

**2014 PALISADES NUCLEAR PLANT**

**INITIAL LICENSE EXAMINATION**

**ADMINISTRATIVE FILES**

Facility: <u>Palisades</u>		Date of Exam: <u>September 15<sup>th</sup>, 2014</u>		Exam Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>	
Item Description	Initials				
	a	b	c		
1. Clean answer sheets copied before grading	SB	BAB	JZ		
2. Answer key changes and question deletions justified and documented	SB	BAB	JZ		
3. Applicants' scores checked for addition errors (reviewers spot check >25% of examinations)	SB	BAB	JZ		
4. Grading for all borderline cases (80% ± 2% overall and 70 or 80, as applicable, ± 4% on the SRO-only) reviewed in detail	SB	BAB	JZ		
5. All other failing examinations checked to ensure that grades are justified	SB	BAB	JZ		
6. Performance on missed questions checked for training deficiencies and wording problems; evaluate validity of questions missed by half or more of the applicants	SB	BAB	JZ		
		Printed Name / Signature	Date		
a. Author	Steve Botimer / <u><i>SBotimer</i></u>		<u>09/19/2014</u>		
b. Facility Reviewer(*)	Brett Baker / <u><i>Baker</i></u>		<u>09/24/2014</u>		
c. NRC Chief Examiner(*)	David W. Reesor / <u><i>David W Reesor</i></u>		<u>10/16/14</u>		
d. NRC Supervisor(*)	Hironen Peterson / <u><i>Hironen Peterson</i></u>		<u>10/20/14</u>		
(*) The facility reviewer's signature is not applicable for examinations graded by the NRC; two independent NRC reviews are required.					



Entergy Nuclear Operations, Inc.  
Palisades Nuclear Plant  
27780 Blue Star Memorial Highway  
Covert, MI 49043

Jeffrey A. Hardy  
Licensing Manager

PNP 2014-089

September 22, 2014

NUREG 1021

Regional Administrator  
U.S. Nuclear Regulatory Commission  
2443 Warrenville Road  
Suite 210  
Lisle, IL 60532-4352

ATTN: Janet Kweiser

Subject: Initial License Examination Comments

Palisades Nuclear Plant  
Docket 50-255  
License No. DPR-20

Dear Sir:

In accordance with NUREG 1021, ES-402, Entergy Nuclear Operations is submitting comments on the initial license examination administered at the Palisades Nuclear Plant during September 2014. Attachment 1 contains the required information.

Please contact Steve Botimer at (269) 764-2975 if you have any questions regarding this submittal.

This letter contains no new commitments and no revisions to existing commitments.

Sincerely,

A handwritten signature in black ink, appearing to read "JAH" followed by a stylized flourish.

JAH/bed

Attachment 1: Palisades Initial License Examination Comments

CC David Reeser, Region III, USNRC  
Project Manager, Palisades, USNRC (w/o attachment)  
Resident Inspector, Palisades, USNRC (w/o attachment)  
Document Control Desk, USNRC (w/o attachment)

RECEIVED SEP 24 2014

**ATTACHMENT 1**

**PALISADES INITIAL LICENSE EXAMINATION COMMENTS**

## Question #81 Comment

Per the exam key, (b) is the correct answer, however, both (a) and/or (b) should be the correct answers.

Question:

The Plant has just entered MODE 3 for a forced outage to repair a Main Condenser Vacuum leak when the following occurs:

- A loss of Left Train 125V DC Bus (more specifically ED-10R and ED-10L) occurs

The Control Room Supervisor directs entry into...

- a. AOP-18 "Loss of Left Train DC power" only
- b. AOP-18, "Loss of Left Train DC Power" and EOP -9.0, "Functional Recovery Procedure."
- c. AOP-18 "Loss of Left Train DC Power," AOP -13 Loss of Preferred AC Bus EY-20," and AOP-15 "Loss of Preferred AC Bus EY-40."
- d. EOP-9.0, "Functional Recovery Procedure" only

**Summary:** Based on the initial condition of MODE 3, EOP-9.0 is not procedurally required to be entered. In this scenario, EOP-9.0 does not provide any additional actions not already covered in AOP-18 to address this event and stabilize the plant. Therefore the CRS may elect to direct entry into AOP-18 only.

**Basis:**

### **AOP-18 does not require EOP-9.0 entry**

EOP-9.0 entry is optional based on the discretion of the Control Room Supervisor and the Shift Manager. Therefore, the CRS may opt to enter AOP-18 only OR enter both AOP-18 and EOP-9.0.

AOP-18, Section 6.0, Operator Actions, Step 2 states, "Refer to EOP-9.0 'Functional Recovery Procedure' for lower mode entry." The scenario provided by this question is specifically addressed in the AOP-18 Basis document as follows (emphasis added):

This is a branching step to EOP-9.0. Transition to EOP-9.0 is required following a reactor trip and event diagnosis in EOP-1.0. EOP-9.0 entry for all other plant conditions is **discretionary**. In most cases, unless Shutdown Cooling is in service, EOP-9.0 entry is highly recommended.

AOP-18 intentionally uses the language of "REFER TO" rather than "ENTER" to allow the CRS discretion, based on plant conditions, the use of EOP-9.0 to combat the event.

### EOP-9.0 entry criteria not met

A review of the EOP-9.0 entry criteria reveal entry is not required (emphasis added):

#### 2.0 ENTRY CONDITIONS

1. EOP-1.0, "Standard Post Trip Actions," has been performed.

#### OR

The event initiated from a lower mode when the Shutdown Cooling System is NOT initially in service.

2. ANY of the following conditions may be present:
  - a. A Reactor trip with unusual concurrent symptoms and diagnosis of one event NOT immediately apparent.
  - b. Any conditions/symptoms which a licensed operator considers serious **and for which other Emergency/Off-Normal Procedures can NOT be identified.**
  - c. Actions from an in-use Optimal Recovery EOP do NOT result in acceptance criteria for in-use Optimal Recovery EOP Safety Function Status Check Sheet being satisfied.
  - d. An Optimal Recovery EOP step directs implementation of EOP-9.0, "Functional Recovery Procedure."

No reactor trip on this event, therefore no EOP-1.0 entry or subsequent EOP entry is required. While the event was initiated from a lower mode without shutdown cooling in service, the event by itself is not sufficient to require use of EOP-9.0. There is only one unique event in progress which has been clearly diagnosed with guidance from an applicable AOP. From the EOP-9.0 basis document, section 1.0 Introduction (emphasis added):

Entry conditions are chosen to identify those conditions which will necessitate implementation of the FRP. Following the performance of the SPTAs for events initiated during Power Operations or Hot Standby with the reactor critical, **or from lower modes** for which the FRP entry conditions are met, **the operator may not be able to diagnose one unique event taking place.** This could happen if **more than one event** is taking place (multiple casualties) or **a condition exists for which abnormal or emergency guidance cannot be identified.** During the course of the event, actions taken in an ORP may not satisfy the Safety Function Status Check acceptance criteria. Also, **actions taken in an AOP (if entering from a lower mode) may not be adequately responding to mitigate the consequences of the event.** Implementation of the safety function based FRP would then be evaluated.

There is an in-use Abnormal Operating Procedure identified which will address the condition. Use of AOP-18 will address the loss of two Preferred AC Busses. Therefore a success path exists to ensure all applicable Safety Functions will be satisfied.

**AOP-18 addresses all applicable actions taken in EOP-9.0**

The highest priority jeopardized Safety Function is MVAE-DC, therefore MVAE-DC-1 would be the entry point for implementing Operator Actions in EOP-9.0, Success path MVAE-DC-1, step 6 addresses restoration of all available preferred AC buses (see attached).

