

# LICENSEE EVENT REPORT (LER)

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|---|--|---|
| FACILITY NAME (1)<br><p style="text-align: center;">TURKEY POINT UNIT 3</p> | DOCKET NUMBER (2)<br><p style="text-align: center;">05000250</p> | PAGE (3)<br><p style="text-align: center;">1 OF 6</p> |
|---|--|---|

TITLE (4) **Console Switch Position Disabled Auxiliary Feedwater Auto Start Logic on 3B Steam Generator Feedwater Pump Trip**

| EVENT DATE (5) |     |    | LER NUMBER (6) |       |    | RPT DATE (7) |     |    | OTHER FACILITIES INV. (8) |  |  |              |
|----------------|-----|----|----------------|-------|----|--------------|-----|----|---------------------------|--|--|--------------|
| MON            | DAY | YR | YR             | SEQ # | R# | MON          | DAY | YR | FACILITY NAMES            |  |  | DOCKET # (S) |
| 11             | 14  | 97 | 97             | 09    | 01 | 03           | 24  | 98 |                           |  |  |              |

|                    |     |                                 |
|--------------------|-----|---------------------------------|
| OPERATING MODE (9) | 1   | <u>10 CFR 50.73(a)(2)(I)(B)</u> |
| POWER LEVEL (10)   | 100 |                                 |

LICENSEE CONTACT FOR THIS LER (12)

|                                  |   |
|----------------------------------|---|
| S. MIHALAKEA, LICENSING ENGINEER | Telephone Number<br><p style="text-align: center;">(305) 246-6454</p> |
|----------------------------------|---|

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | NPRDS? | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | NPRDS? |
|-------|--------|-----------|--------------|--------|-------|--------|-----------|--------------|--------|
|       |        |           |              |        |       |        |           |              |        |

|   |                               |       |     |      |
|---|-------------------------------|-------|-----|------|
| SUPPLEMENTAL REPORT EXPECTED (14) NO <input checked="" type="checkbox"/> YES <input type="checkbox"/> | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
| (if yes, complete EXPECTED SUBMISSION DATE)   |                               |       |     |      |

ABSTRACT (16)

On 11/14/97, the Reactor Control Operator identified that the Control Room (CR) console switch for the 3B Steam Generator Feedwater Pump (SGFW) pump was not in the start position. The 3B SGFW pump had been locally started on 7/30/97, while Unit 3 was in Mode 3.

Technical Specification (TS) Table 3.3-2, Item 6.e, requires Auxiliary Feedwater (AFW) actuation on trip of all main feedwater pumps breakers during Modes 1 and 2. Item 6.e of TS Table 3.3-2, was not met from 7/31/97 (when Unit 3 entered Mode 2), until 11/14/97 because the minimum operating channels requirement includes having each pump switch semaphore in the operating position (red flag). This AFW auto-start feature is an anticipatory AFW actuation for a Steam Generator Low-Low level. The AFW auto-start on SGFW pump trip was disabled only when SGFW pump 3A was not running during Modes 1 and 2. The 3A SGFW pump was not running from 0413 until 1845 on 7/31/97, and again from 1044 on 8/14/97, until 1010 on 8/15/97.

At 1820 on 11/14/97, the CR console switch for the 3B SGFW pump was momentarily placed in the start position, restoring the AFW automatic start actuation circuit for the 3B SGFW pump. Procedure revisions to add local start requirements for the SGFW pump in Modes 3, 4, and 5, were reviewed to ensure they contain all necessary guidance. Operations verified that all CR switch semaphores match component indicating lights. A training brief was issued describing the event and its significance.

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## I. BACKGROUND

The 3B Steam Generator Feedwater Pump (SGFW) pump [SJ:p] was started locally on July 30, 1997, while Unit 3 was in Mode 3. The associated SGFW pump Control Room (CR) console switch [SJ:js] was not placed in the start position. Operations personnel considered the decision to start the first SGFW pump locally as conservative, because the local start would prevent an inadvertent Auxiliary Feedwater (AFW) [BA] actuation if the SGFW pump breaker failed to close.

