

October 11, 2005

10 CFR 50.55a

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

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

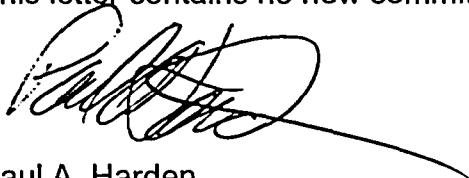
Response to Request for Additional Information Related to Request to Extend the Third
10-Year ISI Interval for Reactor Vessel Weld Examination

By letter dated March 31, 2005, Nuclear Management Company, LLC (NMC) requested Nuclear Regulatory Commission (NRC) approval, pursuant to 10 CFR 50.55a(a)(3)(i), for the use of an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, paragraph IWB-2412, Inspection Program B, at the Palisades Nuclear Plant (PNP).

By letter dated August 23, 2005, the NRC issued a request for additional information (RAI) on the subject relief request. Enclosure 1 provides the NMC response for PNP.

Summary of Commitments

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



Paul A. Harden
Site Vice President, Palisades Nuclear Plant
Nuclear Management Company, LLC

Enclosure (1)
Attachments (4)

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

A 047

ENCLOSURE 1
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
PALISADES NUCLEAR PLANT

NRC Request

In its March 31, 2005, request for authorization to extend the third 10-year ISI interval for reactor vessel examinations, Nuclear Management Company (NMC) stated that the technical justification for its request is consistent with the guidance provided in a January 27, 2005, letter from the NRC to Westinghouse Electric Company (Summary of Teleconference with the Westinghouse Owners Group Regarding Potential One Cycle Relief of Reactor Pressure Vessel Shell Weld Inspections at Pressurized Water Reactors Related to WCAP-16168-NP, "Risk Informed Extension of Reactor Vessel In-Service Inspection Intervals"). Item number six of this guidance says the following:

The licensee could then provide a discussion of how, based on its plant operational experience, fleet-wide operational experience and plant characteristics, the likelihood of an event (in particular, a significant pressurized thermal shock event) over the next operating cycle which could challenge the integrity of the reactor pressure vessel (RPV), if a flaw was present, is very low.

NMC's submittal includes general statements indicating that the likelihood of pressurized thermal shock (PTS) events is small, and briefly describes a Palisades operating procedure that provides guidance on the preferred water temperature in the safety injection refueling water tank (SIRWT). The guidance recommends that the water in the SIRWT be maintained above 80 degrees to reduce the likelihood of a severe PTS event.

The NRC staff is re-evaluating the risk from PTS events in a study done to develop a technical basis for revising Title 10 of the Code of Federal Regulations, (10 CFR) Part 50, Section 61. Although the NRC staff has not yet completed its evaluation, the current results indicate that the three types of accident sequences shown below cause the more severe PTS events and thereby dominate the risk. Please describe the characteristics of your plant (design and operating procedures) that assure that the likelihood of a severe PTS event over the next operating cycle, which could challenge the integrity of the RPV if a flaw was present, is very low for the following accident sequences:

Sequence 1

Any transient with reactor trip followed by one stuck-open pressurizer safety relief valve that re-closes after about 1 hour. Severe PTS events also require the failure to properly control high-head injection.

Sequence 2

Large loss of secondary steam from steam line break or stuck-open atmospheric dump valves. Severe PTS events also require the failure to properly control auxiliary feedwater flow rate and destination (e.g., away from affected steam generators), and failure to properly control high-pressure injection.

Sequence 3

Four-to-nine-inch loss-of-coolant accidents. Severity of PTS event depends on break location (worst location appears to be in the pressurizer line) and primary injection systems flowrate and water temperature.

NMC Response

The Palisades Nuclear Plant (PNP) has design characteristics that assure the likelihood of a severe PTS event over the next operating cycle, which would challenge the integrity of the RPV if a flaw is present, is very low for the following accident sequences. The PNP high pressure safety injection (HPSI) pump's design shutoff head is low, which limits the pressure challenge in the described sequences below. In addition, the PNP nominal pressurizer operating design value of 2060 psia is about 150 psi less than other operating pressurized water reactors (PWRs). Therefore, the likelihood of challenging a pressurizer safety relief valve (SRV) is less than that for other PWRs. Furthermore, the PNP pressure and temperature curves are based on Appendix G pressure and temperature limits and utilize a 200 degree subcooling limit. The 200 degree subcooling curve provides extra margin in regard to PTS.

