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10 CFR 50.90

W3F1-2014-0073

January 21, 2015

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
11555 Rockville Pike  
Rockville, MD 20852

Subject: Waterford Steam Electric Station, Unit 3 Response to Request for Additional Information Regarding a Change to the Updated Final Safety Analysis Report Clarifying Pressurizer Heaters Function for Natural Circulation (TAC No. MF3058)  
Waterford Steam Electric Station, Unit 3 (Waterford 3)  
Docket No. 50-382  
License No. NPF-38

- REFERENCES:
1. Entergy Letter W3F1-2013-0043, Request for Review of Change to Updated Final Safety Analysis Report Clarifying Pressurizer Heaters Function for Natural Circulation at the Onset of a Loss of Offsite Power, dated November 11, 2013. (ADAMS Accession No. ML13316C052)
  2. Letter from NRC, Request for Additional Information Regarding a Change to the Updated Final Safety Analysis Report Clarifying Pressurizer Heaters Function for Natural Circulation (TAC No. MF3058), dated August 22, 2014. (ADAMS Accession No. ML14171A263)
  3. Entergy Letter W3F1-2014-0064, Response to Waterford Steam Electric Station, Unit 3 – Request for Additional Information Regarding a Change to the Updated Final Safety Analysis Report Clarifying Pressurizer Heaters Function for Natural Circulation (TAC No. MF3058), dated October 23, 2014. (ADAMS Accession No. ML14300A020)
  4. Email from NRC, Request for Additional Information Waterford Steam Electric Station, Unit 3 Regarding License Amendment Request for License Basis Changes to Clarify Pressurizer Heater Function During Loss of Off-Site Power (TAC NO. MF3058), dated October 31, 2014. (ADAMS Accession No. ML14305A014)

5. Letter from NRC, Request for Additional Information Regarding a Change to the Updated Final Safety Analysis Report Clarifying Pressurizer Heaters Function for Natural Circulation (TAC No. MF3058), dated December 19, 2014. (ADAMS Accession No. ML14346A177)

Dear Sir or Madam:

In letter dated November 11, 2013 (Reference 1), Entergy Operations, Inc. (Entergy) submitted a request to amend the facility operating license. The proposed amendment will clarify how the Pressurizer Heater function is met for natural circulation at the onset of a loss of offsite power concurrent with the specific single point vulnerability.

In letter dated August 22, 2014 (Reference 2), NRC requested Entergy to provide additional information to support review of the requested License Amendment Request. Entergy provided a response to that request in Reference 3.

In email dated October 31, 2014 (Reference 4), NRC requested Entergy to provide additional information to support review of the requested License Amendment Request. This letter provides that response in Attachment 1.

In letter dated December 19, 2014 (Reference 5), NRC requested Entergy to provide additional information to support review of the requested License Amendment Request. This letter provides that response in Attachment 2.

This correspondence contains no new commitments. If you have any questions or require additional information, please contact the Regulatory Assurance Manager, John Jarrell, at 504-739-6685.

I declare under penalty of perjury that the foregoing is true and correct. Executed on January 21, 2015.

Sincerely,



MRC/LEM

- Attachments:
1. Waterford 3 Response to Request for Additional Information dated October 31, 2014 (TAC No.MF3058).
  2. Waterford 3 Response to Request for Additional Information dated December 19, 2014 (TAC No.MF3058).
  3. Draft markup to Emergency Operating Procedure OP-902-009, Standard Appendices, Appendix 25, Restore Pressurizer Heater Control.

4. Draft markup to Waterford 3 FSAR Figure 8.3-33, Emergency Power Supply for Pressurizer heaters.
5. Draft markup to Waterford 3 FSAR Section 5.4.10.2.

cc: Mr. Marc L. Dapas, Regional Administrator  
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**Attachment 1 to**

**W3F1-2014-0073**

**Waterford 3 Response to Request for Additional Information dated October 31, 2014.**

**(TAC No.MF3058)**

Waterford 3 Response to NRC Request for Additional Information

**Question 1**

It appears from the past tense of some of the wording that this change is a reflection of current practices, and is not an incorporation of any new operator actions. For example, on page 5 of 11 of Attachment 1, the licensee stated, "Emergency Procedures and training have been developed and implemented..." Please clarify whether any operator actions are being added, changed, or deleted to support the LAR, or whether the operator actions described in the LAR just reflect current practices, procedures, and training.

