of the available trip paths (pump group/valve group). The resulting configuration maintains the requirement for successful actuation of both the valve group and the pump group trip paths and the subsequent actuation of one of two sets of subgroup relays. All ESFAS functions require a similar scheme: the successful actuation of both the valve group and the pump group trip paths and their associated subgroup relays for a successful system actuation. There is no change to the failure modes as described in UFSAR Table 7.2-5.

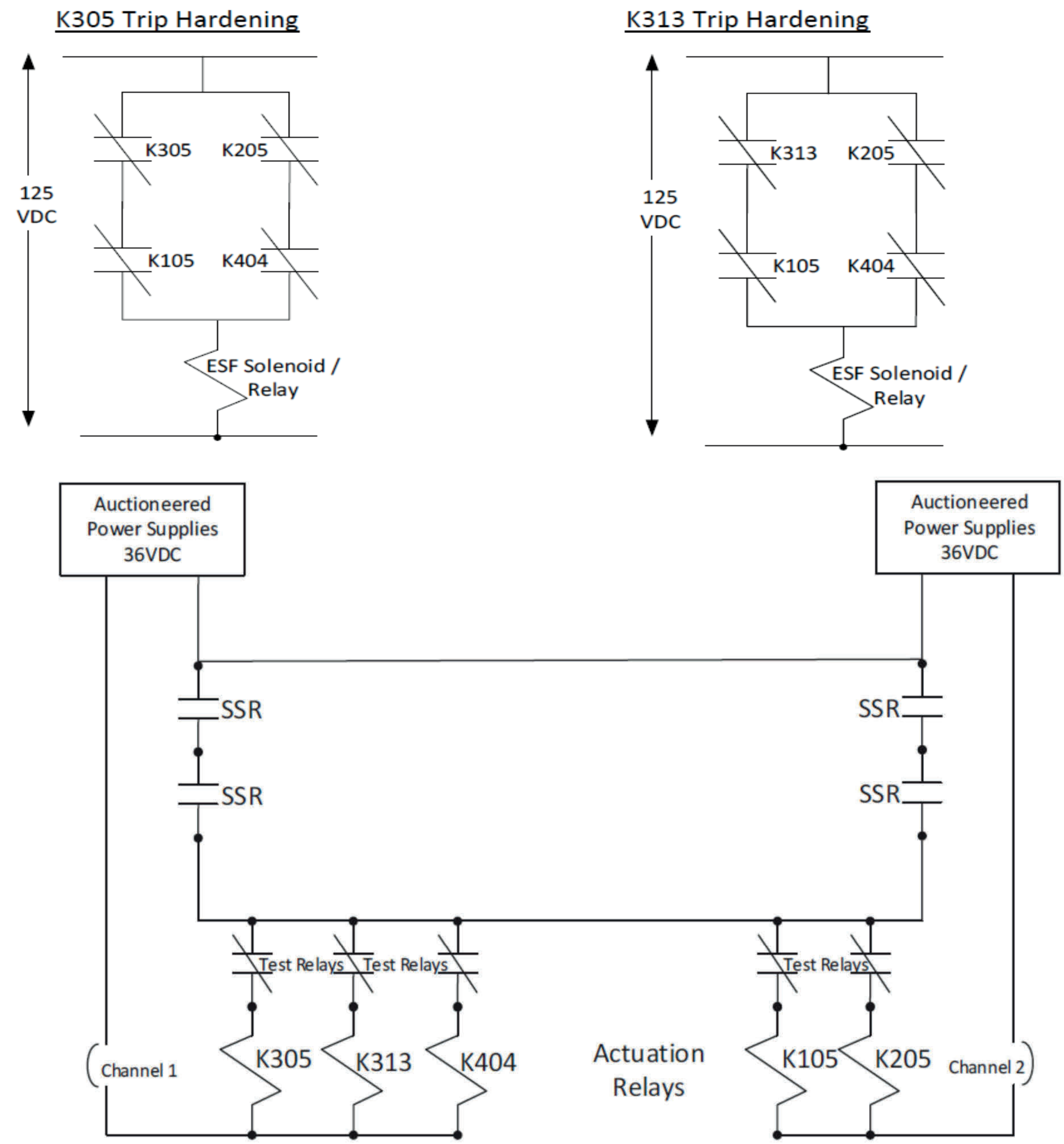
Based on UFSAR Table 7.2-5 and Sections 7.3.1.1.1.3, 7.3.1.1.2.2.3, 7.3.1.1.3.3, and 7.3.1.1.4.3, successful actuation of the Safety Injection System (SIS), Recirculation Actuation System (RAS), CSS (with exception of the valves addressed in this evaluation), and the Containment Isolation System (CIS), respectively, require successful actuation of both the valve group and the pump group trip paths and their associated subgroup relays for successful system actuation. In that regard, the ESFAS SPV trip hardening modification will make the MSIS and CSAS trip paths consistent with other ESFAS trip paths already described in the UFSAR. This modification does not degrade the ability of the affected MSIS or CSAS components to actuate on an actual actuation signal by adding two subgroup paths (path 1 being A and B; path 2 being C and D), either path providing a successful actuation of the downstream actuated device (valve). Following the modification, the ability of the MSIS or CSAS components to actuate on an actual signal requiring protective ESF functions will be consistent with the ability of the SIS, RAS, CSS, or CIS components to actuate on actual signals requiring protective ESF functions.

4.2 Main Steam Isolation Signal Single Point Vulnerability Trip Hardening Modification

The K305 relay will be trip hardened by adding 3 additional relays creating a 2 out of 2 paralleled with 2 out of 2 logic scheme. The spare relays used to trip harden the K305 relay are relays K105, K205, and K404. Relays K305 and K404 are powered from one power supply while relays K105 and K205 are powered by a separate power supply. The K305 relay trip hardened contact is wired in series with the K105 relay contact. The K205 relay contact is wired in series with the K404 relay contact. Relays K305 and K105 or K205 and K404 are required to close to actuate the associated downstream ESF equipment.

The K313 relay will be trip hardened by adding 3 additional relays creating a 2 out of 2 paralleled with 2 out of 2 logic scheme. The spare relays used to trip harden the K313 relay are relays K105, K205, and K404. Relays K313 and K404 are powered from one power supply while relays K105 and K205 are powered by a separate power supply. The K313 relay trip hardened contact is wired in series with the K105 relay contact. The K205 relay contact is wired in series with the K404 relay contact. Relays K313 and K105 or K205 and K404 are required to close to actuate the associated downstream ESF equipment.

The following figure is a simplified diagram of the scheme.