The PNP has operating procedures that assure the likelihood of a severe PTS event over the next operating cycle, which would challenge the integrity of the RPV if a flaw is present, is very low for the following accident sequences. The PNP operator response to each of the listed sequences would be in accordance with the PNP Emergency Operating Procedures (EOPs). The EOPs are based on the Westinghouse Owners Group (WOG) CEN-152, "Emergency Procedure Guidelines," for Combustion Engineering (CE) nuclear steam supply system (NSSS) plants.

Sequence 1

This event is characterized as a vapor space loss-of-coolant accident (LOCA). Upon receipt of a reactor trip, the operators would implement EOP-1.0, "Standard Post Trip Actions," provided as Attachment 1, followed by entry into EOP-4.0, "Loss of Coolant Accident Recovery," provided as Attachment 2.

In order to minimize the risk for a PTS event, the operators control PCS temperature, and PCS pressure within the limits of EOP Supplement 1, "Pressure Temperature Limit Curves," provided as Attachment 4.

PCS temperature is controlled by steaming the steam generators in accordance with EOP-4.0, Step 22. This removes energy from the PCS that could potentially cause PCS pressure to raise leading to a PTS event.

Parameters are continuously monitored to determine if safety injection (SI) and charging pump flow can be throttled or stopped. EOP-4.0, Step 4.25 (a continuously applicable step) provides SI throttle criteria. Step 4.33 provides the instructions for throttling SI and controlling charging and letdown. If HPSI pumps and charging pumps were started by an SI actuation signal, then this step is used to reduce or stop HPSI or charging flow

to reduce the chances of over pressurizing the PCS and low temperature stressing of the reactor vessel.

Once the pressurizer SRV closes, and the SI throttle criteria is verified, EOP-4.0 provides several steps to control primary coolant system (PCS) inventory in order to prevent a PTS event.

Step 4.32 re-establishes letdown if it was isolated in order to control PCS inventory. The control of letdown in a solid condition provides the operator a method to control PCS pressure within EOP Supplement 1 limits.

Step 4.34 (a continuously applicable step) provides contingency actions to address over-subcooling or pressurizer pressure greater than the limits of EOP Supplement 1. The concern for PTS is minimized by staying below the upper subcooled limits shown in EOP Supplement 1.

Step 4.70 provides contingency actions should the subsequent closing of the SRV result in water solid conditions in the PCS. The goal of this step is to maintain the PCS within the limits of EOP Supplement 1, by controlling PCS temperature and pressure with the steam generators, and by controlling HPSI, charging, and letdown flow.

Sequence 2

This event is characterized as an excess steam demand event (ESDE.) Upon receipt of a reactor trip, the operators would implement EOP-1.0, "Standard Post Trip Actions," followed by entry into EOP-6.0, "Excess Steam Demand Event," provided as Attachment 3.

During performance of the standard post trip actions (SPTA), PCS heat removal safety function acceptance criteria are evaluated in Step 4.8. Contingency action, Step 4.8.a.3, requires that, if a steam generator (SG) has an indication of an ESDE, feedwater flow to the affected SG be secured. This supports the strategy outlined in CEN-152, that the operator should not feed a suspected faulted steam generator. Upon entering EOP-6.0, identification and isolation of the affected SG is again addressed in steps 13, 14, and 15. Feedwater is isolated to the affected SG to limit the inventory available to boil off, thus limiting or stopping uncontrolled plant cooldown and stabilizing the plant.

The SI throttle criteria are verified in EOP-6.0, Step 4.17 (a continuously applicable step) and throttling is addressed in Step 4.18. If HPSI pumps and charging pumps were started by an SI actuation signal, then this step is used to limit or stop HPSI or charging flow to reduce the chances of over pressurizing the PCS and low temperature stressing the reactor vessel.