**Response 1**

The discussion in previous submittals, such as the example referenced above, is referring to the current Emergency Operating Procedures (EOPs). The current EOPs already contain steps to prompt the Operator to restore Pressurizer Heaters as necessary to maintain Reactor Coolant System pressure control. The EOP steps refer to EOP OP-902-009, Standard Appendices, Appendix 25, Restore Pressurizer Heater Control, for direction on restoring the Pressurizer Heaters. Appendix 25 already contains a step to monitor Emergency Diesel Generator (EDG) loading prior to restoring the heaters to ensure the EDG is not overloaded upon heaters restoration. Appendix 25 directs closure of the 3A32 and 3B32 Supply Circuit Breakers to restore power to the heaters, which, without the presence of the single point vulnerability, would be performed from the Control Room. While the restoration of Pressurizer Heaters is not a new operator action, the potential need for action to be taken outside of the Control Room to accomplish this is. As discussed in the response to the previous NRC RAI dated October 23, 2014 (Reference 3), OP-902-009 Appendix 25 will be revised to clarify the actions needed to close the 3A32 and 3B32 Supply Circuit Breakers in the event this single point vulnerability exists. An updated draft of the proposed OP-902-009 Appendix 25 is included in Attachment 3 to this letter. This change to the EOPs is contingent upon approval of this License Amendment Request.

**Question 2**

Was a review of operating experience performed; for example, was a review of corrective actions related to natural circulation or pressurizer heaters done? If not, why not?

**Response 2**

To support preparation of the original License Amendment Request (Reference 1), a review was performed of a License Amendment Request (LAR) from Arkansas Nuclear One (ANO). This LAR was for a Technical Specification change to relocate the pressurizer heater requirements to the Technical Requirements Manual. The letter submitting the ANO LAR, 2CAN060903 (Reference 4) is dated June 18, 2009.

**Question 3**

Describe the sequence of operator tasks, beginning with how the operators recognize the common circuit breaker, CVCEBKRO14AB-13 is open or closed, and ending when the pressurizer heaters are confirmed operable, or when exit conditions for the procedure in effect have otherwise been satisfied. Include the following:

- a. the cue to initiate the action(s),
- b. procedure(s) in effect,
- c. instrument or method used to monitor progress,
- d. feedback that the action is working,
- e. any required tools,
- f. possible environmental hazards, e.g. high heat exacerbated by use of “flash suit”
- g. communications devices,
- h. how long the action takes,
- i. the number and kind of personnel required, and
- j. the frequency of performing or training on the action.

**Response 3**

- a. The cue to initiate the actions
  - i. Annunciator L0804 “Isol PNL CHNL NS Power Lost” will be locked in if CVCEBKRO14AB-13 is open.
  - ii. As a result of the loss of power to the 32 coes (3A32 and 3B32) the control switches for the Pressurizer Heaters will lose indication.
  - iii. CVCEBKRO14AB-13 being open will not affect position indication for Switchgear 32A or 32B Supply Circuit Breakers locally or in the control room. If this annunciator was not identified as being in alarm following a Loss of Offsite Power (LOOP) in accordance with OP-902-009, the Control Room operators would attempt to close the 3A32 and 3B32 Supply Circuit Breakers. If the control switch indication does not indicate closed (red) then they would be directed by OP-902-009 Appendix 25 to refer to the subject annunciator and to dispatch an operator to close the breakers locally.
- b. Procedure(s) in effect
  - i. OP-902-003, Loss of Offsite Power/Loss of Forced Circulation Recovery
  - ii. OP-902-009 Appendix 25, Standard Appendices – Restore Pressurizer Heater Control
  - iii. OP-500-010, Annunciator Response – Control Room Cabinet L
- c. Instrument or method used to monitor progress
  - i. The 3A32 and 3B32 Supply Circuit Breakers control switch position indications (red/green) will indicate red when the breakers are successfully closed locally.
  - ii. Local breaker position indication (red/green) will also indicate red when the breaker is closed.