AOP-18, Section 6.0, Step 24 (and 24.1) addresses restoration of available preferred AC buses (see attached).

AOP-18 was written specifically to stabilize the plant following this event. Therefore all plant actions related to this event are addressed in AOP-18 and no further actions taken in EOP-9.0 are required. From the AOP-18 basis document:

The need for a procedure dealing with a complete loss of one train of 125V DC became evident during the automatic reactor trip that occurred on [September 25, 2011].

AOP-18, section 6.0, step 28 states, "PERFORM EOP-9.0, Attachment 1, "Safety Function Status Check Sheet." From the basis document, "Intent of this step is to validate, using EOP-9.0 SFSCs, that all safety functions are being met." Following restoration of one preferred AC bus to the bypass regulator performed in step 24, and no other events in progress, all applicable Safety Functions will be met. This is further evidence that entry into EOP-9.0, under these circumstances, is not required and will provide no additional assistance in addressing this event.

**Facility Position:** The facility agrees with Mr. DeBusscher that for Question #81 answers (a) and/or (b) should be accepted as correct answers based on the discussion above. Abnormal Operating Procedure AOP-18 (Loss of Left Train DC Power) was written to specifically address the scenario described in the stem of the question (ie. Loss of one complete train of 125 VDC Power). The mitigating strategy to expeditiously repower one of the Preferred AC Busses from the Bypass Regulator is addressed and directed by both of the procedures given as distractors. Which of the procedures is entered initially is a discretionary decision to be made by the CRS at the time of event initiation since EOP-9.0 will ultimately be referenced to verify Safety Function Status..

See attached Question and References.

**WRITTEN QUESTION DATA SHEET**

Source of Question: NEW

K/A: 000058 Loss of DC Power / 6

G2.4.8-Knowledge of how abnormal operating procedures are used in conjunction with EOPs.

Tier: 1 Group: 1 SRO Imp: 4.5

Applicable 10CFR55 Section: 43.5 - Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. *This exam question meets the criteria for an SRO-only question because the candidate must assess the facility conditions given in the stem and use those conditions to select the appropriate procedure to respond to a loss of DC power.*

Palisades Learning Objective: IOTF\_CK12.0, Given an Abnormal Operating plant event and control room references, determine the actions of operations and non-operations department personnel necessary to complete the applicable subsequent actions/operator actions in accordance with Abnormal Operating Procedures

References: AOP-18 section 6.0 step 2

**Question:**

The Plant has just entered MODE 3 for a forced outage to repair a Main Condenser vacuum leak when the following occurs:

- A loss of Left Train 125V DC Bus (more specifically ED-10R and ED-10L) occurs

The Control Room Supervisor directs entry into ...

- AOP-18, "Loss of Left Train DC Power" only.
- AOP-18, "Loss of Left Train DC Power" and EOP-9.0, "Functional Recovery Procedure."
- AOP-18, "Loss of Left Train DC Power," AOP-13, "Loss of Preferred AC Bus EY-20," and AOP-15, "Loss of Preferred AC Bus EY-40."
- EOP-9.0, "Functional Recovery Procedure" only.

**DISTRACTOR ANALYSIS**

- Plausible if the student believes that AOP-18 does not require use of EOP-9.0 in lower mode.
- CORRECT**
- Plausible if the student believes that AOP-13 and AOP-15 actions are required (AOP actions are built into AOP-13).
- Plausible if the student believes that only EOP-9.0 applies.

Level of Knowledge: LOW

Difficulty: 2





# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
Revision	22
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

### USER ALERT CONTINUOUS USE PROCEDURE

Read each step of the procedure prior to performing that step. When sign-offs are required, sign off each step as complete before proceeding to the next step.

#### 1.0 PURPOSE

This procedure provides systematic operator actions for events for which a diagnosis is NOT possible or is NOT covered by ANY other one Emergency Operating Procedure. The actions of this procedure are necessary to ensure that the plant is placed in a stable, safe condition.

End of Section 1.0



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
Revision	22
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

### 2.0 ENTRY CONDITIONS

1. EOP-1.0, "Standard Post Trip Actions," has been performed.

OR

The event initiated from a lower mode when the Shutdown Cooling System is NOT initially in service.

2. ANY of the following conditions may be present:
  - a. A Reactor trip with unusual concurrent symptoms and diagnosis of one event NOT immediately apparent.
  - b. Any conditions/symptoms which a licensed operator considers serious and for which other Emergency/Off-Normal Procedures can NOT be identified.
  - c. Actions from an in-use Optimal Recovery EOP do NOT result in acceptance criteria for in-use Optimal Recovery EOP Safety Function Status Check Sheet being satisfied.
  - d. An Optimal Recovery EOP step directs implementation of EOP-9.0, "Functional Recovery Procedure."

**End of Section 2.0**



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

### 3.0 EXIT CONDITIONS

1. The Functional Recovery procedure has accomplished its purpose by satisfying ALL of the following:
  - a. The acceptance criteria for ALL success paths in use are being satisfied.
  - b. An appropriate approved plant procedure can be implemented.

**End of Section 3.0**



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
Revision	22
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

### 4.0 OPERATOR ACTIONS

#### INSTRUCTIONS

#### CONTINGENCY ACTIONS

- © 1. **REFER TO** the Site Emergency Plan **AND CLASSIFY** the event per EI-1, "Emergency Classification and Actions."
2. **OPEN** the placekeeper **AND RECORD** the time of EOP entry.

**NOTE:** P-50A and P-50B shall not be operated simultaneously when  $T_c$  is less than 300°F.

3. **IF** PZR pressure lowers to less than 1300 psia **AND** SIAS is initiated, **THEN PERFORM BOTH** of the following:
- a. **ENSURE** one PCP is stopped in each loop.
  - b. **IF** PCS is less than 25°F subcooled, **THEN ENSURE ALL** PCPs stopped.
4. **WHEN** PCS temperature lowers, **THEN ENSURE** PCPs configured as follows:

PCS $T_c$	MAXIMUM OPERATING PCPs
<450°F	3
<300°F	2

© = Continuously applicable step

☞ = Hold Point



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
Revision	22
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

### INSTRUCTIONS

5. IF PCPs are operating,  
THEN VERIFY PCP operating limits are satisfied. Refer to EOP Supplement 1.
6. IF open,  
THEN CLOSE CWRTs Vent Valves:
  - CV-1064
  - CV-1065

### CONTINGENCY ACTIONS

- 5.1. **STOP** PCPs which do NOT satisfy PCP operating limits.

### CAUTION

Each D/G is limited to a 2500 KW continuous load rating and a 2750 KW two-hour load rating. Operation of VC-10 (VC-11) will draw approximately 44 KW.

7. **ENSURE** at least one train of CR HVAC in Emergency Mode. Refer to SOP-24, "Ventilation and Air Conditioning System."



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

### INSTRUCTIONS

### CONTINGENCY ACTIONS

#### CAUTION

Secondary sample coolers will NOT have cooling if an SIAS signal is present or CV-1359 is closed.

Primary sample coolers will NOT have cooling if an SIAS signal is present or if CV-0944A is closed.

8. IF ALL of the following conditions exist:
- Steam Generator Blowdown Monitor, RIA-0707, has NOT alarmed
  - SIAS has NOT occurred OR has been reset
  - CHP and CHR signals are NOT present,
- THEN **SAMPLE** S/Gs for activity and Lithium  
AND **VERIFY** sample results do NOT indicate a SGTR.
9. **PLACE** at least one Hydrogen Monitor in operation, ensuring the appropriate Key Switch in the "ACCI" position. Refer to SOP-38, "Gaseous Process Monitoring System."