As outlined in Step 4.23 (a continuously applicable step) PCS pressure is maintained within the limits of EOP Supplement 1. The concern for PTS is minimized by staying below the upper subcooled limits shown in EOP Supplement 1. Contingency actions listed in Step 4.23.1, address over-subcooled conditions in the PCS. These include controlling HPSI, charging, and letdown flows, reducing PCS pressure, and controlling

PCS cooldown rate in order to restore PCS temperature and pressure within the limits of EOP Supplement 1, thereby minimizing PTS concerns.

Sequence 3

A LOCA is an accident which is caused by a break in the PCS pressure boundary. The break can be as large as a double ended guillotine break in the hot leg, or as small as a break which results in a loss of PCS fluid at a rate that is just in excess of the available charging capacity of the plant.

Small and large break LOCAs differ in their effect on the post-LOCA PCS heat removal process. For a large break LOCA, the only path necessary for PCS heat removal, in both the short and long term, is the break flow with core boil off. For small breaks, heat removal via the flow out the break is not sufficient to provide cooling and, therefore, SG heat removal is required. The emergency procedure guidelines take this into account with the decisions that must be made. Although distinct small and large break LOCA information is contained in the bases section of EOP-4.0, the action steps to be used during the actual emergency do not require the operator to distinguish between break sizes.

There are two paths initially available for PCS heat removal: heat transfer to the secondary side via the SGs, and heat transfer via the fluid flowing out the break. Large break LOCAs have sufficient fluid flowing out the break to provide adequate heat removal without relying on the SGs. Small break LOCAs do not have sufficient fluid flowing out of the break to provide adequate heat removal. Therefore, SG heat removal is required in addition to break flow for adequate heat removal. Because the LOCA EOP does not distinguish between large and small break LOCAs, SG heat removal capability is required at all times during a LOCA (EOP-4.0, Step 22.) Steaming the SGs removes energy from the PCS that could potentially cause PCS pressure to raise leading to a PTS event.

Parameters are continuously monitored to determine if SI and charging pump flow can be throttled or stopped. EOP-4.0, Step 4.25 (a continuously applicable step) provides SI throttle criteria. Step 4.33 provides the instructions for throttling SI and controlling charging and letdown. If HPSI pumps and charging pumps were started by an SI actuation signal, then this step is used to reduce or stop HPSI or charging flow to reduce the chances of over pressurizing the PCS and low temperature stressing of the reactor vessel.

Step 4.34 (a continuously applicable step) provides contingency actions to address over-subcooling or pressurizer pressure greater than the limits of EOP Supplement 1. The concern for PTS is minimized by staying below the upper subcooled limits shown in EOP Supplement 1. Contingency actions listed in Step 4.34.1 address over-subcooled conditions in the PCS, including throttling SI flows.

A break location in the pressurizer surge line could impact the ability of the operator to determine if SI throttle criteria are met due to either the inability to refill the pressurizer or lack of PCS pressure indication. If SI throttle criteria cannot be verified, then the operator would continue to maintain full SI flow, while aggressively steaming the SGs to remove heat from the PCS (EOP-4.0, Step 22.)

ATTACHMENT 1

EOP-1, "STANDARD POST TRIP ACTIONS"

25 Pages Follow (Procedure Attachments not included)



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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| Revision | 12 |
| Issued Date | 2/11/02 |

STANDARD POST-TRIP ACTIONS

| | |
|-----------------------|------------------|
| <u><i>Pat Tub</i></u> | <u>1 1/29/02</u> |
| Procedure Sponsor | Date |
| <u>GGPalmisano</u> | <u>1 1/2/02</u> |
| Technical Reviewer | Date |
| <u>GWSleeper</u> | <u>1 1/1/01</u> |
| User Reviewer | Date |



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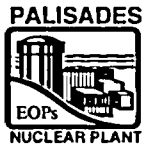
USER ALERT CONTINUOUS USE PROCEDURE

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 the immediate actions which must be accomplished after a Reactor trip has occurred or should have occurred. These actions are necessary to ensure that the plant is placed in a stable, safe condition or that the plant is configured to respond to a continuing emergency.