- d. Feedback that the action is working
  - i. Control switch lights for individual pressurizer heater banks in the Control Room will indicate when power has been restored. They will indicate red when the heater banks are successfully turned on by the operator.
  - ii. Proportional heater power output can be monitored in the Control Room using Proportional Heater Bank #1 Ammeter (RC EM0100-3A) and Proportional Heater Bank #2 Ammeter (RC EM0100-3B). Using these meters, operators will be able to determine when the proportional heaters begin to fire, providing an alternate means of verification to control switch indication.
  - iii. Proper Reactor Coolant System (RCS) pressure and sub-cooled margin response will also indicate the action is successful.
- e. Any required tools
  - i. A flash suit is required for manual operation of 4.16 KV breakers. Flash suits are available in safety lockers in the Reactor Auxiliary Building Safety Switchgears (A and B) and verified during the Safety Locker Inventory check on a six month periodicity. Waterford 3 made a commitment in the original License Amendment Request (Reference 1) to establish appropriate controls to ensure flash suits for Operations usage (for local manual operation of 4.16 KV breakers) are available in the Reactor Auxiliary Building Safety Switchgear Room B at all times to meet Personal Protection Equipment requirements.
- f. Possible environmental hazards, e.g high heat exacerbated by use of “flash suit”
  - i. Both Switchgear Rooms A and B are cooled by the safety related Essential Chilled Water System and use two safety-related thermocouples in the switchgear area to maintain temperature 79°F.
  - ii. Per procedure EN-IS-108, Working in Hot Environments, with the switchgear area temperature at 80°F the stay time limit for working in a flash suit is 150 minutes. Local operation of the 3A32 and 3B32 Supply Circuit Breakers can be performed well within this timeframe as discussed below.
- g. Communication devices
  - i. Plant operators carry hand held radios that are operational during a loss of offsite power to ensure continuity of communications with the Control Room staff.
- h. How long the action takes
  - i. Although this is not a time critical action, time validations were performed which showed a time of less than 10 minutes for the operator to don a flash suit and close the 3A32 and 3B32 Supply Circuit Breakers. These times included travel time from remote areas of the plant.
- i. The number and kind of personnel required
  - i. Two Nuclear Auxiliary Plant Operators (NAOs) will perform the task. Although the task can be physically performed by one operator, the NAOs are trained to have a safety/first aid operator with them when locally operating 4.16 KV breakers.
- j. The frequency of performing or training on the action
  - i. Initial training on the single point vulnerability and required actions to locally operate the 3A32 and 3B32 Supply Circuit Breakers was provided to Operations during Cycle 5 2013 (Lesson Plan WLP-LOR-135EDGGTS00).
  - ii. Future training on this vulnerability and required actions to locally operate the 3A32 and 3B32 Supply Circuit Breakers will be driven by a training analysis per EN-TQ-201-01, SAT – Analysis



Phase, as part of the procedure change process when OP-902-009 is revised. The fleet procedure governing procedure changes, EN-AD-101, states that a Training Evaluation and Action Request (TEAR) shall be issued for all Non-Editorial Changes with Potential Training impact in accordance with EN-TQ-201, Systematic Approach to Training Process.

- iii. Currently training on the local closure of a 4.16 KV breaker is provided in initial training to NAOs and on a 2 year periodicity.

#### **Question 4**

In Attachment 2 of the licensee's submittal, Inserts 2A and 3 include a statement to the effect of:

Operator actions to power the Pressurizer Heaters are not time critical. However, in UFSAR 5.4.10, Pressurizer, it is stated that single phase natural circulation can be maintained at hot standby conditions with a 50°F sub-cooled margin indefinitely by energizing 150kW of heater capacity thirty minutes after the loss of offsite power.

- a. Is thirty minutes a self-imposed time limit for energizing pressurizer heaters?
- b. Is this time limit included in the controlling procedure?
- c. Is this limit addressed in the associated training?
- d. Is this limit used as a pass/fail measure?
- e. Was this limit used during validation of the task feasibility and reliability?

#### **Response 4**

Based on review of Emergency Operating Procedures, Technical Specifications and the Technical Requirements Manual, there are no specific time requirements for energizing the pressurizer heaters during natural circulation conditions. The discussion in the FSAR 5.4.10.2 related to natural circulation evaluation was added to the FSAR prior to initial startup. The evaluation discussed in FSAR 5.4.10.2 predates the Waterford 3 Extended Power Uprate (EPU) and Replacement Steam Generators (RSG). The current natural circulation cooldown analysis to shutdown cooling entry conditions to support Branch Technical Position (BTP) 5-4 Criteria for Waterford-3 with Replacement Steam Generators does not credit operation of any pressurizer heaters. A discussion of the analysis that demonstrates compliance with BTP 5-4 for Waterford 3 following EPU and RSGs was provided to the NRC in Entergy's response to NRC RAI (Reference 5) dated January 13, 2015 (Reference 6). The complete analysis is considered proprietary by the vendor, Westinghouse. Preparations are ongoing with the NRC and Westinghouse to schedule an audit of the analysis.

The License Amendment Request (Reference 1) proposes to add the following statement to FSAR 5.4.10.2:

“The natural circulation cooldown analysis, performed to comply with Branch Technical Position 5-4, Design Requirements of the Residual Heat Removal System, does not credit the operation of any pressurizer heaters. Therefore, the operator action to energize the Pressurizer Heaters is not a time critical operator action.”

Including both statements (the above proposed statement and the existing discussion in FSAR 5.4.10.2 of energizing pressurizer heaters (150 kW) thirty minutes after loss of offsite power to support maintaining hot standby conditions indefinitely) in the FSAR contradict one another and could cause confusion. Therefore, to be consistent with latest analysis, the outdated information will be removed. A draft markup of affected page is included as Attachment 5 to this letter. This markup includes identification of where the proposed Insert 2A from the original LAR (Reference 1) will go once the information is removed.