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

### INSTRUCTIONS

### CONTINGENCY ACTIONS

- © 10. **IDENTIFY** plant resources or success paths which can be used to fulfill each safety function. Refer to Resource Assessment Trees A through I, as necessary.
  
- © 11. **VERIFY** Attachment 1, "Safety Function Status Check Sheet" acceptance criteria are satisfied at intervals of approximately fifteen minutes.
  
- © 12. **PERFORM ALL** of the following in the order listed:
  - a. Operator actions for those success paths that are in jeopardy.
  
  - b. Operator actions for those success paths that are challenged.
  
  - c. Operator actions for ALL other success paths in use.
  
- 13. WHEN each safety function has at least ONE set of acceptance criteria satisfied,  
THEN PERFORM "Long Term Actions."

End Of Section 4.0

© = Continuously applicable step

☞ = Hold Point



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

### 5.0 PLACEKEEPER

### SAFETY FUNCTION TRACKING

Time of: EOP Entry \_\_\_\_\_ SIAS: \_\_\_\_\_ Loss Of All AC Power: \_\_\_\_\_

Safety Function	One Success Path SFSC Criteria Met?		Success Path	✓ Path Selected	Selected Path in Jeopardy?	✓ Path Complete
	YES	NO				
RC (RAT A)			1 Control Rod insertion			
			2 Boration using CVCS			
			3 Boration using SIS			
MVAE (RAT B)			DC-1 Battery Chargers/ Station Batteries			
			AC-1 Offsite Power			
			AC-2 Diesel Generator			
			AC-3 Backfeeding VIA Main Transformer			
IC (RAT C)			1 CVCS or SI Throttled			
			2 Safety Injection			
PC (RAT D)			1 Subcooled Pressure Control			
			2 PORVs			
			3 Saturated Pressure Control			
HR (RAT E)			1 S/G with SI NOT operating			
			2 S/G with SI operating			
			3 Once-Through-Cooling			
CI (RAT F)			1 Automatic/Manual Isolation			





# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

### 5.0 PLACEKEEPER

#### SAFETY FUNCTION TRACKING

Safety Function	One Success Path SFSC Criteria Met?			Success Path	✓ Path Selected	Selected Path in Jeopardy?	✓ Path Complete
	YES	NO					
CA (RAT G)			1	Containment Air Coolers (Normal Mode)			
			2	Containment Air Coolers (Emergency Mode)			
			3	Containment Spray			
MVAW (RAT H)			1	Service Water and CCW			
MVAA (RAT I)			1	Instrument Air Compressors			
			2	FWP Air Compressors			



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

### 5.0 PLACEKEEPER

EOP ENTRY TIME: \_\_\_\_\_

<u>STEP</u>	<u>INSTRUCTIONS</u>	<u>PAGE</u>	<u>START</u>	<u>DONE</u>
3.	If PZR pressure lowers to less than 1300 psia then establish one PCP per loop or if PCS subcooling is less than 25°F subcooled, then trip all PCPs	4	_____	_____
4.	Ensure proper PCP configuration as PCS temperature lowers	4	_____	_____
5.	Verify operating limits for any running PCP	5	_____	_____
6.	If open, then close CWRTs vent valves.	5	_____	_____
7.	Ensure at least one train of CR HVAC in Emergency Mode.	5	_____	_____
8.	If S/G blowdown is available, sample S/Gs	6	_____	_____
9.	Place Hydrogen Monitor in service	6	_____	_____
10.	Identify plant resources used to fulfill success paths	7	_____	©
11.	Perform Safety Function Status Checks	7	_____	©
12.	Perform operator actions	7	_____	©
13.	When SFSCs are met, perform long term actions	7	_____	_____

**End of Section 5.0**



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
Success Path: MVAE-DC-1	
Revision	21
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

**SAFETY FUNCTION:** Maintenance of Vital DC Power  
**SUCCESS PATH:** Battery Chargers/Station Batteries  
**RESOURCE TREE:** Tree B

### INSTRUCTIONS

- © 1. **VERIFY** ALL of the following:
- a. At least ONE of the following 125V Vital DC bus selections is energized:
- D11A, D11-1, and D11-2
  - D21A and D21-1
- b. 125V Vital DC Bus D21-2 is energized.
2. **WHEN** at least five minutes have elapsed from the onset of loss of all AC power, **THEN VERIFY** ALL PCP DC Oil Lift Pumps are stopped.

### CONTINGENCY ACTIONS

- 1.1 **ENERGIZE** affected 125V Vital DC Bus Sections/Trains from the associated Battery Charger or Battery. Refer to the following as applicable:
- AOP-17, "Loss of 125V DC Panel(s),"Section 6.0.
  - AOP-18, "Loss of Left Train DC Power"
  - AOP-19, "Loss of Right Train DC Power"
- 2.1 **STOP** ALL operating PCP DC Oil Lift Pumps.

PCP	Lift Pump
P-50A	P-81A
P-50B	P-81B
P-50C	P-81C
P-50D	P-81D



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
Success Path: MVAE-DC-1	
Revision	21
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

**SAFETY FUNCTION:** Maintenance of Vital DC Power  
**SUCCESS PATH:** Battery Chargers/Station Batteries  
**RESOURCE TREE:** Tree B

### INSTRUCTIONS

### CONTINGENCY ACTIONS

#### CAUTION

AC power must be restored prior to an elapsed time of four hours after the onset of loss of ALL AC power to ensure that the Station Batteries do NOT exceed their duty rating.

3. IF the Station Batteries are NOT connected to an energized battery charger, THEN, within 30 minutes after the loss of AC power, **COMMENCE** monitoring discharge current for BOTH Station Batteries using the dual-range ammeters at each panel. **REFER TO** EOP Supplement 7 or 8.
  - D13 - Station Battery No 1 (EOP Supplement 7)
  - D23 - Station Battery No 2 (EOP Supplement 8)



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
Success Path:	MVAE-DC-1
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

**SAFETY FUNCTION:** Maintenance of Vital DC Power  
**SUCCESS PATH:** Battery Chargers/Station Batteries  
**RESOURCE TREE:** Tree B

### INSTRUCTIONS

4. IF the Station Batteries are NOT connected to an energized battery charger  
THEN VERIFY each Station Battery load is less than or equal to the load limit specified in EOP Supplement 7 and 8.
- Station Battery No 1
  - Station Battery No 2

### CONTINGENCY ACTIONS

#### WARNING

The following contingency action may result in loss of emergency lighting.

- 4.1 **REDUCE** the affected Station Battery discharge current to less than or equal to the limits of the applicable EOP Supplement:
- Station Battery No 1 - **REFER TO** EOP Supplement 7
  - Station Battery No 2 - **REFER TO** EOP Supplement 8



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
Success Path: MVAE-DC-1	
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

**SAFETY FUNCTION:** Maintenance of Vital DC Power  
**SUCCESS PATH:** Battery Chargers/Station Batteries  
**RESOURCE TREE:** Tree B

### INSTRUCTIONS

### CONTINGENCY ACTIONS

#### CAUTION

The following step should only be performed as a last resort since it results in separating the respective DC Bus from the Station Battery. Buses D11A and D21A will still be supplied from the Station Batteries.

5. IF there is an obvious DC Bus problem which can NOT be immediately corrected,  
OR bus voltage falls to less than 105 volts,  
THEN PERFORM ALL of the following:
  - a. IF the condition is indicated on 125V DC Bus D10,  
THEN PUSH Shunt Trip pushbutton "D-11 Incoming Power Trip" on Panel D11A.
  - b. IF the condition is indicated on 125V DC Bus D20,  
THEN PUSH Shunt Trip pushbutton "D-21 Incoming Power Trip" on Panel D21A.
  - c. **REFER TO** AOP-41, "Alternate Safe Shutdown Procedure."