End of Section 1.0



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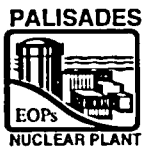
TITLE: STANDARD POST-TRIP ACTIONS

2.0 ENTRY CONDITIONS

Standard Post Trip Actions may be entered when ANY of the following symptom(s) of a Reactor Trip exist:

1. Reactor Trip alarm (EK-0972).
2. Control Rod bottom lights on.
3. Rapid reduction of Reactor power.
4. Red trip lights lit on Clutch Power Supplies 1 through 4.
5. RPS trip logic lights on.
6. RPS trip setpoint(s) exceeded.
7. Licensed operator evaluation indicates conditions warrant a Reactor trip.

End of Section 2.0



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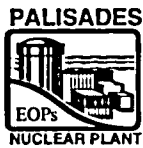
TITLE: STANDARD POST-TRIP ACTIONS

3.0 EXIT CONDITIONS

SPTAs may be exited when ANY of the following conditions exist:

1. IF ALL safety function acceptance criteria are met,
AND NO contingency actions were performed,
THEN GO TO EOP-2.0 "Reactor Trip Recovery."
2. IF ANY safety function acceptance criteria are NOT met,
OR ANY contingency action was taken,
THEN GO TO Attachment 1, "Event Diagnostic Flow Chart" to diagnose
the event.

End of Section 3.0



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4.0 IMMEDIATE ACTIONS



INSTRUCTIONS



CONTINGENCY ACTIONS

Record Time of Reactor Trip _____

1. **DETERMINE** that Reactivity
Control acceptance criteria met:



- a. **VERIFY** Reactor power
lowering.



- a.1. **PERFORM ANY** of the following:

- **PUSH BOTH REACTOR TRIP**
pushbuttons on EC-02 and
EC-06.
- **OPEN CRD Clutch Power**
Feeder Breakers 42-1RPS and
42-2RPS.
- **PLACE ALL CRD clutch power**
toggle switches to CLUTCH
OFF.



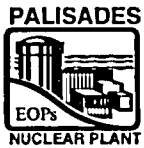
- b. **VERIFY** negative startup rate.



- c. **VERIFY** a maximum of one full
length Control Rod NOT fully
inserted.



- c.1. **COMMENCE** emergency boration.



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INSTRUCTIONS

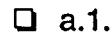
2. **DETERMINE** that Main Turbine-Generator acceptance criteria are met:



- a. **VERIFY** Main Turbine is tripped.



CONTINGENCY ACTIONS



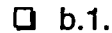
- a.1. **IF** plant was operating at power **AND** the MSIVs are open, **THEN PERFORM ANY** of the following:

- 1) **MANUALLY TRIP** Main Turbine at Control Panel C-01 (preferred).
- 2) **CLOSE BOTH MSIVs.**
 - CV-0510 ('A' S/G)
 - CV-0501 ('B' S/G)



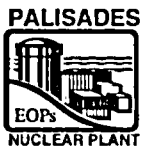
- b. **VERIFY** that the Main Generator is disconnected from grid by **ANY** of the following:

- Main Generator Output Breakers open.
 - 25F7
 - 25H9
- MOD 26H5 open.



- b.1. **PERFORM ANY** of the following:

- 1) **OPEN** Main Generator Output Breakers at Control Panel C-01.
 - 25F7
 - 25H9
- 2) **CONNECT** jumper between terminals 1 and 10 on Relay 487U (Y Phase) inside Panel C-04.



