

# OPERATIONS NOTEBOOK

FILE: \_\_\_\_\_

SUBJECT: Contingency Strategy

The PSA Group has provided us with a Contingency Strategy for the Failure of one "B" Train EDG in regards to the issue raised by CAP030227, Service Water (SW) to Auxiliary Feedwater (AFW) Pump Suction Power Supply. The Contingency Strategy is attached.

In summary, there are three key elements of the strategy should we have a failure of a "B" train EDG"

1. Align the operable "B" train EDG to both "B" train buses per OI-35A which is our normal practice.
2. Protect the operable "B" train EDG IAW NP 10.3.7 (post the protected signs and list as protected equipment on the Plan Of The Day)
3. Expedite repair and return to service of the failed "B" train EDG. This means a Priority 2 WO, call in the required support groups, and work around-the-clock.

See the detailed risk discussion in the attached PSA Group writeup.

Approved By:   
Ron Harper

Place in Section: OPS Info

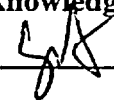

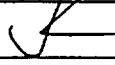
Placed in Notebook: 11/23/02  
Date

Remove By: 12/23/02  
Date

### Schedule for Removal:

- Night Orders: 4 days or less
- Operational Information: 31 days or less
- Significant Events: 31 days or less
- Industrial Safety: 31 days or less
- Administrative: 31 days or less
- Operational Experience: 31 days or less
- Modifications: 31 days or less
- Miscellaneous: 31 days or less
- quest for Data: Until data is gathered

### DSS Acknowledgement

- Crew A: 
- Crew B: \_\_\_\_\_
- Crew C: \_\_\_\_\_
- Crew D: 
- Crew E: 
- Crew F: \_\_\_\_\_

*A/349*

## Contingency Strategy for the Failure of One B Train EDG

### Recommended Contingency Actions to Mitigate Risk Impact

- Align the operable B Train EDG to both B Train 4KV safeguards buses per OI-35A
- Designate the remaining operable B Train EDG as protected equipment per NP-10.3.7
- Expedite repair and return to service of the failed EDG

### Discussion

If either G03 or G04 becomes inoperable, the normal action would be for Operations to align the remaining operable B Train EDG to both of the B Train 4KV emergency buses, 1-A-06 and 2-A-06, per OI-35A. This is still the correct action to take.

Given the current plant design with service water supply valves for three AFW Pumps (P38B, 1P29, and 2P29) fed from B Train, this alignment will make the operability of these service water supply valves vulnerable to the single failure of the remaining operable B Train EDG. However, making this alignment is still the best action to take in response to a B Train EDG failure because:

- The random failure probability of the second EDG is relatively low – approximately 5 chances out of 100 ( $5E-02$  probability) over a 24 hour mission time. The alternative action of not aligning the operable EDG to both of the B Train 4KV buses will, in the event of a LOOP, guarantee failure of at least one AFW service water valve (for 1P29) if 1A06 is left unaligned or two AFW service water valves (for P38B and 2P29) if 2A06 is left unaligned.
- Even with a failure of the second B Train EDG, three AFW pumps will still be available as long as the CST inventory lasts. After that, P38A can be aligned to service water from the Control Room.
- For every accident except a seismic event or an ATWS, the CSTs will provide an initial supply of water to the AFW pumps that will last several hours. This will allow plenty of time for a local operator to open the service water supply valves manually if AC power is lost. The failure probability for this manual action is also low – less than 8 chances out of 1000 ( $8E-03$  probability).
- A seismic event or an ATWS could require a quick transition to service water as the supply for AFW. This can still be accomplished from the Control Room unless there is also a loss of offsite power. A seismic event with a consequential loss of offsite power occurs with a frequency on the order of  $2E-05$ /year, and an ATWS followed by a random loss of offsite power has a frequency on the order of  $3E-09$ /year.

*enough for  
HIT,  
G03, G04  
X-710 => 10-6 to 10-5*

Prepared By: *Paul Knoespel* 11/23/02  
Paul Knoespel

Approved By: *Rick Wood* 11/23/2002  
Rick Wood

# OPERATIONS NOTEBOOK

FILE:

SUBJECT: AFW SW MOV power supplies

The attached CAP030227 brings up a scenario allowed by our technical specifications where the availability of required AFW flow is questioned.