On April 11, 1997, with Turkey Point Unit 3 in Mode 3, AFW was inadvertently actuated during an attempt to start the 3B SGFW pump, when the associated pump breaker failed to close. This event was reported in LER 250/97-004. It was determined that an inadvertent AFW actuation may occur while attempting to start the pump from the CR if the breaker were to fail to close while the other SGFW pump is not operating. It was recommended that the first SGFW pump be started using the local push-button during Mode 3. Using the local push-button prevents an AFW automatic actuation if the associated pump breaker fails to close. Following the pump start using the local push-button, the CR console switch must be cycled to the start position in order to enable the AFW automatic start actuation circuit and provide evidence of this action by displaying the red flag. As a result, procedural changes were required to incorporate guidance for starting the first SGFW pump during Mode 3 using the local push-button. These procedural changes were initiated on July 22, 1997, and were not approved until August 25, 1997. Consequently, on July 30, 1997, when a reactor trip occurred as a result of an inadvertent closure of the 3B Main Steam Isolation Valve [SB:isv] (LER 250 97-007), the procedures used to start the 3B pump had not been changed to address locally starting a SGFW pump.

## II. DESCRIPTION OF THE EVENT

On November 14, 1997, Turkey Point Unit 3 was running at 100% power. At approximately 1800 hours, during the once per shift review of 3-OSP-201.1, Reactor Control Operator (RCO) Daily Logs Minimum Instrumentation and Equipment List, the RCO questioned why the 3B SGFW pump CR console switch had a green flag semaphore [SJ:js,zi] even though the pump was operating. The "green flagged" semaphore indicates that the last demand by the switch was to stop the pump.

Technical Specification Table 3.3-2, Item 6.e, requires automatic actuation of AFW on the trip of all Main Feedwater pump breakers for Modes 1 and 2. It was determined that Technical Specification Table 3.3-2, Item 6.e had not been met since Unit 3 entered Mode 2 on July 31, 1997. Operations personnel determined that the as found condition would prevent an AFW automatic start actuation on SGFW pump trip if the 3B SGFW pump was the only feed pump running and the 3B SGFW pump motor breaker tripped. Although the Technical Specification requirements were not met from July 31, 1997 until November 14, 1997, the AFW automatic start actuation on SGFW pump trip was only disabled when the SGFW pump 3A was not running during Modes 1 and 2. Operator logs show that the 3A SGFW pump was not running from July 31, 1997, at 0413 hours (when Unit 3 entered Mode 2), until July 31, 1997, at 1845 hours, and again from August 14, 1997, at 1044 hours until August 15, 1997, at 1010 hours.

The entry into Mode 2 on July 31, 1997, also violated Technical Specification 3.0.4, which requires that, "Entry into an OPERATIONAL MODE... shall not be made when the conditions for the Limiting Condition for Operation are not met...". During the period in which the condition existed, Technical Specification 3.0.4 was violated twice more when mode changes took place; when Unit 3 entered Mode 1 later on July 31, 1997, and again when Unit 3 entered Mode 1, on August 15, 1997.



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The AFW automatic start actuation on SGFW pump trip for the 3B SGFW pump was restored on November 14, 1997, at 1820 hours by momentarily placing the CR console switch to the start position and returning the switch to the mid position. This action aligned the CR switch contacts to restore the interlock and changed the switch semaphore from green to red.

### III. SYSTEM DESCRIPTION

The trip of all SGFW pumps is a non-safety related AFW actuation feature. AFW will automatically actuate on the loss of both feedwater pumps under normal operating conditions, as described in Section 9.11.2 of the Updated Final Safety Analysis Report (UFSAR). The AFW automatic start feature is an anticipatory AFW actuation for a Steam Generator [SJ:sg] Low-Low level condition associated with the Loss of Feedwater Flow event. This anticipatory Engineering Safety Feature (ESF) actuation is required in Technical Specification Table 3.3-2, Item 6.e. The Technical Specifications minimum channel operable requirement is one channel per breaker per operating pump, in Modes 1 and 2.