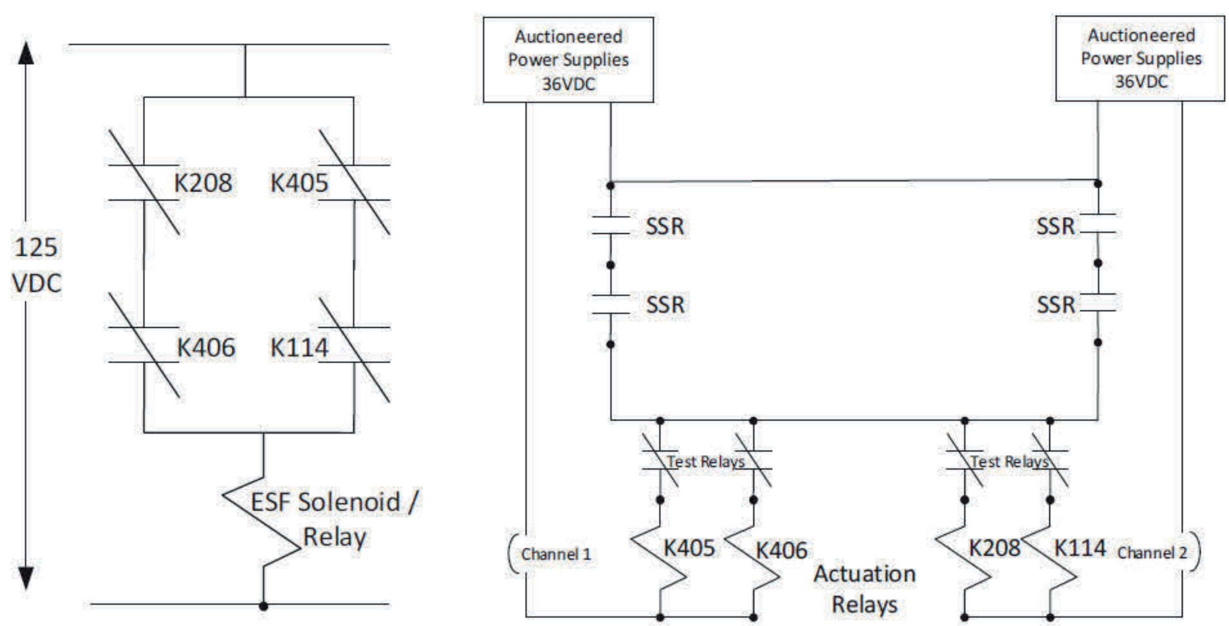


Note: This circuit diagram is not a design drawing and is provided for explanation purposes only.

4.3 Containment Spray Actuation Signal Single Point Vulnerability Trip Hardening Modification

The K114 relay will be trip hardened by adding 3 additional relays creating a 2 out of 2 paralleled with 2 out of 2 logic scheme. The spare relays used to trip harden the K114 relay are relays K208, K405, and K406. Relays K114 and K208 are powered from one power supply while relays K405 and K406 are powered by a separate power supply. The relay K114 trip hardened contact is wired in series with the K405 relay contact. The K208 relay contact is wired in series with the K406 relay contact. Relays K114 and K405 or K208 and K406 are required to close to actuate the associated downstream ESF equipment.

The following figure is a simplified diagram of the scheme.



Note: This circuit diagram is not a design drawing and is provided for explanation purposes only.

4.4 Auxiliary Relay Cabinet Test Switch Function Description

Periodically, the subgroup relays are tested to ensure proper operation. To minimize plant impact, each ESFAS subgroup relay has an associated test relay located in the ARCs that allows for discrete testing. The test relay has a normally closed contact wired in series with the coil of the subgroup relay. The test relay is normally deenergized; therefore, the test relay contact is normally closed and power to the subgroup actuation relay is maintained under normal conditions (no MSIS or CSAS signal present).

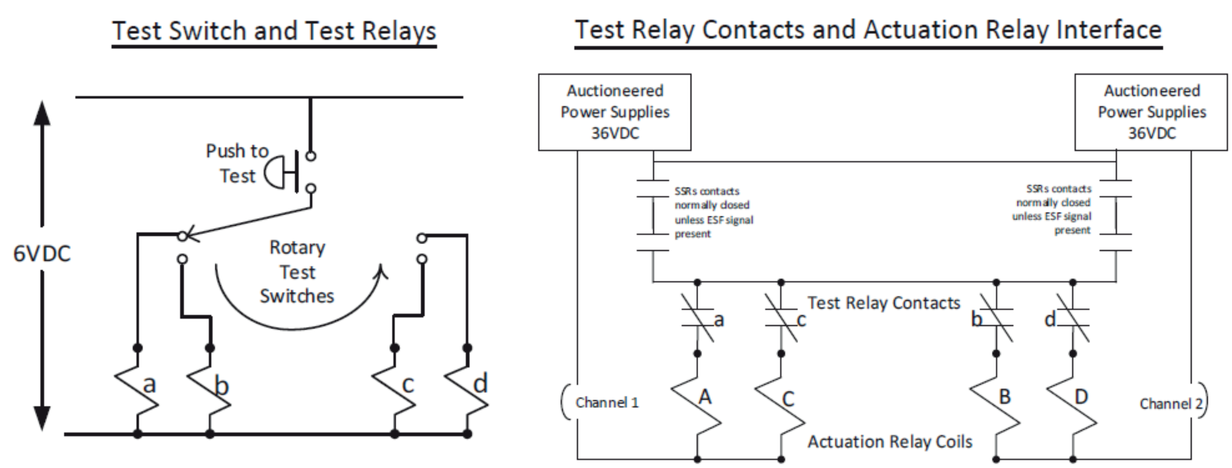
During ESFAS MSIS or CSAS testing, Control Room operators align the ESFAS test selector switches at Control Panel CP-33 for the specific subgroup relay under test and the "Push to Test" pushbutton is depressed initiating the test. The "Push to Test" pushbutton provides power (6 vdc) to the selected subgroups' test relay. When the test relay is energized, its normally closed contact opens, thus deenergizing the subgroup relay.

When the subgroup relay deenergizes, its normally closed (shelf state) contact closes, thus providing 125 VDC power to the associated downstream Solenoid Operated Valve (SOV) associated with an ESF function (for MSIS and CSAS this results in valve closure).

4.5 Relay Testing Change

The spare relays used in the trip hardening scheme have associated test relays located in the ESFAS cabinets that are pre-wired to test switches in the Control Room. This wiring exists currently for the spare actuation relays. The design change will take advantage of the pre-wired test relays and switch positions to incorporate both discrete online testing and gang operated offline testing that will test both actuation relays and downstream ESF devices. Online testing and gang operated offline (full actuation) testing of the MSIS and CSAS will be controlled in accordance with the Surveillance Frequency Control Program.