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
Success Path: MVAE-DC-1	
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

**SAFETY FUNCTION:** Maintenance of Vital DC Power  
**SUCCESS PATH:** Battery Chargers/Station Batteries  
**RESOURCE TREE:** Tree B

### INSTRUCTIONS

### CONTINGENCY ACTIONS

- © 6. **VERIFY** at least three Preferred AC Buses are energized.

- 6.1 **ENERGIZE** ALL available Preferred AC Buses. Refer to the following:

BUS	PROCEDURE
Y10	AOP-12, "Loss of Preferred AC Bus Y10"
Y20	AOP-13, "Loss of Preferred AC Bus Y20"
Y30	AOP-14, "Loss of Preferred AC Bus Y30"
Y40	AOP-15, "Loss of Preferred AC Bus Y40"

- © 7. **VERIFY** 125V DC Buses D10 and D20 are powered by a Battery Charger.

- 7.1 **IF** MCC 1 or MCC 2 is energized, **THEN PLACE** battery chargers in operation. Refer SOP-30, "Station Power."

- 8. **IF** 125V DC Bus D10 is powered by a Battery Charger **AND** loads were reduced, **THEN REFER TO** EOP Supplement 7 **AND CLOSE** ALL breakers that were previously opened.

- 9. **IF** 125V DC Bus D20 is powered by a Battery Charger **AND** loads were reduced, **THEN REFER TO** EOP Supplement 8 **AND CLOSE** ALL breakers that were previously opened.

© = Continuously applicable step



# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
Success Path: MVAE-DC-1	
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

**SAFETY FUNCTION:** Maintenance of Vital DC Power  
**SUCCESS PATH:** Battery Chargers/Station Batteries  
**RESOURCE TREE:** Tree B

### INSTRUCTIONS

### CONTINGENCY ACTIONS

- © 10. **VERIFY** MVAE-DC-1 (Battery Chargers/Station Batteries) is satisfied by ALL of the following:
- a. At least ONE of the following 125V Vital DC bus selections is energized:
    - D11A, D11-1, and D11-2
    - D21A and D21-1
  - b. 125V Vital DC Bus D21-2 is energized.
  - c. At least three Preferred AC Buses energized.

- 10.1 IF the Maintenance of Vital DC Power safety function is still in jeopardy, THEN REFER TO MVAE-DC continuing actions.





# PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP-9.0
Success Path: MVAE-DC-1	
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## TITLE: FUNCTIONAL RECOVERY PROCEDURE

**SAFETY FUNCTION:** Maintenance of Vital DC Power  
**SUCCESS PATH:** Battery Chargers/Station Batteries  
**RESOURCE TREE:** Tree B

### PLACEKEEPER

<u>STEP</u>	<u>INSTRUCTIONS</u>	<u>PAGE</u>	<u>START</u>	<u>DONE</u>
1.	Verify DC busses available	1	_____	◎
2.	After five (5) minutes, verify PCP DC Oil Lift Pumps are stopped	1	_____	_____
3.	If chargers are not energized, within 30 minutes commence monitoring Station Battery discharge current	2	_____	_____
4.	If chargers are not energized, verify Station Battery load less than or equal to specified limits	3	_____	_____
5.	If DC bus problem then trip the shunt trip breakers and refer to AOP-41	4	_____	_____
6.	Verify at least three Preferred AC Buses are energized	5	_____	◎
7.	Verify 125V DC Buses D10 and D20 are powered by a Battery Charger	5	_____	◎
8.	If 125V DC Bus D10 is powered by a Battery Charger and loads were reduced, close all previously opened breakers	5	_____	_____
9.	If 125V DC Bus D20 is powered by a Battery Charger and loads were reduced, close all previously opened breakers	5	_____	_____
10.	Verify MVAE-DC-1 (Battery Chargers/Station Batteries) is satisfied	6	_____	◎

◎ = Continuously applicable step

## Attachment 1

### Comments on Palisades 2014 NRC Written Examination

There were two Candidate comments regarding the 2014 NRC Written Exam. The comments are for RO Question #46 and SRO Question #81.

#### **Question #46**

Per the exam key, (A) is the correct answer, however, (B) should be the correct answer.

Question gives initial conditions that the plant is at full power, Main Feedwater Flow is 4.0E6 lbm/hr and lowering, and Main Steam Flow is 5.6E6 lbm/hr and stable.

Question then asks, based on conditions, what actions are taken by the operator.

Per NUREG-1021, Appendix E, Policies and Guidelines for Taking NRC Examination, Section B.7, "When answering a question, do not make assumptions regarding conditions that are not specified in the question unless they occur as a consequence of other conditions that are stated in the question."

No failures were given in the stem of the question so no failures can be assumed. Also, Steam Generator levels were not given in the stem of the question, so level/trend assumptions (failure method) would have to be based on the indications given.

Based on the conditions given, with Feedwater flow less than Steam flow, it can be assumed that Steam Generator level is lowering.

With Steam Generator level lowering, the NCO is expected to take MANUAL control, and take actions to RAISE Steam Generator level.

Therefore, answer (B) is the most correct answer.

**Facility Position:** The facility agrees with Mr. Sholey that Question #46 answer should be changed from distractor (a) to distractor (b). due to the information given in the question stem, and the Appendix E briefing given prior to the start of the examination.

See attached Question and References.

**WRITTEN QUESTION DATA SHEET**

Source of Question: NEW

K/A: 059 Main Feedwater

A4.08-Ability to manually operate and monitor in the control room: Feed regulating valve controller

Tier: 2      Group: 1      RO Imp: 3.0

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: SGWL\_CK02.0

References: AOP-3

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**Question:**

Given the following conditions:

- The Plant is operating at full power
- FI-0703 (Steam/Feed Flow Indicator - Main Feed) indicates
  - Main Feedwater Flow at 4.0 E6 lbm/hr and lowering
  - Main Steam Flow at 5.6 E6 lbm/hr and stable

Based on the above conditions, the immediate actions to be taken by the NCO, using LIC-0703 (E-50B Level Indicating Controller) should be to (1), and (2).

- a. (1) transfer controller to MANUAL  
(2) lower controller output signal to lower S/G level
- b. (1) transfer controller to MANUAL  
(2) raise controller output signal to raise S/G level
- c. (1) leave controller in AUTO  
(2) lower level setpoint to lower S/G level
- d. (1) leave controller in AUTO  
(2) raise level setpoint to raise S/G level

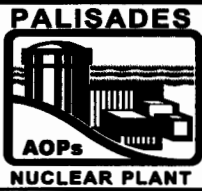
---

**DISTRACTOR ANALYSIS**

- a. **CORRECT**, actual S/G level will be rising
- b. Plausible if student thinks lowering instrument input to controller will cause actual level to lower
- c. Plausible because the control function is correct but automatic operation is too slow and NOT and immediate action per AOP-3
- d. Plausible combination of b and c above

---

**Level of Knowledge: HIGH****Difficulty: 2**



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

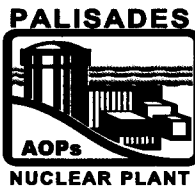
Proc No	AOP-3
Revision	0
Issued Date	9/19/13

## MAIN FEEDWATER TRANSIENTS

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GGShaffer	/	8/29/13
Procedure Sponsor		Date
GGShaffer	/	7/15/13
Technical Reviewer		Date
RJHudzik	/	5/16/13
Validation Reviewer		Date

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# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

### USER ALERT

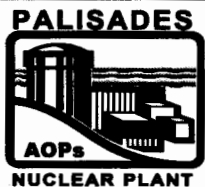
Read each step of the procedure prior to performing that step. Since the cause and nature of the abnormal condition cannot be predicted, performance of steps out of sequence may be necessary.