The scenario is that one "B" train EDG is aligned to both "B" train buses. A seismic event occurs which results in a loss of off site power, the CST's are lost, and then a single failure results in the loss of the operable "B" train EDG. This would result in losing power to the AFW pumps SW suction MOV's for P-38B and both TDAFP's. The question now is: "Are 3 of the 4 AFW pumps inoperable due to a single failure?"

*new twist, racing against dryout*

As described in the attached CAP, P-38A MDAFP and it's SW suction MOV remain fully operable for one unit. For the other unit, there is ample time to locally open the SW suction MOV for that unit's P-29 TDAFW pump which will provide more than the required AFW flow prior to SG dryout, and the SG's can be recovered to normal levels.

For the postulated scenario, the AFW system remains capable of meeting it's required safety function.

Approved By:

*Ron Harper*  
Ron Harper

Place in Section:

OPS Info

Placed in Notebook:

11/22/02  
 Date

Remove By:

12/22/02  
 Date

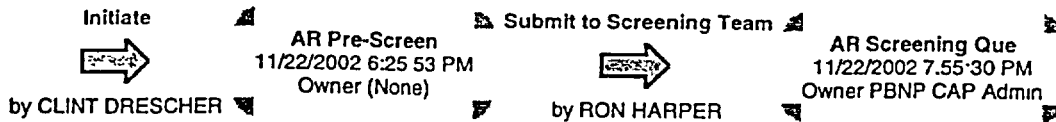
**Schedule for Removal:**

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- Significant Events: 31 days or less
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- Administrative: 31 days or less
- Operational Experience: 31 days or less
- Modifications: 31 days or less
- Miscellaneous: 31 days or less
- quest for Data: Until data is gathered

**DSS Acknowledgement**

- Crew A: *LJA*
- Crew B: \_\_\_\_\_
- Crew C: \_\_\_\_\_
- Crew D: *RH*
- Crew E: *J*
- Crew F: *MM*

STATE CHANGE HISTORY



SECTION 1

Activity Request Id: CAP030227  
 Activity Type: CAP Submit Date: 11/22/2002 6:25:53 PM

One Line Description: Service Water (SW) to Auxiliary Feedwater (AFW) Pump Suction Power Supply Issues

Detailed Description: 11/22/2002 6:25:53 PM - CLINT DRESCHER:  
 During further research into electrical power supply issues associated with the AFW system, an anomaly was noticed in the power supplies to the motor operated valves (MOVs) between the SW system and each pump suction. For the most part, the power supplies to the components associated with turbine driven AFW pump 1P-29 and motor driven AFW pump P-38A are fed from Unit 1 A-train supplies, and the power supplies to the components associated with motor driven AFW pump P-38B and turbine driven AFW pump 2P-29 are fed from Unit 2 B-train. The anomaly is that the SW supply MOV to 1P-29 (1AF-4006) is powered from Unit 1 B-train.

This may pose an issue with aligning the SW system to the AFW pumps following a loss of the Condensate Storage Tank (CST) supply due to depletion or loss from a seismic event. This may become an issue during the following credible design basis event: a loss of offsite power (LOOP) from a seismic event combined with a single active failure of a piece of equipment important to safety. The worst case single failure could occur if one of the B-train emergency diesel generators (EDGs G-03 or G-04) is aligned to the Unit 1 and Unit 2 B-train buses. This condition is allowed by Technical Specifications without entry into a TSAC. This configuration combined with the event mentioned above, would disable the remote opening capability of three of the valves (1AF-4006, AF-4016 and 2AF-4006). AF-4016 is associated with P-38B and 2AF-4006 is associated with 2P-29. This would not challenge the operability of the pumps, except P-38B which is powered from B-train, but would challenge operations to locally align SW to AFW suction in the five minutes as credited in the FSAR.