The next figure is a simplified version of the test switch arrangement and how it discretely controls the actuation relays. This figure represents any given ESFAS actuation relay (A, B, C, D) and its test relay pair (a, b, c, d). By aligning the rotary switch to the "c" position and pressing the "Push to Test" pushbutton, "c" test relay would be energized by the 6 volt source and its associated normally closed contact in series with ESFAS actuation relay "C" would be deenergized from its 36 vdc source. The testing of actuation relay "C" is achieved without dropping out the entire actuation relay bus. This same method is employed for each actuation relay. By trip hardening the relays with 3 other relays, a single relay no longer actuates the downstream ESF function and can be tested at power. This design change assigns existing spare switch positions in the Control Room to allow testing of each trip hardened relay.



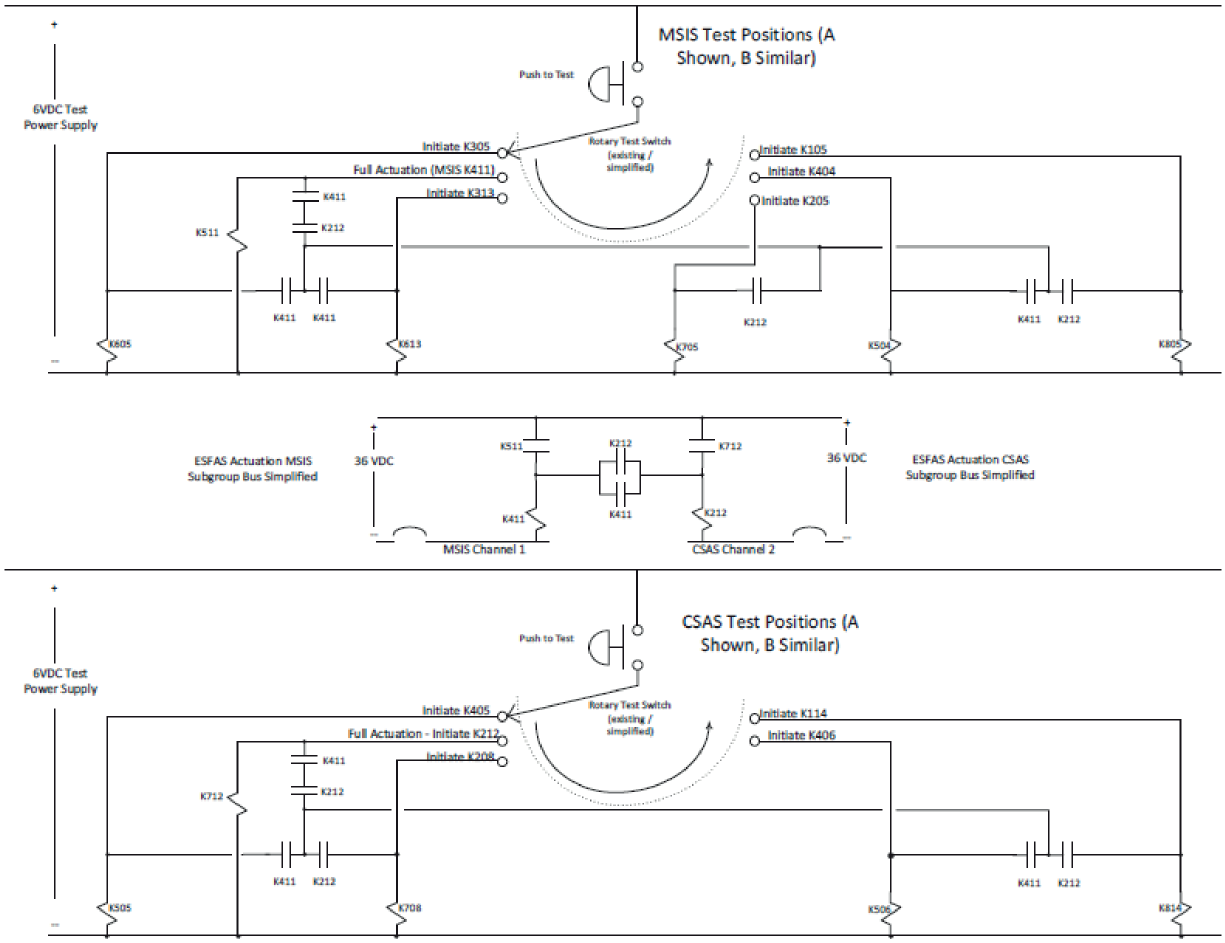
Note: This circuit diagram is not a design drawing and is provided for explanation purposes only.

The gang operation of the MSIS and CSAS utilize two relays (K212 and K411) (formerly spare actuation relays) and associated test relays K511 and K712. The spare actuation relay contacts will be used to tie test actuation power to the test relays of the trip hardened relays allowing for simultaneous dropout of the trip hardened relays for the MSIS or CSAS. The gang operation is achieved using two existing spare relays and associated test relays including their pre-wired and pre-assigned test positions in the Control Room. Two relays are used to prevent introduction of an SPV if only one relay were used. The K212 and K411 relays provide the contacts and wiring to provide 6 vdc test power to all associated test relays for the trip hardened contacts of the MSIS and CSAS. The MSIS and CSAS test relay coil power is selected using the Control Room test switches and "Push to Test" pushbutton. Only the MSIS or CSAS can receive the test power at any given time due to exclusivity of the test switch. When aligned to relay K411, only test relays associated with the MSIS will receive the 6 vdc necessary to pick up test relays K605, K613, K705, K504, and K805. Power is provided through the test switch alignment and depressing the "Push to Test" pushbutton. Once the pushbutton is depressed, the 6 vdc source picks up test relay K511. Test relay K511 contact closes providing 36 vdc power to the MSIS subgroup relay K411. Relay K411 contacts close to provide the same 36 vdc source to K212. Contacts for K411 and K212 provide 6 vdc power source ties from the test switch to all test relays associated with the MSIS. The contacts which tie the coils of relays K411 and K212 together are utilized to maintain electrical separation when not in gang operation. The K411 and K212 relays are shared between the MSIS and CSAS. The 6 vdc power source is exclusive such that only power is available to the MSIS or CSAS when aligned.

During the Waterford 3 design review of the gang operation test circuit proposed for the ESFAS MSIS and CSAS, it was identified that the potential existed to create test equipment sneak circuits if gang relay (K411 or K212) contact(s) were to become stuck closed. These stuck contact(s) induced sneak circuits that could result in unexpected equipment actuation during online subgroup relay testing. Even though such gang relay contact failures are fully detectable by discrete (offline) subgroup relay testing, it was decided to even further harden the test circuits against the likelihood of these detectable gang relay contact failures. Refer to the June 29, 2018 LAR supplement (Reference 3) for details regarding the design change to improve "hardening" against the potential stuck contact(s) induced sneak circuit. A discussion of the design hardening improvements to prevent a full actuation of the MSIS or CSAS for the scenarios involving a single stuck gang relay contact (K411 or K212) and a stuck gang relay (all contacts for K411 or K212 closed) is presented in Section 4.7 of this Enclosure.