### 1.0 PURPOSE

This procedure provides instructions to mitigate Main Feed Water transients and associated system malfunctions.

### 2.0 ENTRY CONDITIONS

- EK-0143, "FW PUMP P1A TURBINE K7A TRIP"
- EK-0146, "FW PUMP LO SUCTION PRESS CHANNEL TRIP" (250 psig)
- EK-0148, "FW PUMP P1A LO SUCTION FLOW OR LO DISCH PRESS" (2500 gpm or 800 psig)
- EK-0149, "FW PUMP P1B TURBINE K7B TRIP"
- EK-0154, "FW PUMP P1B LO SUCTION FLOW OR LO DISCH PRESS" (2500 gpm or 800 psig)
- EK-0155, "CONDENSATE PUMP TRIP"
- EK-0157, "CONDENSATE PUMP P2A DISCHARGE LO PRESS" (390 psig)
- EK-0160, "FDWTR PUMP LO SUCTION" (305 psig)
- EK-0163, "CONDENSATE PUMP P2B DISCHARGE LO PRESS" (390 psig)
- EK-0170, "HEATER DRAIN PUMP TRIP"
- EK-0961, "STEAM GENERATOR E-50A HI LEVEL" (84.7%)
- EK-0962, "STEAM GENERATOR E-50A LO LEVEL" (55%)
- EK-0963, "STEAM GENERATOR E-50B HI LEVEL" (84.7%)
- EK-0964, "STEAM GENERATOR E-50B LO LEVEL" (55%)
- Indications of a Main Feedwater transient in progress
- Condensate Cleanup System Leak
- Main Feedwater Piping Rupture
- Heater Drain Pump Malfunction



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

### 3.0 EXIT CONDITIONS

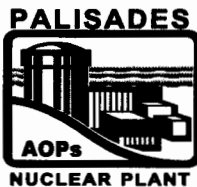
- The diagnosis of Main Feedwater Transients is NOT confirmed.

OR

- All applicable steps of this procedure have been completed.

### 4.0 AUTOMATIC ACTIONS

- CV-0608, Moisture Separator Drain Tank T-5 Level Control fully opens (Low Feedwater suction pressure 270 psig)
- Main Feed Pumps, trips (Low Feedwater Pump suction pressure 250 psig after a 3 second time delay).
- AFAS initiation (Steam Generator level of 30%)
- Reactor trip (Steam Generator level of 28%)
- CV-0701, E-50A Feed Regulating Valve, closes by high level override (84.7%).
- CV-0703, E-50B Feed Regulating Valve, closes by high level override (84.7%).



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

### REACTOR AND EQUIPMENT TRIP CRITERIA

#### Reactor Trip

- Either Steam Generator level lowers to 30%
- No Main Feedwater Pump operating
- EK-0961, STEAM GENERATOR E-50A HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- EK-0963, STEAM GENERATOR E-50B HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- Reactor power greater than 80%:
  - Any operating Main Feedwater Pump trips
  - CV-0711, Feed Pump P-1A Recirculation Valve fails open
  - CV-0710, Feed Pump P-1B Recirculation Valve fails open
- Reactor power greater than or equal to 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%

#### Turbine Trip

- Reactor power less than 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

### 5.0 IMMEDIATE ACTIONS

#### ACTIONS\EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

**NOTE:** A failed Feedwater flow input results in HB\_PWR being inoperable.

1. **TAKE** manual control of the following, as necessary, to restore/stabilize Steam Generator level(s):

- CV-0701, E-50A Feed Regulating Valve
- CV-0702, E-50B Feed Regulating Valve
  
- CV-0735, E-50B Feed Reg Bypass
- CV-0734, E-50B Feed Reg Bypass
  
- HIC-0525, Combined Feed Pump Speed Control
  
- HIC-0526, P-1A Turbine Driver K-7A Speed Control
  
- HIC-0529, P-1B Turbine Driver K-7B Speed Control

- 1.1 IF either Steam Generator level is less than or equal to 30%, THEN TRIP the Reactor.

- a. **GO TO** EOP-1.0. "Standard Post-Trip Actions."

- 1.2 IF either Steam Generator level is greater than or equal to 95% AND Reactor Power is greater than or equal to 15%, THEN TRIP the Reactor.

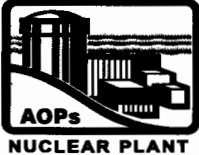
- a. **GO TO** EOP-1.0. "Standard Post-Trip Actions."

- 1.3 IF either Steam Generator level is greater than or equal to 95% AND Reactor Power is less than 15%, THEN TRIP the Turbine.

© = Continuously applicable step

☞ = Hold Point





# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

### REACTOR AND EQUIPMENT TRIP CRITERIA

#### Reactor Trip

- Either Steam Generator level lowers to 30%
- No Main Feedwater Pump operating
- EK-0961, STEAM GENERATOR E-50A HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- EK-0963, STEAM GENERATOR E-50B HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- Reactor power greater than 80%:
  - Any operating Main Feedwater Pump trips
  - CV-0711, Feed Pump P-1A Recirculation Valve fails open
  - CV-0710, Feed Pump P-1B Recirculation Valve fails open
- Reactor power greater than or equal to 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%

#### Turbine Trip

- Reactor power less than 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

### 5.0 IMMEDIATE ACTIONS

#### ACTIONS\EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

2. IF either of the following are in alarm:

- EK-0961, "STEAM GENERATOR E-50A HIGH LEVEL"
- EK-0963, "STEAM GENERATOR E-50B HIGH LEVEL"

THEN VERIFY the high level override is maintaining Steam Generator level(s):

a. Greater than or equal to 60%.

a.1 **TRIP** the Reactor.

1) **GO TO** EOP-1.0, "Standard Post-Trip Actions."

b. Less than or equal to 90%.

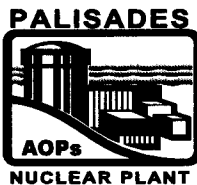
b.1 IF Reactor Power is greater than or equal to 15%, THEN TRIP the Reactor

1) **GO TO** EOP-1.0, "Standard Post-Trip Actions."

b.2 IF Reactor Power is less than 15%, THEN TRIP the Turbine.

© = Continuously applicable step

☞ = Hold Point



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

### REACTOR AND EQUIPMENT TRIP CRITERIA

#### Reactor Trip

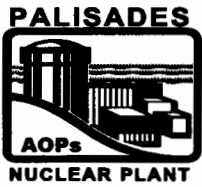
- Either Steam Generator level lowers to 30%
- No Main Feedwater Pump operating
- EK-0961, STEAM GENERATOR E-50A HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- EK-0963, STEAM GENERATOR E-50B HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- Reactor power greater than 80%:
  - Any operating Main Feedwater Pump trips
  - CV-0711, Feed Pump P-1A Recirculation Valve fails open
  - CV-0710, Feed Pump P-1B Recirculation Valve fails open
- Reactor power greater than or equal to 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%

#### Turbine Trip

- Reactor power less than 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%

© = Continuously applicable step

☞ = Hold Point



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

### 6.0 OPERATOR ACTIONS

#### ACTIONS\EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

© 1. **VERIFY** the following:

- E-50A, 'A' Steam Generator level greater than 30%.
- E-50B, 'B' Steam Generator level greater than 30%.
- At least one Main Feedwater Pump operating.

2. **DETERMINE AND PERFORM** required procedure steps:

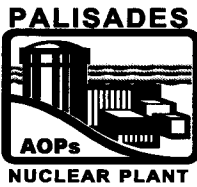
- Main Feedwater Pump Malfunction (Step 3 through 5)
- Isolate Condensate Cleanup System Leak (Step 6)
- Main Feed Line Rupture (Step 7 through 8)
- Heater Drain Pump Malfunction (Step 9 through 12)
- Miscellaneous Control Valve Malfunction (Step 13)

1.1 **TRIP** the Reactor.