The Loss Of AC power transient (LOAC) is described in FSAR section 14.1.11. That analysis assumes that only a single motor driven AFW pump is available to a unit, and that flow is restored within 5 minutes of the loss of feedwater (due to the loss of AC).

The 5 minute / 200 gpm criterion would be met for whichever unit is to be fed from motor driven AFW pump P-38A. Power would be available to manually open AF-4009 from the control room, and promptly (re)start pump P-38A. These actions are procedurally directed.

The other unit would not have any feed water available until an Operator could be dispatched to the AFW pump room, manually de-clutch the MOV operator, and manually open the valve locally. These valves are periodically stroked to ensure free motion, and the operation is expected to be completed within 5-15 minutes of the loss of power. Loss of power to the MOVs cause the control board position indication lights to de-energize, giving prompt indication that local manual action is required to reposition the valve.

Westinghouse WCAP 15154 Table 2-22 conservatively provides the decay heat fraction of rated thermal power as a function of time post-trip. At 1 minute, the decay heat fraction is 0.039 of the full 102% rated power of 1518.5 MWt, or 3.46E+6 BTU/min. Assuming 120 deg F AFW and an 1100 psia steam generator, a boil-off of ~381 gpm is required to remove decay heat. This is less than the 400 gpm capacity of the turbine driven pump. Therefore, if the turbine driven AFW pump is aligned to SW and started at any time prior to steam generator dry out, steam generator level recovery will be achieved and a pressurizer solid condition avoided.

*thermal shock not considered.*

From SAMG SAG-1, it is noted that the time to steam generator dry-out from a normal trip is conservatively 30 minutes for an LOAC event. Therefore, ample time and margin is available to take procedurally directed manual action to open the SW supply to AFW MOV and restore the associated 400 gpm turbine driven pump.

-2015

Initiator: DRESCHER, CLINT Initiator Department: EDEP Engineering Design



Electncal PB

**Date/Time of Discovery:** 11/22/2002 5:36:06 PM      **Date/Time of Occurrence:** 11/22/2002 5:36.06 PM  
**Identified By:** Site-identified      **System:** AF PB  
**Equipment # (1st):** (None)      **Equipment Type (1st):** (None)  
**Equipment # (2nd):** (None)      **Equipment Type (2nd) :** (None)  
**Equipment # (3rd):** (None)      **Equipment Type (3rd) :** (None)  
**Site/Unit:** Point Beach - Common  
**Why did this occur?:** 11/22/2002 6:25:53 PM - CLINT DRESCHER:  
 Unknown. This appears to be part of the original plant design (as-bult configuration).  
**Immediate Action Taken:** 11/22/2002 6:25:53 PM - CLINT DRESCHER:  
 Researched potential consequences of power supply failure. Initiated CAP to track final resolution.  
**Recommendations:** 11/22/2002 6:25:53 PM - CLINT DRESCHER:  
 Evaluate feasability of powering 1AF-4006 from Unit 1 A train power to be consistent with similar diversity/redundancy powering schemes found within the plant.  
 **Notify Me During Eval?:** N       **SRO Review Required?:** N

**SECTION 2**

**Operability Status:** Operable       **Compensatory Actions:** N  
**Basis for Operability:** 11/22/2002 7:55:30 PM - RON HARPER:  
 All AFW pumps and their SW suction MOV's are operable.

In the scenario described above, P-38A MDAFW pump and it's associated SW suction MOV will remain operable to provide the AFW requirements to one unit. For the other unit, the CAP describes that we have ample time to align a P-29 TDAFW pump to the other unit. The P-29 TDAFW pump SW suction MOV can be locally opened prior to SG dry out to provide more than the required AFW flow for that unit. For these reasons, the AFW system will be able to provide the required AFW flow to each unit within the required times and therefore meets it's required safety function.