The next figures are simplified versions of the test switch arrangement and the gang operation of the MSIS and CSAS incorporating the improved test circuit hardening design.

MSIS and CSAS Test Switch Arrangements



Note: This circuit diagram is not a design drawing and is provided for explanation purposes only.

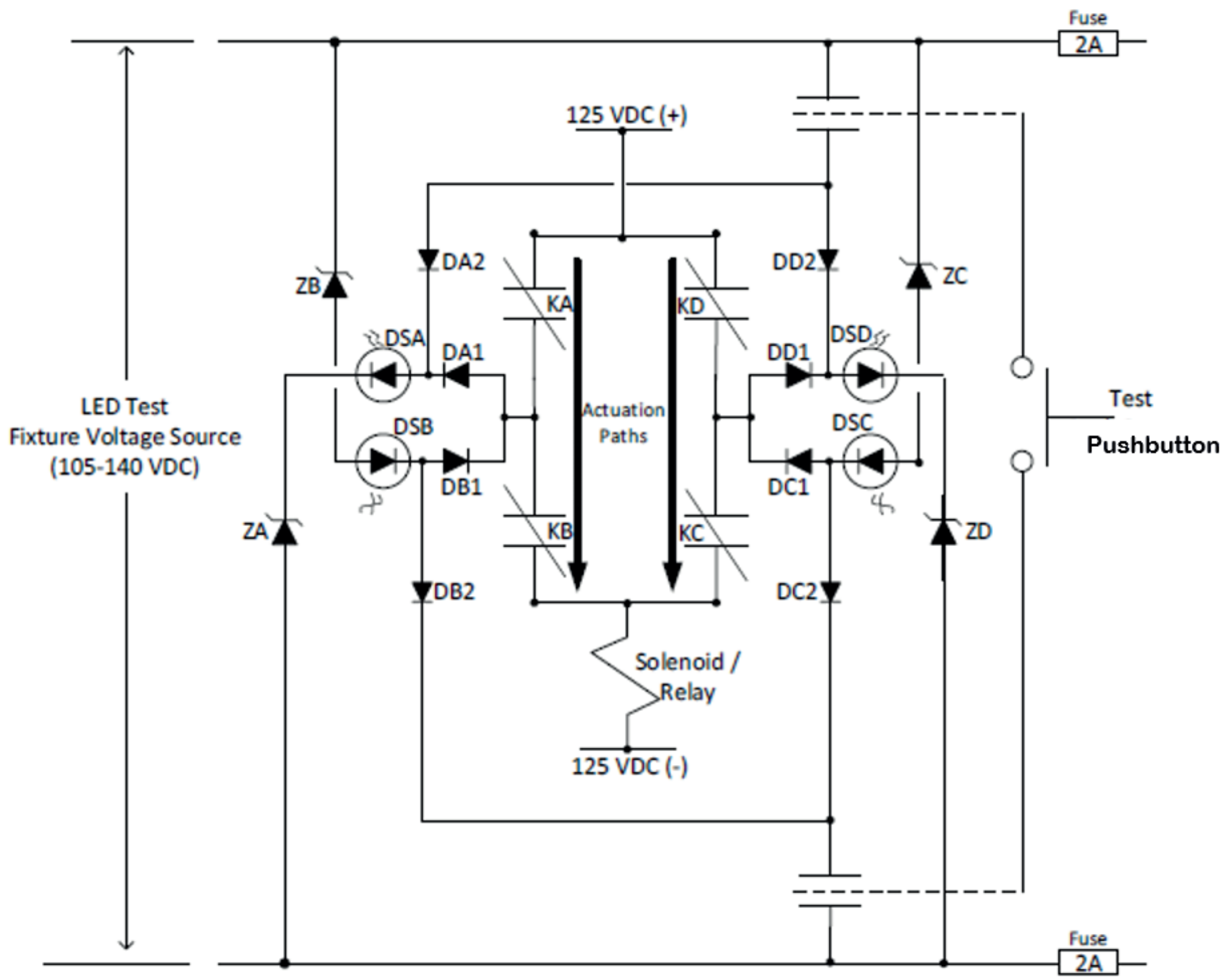
4.6 <u>Light Emitting Diode Relay Light Indication</u>

The ESFAS SPV trip hardening modification includes new Light Emitting Diode (LED) Test Fixtures that will be installed in the ESFAS Train A and B cabinets. The LED Test Fixtures provide light indications of trip hardened contact closures during testing and are also used during normal operating rounds to verify that the trip hardened relays have not failed. A "Test Pushbutton" is provided for lamp checks during operator rounds to verify all LEDs are in working order.

The LED Test Fixtures are not used for monitoring an MSIS or CSAS full actuation that is initiated either by gang operation during offline testing or by an actual ESFAS signal received due to an event. This is acceptable as full actuations are verified by proper operation of the downstream ESF component indications (valve closes, pump starts, etc.). Existing indications in the Control Room will continue to be relied upon for ESF component response during MSIS and CSAS full actuations with no changes required.

The next figure is a simplified diagram of the LED Test Fixture (the Train A and B LED Test Fixtures are virtually identical). KA through KD are the subgroup actuation relay contacts. DSA through DSD are the LEDs used to monitor their respective actuation contact. The following examples assume all contacts are open unless stated otherwise. As an example, assume Operations is performing an online surveillance test of each relay (KA, KB, KC, KD) discretely, meaning only one is being tested at a time. The first step Operations will perform is verifying the LEDs are working properly by depressing the "Test Pushbutton." Once all LEDs are verified illuminated, the pushbutton will be released, extinguishing the LEDs. Next, Operations will verify no LEDs remain illuminated (which would indicate a failed actuation relay or contact). Once all LEDs are verified extinguished, testing may be performed. Assume KA is under test. Contact KA is monitored by LED DSA. When KA is closed, DSA is illuminated (ON). When KA is open, DSA is not illuminated (OFF). The remaining LEDs (DSB through DSD) function in the same manner.