The SGFW pump CR console switch is a three position, STOP/START and spring return to middle position switch. These CR console switches have a semaphore (small red/green flag) window which indicates if the switch was last in the open (green) or closed (red) position. The SGFW pump switches are part of the AFW initiation logic in order to avoid an AFW initiation when the SGFW pumps are manually stopped. With either of the two pump control switches in the middle position after having been in the start position and with both of the two pump breakers open, AFW will be initiated. When only one pump is operating, the tripping of that pump will initiate AFW.

Starting a SGFW pump locally does not enable the AFW automatic start logic. Using the local push-button, AFW automatic start would not be actuated if a pump breaker failed to close. Following the SGFW pump start using the local push-button, the CR console switch must be cycled to the start position in order to enable the AFW automatic actuation circuit as evidenced by the red flag.

### IV. ANALYSIS OF THE EVENT

An event investigation was performed to determine the causes of the mismatched CR switch semaphore on the 3B SGFW pump that existed from July 30, 1997 to November 14, 1997. The results of the event investigation identified the following:

- The 3B SGFW pump was started locally on July 30, 1997, at 1634 hours while Unit 3 was in Mode 3.
- Operator log reviews and personnel interviews show that historically the SGFW pumps have been started from the control room with the exception of tests, for example, bumping the motor for rotation, stroking the motor operated discharge valve.
- An information tag was placed over the 3B SGFW pump CR console switch semaphore indicator because of recent pump casing deficiencies: The CR console switch semaphore was not considered as an indicator for the SGFW pump. Operations personnel did not regard the tag as improperly placed over a SGFW pump indicator. This tag hid the status of the switch from operators performing board walkdowns.



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- The procedure utilized to start the 3B SGFW pump locally, Procedure 3-OP-74, Steam Generator Feedwater Pump, did not provide specific guidance to start the SGFW pump locally. Operations personnel were aware that Engineering had evaluated the use of the local start control switch as a method to prevent an inadvertent AFW actuation when attempting to start the first SGFW pump. The procedural changes to incorporate specific guidance to start a SGFW pump locally were initiated on July 22, 1997. These changes were approved on August 25, 1997.
- Previous start failures of the SGFW pumps led to a decision to perform local starts of the pumps when in Modes 3, 4, 5. This evolution creates the potential for not meeting Technical Specification Table 3.3-2, Item 6.e. requirements if the CR console switch is left in the stop (returned to middle) position (green flagged) when entering Modes 1, and 2.
- The 3B SGFW pump was started locally, but the CR console switch was not placed to start to actuate the AFW automatic start interlock after the pump was running. The Technical Specification Table 3.3-2, Item 6.e was not met from July 31, 1997, when Mode 2 was entered at approximately 0413 hours, until November 14, 1997, at approximately 1820 hours, when the AFW automatic start actuation on SGFW pump trip for the 3B SGFW pump was restored. However, the AFW automatic start actuation on SGFW pump trip was disabled only when 3A SGFW pump was not running during Modes 1 and 2, for approximately 14.5 hours on July 31, 1997, and for approximately 24 hours during August 14-15, 1997.

## V. CAUSE OF THE EVENT

The root cause for this event is inadequate procedural guidance for starting the SGFW pump locally without enabling the AFW automatic start circuit by momentarily placing the CR console switch to start. This information needed to be provided to the CR Operators, that entry into Modes 1 and 2 without momentarily placing the CR console switch to start (as evidenced by the switch semaphore red flag) would not meet the requirements of Technical Specification Table 3.3-2, Item 6.e.

There are several causal factors that contributed to the duration of time before the SGFW pump CR console switch was repositioned to restore the AFW actuation interlock.

- The CR console switch semaphore flag was covered by an information tag that prevented the discovery during operator board walkdowns.
- Operations personnel were not aware of the significance associated with the SGFW pump CR console switch alignment and semaphore indication.
- Operations personnel did not have an adequate knowledge level associated with the SGFW pump CR console switch alignment requirements and the significance of the semaphore indication. Operations personnel had been instructed not to reposition switches to align semaphores unless directed by procedure.
- General Operating Procedure, 3/4-GOP-301, Hot Standby to Power Operations, requires a CR console switch alignment check prior to a mode change, but this verification did not include the SGFW pump control switches or semaphores.