**Unplanned TSAC Entry:** N       **External Notification:** N

**SECTION 3**

**Screened?:** N       **Significance Level:** (None)  
**INPO OE Req'd?:** N      **Potential MRFF?:** N  
 **QA/Nuclear Oversight?:** N       **Licensing Review?:** N  
**Good Catch/Well Doc'd?:** NA

**SECTION 4**

**Inappropriate Action:**

**Process:** (None)      **Activity:** (None)  
**Human Error Type:** (None)      **Human Perf Fail Mode:** (None)  
**Equip Failure Mode:** (None)      **Process Fail Mode:** (None)  
**Org/Mgt Failure Mode:** (None)       **Group Causing Prob:** (None)  
**Hot Buttons:** (None)

# OPERATIONS NOTEBOOK

FILE: \_\_\_\_\_  
SUBJECT: AFW Flow Indication

To ensure we are able to maintain the Operability of our AFW pumps it is essential that we are able to accurately determine the individual AFW pumps flowrates in order to maintain the required minimum flows for each pump.

The attached figure shows the arrangement of individual pump flow indicators and the total flow indicators to each S/G. Should a single AFW pump flow indicator fail, it is still possible to readily determine that pumps flow by looking at the total AFW flow to the applicable S/G and subtracting the known flow of any other AFW pump that may be providing flow. It may also be possible to readily determine individual AFW pump flows for multiple AFW pump failures and/or individual AFW pump flow indicators, depending on the combination of failures, utilizing the same methodology.

If at anytime an individual AFW pump flow cannot be determined to be greater than the minimum required (50 gpm for P-38A/B and 75 gpm for 1(2)P-29) then the affected AFW pump shall be immediately secured to prevent pump damage until adequate flow can be established.