LED Test Fixture



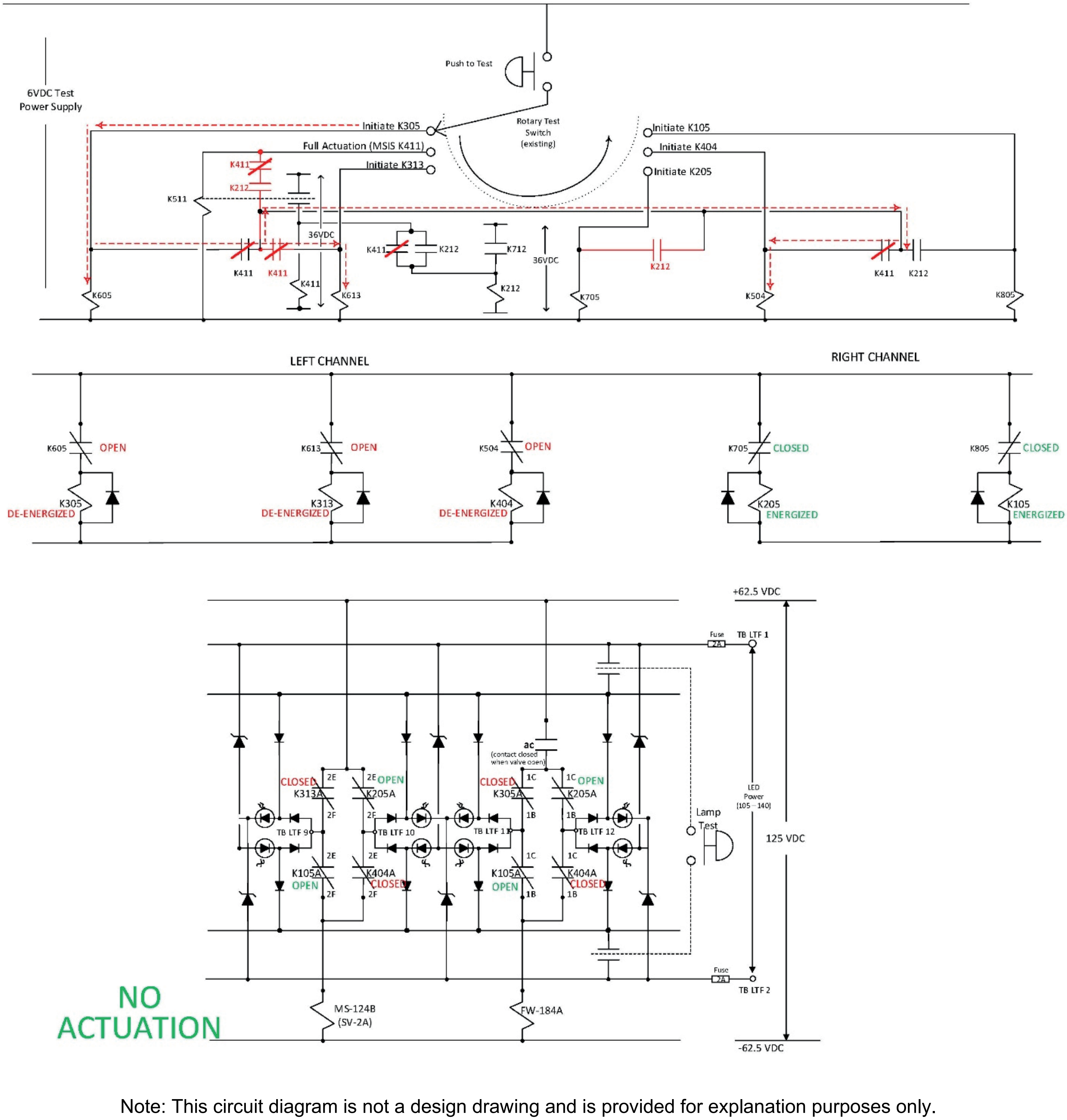
Note: This circuit diagram is not a design drawing and is provided for explanation purposes only.

The added LED Test Fixtures have been evaluated for failure modes and none were identified that result in addition of a new failure mode to the ESFAS. There is no credible single failure within the LED Test Fixtures that result in a failure to actuate when required, or actuation when none is called for. Failures internal to the LED Test Fixtures are detectible by observing that the LED is illuminated when not required, the LED is not illuminated when required, by a surveillance test that results in a different result than required, or by a preventive maintenance activity that detects defective diodes.

4.7 Design Hardening Improvement to Prevent Voltage Sneak Paths

The following figures depict the design which has been "hardened" against the voltage sneak paths described in Section 4.5 of the Enclosure. The addition of the K411 and K212 contacts in the improved hardening design block the voltage from the K511 coil during discrete subgroup relay testing, thus preventing full actuation of the MSIS or CSAS under the condition of a single stuck gang relay contact (K411 or K212) scenario. The ESFAS MSIS and CSAS test circuits are also hardened for channel protection such that a stuck gang relay (all contacts for K411 or K212 closed) would not result in full actuation of the MSIS or CSAS. The "left channel" is arranged with K411 contacts and the "right channel" is arranged with K212 contacts. In the scenario depicted in the following figures, if all the gang relay K411 contacts are stuck closed, a full actuation would not occur. The only result would be that the left channel subgroup relays actuate (K212 results are similar for right channel only). Full actuation requires that both the left and right channel subgroup relays actuate. For the condition described, the actuation of all the left or right channel relays would be detected by the LED Test Fixture indication. In the described scenario, two LED lights will illuminate. If the circuit were operating properly and there are no stuck gang operated test relay contacts, only a single LED out of 4 per group for a given valve would illuminate.

SCENARIO: All K411 (shown) or K212 contacts are stuck closed after a full actuation



Note: This circuit diagram is not a design drawing and is provided for explanation purposes only.

4.8 Outage Precautions

As a precaution to guard against a stuck gang operated test relay or gang operated relay, Waterford 3 has adopted a proceduralized approach for testing the MSIS and CSAS gang operation during refueling outages. Once full actuation of the MSIS and CSAS is achieved under the offline surveillances using the gang operation feature provided, discrete subgroup relay testing is performed as previously described to ensure gang operation contacts have reset to the open position. A failure to reset gang operation will be manifested at the LED Test Fixture with more than one LED per group of four being illuminated. If detected, the failed gang operation test relay or gang operation subgroup relay can be replaced, thereby eliminating inadvertent actuation during online testing.

5.0 REGULATORY EVALUATION

5.1 Applicable Regulatory Requirements/Criteria

The proposed change has been evaluated to determine whether applicable regulations and requirements continue to be met. The ESFAS complies with the 10 CFR 50 Appendix A, General Design Criteria (GDCs) related to protection system reliability and testability (GDC 21). Surveillance requirements for the testing of the ESFAS system relate to requirements of 10 CFR 50.36, "Technical specifications." RG 1.22 describes acceptable methods for periodic tests of the protection system during reactor operation.

As discussed below, the change provided in this amendment request does not affect the conclusions provided in the Waterford 3 UFSAR and the ESFAS continues to comply with the regulation.

GDC 21 – "Protection system reliability and testability"

This GDC requires that the protection system be designed for high functional reliability and inservice testability commensurate with the safety functions to be performed. The protection system shall be designed to permit periodic testing of its functioning when the reactor is in operation, including a capability to test channels independently to determine failures and losses of redundancy that may have occurred.