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## VI. SAFETY SIGNIFICANCE

The three turbine driven AFW pumps (shared by Turkey Point Units 3&4) are started on any of the following signals: a) Low-Low water level in any steam generator, b) any Safety Injection signal, c) loss of offsite power d) loss of either A or B 4.16 kv bus on either unit, e) trip of all running Main Feedwater pumps on either unit f) ATWS Mitigating System Actuation Circuitry (AMSAC), g) manual actuation.

The UFSAR Chapter 14 accident analysis credits AFW for mitigation of several events. The following events which credit AFW were reviewed: 1) Loss of Normal Feedwater, 2) Loss of Non Emergency AC to plant auxiliaries, 3) Steam Generator Tube Rupture, 4) Main Steam Line Break, and 5) Small Break Loss of Coolant Accident.

The loss of Normal Feedwater Flow transient is analyzed in Section 14.1.11 of the UFSAR. The event assumes that AFW is initiated conservatively 120 seconds following the start of the signal on the Low-Low Steam Generator level signal.

The loss of Non Emergency AC Power to plant auxiliaries is analyzed in Section 14.1.12 of the UFSAR. The analysis assumes that AFW is initiated on the Low-Low Steam Generator level signal.

The Steam Generator Tube Rupture transient is analyzed in Section 14.2.4 of the UFSAR. For this event AFW is initiated on the Safety Injection signal.

The Main Steam Line Break transient is analyzed in Section 14.2.5 of the UFSAR. AFW is initiated on the Safety Injection signal.

The Small Break LOCA is analyzed in Section 14.3.2.2 of the UFSAR. AFW is initiated on the Safety Injection signal.

Based on the review of these events, it is concluded that the AFW automatic start initiation credited in the analyses is based on Safety Injection or Low-Low Steam Generator Water Level signals. There are no analyses which credit the AFW automatic initiation on the trip of all running Main Feedwater pumps. The actuation of AFW due to loss of the running SGFW pump is anticipatory. Additionally, all risk dominant scenarios requiring the operation of AFW are associated with Low-Low steam generator levels. Since Low-Low steam generator level would have provided actuation of the AFW, the risk impact of the Main Feedwater related AFW actuation failure is not significant. Therefore, it is concluded that there is no safety significance associated with the as found condition.

## VII. CORRECTIVE ACTIONS

- 1) Procedures 3/4-OP-074, Steam Generator Feed Pump, were revised to incorporate the requirements to locally start the first SGFW pump in Modes 3,4, and 5. These revisions were reviewed to ensure they contain all necessary guidance for local SGFW pump starts.
- 2) An Operations Department Night Order has been issued informing personnel of the event. Emphasis was placed on the SGFW pump CR console switch alignment requirements and the placement of information tags.
- 3) The control room was walked down to ensure other information tags were not obscuring control board indication.





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- 4) Training Brief 703, AFW pump Automatic-Start Logic, has been issued describing the event and the logic of the AFW automatic actuation on loss of all running SGFW pumps.
- 5) General Operating Procedure, 3/4-GOP-301, Hot Standby to Power Operations, has been revised to incorporate switch alignment checks for the SGFW pump CR console switches including verification of the semaphore indication.
- 6) Operations performed a control board walkdown and verified that CR switch semaphores match associated component indicating lights.
- 7) Engineering will perform a review to determine if other CR switches with semaphore indication have a control function that is inhibited if the semaphore does not match the component indicating light.
- 8) FPL is pursuing an enhanced information tag or method of controlling tag installation to ensure control board indication is not obscured from view.
- 9) The SGFW pump CR console switch semaphore alignment and AFW actuation logic has been verified on the plant simulator. The Training Department will demonstrate this event during licensed operator simulator training.

## VIII. ADDITIONAL INFORMATION

There have been two other events reported related to the AFW Actuation Automatic Start logic. These events were LERs 250/96-004, and 250/97-004.