- a. **GO TO** EOP-1.0, "Standard Post-Trip Actions."

© = Continuously applicable step

☞ = Hold Point



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

### REACTOR AND EQUIPMENT TRIP CRITERIA

#### Reactor Trip

- Either Steam Generator level lowers to 30%
- No Main Feedwater Pump operating
- EK-0961, STEAM GENERATOR E-50A HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- EK-0963, STEAM GENERATOR E-50B HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- Reactor power greater than 80%:
  - Any operating Main Feedwater Pump trips
  - CV-0711, Feed Pump P-1A Recirculation Valve fails open
  - CV-0710, Feed Pump P-1B Recirculation Valve fails open
- Reactor power greater than or equal to 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%

#### Turbine Trip

- Reactor power less than 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%



**PALISADES NUCLEAR PLANT  
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**MAIN FEEDWATER TRANSIENTS**

**ACTIONS\EXPECTED RESPONSE**

**RESPONSE NOT OBTAINED**

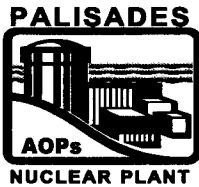
**Main Feedwater Pump Malfunction  
(Step 3 through 5)**

3. **VERIFY** Reactor power is greater than 80%.
4. **VERIFY** the following:
  - P-1A, Main Feedwater Pump operating
  - P-1B, Main Feedwater Pump operating
  - CV-0711, Feed Pump P-1A, Recirculation Valve closed or isolated
  - CV-0710, Feed Pump P-1B, Recirculation Valve closed or isolated
5. **IF** Reactor power is greater than 60% but less than or equal to 80%, **THEN VERIFY** two Main Feedwater Pumps operating.

- 3.1 **GO TO** Step 5.
  - 4.1 **TRIP** the Reactor.
    - a. **GO TO** EOP-1.0, "Standard Post-Trip Actions."
- NOTE:** PDIL restrictions do not apply for rapid power reduction. The goal of power reduction is to avert both a Steam Generator low level condition and a subsequent Steam Generator overfeed.
- 5.1 **COMMENCE** a rapid power reduction. Refer to AOP-7, "Rapid Power Reduction."
  - 5.2 **MANUALLY RAISE** the speed of the operating Main Feed Pump using the Individual Main Feed Pump Speed Controller.
    - HIC-0526, P-1A Turbine Driver K-7A Speed Control.
    - HIC-0529, P-1B Turbine Driver K-7B Speed Control

(Continue)

(Continue)



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

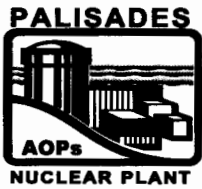
### REACTOR AND EQUIPMENT TRIP CRITERIA

#### Reactor Trip

- Either Steam Generator level lowers to 30%
- No Main Feedwater Pump operating
- EK-0961, STEAM GENERATOR E-50A HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- EK-0963, STEAM GENERATOR E-50B HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- Reactor power greater than 80%:
  - Any operating Main Feedwater Pump trips
  - CV-0711, Feed Pump P-1A Recirculation Valve fails open
  - CV-0710, Feed Pump P-1B Recirculation Valve fails open
- Reactor power greater than or equal to 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%

#### Turbine Trip

- Reactor power less than 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%



**PALISADES NUCLEAR PLANT  
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**MAIN FEEDWATER TRANSIENTS**

**ACTIONS\EXPECTED RESPONSE**

**RESPONSE NOT OBTAINED**

5. (Continued)

(Continued)

5.3 **STOP** the power reduction when feed flow indication becomes slightly greater than steam flow indication for both Steam Generators AND Steam Generator levels are slowly recovering.

**CAUTION**

Excessive feed flow can result in excessive positive reactivity addition and lowering feed pump suction pressure. Careful attention must be given to the rate at which Steam Generator level are restored.

5.4 **SLOWLY RESTORE** Steam Generator levels to 60% to 70%.

**Isolate Condensate Cleanup System Leak (Step 6)**

6. **ENSURE CLOSED** the following valves to isolate the Condensate Clean-up Modification.

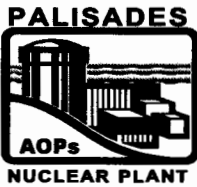
- MV-CD383, Condensate Cleanup Supply to Demin
- MV-MS217, Condensate Cleanup Return from Demin
- MV-MS218, Condensate Cleanup Return from Demin

LOCATION: East of Air Ejectors

© = Continuously applicable step

☞ = Hold Point





# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

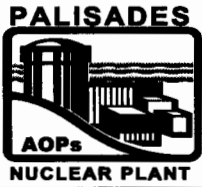
### REACTOR AND EQUIPMENT TRIP CRITERIA

#### Reactor Trip

- Either Steam Generator level lowers to 30%
- No Main Feedwater Pump operating
- EK-0961, STEAM GENERATOR E-50A HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- EK-0963, STEAM GENERATOR E-50B HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- Reactor power greater than 80%:
  - Any operating Main Feedwater Pump trips
  - CV-0711, Feed Pump P-1A Recirculation Valve fails open
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- Reactor power greater than or equal to 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%

#### Turbine Trip

- Reactor power less than 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%



**PALISADES NUCLEAR PLANT  
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**MAIN FEEDWATER TRANSIENTS**

**ACTIONS\EXPECTED RESPONSE**

**RESPONSE NOT OBTAINED**

**Main Feed Line Rupture (Steps 7 through 8)**

7. **COMMENCE** a rapid power reduction, as necessary. Refer to AOP-7, "Rapid Power Reduction."
8. **CONSIDER** the following to reduce feedwater loss.
  - **STOP** operating Main Feed Pumps as necessary
  - **STOP** operating Heater Drain Pumps as necessary
  - **STOP** operating Condensate Pumps as necessary

**Heater Drain Pump Malfunction (Steps 9 through 12)**

9. **VERIFY** Reactor power greater than 90%.
- © 10. **VERIFY** both Main Feedwater Pumps operating.
- © 11. **VERIFY** Main Feedwater Pump suction pressure stable.

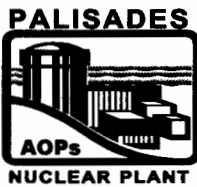
- 9.1 **GO TO** Step 11.
- 10.1 **TRIP** the Reactor.
  - a. **GO TO** EOP-1.0, "Standard Post-Trip Actions."

**NOTE:** Rate of power reduction should be based on Main Feedwater pump suction pressure. A faster rate could potentially cause suction pressure to lower quicker than a slower rate.

- 11.1 **COMMENCE** a power reduction at a rate specified by the Control Room Supervisor to stabilize main feedwater suction pressure. Refer to one of the following:
  - AOP-7, "Rapid Power Reduction"
  - GOP-8, "Power Reduction and Plant Shutdown To MODE 2 or MODE 3  $\geq 525^{\circ}\text{F}$ "

© = Continuously applicable step

☞ = Hold Point



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

### REACTOR AND EQUIPMENT TRIP CRITERIA

#### Reactor Trip

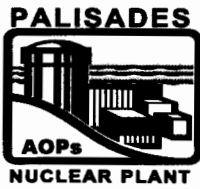
- Either Steam Generator level lowers to 30%
- No Main Feedwater Pump operating
- EK-0961, STEAM GENERATOR E-50A HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- EK-0963, STEAM GENERATOR E-50B HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- Reactor power greater than 80%:
  - Any operating Main Feedwater Pump trips
  - CV-0711, Feed Pump P-1A Recirculation Valve fails open
  - CV-0710, Feed Pump P-1B Recirculation Valve fails open
- Reactor power greater than or equal to 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%

#### Turbine Trip

- Reactor power less than 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%

© = Continuously applicable step

☞ = Hold Point



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

### ACTIONS\EXPECTED RESPONSE

### RESPONSE NOT OBTAINED

12. GO TO Step 14.

#### Miscellaneous Control Valve Operation (Step 13)

13. **VERIFY** proper operation of the following valves:

- a. CV-0608, Moisture Separator Drain Tank T-5 Level Control.
- b. CV-0730, Condensate Pump P-2A/B Recirculation Valve.
- c. CV-0710, Feed Pump P-1B Recirculation Valve.
- d. CV-0711, Feed Pump P-1A Recirculation Valve.
- e. CV-0609, Moist Sep Drain Tank T-5 Dump to Condenser (local position).