The protection system as defined by IEEE Standard 279-1971 and RG 1.22 is designed to permit testing (up to the input to the actuation devices) with the reactor in operation. Testing is in compliance with IEEE 338-1971 and consistent with the recommendations of RG 1.22.

Regulatory Guide 1.22 – "Periodic Testing of Protection System Actuation Functions"

Regulatory Guide 1.22 Section D (Regulatory Position) Item 1 states:

> The protection system should be designed to permit periodic testing to extend to and include the actuation devices and actuated equipment.
>
> a. The periodic tests should duplicate, as closely as practicable, the performance that is required of the actuation devices in the event of an accident.

b. The protection system and the systems whose operation it initiates should be designed to permit testing of the actuation devices during reactor operation.

Regulatory Guide 1.22 Section D Item 1 compliance:

The proposed change will remove the TS 3/4.3.2 Table 4.3-2, Note 3, exemption from testing relays K305, K313, and K114 at power. The removal of the exemption from testing during power operation means the impacted relays will be tested at power. Specifically, with the removal of the exemption, the MSIS subgroup relays will be covered by TS 3/4.3.2 Table 4.3-2, Item 4.d and the CSAS subgroup relays will be covered by TS 3/4.3.2 Table 4.3-2, Item 2.c.

TS Surveillance 4.3.2.1 Table 4.3-2, Item 2.c and Item 4.d are specific regarding the subgroup relay tests. The ESFAS SPV trip hardening modification will allow periodic tests (online) for each of the subgroup relays. The tests allow the subgroup relays to be actuated which meets the "as closely as practicable" performance requirement for these devices.

This change complies with the RG 1.22 Section D Item 1 position.

Regulatory Guide 1.22 Section D Item 2 states:

Acceptable methods of including the actuation devices in the periodic tests of the protection system are:

a. Testing simultaneously all actuation devices and actuated equipment associated with each redundant protection system output signal;

b. Testing all actuation devices and actuated equipment individually or in judiciously selected groups;

c. Preventing the operation of certain actuated equipment during a test of their actuation devices;

d. Providing the actuated equipment with more than one actuation device and testing individually each actuation device.

Method a. set forth above is the preferable method of including the actuation devices in the periodic tests of the protection system. It shall be noted that the acceptability of each of the four above methods is conditioned by the provisions of regulatory positions 3 and 4 below.

Regulatory Guide 1.22 Section D Item 2 compliance:

The K305 and K313 relays are associated with the MSIS, with the end devices being the MSIVs, MFIVs, main feedwater regulating valves, and the startup feedwater regulating valves. The K114 relays are associated with the CSAS, with the end devices being the CCW containment isolation valves.

Actuation of the K114, K305, and K313 end devices would result in plant transients that would trip the plant and adversely impact safe operation. The ESFAS SPV trip hardening modification logic tests allow the relays to be tested preventing the operation of the end devices to ensure plant safety is maintained (RG 1.22 Item 2.c). The subgroup relay tests allow the testing of the individual relays to ensure proper operation (RG 1.22 Item 2.d).

This change complies with the RG 1.22 Section D Item 2 position.

Regulatory Guide 1.22 Section D Item 3 states:

Where the ability of a system to respond to a bona fide accident signal is intentionally bypassed for the purpose of performing a test during reactor operation:

a. Positive means should be provided to prevent expansion of the bypass condition to redundant or diverse systems, and

b. Each bypass condition should be individually and automatically indicated to the reactor operator in the main control room.

Regulatory Guide 1.22 Section D Item 3 compliance:

The ESFAS subgroup relay tests are performed in the Control Room. Each subgroup relay is selected from a selector switch which prevents the expansion of the test to the other relays. This change is not impacting or changing an operational bypass. Thus, the change will neither cause a spurious ESFAS actuation during testing nor prevent a proper ESFAS actuation of the circuits under test.

This change complies with the RG 1.22 Section D Item 3 position.

Regulatory Guide 1.22 Section D Item 4 states:

Where actuated equipment is not tested during reactor operation, it should be shown that:

a. There is no practicable system design that would permit operation of the actuated equipment without adversely affecting the safety or operability of the plant;

b. The probability that the protection system will fail to initiate the operation of the actuated equipment is, and can be maintained, acceptably low without testing the actuated equipment during reactor operation, and

c. The actuated equipment can be routinely tested when the reactor is shut down.

Regulatory Guide 1.22 Section D Item 4 compliance:

The proposed change will remove the TS 3/4.3.2 Table 4.3-2, Note 3, exemption from testing relays K305, K313, and K114. The removal of the exemption from testing during power operation means the impacted relays will be tested at power. This change is only associated with the subgroup relays. The end devices associated with the K114, K305, and K313 relays will continue to not be tested at power because actuation of the end devices would result in plant transients that would trip the plant and adversely impact the safe operation. The ESFAS SPV trip hardening modification logic tests allow the relays to be tested while preventing the operation of the end devices to ensure plant safety is maintained.

The change for the subgroup relays does not require the RG 1.22 Section D Item 4 exemption.

10 CFR 50.36, "Technical specifications"

10 CFR 50.36(c)(3), "Surveillance requirements," requires that TSs include surveillance requirements, which are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

No modifications to trip setpoints or channel responses are associated with this change.

The proposed change does not affect compliance with these regulations or guidance and will ensure that the lowest functional capabilities or performance levels of equipment required for safe operation are met.

5.2 No Significant Hazards Consideration

Entergy Operations, Inc. (Entergy) has evaluated the proposed changes to the Technical Specifications (TSs) using the criteria in 10 CFR 50.92, "Issuance of amendment," and has determined that the proposed changes do not involve a significant hazards consideration.

Entergy proposes a change to the Waterford Steam Electric Station Unit 3 (Waterford 3) TSs that would revise TS 3/4.3.2 Table 4.3-2, "Engineered Safety Features Actuation System Instrumentation Surveillance Requirements," Table Notation (3) (hereinafter referred to as Note 3), to remove the exemption from testing relays K114, K305, and K313 at power.

An editorial change is proposed by adding a period (".") to the last sentence in Note 3.

Basis for no significant hazards consideration determination: As required by 10 CFR 50.91(a), Entergy's analysis of the issue of no significant hazards consideration is presented below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The proposed change will remove the TS 3/4.3.2 Table 4.3-2, Note 3, exemption from testing relays K305, K313, and K114 at power. The K305 and K313 relays are associated with the Main Steam Isolation Signal (MSIS). The K114 relay is associated with the Containment Spray Actuation Signal (CSAS).