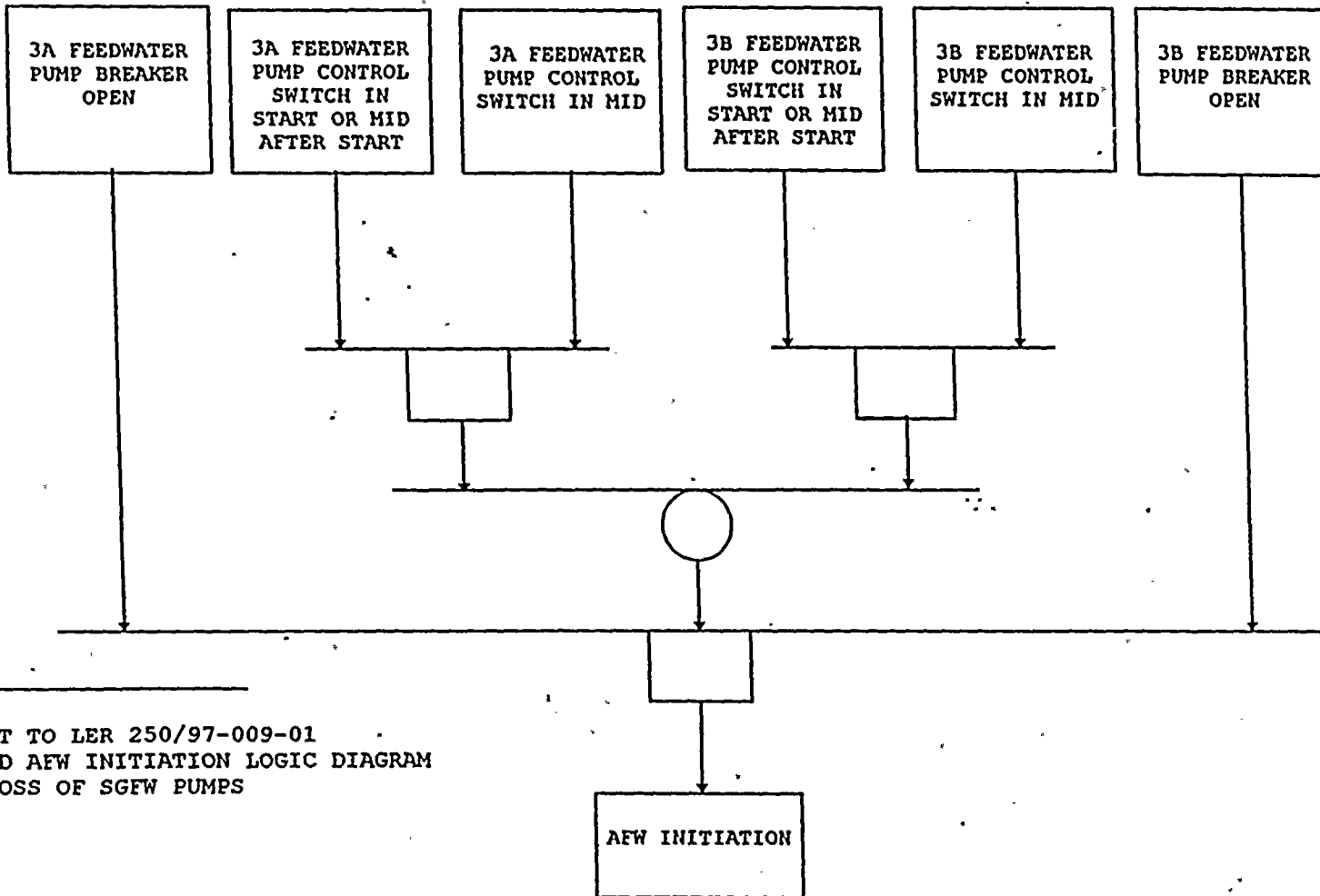
LER 250/96-004 pertained to the inadequate surveillance testing of the AFW actuation circuitry.

LER 250/97-004 is directly related to this event. The local start of the SGFW pump was an approved corrective action for preventing an inadvertent AFW initiation when the breaker for the first pump fails to close while attempting to start the first SGFW pump from the CR console switch.

The AFW Initiation logic diagram for the loss of SGFW pumps is attached.

EIIS Codes are shown in the format [EIIS SYSTEM: IEEE component function identifier, second component identifier (if appropriate)].





ATTACHMENT TO LER 250/97-009-01  
 SIMPLIFIED AFW INITIATION LOGIC DIAGRAM  
 FOR THE LOSS OF SGFW PUMPS