- a.1 **REFER TO** SOP-10, "Extraction and Heater Drain System."
- b.1 **REFER TO** SOP-11, "Condensate System."
- c.1 **CLOSE** MV-FW734, MFWP P-1B Recir Stop.  
  
LOCATION: Above T-26B Pit, Chain Operator
- d.1 **CLOSE** MV-FW733, MFWP P-1A Recir Stop.  
  
LOCATION: Above T-26A Pit, Chain Operator
- e.1 **REFER TO** SOP-10, "Extraction and Heater Drain System."

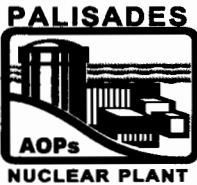
14. **VERIFY** change in Reactor Power less than or equal to 15% in any 1 hour period.

14.1 **NOTIFY** Chemistry to perform an isotopic analysis for iodine.

15. **REFER TO** Operating Requirements Manual ORM 3.17.6 #4 (Feedwater flow channel inoperable)

© = Continuously applicable step

☞ = Hold Point



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

Proc No	AOP-3
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## MAIN FEEDWATER TRANSIENTS

### REACTOR AND EQUIPMENT TRIP CRITERIA

#### Reactor Trip

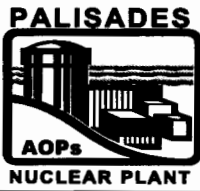
- Either Steam Generator level lowers to 30%
- No Main Feedwater Pump operating
- EK-0961, STEAM GENERATOR E-50A HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- EK-0963, STEAM GENERATOR E-50B HIGH LEVEL is alarming, AND Steam Generator level(s) are less than 60% and lowering (eg, fault in high level override circuit)
- Reactor power greater than 80%:
  - Any operating Main Feedwater Pump trips
  - CV-0711, Feed Pump P-1A Recirculation Valve fails open
  - CV-0710, Feed Pump P-1B Recirculation Valve fails open
- Reactor power greater than or equal to 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%

#### Turbine Trip

- Reactor power less than 15%:
  - Either Steam Generator level is greater than 90% AND the high level override has not lowered feedwater flow
  - Either Steam Generator level is greater than 95%

© = Continuously applicable step

☞ = Hold Point



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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## MAIN FEEDWATER TRANSIENTS

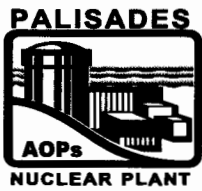
### ACTIONS\EXPECTED RESPONSE

16. **NOTIFY** Radiation Protection of changing Reactor power levels for determination of Auxiliary Building posting requirements.
17. **ENSURE** all applicable steps have been completed.
  - a. **EXIT** this procedure.

### RESPONSE NOT OBTAINED

© = Continuously applicable step

☞ = Hold Point



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

Proc No      AOP-3

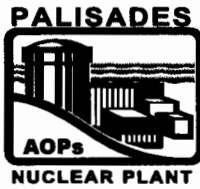
Revision      0

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## MAIN FEEDWATER TRANSIENTS

### 7.0      SPECIAL REVIEWS

None



# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

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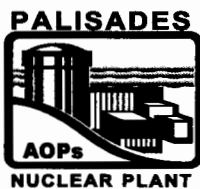
## MAIN FEEDWATER TRANSIENTS

### MITIGATION STRATEGY AND STEP INDEX

#### MITIGATION STRATEGY

1. Maintain Steam Generator inventory and restore Steam Generator levels to normal operating band.
2. Reduce power to match Main Steam/Main Feed Flow as necessary.
3. Verify pumps and valves operating as expected.





# PALISADES NUCLEAR PLANT ABNORMAL OPERATING PROCEDURE

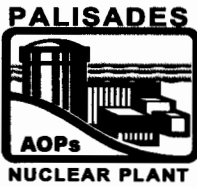
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## MAIN FEEDWATER TRANSIENTS

### MITIGATION STRATEGY AND STEP INDEX

#### STEP INDEX

STEP	ACTIONS\EXPECTED RESPONSE	PAGE
© 1.	Verify Steam Generator level(s) greater than 30% and at least on Main Feedwater Pump operating.	8
2.	Determine and perform required procedure steps.	8
<b><u>Main Feedwater Pump Malfunction (Step 3 through 5)</u></b>		
3.	Verify Reactor power greater than 80%.	10
4.	Verify Main Feedwater Pumps operating and Feed Pump Recirculation valves closed or isolated.	10
5.	If Reactor power is greater than 60% but less than or equal to 80%, then verify two Main Feedwater Pumps operating.	10
<b><u>Isolate Condensate Cleanup System Leak (Step 6)</u></b>		
6.	Ensure closed the following valves to isolate Condensate Clean-up Modification.	12
<b><u>Main Feed Line Rupture (Step 7 through 8)</u></b>		
7.	Commence a rapid power reduction, as necessary.	14
8.	Consider the following to reduce feedwater loss:	14
<b><u>Heater Drain Pump Malfunction (Step 9 through 14)</u></b>		
9.	Verify Reactor power greater than 90%.	14
© 10.	Verify both Main Feedwater pumps operating.	14
© 11.	Verify Main Feedwater pump suction pressure stable.	14
12.	Go to Step 14.	16
<b><u>Miscellaneous Control Valve Malfunction (Step 13)</u></b>		
13.	Verify proper operation of MSR Drain T-5 level control valves, Condensate Recirc control valve, and MFP Recirc control valves.	16



**PALISADES NUCLEAR PLANT  
ABNORMAL OPERATING  
PROCEDURE**

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**MAIN FEEDWATER TRANSIENTS**

**MITIGATION STRATEGY AND STEP INDEX**

<u>STEP</u>	<u>ACTIONS\EXPECTED RESPONSE</u>	<u>PAGE</u>
14.	Verify change in Reactor Power less than or equal to 15% in any 1 hour period.	16
15.	Refer to Operating Requirements Manual ORM 3.17.6 #4 (Feedwater flow channel inoperable).	16
16.	Notify Radiation Protection of changing Reactor power levels for determination of Auxiliary Building posting requirements.	18
17.	Exit procedure.	18

**LIST OF ATTACHMENTS**

Attachment 1, "Mitigation Strategy and Step Index"



Entergy Nuclear Operations, Inc.  
Palisades Nuclear Plant  
27780 Blue Star Memorial Highway  
Covert, MI 49043

Jeffery A. Hardy  
Licensing Manager

PNP 2014-093

October 14, 2014

NUREG 1021

Regional Administrator  
U.S. Nuclear Regulatory Commission  
2443 Warrenville Road  
Suite 210  
Lisle, IL 60532-4352

ATTN: Janet Kweiser

Subject: Initial License Examination Comments

Palisades Nuclear Plant  
Docket 50-255  
License No. DPR-20

Dear Sir:

In accordance with NUREG 1021, ES-402, Entergy Nuclear Operations is submitting comments on the initial license examination administered at the Palisades Nuclear Plant during September 2014. Attachment 1 contains the required information.