Approved By: *[Signature]*

Place in Section: \_\_\_\_\_

Placed in Notebook: 11/22/02  
Date

Remove By: 12/22/02  
Date

### Schedule for Removal:

Night Orders: 4 days or less

Operational Information: 31 days or less

Significant Events: 31 days or less

Industrial Safety: 31 days or less

Administrative: 31 days or less

Operational Experience: 31 days or less

Modifications: 31 days or less

Miscellaneous: 31 days or less

Request for Data: Until data is gathered

### DSS Acknowledgement

Crew A: *[Signature]*

Crew B: \_\_\_\_\_

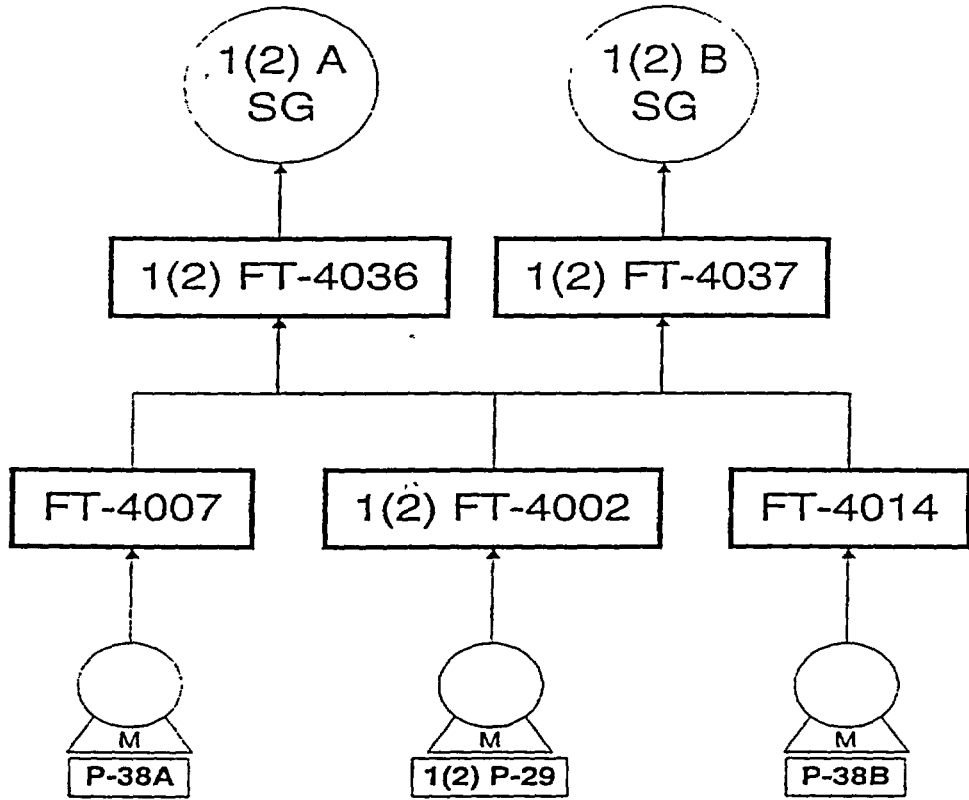
Crew C: \_\_\_\_\_

Crew D: *[Signature]*

Crew E: *[Signature]*

Crew F: \_\_\_\_\_

# FLOW INDICATORS FOR BOTH UNITS



# OPERATIONS NOTEBOOK

FILE:

SUBJECT: AFW Recirc. with Loss of D-01

See attached CAP regarding issue associated with Loss of Bus D-01 and its effect on AFW Recirc flow.

Approved By: R.Harrsch

Place in Section: \_\_\_\_\_

Placed in Notebook: 11/21/02  
Date

Remove By: 12/21/02  
Date

**Schedule for Removal:**

**DSS Acknowledgement**

Night Orders: 4 days or less

Crew A: CK

Operational Information: 31 days or less

Crew B: \_\_\_\_\_

Significant Events: 31 days or less

Crew C: \_\_\_\_\_

Industrial Safety: 31 days or less

Crew D: WJ

Administrative: 31 days or less

Crew E: J

Operational Experience: 31 days or less

Crew F: gm

Modifications: 31 days or less


Miscellaneous: 31 days or less

Request for Data: Until data is gathered



**COPY**

**STATE CHANGE HISTORY**

Initiate  
  
 by CLINT DRESCHER  
 AR Pre-Screen  
 11/21/2002 2:28 33 PM  
 Owner (None)

**SECTION 1**

Activity Request Id: CAP030209  
 Activity Type: CAP Submit Date: 11/21/2002 2:28:33 PM

One Line Description: Loss of 125VDC Bus D-01 Could Make Three AFW Pumps Inoperable.


Detailed Description: 11/21/2002 2:28.33 PM - CLINT DRESCHER:  
 As part of researching a solution for the issues associated with the auxiliary feedwater (AFW) pump recirculation valves, I discovered that the recirculation valves for both turbine-driven AFW pumps (1AF-4002 and 2AF-4002) and the control power for motor-driven AFW pump P-38A are supplied from 125VDC bus D01. (Valve 1AF-4002 and the P-38A control circuit are powered from D11 and valve 2AF-4002 is powered from D12) This was evaluated to check if the AFW system would continue to meet its design basis requirement to supply 200 gpm per unit following a low-low level signal associated with a design basis accident or event. A single failure of equipment important to safety must also be considered when evaluating if a system will continue to meet its design basis requirements following a design basis accident or event. Since the loss of D01 makes the fail closed recirculation valves on 1P-29 and 2P-29 go closed, it has been concluded that the loss of D01 could make 1P-29, 2P-29 and P-38A inoperable, not allowing the 200 gpm per unit value to be met.

11/21/2002 3:08:39 PM - RON HARPER:  
 The loss of Bus D-01 would cause the recirculation valved for 1P-29, 2P-29 and P-38A to fail shut, thus challenging their ability to provide a reliable source of AFW to the steam generators.

Initiator: DRESCHER, CLINT Initiator Department: EDEP Engineering Design  
  Electrical PB 

Date/Time of Discovery: 11/21/2002 1:16:34 PM Date/Time of Occurrence: 11/21/2002 1:16:34 PM

Identified By: Site-identified System: AF PB

Equipment # (1st): P-029 PB  Equipment Type (1st): 9 STG CENT

Equipment # (2nd): P-038A PB  Equipment Type (2nd): CENTRIFUGAL

Equipment # (3rd): (None) Equipment Type (3rd): (None)

Site/Unit: Point Beach - Common

Why did this occur?: 11/21/2002 2:28:33 PM - CLINT DRESCHER:  
 Unknown.