   The removal of the TS 3/4.3.2 Table 4.3-2, Note 3, exemption from testing relays K305, K313, and K114 means these relays will be tested more frequently thereby improving the ability to identify failed components. This testing frequency will be consistent with the other TS Table 4.3-2 subgroup relays that do not have an exemption. The probability of an operator choosing the wrong subgroup relay during testing is no different for this change as it is for the existing TS Table 4.3-2 subgroup relays that are already tested on this same frequency. Thus, there will be no significant increase in the probability of an operator error causing an accident.

The change will also support the elimination of a potential single failure vulnerability (SPV) associated with the MSIS (relays K305 and K313) and the CSAS (relay K114). The elimination of the single failure potential will lower the probability of an accident due to the spurious actuation of the MSIS or CSAS.

The change uses a parallel 2 out of 2 logic scheme to ensure no single failure of one actuation path would prevent the other actuation path from completing its function. This ensures no additional failure mode would prevent required equipment from actuating and increasing accident consequences.

The editorial change to add a period at the end of Note 3 is strictly an administrative change that has no impact on previously evaluated accidents.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   The proposed change will remove the TS 3/4.3.2 Table 4.3-2, Note 3, exemption from testing relays K305, K313, and K114 at power. The K305, K313, and K114 relays are part of the Engineered Safety Features Actuation System (ESFAS). The ESFAS is used for accident mitigation but an inadvertent actuation could initiate an accident. The K305 and K313 relays are associated with the MSIS. The K114 relays are associated with the CSAS. The potential failures of the main steam isolation and containment spray systems have been evaluated in the Waterford 3 Updated Final Safety Analysis Report (UFSAR). The potential accidents are as follows:

   - Loss of External Load which could be caused by closure of the Main Steam Isolation Valves (MSIVs) (UFSAR Section 15.2, "Decrease in Heat Removal by the Secondary System (Turbine Plant)").
   - Loss of Normal Feedwater Flow which could be caused by the closure of the Main Feedwater Isolation Valves (UFSAR Section 15.2).
   - Asymmetric Steam Generator Transient which could be caused by the closure of one MSIV (UFSAR Section 15.9.1.1, "Asymmetric Steam Generator Transient").
   - Loss of Component Cooling to Reactor Coolant Pumps (RCPs) which could be caused by the closure of the RCP Component Coolant Water valve. This could lead to RCP seal assembly damage and the possibility for a loss of coolant accident (UFSAR Section 15.6, "Decrease in Reactor Coolant System Inventory").
   - Inadvertent Containment Spray which could be caused by actuation of one train of containment spray (UFSAR Section 6.2.1.1.3, "Design Evaluation - Containment Pressure - Temperature Analysis")

   The removal of the exemption from testing during power operation means the impacted relays will be tested more frequently thereby improving the ability to identify failed components; however, they will be tested at power. The ESFAS K305, K313, and K114 relay test logic is designed to test the relays at power and not actuate the end devices which could adversely impact plant safety. Any failures that could actuate plant equipment would continue to be bounded by the existing UFSAR accidents; therefore, no new accident is being created.

The ESFAS is used for accident mitigation. The removal of the exemption from testing during power operation means the impacted relays will be tested more frequently thereby improving the ability to identify failed components. This lowers the possibility of the ESFAS equipment not being available when needed. This also means that with the ESFAS equipment available, this change does not create the possibility of a different kind of accident.

The editorial change to add a period at the end of Note 3 is strictly an administrative change that has no impact on previously evaluated accidents.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No.

   The proposed change will remove the TS Table 4.3-2, Note 3, exemption from testing relays K305, K313, and K114 at power. The removal of the exemption from testing during power operation means the impacted relays will be tested more frequently thereby improving the ability to identify failed components. The more frequent testing will improve the margin of safety.

   The change will also support the elimination of a potential SPV associated with the MSIS (relays K305 and K313) and the CSAS (relay K114). The elimination of the single failure potential will improve the margin of safety by reducing the potential of an accident due to the spurious actuation of the MSIS or CSAS.

   The editorial change to add a period at the end of Note 3 is strictly an administrative change that has no impact on safety margins.

   Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based upon the reasoning presented above, Entergy concludes that the requested change involves no significant hazards consideration, as set forth in 10 CFR 50.92(c), "Issuance of amendment."

5.3 Conclusions

In conclusion, on the basis of the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

The proposed amendment has been evaluated for environmental considerations. The review has resulted in the determination that the proposed amendment would change requirements with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22, paragraph (b), no environmental impact statement or environmental assessment needs to be prepared in connection with the proposed amendment.

7.0 REFERENCES

1. U.S. Nuclear Regulatory Commission (NRC) "Notice of Meeting with Entergy Operations, Inc. Regarding Waterford Steam Electric Station, Unit 3," (ADAMS Accession No. ML22272A046), dated September 29, 2022

2. Entergy Operations, Inc. (Entergy) letter to NRC, "License Amendment Request to Remove Technical Specification 3/4.3.2 Table 4.3-2 Note 3 Exemption for Testing Relays K114, K305, and K313," (ADAMS Accession Number ML17340B321), dated December 6, 2017

3. Entergy letter to NRC, "Supplemental Information Supporting the License Amendment Request to Remove Technical Specification 3/4.3.2 Table 4.3-2 Note 3 Exemption for Testing Relays K114, K305, and K313," (ADAMS Accession No. ML 18180A271), dated June 29, 2018

4. Entergy letter to NRC, "Withdrawal of License Amendment Request to Remove Technical Specification 3/4.3.2 Table 4.3-2 Note 3 Exemption for Testing Relays K114, K305, and K313," (ADAMS Accession No. ML18354B283), dated December 20, 2018

5. NRC letter to Entergy, "Waterford Steam Electric Station, Unit 3 – Withdrawal of Amendment Request to Revise Technical Specification 3/4.3.2 to Relocate Surveillance Frequency Requirements for Engineered Safety Feature Actuation System Subgroup Relays to the Surveillance Frequency Control Program," (ADAMS Accession No. ML19009A362), dated January 24, 2019

6. NRC letter to Entergy, "Waterford Steam Electric Station, Unit 3 – Issuance of Amendment RE: Adoption of TSTF-425, Revision 3 'Relocate Surveillance Frequencies to Licensee Control – RITSTF Initiative 5b' (CAC No. MF6366)," (ADAMS Accession Number ML16159A419), dated July 26, 2016

7. Waterford Steam Electric Station Unit 3, Updated Final Safety Analysis Report (UFSAR), Revision 315

8. NRC Regulatory Guide 1.22, Revision 0, "Periodic Testing of Protection System Actuation Functions," dated February 1972

9. NRC NUREG-0973, "Technical Specifications, Waterford Steam Electric Station, Unit No. 3," (ADAMS Accession No. ML20101N050), dated December 1984

10. NRC NUREG-1117, "Technical Specifications, Waterford Steam Electric Station, Unit No. 3," (ADAMS Accession No. ML20100E389), dated March 1985