#### **Question 5**

Describe the process used to verify and validate the ability of your operators to accomplish the tasks required for the proposed LAR. In lieu of a description, you may provide the relevant administrative procedure(s) for verification and validation. Did the Validation include a representative sample of operators, and was it done with Technical Specification (TS) minimum staffing and nominal staffing?

#### **Response 5**

For clarification, the operator action to close the Switchgear 3A32 or 3B32 Supply Circuit Breakers locally in the event of a loss of offsite power coincident with circuit breaker CVCEBKR014AB-13 being open may be desired to restore the Pressurizer Heater function, but is not required to support natural circulation cooldown to meet the requirements of Branch Technical Position (BTP) 5-4 and is not a time critical operator action.

The OP-902-009 Appendix 25 action (provided in Reference 3) can be performed with the Technical Specification (TS) Table 6.2-1 minimal staffing and normal staffing. Technical Specifications only require two Auxiliary Operators (AOs) to be on site in MODES 1-4. Normal staffing includes at least 5 AOs on site per procedure OI-042-000, Watch Station Processes. The only time-specified action in OP-902-003, Loss of Offsite Power/Loss of Forced Circulation Recovery, requiring use of AOs is the restoration of Dry Cooling Tower (DCT) Sump Pumps should the Loss of Offsite Power (LOOP) occur coincident with a Probable Maximum Precipitation Event. Restoring DCT Sump Pumps may be required within 30 minutes and can be performed by one AO. While there are additional tasks that AOs may be asked to perform in the field, they are not time critical and can be performed as prioritized by the control room operators. The pressurizer heaters are not required for design basis accident response, thus the restoration of Pressurizer Heaters is also not a time-critical action. The restoration could be performed as prioritized by the control room (assuming only 2 AOs available) or could be performed concurrently (assuming normal staffing).

OP-100-016 "Emergency Operating Procedure Change, Revision, Verification and Validation Process," is the site procedure that governs the changing of emergency operating procedures. OP-100-016 is the procedure used to establish the requirements for the verification and validation of all changes to emergency operating procedures. Part of the validation process required by OP-100-016, is the performance of a local validation walkdown for any steps which are to be performed locally. This requires the completion of Attachment 6.8, Local Action Validation Walkdown, in OP-100-016, by personnel who may be expected to perform the task. The validator uses Attachment 6.8 to verify the accuracy and detail of the proposed procedure change. Attachment 6.8 directs the validator to consider accessibility, equipment availability, sequencing, and the overall ability for the procedure revision to be performed as written during accident conditions.

In Reference 3, Waterford 3 provided a response to a NRC Request for Additional Information (RAI) to provide a draft copy of the operating procedure which will then identify the need for the local manual operator action in the respective train switchgear room to reenergize the necessary Pressurizer Heaters. Using OP-100-016 Attachment 6.8, a preliminary validation for the field actions has been performed using the current draft procedure revision to OP-902-009 Appendix 25. The validation was performed independently by three AOs, with experience levels ranging from 2 to 6 years. After completing the walkdown of the proposed change to OP-902-009, Standard Appendices, Appendix 25, all of the AOs concurred that the procedure contained the appropriate level of detail and information needed to properly execute the task during accident conditions. Following approval of this LAR, OP-902-009 Appendix 25 will be revised using OP-100-016, which will require the revision to be formally verified and validated per procedure OP-100-016.

#### **Question 6**

Describe the process that will be used to monitor the manual actions to ensure that they remain feasible and reliable over the long term, and are not degraded because of design changes, inadequate training, or other mechanisms.

#### **Response 6**

The potential need to locally close the 3A32 and 3B32 Supply Circuit Breakers will be incorporated into the Emergency Operating procedure OP-902-009 upon approval of this LAR (Reference 1). The EOP change process is governed by procedure OP-100-016, "EOP Change, Revision, Verification, and Validation Process." This process requires verification that changes are technically correct and validation that the procedure changes work prior to incorporation. This process requires Operator training be performed on the action, including updating of lesson plans to ensure the changes are captured long-term. This process also requires updating of the EOP Technical Guides to document a basis for each step. This process ensures future EOP revisions will not affect the operator action without full consideration and review.

The fleet procedure governing plant modifications, EN-DC-115, "Engineering Change Process," states "Impact Screenings are required for Commercial Changes, Engineering Evaluations, and Nuclear

Changes.” The guidelines contained in EN-DC-115 ensure that potential changes to EOPs are identified and addressed during the modification process. The Operations procedure governing Operator reviews of design changes is OI-040-000 Attachment 6.5, “EC Review Operational Considerations.” This attachment includes Emergency Operating Procedures as one of the items to be considered during reviews.