Please contact Steve Botimer at (269) 764-2975 if you have any questions regarding this submittal.

This letter contains no new commitments and no revisions to existing commitments.

Sincerely,

A handwritten signature in black ink, appearing to read "JAH".

JAH/bed

Attachment 1: Palisades Initial License Examination Comments (Revised)

CC David Reeser, Region III, USNRC  
Project Manager, Palisades, USNRC (w/o attachment)  
Resident Inspector, Palisades, USNRC (w/o attachment)  
Document Control Desk, USNRC (w/o attachment)

RECEIVED OCT 16 2014

Attachment 1  
Palisades Initial License Examination Comments (Revised)

**Question #81 Comment**

This submission is being modified based on request from NRC Region III for additional clarification of the facility response.

**Per the exam key, (b) is the correct answer, however, answers (a), and (d) are also correct answers.**

Question:

The Plant has just entered MODE 3 for a forced outage to repair a Main Condenser Vacuum leak when the following occurs:

- A loss of Left Train 125V DC Bus (more specifically ED-10R and ED-10L) occurs

The Control Room Supervisor directs entry into...

- a. AOP-18 "Loss of Left Train DC power" only
- b. AOP-18, "Loss of Left Train DC Power" and EOP -9.0, "Functional Recovery Procedure."
- c. AOP-18 "Loss of Left Train DC Power," AOP -13 Loss of Preferred AC Bus EY-20," and AOP-15 "Loss of Preferred AC Bus EY-40."
- d. EOP-9.0, "Functional Recovery Procedure" only

**Summary:** Based on the initial condition of a deliberate and controlled entry into MODE 3 for repair of a Condenser Vacuum leak followed by the loss of the Left Train of 125VDC, both the Abnormal Operating Procedure (AOP-18) and the Functional Recovery Procedure (EOP-9.0) will provide the same guidance on how to mitigate the effects of this event. The preferred procedural path is to use the Abnormal Operating Procedure since it was developed specifically for this event following the actual loss of DC power event at Palisades in September of 2011. Entry into an Optimal Recovery EOP or the Functional Recovery EOP from a lower mode is always allowed if the entry conditions for that procedure are met. For the scenario presented in the stem of this question, AOP-18 would be the preferred procedural guidance used to mitigate the event while entry into and use of EOP 9.0 in parallel with AOP-18 or by itself would

successfully address the scenario. Use of EOP 9.0 with or without AOP-18 is completely discretionary. The basis for the decision is explained below.

**Basis:**

**AOP-18 does not require EOP 9.0 entry**

AOP-18, Section 6.0, Operator Actions, Step 2 states, "Refer to EOP 9.0 'Functional Recovery Procedure' for lower mode entry." The scenario provided by this question is specifically addressed in the AOP-18 Basis document as follows (emphasis added):

This is a branching step to EOP 9.0. Transition to EOP 9.0 is required following a reactor trip and event diagnosis in EOP-1.0. EOP 9.0 entry for all other plant conditions is discretionary. In most cases, unless Shutdown Cooling is in service, EOP 9.0 entry is highly recommended.

AOP-18 intentionally uses the language of "REFER TO" rather than "ENTER" to allow the CRS discretion, based on plant conditions, the use of EOP 9.0 to combat the event. Further clarification from Operations Senior Leadership Team reinforces the guidance that "Referring" to another procedure does not mean the entire procedure must be entered and implemented. Therefore entry into EOP 9.0 is a discretionary decision to be made by the CRS, based on plant conditions at the time of event initiation.

**EOP 9.0 entry criteria not met**

A review of the EOP 9.0 entry criteria also reveals entry is not **required** (emphasis added):

**2.0 ENTRY CONDITIONS**

1. EOP 1.0, "Standard Post Trip Actions," has been performed.

**OR**

The event initiated from a lower mode when the Shutdown Cooling System is NOT initially in service.

2. ANY of the following conditions may be present:
  - a. A Reactor trip with unusual concurrent symptoms and diagnosis of one event NOT immediately apparent.

- b. Any conditions/symptoms which a licensed operator considers serious **and for which other Emergency/Off-Normal Procedures can NOT be identified.**
- c. Actions from an in-use Optimal Recovery EOP do NOT result in acceptance criteria for in-use Optimal Recovery EOP Safety Function Status Check Sheet being satisfied.
- d. An Optimal Recovery EOP step directs implementation of EOP 9.0, "Functional Recovery Procedure."

In this scenario, the plant was shutdown to Mode 3 in a deliberate and controlled fashion which precluded a Reactor Trip. Since there was no reactor trip, EOP 1.0 entry and/or subsequent EOP entry is not required. Since the event was initiated from a lower mode without shutdown cooling in service, Step 2.2.b (above) is the only other EOP 9.0 entry condition which could apply. Since the event is obviously serious the CRS would determine that there is an Abnormal Operating Procedure that has been identified for this event, therefore none of the Functional Recovery Procedure entry conditions are met. From the EOP 9.0 basis document, section 1.0 Introduction (emphasis added):

Entry conditions are chosen to identify those conditions which will necessitate implementation of the FRP. Following the performance of the SPTAs for events initiated during Power Operations or Hot Standby with the reactor critical, **or from lower modes** for which the FRP entry conditions are met, **the operator may not be able to diagnose one unique event taking place.** This could happen if more than one event is taking place (multiple casualties) or **a condition exists for which abnormal or emergency guidance cannot be identified.** During the course of the event, actions taken in an ORP may not satisfy the Safety Function Status Check acceptance criteria. Also, **actions taken in an AOP (if entering from a lower mode) may not be adequately responding to mitigate the consequences of the event.** Implementation of the safety function based FRP would then be evaluated.

### **Safety Function comparison in AOP-18 and EOP 9.0**

AOP-18 was written specifically to stabilize the plant following this event. From the AOP-18 basis document:

The need for a procedure dealing with a complete loss of one train of 125V DC became evident during the automatic reactor trip that occurred on [September 25, 2011].

AOP-18, Section 6.0, Step 24 (and 24.1) addresses restoration of available preferred AC buses per SOP-30, "Station Power."

Following restoration of one preferred AC bus to the bypass regulator performed in step 24, and no other events in progress, all applicable Safety Functions will be met. This is further evidence that entry into EOP 9.0, under these circumstances, is not required and will provide no additional assistance in addressing this event.

EOP 9.0 implementation is based on the determination of Safety Function status. For this scenario, the highest priority Safety Function that would be challenged or jeopardized is MVAE-DC, therefore MVAE-DC-1 would be the entry point for implementing Operator Actions in EOP 9.0. Success path MVAE-DC-1, Step 6.1 addresses restoration of all available preferred AC buses per the appropriate AOP.

**Facility Position:** The facility agrees with \_\_\_\_\_ that for Question #81, answers (a), (b) and (d) are correct answers based on the discussion above. Although the preferred path for mitigation of this specific event is to use Abnormal Operating Procedure AOP-18 (Loss of Left Train DC Power), the CRS could choose to enter both procedures and implement them in parallel or choose to implement EOP 9.0 by itself. The mitigating strategy to expeditiously repower one of the Preferred AC Busses from the Bypass Regulator is addressed and directed by both AOP-18 and EOP 9.0, using steps contained in other procedures (specifically AOP-12, AOP-14, and SOP-30). Completing actions to restore a preferred AC bus in either AOP-18 or EOP 9.0 will result in satisfying all safety functions, therefore entering AOP-18 to mitigate the event is preferred while entering EOP 9.0 by CRS discretion is acceptable.