11. Letter from G.W. Knighton to L.V. Maurin, "Waterford 3 Engineered Safety Features Actuation System Surveillance Requirements," (ADAMS Accession No. 8306020687), dated May 10, 1983

12. Letter W3P83-2273, F. J. Drummond to G. W. Knighton, "Engineered Safety Features Actuation System (ESFAS) Surveillance Requirements," (ADAMS Accession No. 8307260489), dated July 21, 1983

13. Letter W3P84-1328, K. W. Cook to G. W. Knighton, "Engineered Safety Features Actuation System (ESFAS) Subgroup Relay Testing Meeting 4/26/84," (ADAMS Accession No. 8405180062), dated May 14, 1984

8.0 ATTACHMENTS

1. Technical Specification Page Markup

2. Technical Specification Page Retyped

3. Cross Reference of Current to Historical Equipment Descriptions and Designations Related to ESFAS Single Point Vulnerability Trip Hardening Modification

Enclosure, Attachment 1

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Technical Specification Page Markup

<u>TS Page</u>

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TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
7. EMERGENCY FEEDWATER (EFAS)				
a. Manual (Trip Buttons)	N.A.	N.A.	SFCP	1, 2, 3
b. SG Level (1/2) - Low and ΔP (1/2) - High	SFCP	SFCP	SFCP	1, 2, 3
c. SG Level (1/2) - Low and No Pressure - Low Trip (1/2)	SFCP	SFCP	SFCP	1, 2, 3
d. Automatic Actuation Logic (except subgroup relays)	N.A.	N.A.	SFCP(2)	1, 2, 3
Actuation Subgroup Relays	N.A.	N.A.	SFCP(1) (3)	1, 2, 3
e. Control Valve Logic (Wide Range SG Level - Low)	SFCP	SFCP	SFCP(5)	1, 2, 3

TABLE NOTATION

(1) Each train or logic channel shall be tested in accordance with the Surveillance Frequency Control Program.

(2) Testing of Automatic Actuation Logic shall include the energization/deenergization of each initiation relay and verification of the OPERABILITY of each initiation relay.

(3) A subgroup relay test shall be performed which shall include the energization/deenergization of each subgroup relay and verification of the OPERABILITY of each subgroup relay. Relays K109, ~~K114,~~ K202, K301~~, K305,~~ K308 and ~~K313~~ are exempt from testing during power operation but shall be tested in accordance with the Surveillance Frequency Control Program and during each COLD SHUTDOWN condition unless tested within the previous 62 days.

Add period

(4) Using installed test switches.

(5) To be performed during each COLD SHUTDOWN if not performed in the previous 6 months.

(6) Each train shall be tested, with the exemption of relays, K110, K410 and K412, in accordance with the Surveillance Frequency Control Program. Relays K110, K410 and K412 shall be tested in accordance with the Surveillance Frequency Control Program.

Enclosure, Attachment 2

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Technical Specification Page Retyped

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ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
7. EMERGENCY FEEDWATER (EFAS)				
a. Manual (Trip Buttons)	N.A.	N.A.	SFCP	1, 2, 3
b. SG Level (1/2) - Low and ΔP (1/2) - High	SFCP	SFCP	SFCP	1, 2, 3
c. SG Level (1/2) - Low and No Pressure - Low Trip (1/2)	SFCP	SFCP	SFCP	1, 2, 3
d. Automatic Actuation Logic (except subgroup relays)	N.A.	N.A.	SFCP(2)	1, 2, 3
Actuation Subgroup Relays	N.A.	N.A.	SFCP(1) (3)	1, 2, 3
e. Control Valve Logic (Wide Range SG Level - Low)	SFCP	SFCP	SFCP(5)	1, 2, 3

TABLE NOTATION

(1) Each train or logic channel shall be tested in accordance with the Surveillance Frequency Control Program.

(2) Testing of Automatic Actuation Logic shall include the energization/deenergization of each initiation relay and verification of the OPERABILITY of each initiation relay.

(3) A subgroup relay test shall be performed which shall include the energization/deenergization of each subgroup relay and verification of the OPERABILITY of each subgroup relay. Relays K109, K202, K301 and K308 are exempt from testing during power operation but shall be tested in accordance with the Surveillance Frequency Control Program and during each COLD SHUTDOWN condition unless tested within the previous 62 days.

(4) Using installed test switches.

(5) To be performed during each COLD SHUTDOWN if not performed in the previous 6 months.

(6) Each train shall be tested, with the exemption of relays, K110, K410 and K412, in accordance with the Surveillance Frequency Control Program. Relays K110, K410 and K412 shall be tested in accordance with the Surveillance Frequency Control Program.

Enclosure, Attachment 3

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Cross Reference of Current to Historical Equipment Descriptions and Designations Related to ESFAS Single Point Vulnerability Trip Hardening Modification

Cross Reference of Current to Historical Equipment Descriptions and Designations Related to ESFAS Single Point Vulnerability Trip Hardening Modification

The following provides a cross reference between the historical equipment descriptions and designations used in Letters W3P83-2273 and W3P84-1328 and those used in current Waterford 3 plant documentation.

Actuation Relay		Actuated Equipment			
		Designation		Description	
Train A	Train B	Historical	Current	Historical	Current
K305A MSIS	K305B MSIS	2MS-V602A	MS-124A	SG #1 Main Steam Isolation Valve	Main Steam Isolation Valve 1
		2FW-V823A	FW-184A	SG #1 Feedwater Isolation Valve	SG1 Main Feedwater Isolation Valve
		5FW-FM833	FW-173A	SG #1 Feedwater Control Valve	SG1 Main Feedwater Regulating Valve
		5FW-FM835	FW-166A	SG #1 Feedwater Control Bypass Valve	SG1 Startup Feedwater Regulating Valve
K313A MSIS	K313B MSIS	2MS-V604B	MS-124B	SG #2 Main Steam Isolation Valve	Main Steam Isolation Valve 2
		2FW-V824B	FW-184B	SG #2 Feedwater Isolation Valve	SG2 Main Feedwater Isolation Valve
		5FW-FM834	FW-173B	SG #2 Feedwater Control Valve	SG2 Main Feedwater Regulating Valve
		5FW-FM836	FW-166B	SG #2 Feedwater Control Bypass Valve	SG2 Startup Feedwater Regulating Valve
K114A CSAS		2CC-F243A/B	CC-710	CCW to RCPs Containment Isolation Valve	CCW Return Header Inside Containment Isolation Valve
	K114B CSAS	2CC-F147A/B	CC-713	CCW from RCP's Containment Isolation Valve[s]	CCW Return Header Outside Containment Isolation Valve
		2CC-F146A/B	CC-641		CCW to Containment Outside Containment Isolation Valve