REFERENCES

1. Entergy letter W3F1-2013-0043, Request for Review and Approval of Change to Updated Final Safety Analysis Report Clarifying Pressurizer Heaters Function for Natural Circulation at the Onset of a Loss of Offsite Power, dated November 11, 2013. (ADAMS Accession No. ML13316C052)
2. Email from NRC, Request for Additional Information Waterford Steam Electric Station, Unit 3 Regarding License Amendment Request for License Basis Changes to Clarify Pressurizer Heater Function During Loss of Off-Site Power (TAC NO. MF3058), dated October 31, 2014. (ADAMS Accession No. ML14305A014)
3. Entergy Letter W3F1-2014-0064, Response to Waterford Steam Electric Station, Unit 3 – Request for Additional Information Regarding a Change to the Updated Final Safety Analysis Report Clarifying Pressurizer Heaters Function for Natural Circulation (TAC No. MF3058), dated October 23, 2014. (ADAMS Accession No. ML14300A020)
4. Entergy (ANO) Letter 2CAN060903, License Amendment Request – Technical Specification Changes to Relocate Pressurizer Heater Requirements to TRM, dated June 18, 2009. (ADAMS Accession No. ML091760204)
5. NRC letter, Request for Additional Information Waterford Steam Electric Station, Unit 3 Regarding License Amendment Request for License Basis Changes to Clarify Pressurizer Heater Function During Loss of Off-Site Power (TAC NO. MF3058), dated October 21, 2014 (received October 23, 2014). (ADAMS Accession No. ML14246A015)
6. Entergy Letter W3F1-2014-0072, Response to Waterford Steam Electric Station, Unit 3 – Request for Additional Information Regarding a Change to the Updated Final Safety Analysis Report Clarifying Pressurizer Heaters Function for Natural Circulation (TAC No. MF3058), dated January 13, 2015. (ADAMS Accession No. ML15013A439)

**Attachment 2 to**

**W3F1-2014-0073**

**Waterford 3 Response to Request for Additional Information dated December 19, 2014.**

**(TAC No.MF3058)**

Waterford 3 Response to NRC Request for Additional Support

**Question 1**

In UFSAR Figure 8.3-33, the reclosing of two 4.16 kiloVolt circuit breakers to two 480 Volt switchgears (3A32 and 3B32 supplying the pressurizer heaters) is explained with the following symbols and notes:

Symbol Tc (applicable to both breakers) — Breaker recloses automatically when the diesel generator voltage is available (See Note 1).

Note 1 (applicable to both breakers) - This breaker opens upon Safety Injection Actuation Signal (SIAS) but may be closed from Control Room 205 seconds after SIAS if offsite power is unavailable.

Note 5 (applicable to only one breaker) — If Loss of Offsite Power (LOOP) and SIAS are present, this breaker may be closed 205 seconds after SIAS locally at the breaker.

The above symbol and notes appear to be inconsistent with each other. In addition, there are inconsistencies with the LAR, which states that these breakers would close automatically (unless the single-point vulnerability disables closing of these breakers). Please explain reclosing of the above breakers under the following scenarios: (1) LOOP only, (2) SIAS only, and (3) Concurrent LOOP and SIAS. If any changes to the UFSAR Figure 8.3-33 are required, please provide a proposed markup of the figure.

**Response 1**

Waterford 3 initiated CR-WF3-2015-00178 to document an error associated with Note 1 of FSAR Figure 8.3-33 (Emergency Power Supply for Pressurizer heaters). Note 1 describes the operation of the Station Service Transformers 3A32 Bus and 3B32 Supply Circuit Breakers during a Safety Injection Actuation Signal (SIAS) event. The note states, "This breaker opens upon SIAS but may be closed from Control Room 205 SEC after SIAS if offsite power is UNAVAILABLE." Per Control Wiring Diagram B424 sheet 2398, the breaker can be closed from the Control Room if offsite power is AVAILABLE. FSAR figure 8.3-33 Note 1 will be updated by replacing UNAVAILABLE with AVAILABLE. A markup of the proposed change to FSAR Figure 8.3-33 is attached as Attachment 4.

Operations of the Station Service Transformers 3A32 Bus and 3B32 Supply Circuit Breakers under various scenarios are described below:

Loss Of Offsite Power (LOOP) only - Breaker trips on Loss of Voltage signal and recloses automatically when Emergency Diesel Generator (EDG) voltage is available.

SIAS only - Trip on SIAS signal and may be manually closed from Control Room 205 seconds after SIAS.