Immediate Action Taken: 11/21/2002 2:28:33 PM - CLINT DRESCHER:  
 Initiated this action request. Notification of engineering supervisor and operations.

11/21/2002 3:08:39 PM - RON HARPER:  
 Submitted Operations Notebook entry to ensure information is provided to the operating crews

Recommendations: 11/21/2002 2:28:33 PM - CLINT DRESCHER:  
 (1) It appears that changing recirculation valves 1AF-4002 and 2AF-4002 from fail closed to fail open will resolve this issue without having to change the power supplies of the valves. The turbine driven AFW pumps could supply the necessary 200 gpm with the recirculation valves open from a single failure.

(2) Revise the current operability determination (OD) associated with the recirculation valves to encompass this issue and not allow closure of the OD until this issue has been resolved.

11/21/2002 3:08:39 PM - RON HARPER:  
 Revise OPR 000031 rev 3 to address this issue, due in 24 hours. Clint Drescher has lead

responsibility for completing OPR revision

Notify Me During Eval?: N

SRO Review Required?: Y

**SECTION 2**

Operability Status: (None)

Compensatory Actions:

*not that temp into  
Y tags needed to  
be changed.*

Basis for Operability: 11/21/2002 3:08:39 PM - RON HARPER:

Based on current compensatory actions being taken under OPR 000031 rev 3, AFW system remains operable but non-conforming in regards to the pumps recirculation flowpath.

Unplanned TSAC Entry: N

External Notification: N

**SECTION 3**

Screened?: N

Significance Level: (None)

INPO OE Req'd?: N

Potential MRFF?: N

QA/Nuclear Oversight?: N

Licensing Review?: N

Good Catch/Well Doc'd?: NA

**SECTION 4**

Inappropriate Action:

Process: (None)

Activity: (None)

Human Error Type: (None)

Human Perf Fail Mode: (None)

Equip Failure Mode: (None)

Process Fail Mode: (None)

Org/Mgt Failure Mode: (None)

Group Causing Prob: (None)

Hot Buttons: (None)

**SECTION 5**

CAP Admin: PBNP CAP Admin

Prescreener: (None)

Project: Corrective Action Program (CAP)

State: AR Pre-Screen

Active/Inactive: Active

Submitter: CLINT DRESCHER

Owner: (None)

AR Type: Parent

Last Modified Date: 11/21/2002 3:08:39 PM

Last Modifier: RON HARPER

Last State Change Date: 11/21/2002 2:28:33 PM

Last State Changer: CLINT DRESCHER

Close Date:

NUTRK ID:

# of Children: 0

References:

Update:

Prescreen Comments:

Import Memo Field:

OPR Completed?: N

OLD\_ACTION\_NUM:

sub\_tsid: 0 original\_project\_id: 0

original\_issue\_id:

Site: Point Beach

Cartridge and Frame:

**CHANGE HISTORY**

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11/21/2002 3:08:39 PM by RON HARPER

Detailed Description Changed From '[Original Text]' To '[Appended:] The loss of Bus D-01 would cause the recirculation valved for 1P-29, 2P-29 and P-38A to fail shut, thus challenging their ability to provide a reliable source of AFW to the steam generators.'

System Changed From (None) To AF PB

Equipment # (1st) Changed From (None) To P-029 PB

Equipment # (2nd) Changed From (None) To P-038A PB

Immediate Action Taken Changed From '[Original Text]' To '[Appended:] Submitted Operations Notebook entry to ensure information is provided to the operating crews'

Recommendations Changed From '[Original Text]' To '[Appended:] Revise OPR 000031 rev 3 to address this issue, due in 24 hours. Clint Drescher has lead responsibility for completing OPR revision'

Compensatory Actions Changed From N To Y

Basis for Operability Changed From " To '[Appended:] Based on current compensatory actions being taken under OPR 000031 rev 3, AFW system remains operable but non-conforming in regards to the pumps recirculation flowpath.'

Last Modified Date Changed From 11/21/2002 2:28:33 PM To 11/21/2002 3:08:39 PM

Last Modifier Changed From CLINT DRESCHER To RON HARPER