Concurrent LOOP and SIAS - Breaker trips are initiated by Loss of Voltage and/or SIAS. The 3B32 Supply Circuit Breakers may be closed locally 205 seconds after SIAS using the manual Push Button and the keyed Selector Switch (SS/SWGR). During a control room fire event, fire induced damage to certain cables may prevent automatic sequencing of Switchgear 3B32 Supply Circuit breaker following a loss of

offsite power event. In this event the keyed Selector Switch allows Operators to close the breaker without having to open the breaker cubicle door. Train B is the dedicated train during a Control Room fire event and therefore, the Selector Switch was installed for Switchgear 3B32 only. Since Train A is not dedicated for a control room fire the breaker for Switchgear 3A32 does not have a Selector Switch and may only be closed with the breaker cubicle door open.

## **Question 2**

In the October 23, 2014, supplement, Question 3 referred to the Switchgears 32A and 32B. However, in the LAR and UFSI\R Figure 8.3-33, the licensee referred to these switchgears with the respective designations 3A32 and 3B32. Please resolve inconsistency in the switchgear designations, and provide a revised Response 3, if necessary.

## **Response 2**

For clarification, a revised response to Question 3 of the supplement provided on October 23, 2014 (Reference 1) in its entirety is given below. It should be noted that the italicized paragraph is a direct quotation from operations annunciator response procedure OP-500-010, Control Room Cabinet L. However, in that paragraph the phrase "Switchgear 32A Supply" can be used interchangeably with "3A32 Supply Circuit Breaker" and "Switchgear 32B Supply" can be used interchangeably with "3B32 Supply Circuit Breaker." In addition, reference to attachments in the below response is referring to the attachments of Reference 1.

Annunciator Alarm L0804 (H-4), Isol PNL CHNL NS Power Lost, would alarm in the Control Room to alert control room operators that CVCEBKR014AB-13 is Open. The below wording has been added to operations annunciator response procedure OP-500-010, Control Room Cabinet L, so that if this alarm is received, the operators are aware of the potential impact to the Pressurizer Heaters.

*The loss of power to CVC-EBKR-014AB-13 does not de-energize Switchgear 32A and 32B from the emergency power buses if they are already connected. However, Switchgear 32A Supply, SSD-EBKR-3A-8, and Switchgear 32B Supply, SSD-EBKR-3B-9, will not automatically close to load Switchgear 32A and 32B onto the Emergency Diesel Generators if they were initially open, such as during a Loss of the 3A or 3B Bus or during Loss of Offsite Power event. Also these breakers will not be able to be closed remotely (from the Control Room) to re-energize Pressurizer Heaters. If this condition affects Pressurizer Heater availability, then refer to Technical Specification 3.4.3.1 and Technical Requirements Manual 3.4.3.1.*

A markup copy of a draft revision to operating procedure OP-902-009, Standard Appendices, Appendix 25, Restore Pressurizer Heater Control, has been included as Attachment 3 of this letter. OP-902-009 is used in conjunction with performance of other station Emergency Operation Procedures (EOPs) for actions that are necessary to be taken in several events.



Performance of a certain appendix or appendices in OP-902-009 is directed by the specific EOP step or steps the station would be performing. When the operators are instructed to restore pressurizer heater control, the draft markup provides guidance that local closure of CVC-EBKR-014AB-13 may be required and also references the annunciator response documented above. Attachment 3 contains both a marked up and clean copy of the draft changes.

REFERENCES:

1. Entergy Letter W3F1-2014-0064, Response to Waterford Steam Electric Station, Unit 3 – Request for Additional Information Regarding a Change to the Updated Final Safety Analysis Report Clarifying Pressurizer Heaters Function for Natural Circulation (TAC No. MF3058), dated October 23, 2014. (ADAMS Accession No. ML14300A020)

**Attachment 3 to**

**W3F1-2014-0073**

**Draft markup to Emergency Operating Procedure OP-902-009, Standard Appendices,  
Appendix 25, Restore Pressurizer Heater Control.**

**(TAC No.MF3058)**

## 25.0 Restore Pressurizer Heater Control

### INSTRUCTIONS

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#### NOTE

Pressurizer heaters shall **NOT** be restored with a LOOP concurrent with a SIAS.

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1. Verify Pressurizer level is greater than 33%.
2. Monitor EDG loading to ensure EDG does not exceed 4 MW.
3. Check SEQUENCER has timed out for each energized Safety bus.

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#### NOTE

The Security SUPS, SUPS 014AB, breaker CVC-EBKR-014AB-13 provides power for the automatic loading capability of the 3A32 and 3B32 buses. With breaker CVC-EBKR-014AB-13 open the feeder breakers below would require local closure. Refer to Annunciator L0804.

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4. Close SWITCHGEAR 32A SUPPLY breaker (SSD EBKR3A8).
5. Close SWITCHGEAR 32B SUPPLY breaker (SSD EBKR3B9).
6. Place PROPORTIONAL HEATER BANKS Control switches to "ON."
7. Momentarily place each BACKUP HEATER BANKS Control switches to "OFF" and THEN to "AUTO."

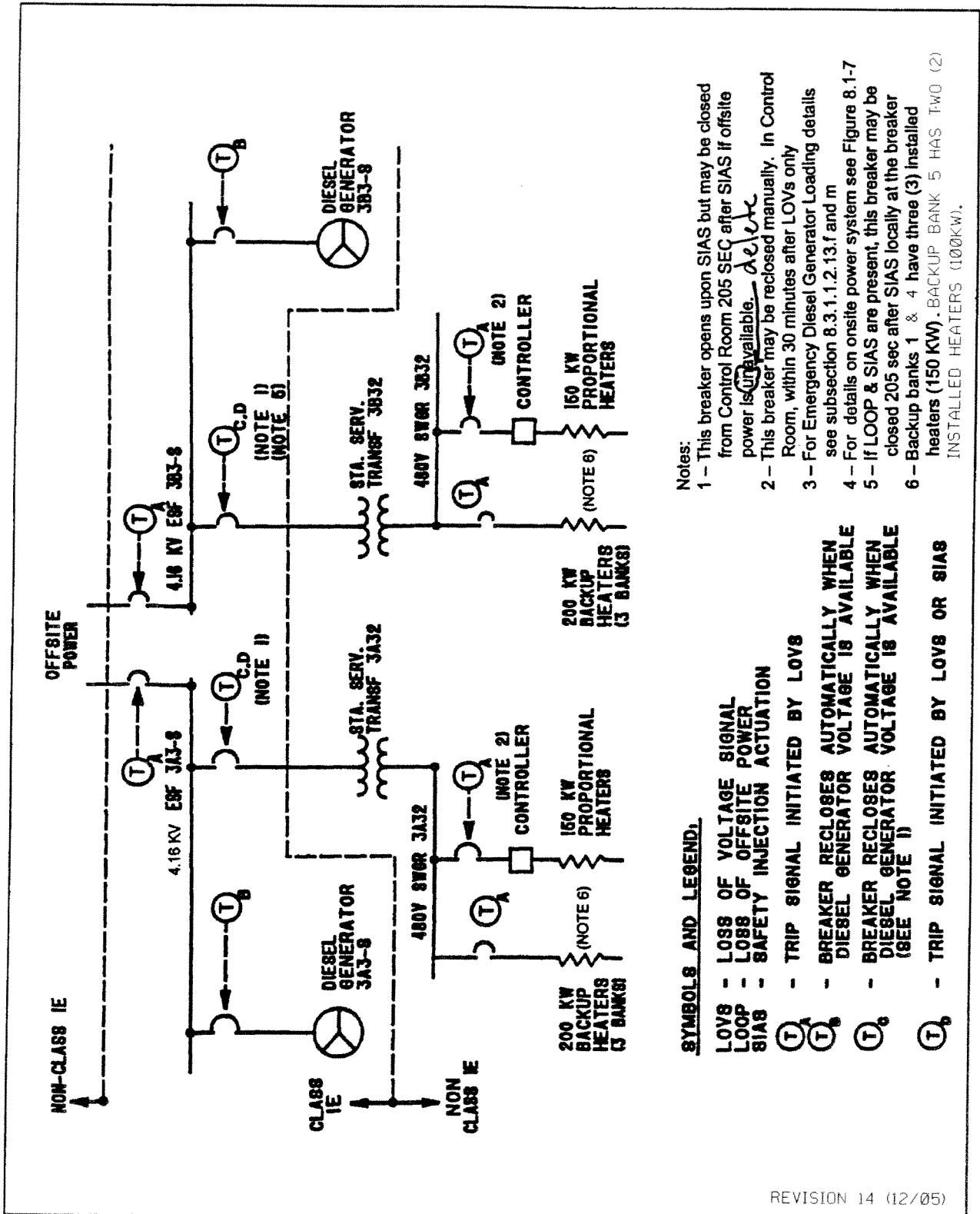
**End of Appendix 25**

**Attachment 4 to**

**W3F1-2014-0073**

**Draft markup to Waterford 3 FSAR Figure 8.3-33, Emergency Power Supply for  
Pressurizer heaters.**

**(TAC No.MF3058)**



- Notes:**
- 1 - This breaker opens upon SIAS but may be closed from Control Room 205 SEC after SIAS if offsite power is ~~available~~ *deloc*
  - 2 - This breaker may be reclosed manually. In Control Room, within 30 minutes after LOVs only
  - 3 - For Emergency Diesel Generator Loading details see subsection 8.3.1.2.13.f and m
  - 4 - For details on onsite power system see Figure 8.1-7
  - 5 - If LOOP & SIAS are present, this breaker may be closed 205 sec after SIAS locally at the breaker
  - 6 - Backup banks 1 & 4 have three (3) installed heaters (150 KW). Backup Bank 5 HAS TWO (2) INSTALLED HEATERS (100KW).

- SYMBOLS AND LEGEND:**
- LOVS - LOSS OF VOLTAGE SIGNAL
  - LOOP - LOSS OF OFFSITE POWER
  - SIAS - SAFETY INJECTION ACTUATION
  - (T) - TRIP SIGNAL INITIATED BY LOVS
  - (T<sub>A</sub>) - BREAKER RECLOSING AUTOMATICALLY WHEN DIESEL GENERATOR VOLTAGE IS AVAILABLE
  - (T<sub>B</sub>) - BREAKER RECLOSING AUTOMATICALLY WHEN DIESEL GENERATOR VOLTAGE IS AVAILABLE (SEE NOTE 1)
  - (T<sub>C</sub>) - TRIP SIGNAL INITIATED BY LOVS OR SIAS
  - (T<sub>D</sub>) - TRIP SIGNAL INITIATED BY LOVS OR SIAS

REVISION 14 (12/05)

Waterford Steam Electric Station #3	EMERGENCY POWER SUPPLY FOR PRESSURIZER HEATERS	FIGURE 8.3-33
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**Attachment 5 to**

**W3F1-2014-0073**

**Draft markup to Waterford 3 FSAR Section 5.4.10.2.**

**(TAC No.MF3058)**

### WSES-FSAR-UNIT-3

setpoint, the letdown control valves close to a minimum value, and additional charging pumps in the Chemical and Volume Control System (CVCS) are automatically started to add coolant to the system and restore pressurizer level.

When load is increased, the average reactor coolant temperature is raised in accordance with the coolant temperature program. The expanding coolant from the reactor coolant piping hot leg enters the bottom of the pressurizer through the surge line, compressing the steam and raising system pressure. The increase in pressure is moderated by the condensation of steam during compression and by the decrease in bulk temperature in the liquid phase. Should the pressure increase be large enough, the pressurizer spray valves open, spraying coolant from the reactor coolant pump discharge (cold leg) into the pressurizer steam space. The relatively cold spray water condenses some of the steam in the steam space, limiting the system pressure increase. The programmed pressurizer water level is a power dependent function. A high level error signal, produced by an insurge, causes the letdown control valves to open, releasing coolant to the CVCS and restoring the pressurizer to the programmed level. Small pressure and primary coolant volume variations are accommodated by the steam volume that absorbs flow into the pressurizer and by the water volume that allows flow out of the pressurizer.

The pressurizer heaters are single unit, direct immersion heaters that protrude vertically into the pressurizer through sleeves welded in the lower head. Each heater is internally restrained from high amplitude vibrations and can be individually removed for maintenance during plant shutdown.

Approximately one-fifth of the heaters are connected to proportional controllers that adjust the heat input as required to compensate for steady-state losses and to maintain the desired steam pressure in the pressurizer. The remaining backup heaters are connected to on-off controllers. These heaters, normally deenergized, are turned on by either a low-pressurizer pressure signal or high-level error signal. This latter feature is provided since load increases result in an in-surge of relatively cold coolant into the pressurizer, thereby decreasing the bulk water temperature. The CVCS acts to restore level, resulting in a transient pressure below normal operating pressure. To minimize the extent of this transient, the backup heaters are energized, contributing more heat to the water. An interlock prevents operation of the backup heaters in the event of concurrent high level error and high-pressurizer pressure signals. A low-low pressurizer level signal deenergizes all heaters to protect the heaters should they become uncovered.

Delete

In order to determine the pressurizer heater capacity required to maintain natural circulation in the hot standby condition after a loss of offsite power, it was conservatively assumed that the ambient heat loss rate through the pressurizer was 400,000 BTU/hr. The measured heat loss from startup testing was only 356,000 BTU/hr. With an assumed 400,000 BTU/hr heat loss and a safety valve leakage of up to 0.5 gpm, single phase natural circulation can be maintained at hot standby conditions with a 50°F subcooled margin indefinitely by energizing 150kW of heater capacity thirty minutes after the loss of offsite power. Loss of subcooling, however, does not imply loss of natural circulation.

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A redundant group of pressurizer proportional heaters and three redundant groups of backup heaters have been made available to be placed manually on the emergency diesel generator after a loss of offsite power. Each bank of heaters has access to only one Class 1E division power supply.

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Insert 2A