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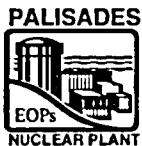
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| <input checked="" type="checkbox"/> INSTRUCTIONS | <input checked="" type="checkbox"/> CONTINGENCY ACTIONS |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. CONTROL the Feedwater System as follows: | |
| <input type="checkbox"/> a. PLACE ALL operating Main Feed Pump Individual Speed Controllers to MAN. <ul style="list-style-type: none">• HIC-0526• HIC-0529 | |
| <input type="checkbox"/> b. <u>IF</u> BOTH Main Feed Pumps are operating, <u>THEN RAMP</u> ONE Main Feed Pump to minimum speed. | <input type="checkbox"/> b.1. <u>IF</u> a Main Feed Pump's speed can NOT be lowered, <u>THEN TRIP</u> the Main Feed Pump. |
| <input type="checkbox"/> c. <u>WHEN</u> T_{AVE} lowers towards 525°F (535°F preferred), <u>THEN RAMP</u> the remaining Main Feed Pump to minimum speed. | <input type="checkbox"/> c.1. <u>IF</u> a Main Feed Pump's speed can NOT be lowered, <u>THEN TRIP</u> the Main Feed Pump. |
| <input type="checkbox"/> d. ENSURE CLOSED ALL Main Feed Regulating Valves and ALL Bypass Feed Regulating Valves for BOTH S/Gs: <ul style="list-style-type: none">• CV-0701 ('A' S/G)• CV-0735 ('A' S/G)• CV-0703 ('B' S/G)• CV-0734 ('B' S/G) | <input type="checkbox"/> d.1. <u>IF</u> ALL Main Feed Regulating Valves <u>AND</u> ALL Bypass Feed Regulating Valves can NOT be closed, <u>THEN TRIP</u> the operating Main Feed Pumps. |



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INSTRUCTIONS

4. **DETERMINE** that Vital
Auxiliaries-Electric acceptance
criteria are met:

- a. **VERIFY** that station loads have
transferred to offsite electrical
power such that ALL of the
following conditions exist:



- 1) Buses 1C and 1D energized.



CONTINGENCY ACTIONS



- 1.1) **ENSURE** D/G started for bus NOT
energized.

- 1-1 D/G (Bus 1C)
- 1-2 D/G (Bus 1D)



- 1.2) **ENSURE** associated D/G output
breaker closed (one attempt only)

- Bus 1C (D/G 1-1): 152-107
- Bus 1D (D/G 1-2): 152-213



- 2) IF SIAS is NOT actuated,
THEN Bus 1E is energized.

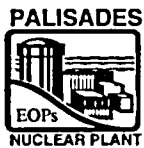


- 3) Buses 1A and 1B are
energized.



- 4) Y01 is energized.

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INSTRUCTIONS



CONTINGENCY ACTIONS

4. (continued)

NOTE: The following indications can be used for status of DC power:

| DC Bus | Indication |
|--------|--------------------|
| D11A | P-8A Control Power |
| D11-1 | CV-0510 MSIV |
| D11-2 | K-7A Trip Power |
| D21A | P-8C Control Power |
| D21-1 | CV-0501 MSIV |
| D21-2 | K-7B Trip Power |



5) ALL of the following DC Buses are energized:

- Left Channel DC Buses
 - D11A
 - D11-1
 - D11-2
- Right Channel DC Buses
 - D21A
 - D21-1
 - D21-2



6) At least 3 of 4 Preferred AC Buses are energized.

- Y10
- Y20
- Y30
- Y40



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INSTRUCTIONS

5. **DETERMINE** that PCS Inventory Control acceptance criteria are met:



- a. **VERIFY BOTH** of the following conditions exist:

- Pressurizer (PZR) level between 20% and 85%
- PZR level trending to between 42% and 57%

NOTE: Determine PCS subcooling using T_H with forced circulation and the Average of Qualified CETs with natural circulation.



- b. **VERIFY** PCS at least 25°F subcooled.



CONTINGENCY ACTIONS



- 5.1. **IF** PLCS does NOT respond, **THEN RESTORE AND MAINTAIN** PZR level between 42% and 57%:

- a. **OPERATE** PZR Level Control System (PLCS).
- b. **MANUALLY OPERATE** Charging and Letdown.



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INSTRUCTIONS

☐ 6.

DETERMINE that PCS Pressure Control acceptance criteria are met by verifying that BOTH of the following conditions exist:

- PZR pressure between 1650 and 2185 psia
- PZR pressure trending toward 2010 and 2100 psia



CONTINGENCY ACTIONS

☐ 6.1.

IF PPCS is NOT operating properly, THEN RESTORE AND MAINTAIN PZR pressure within the limits of EOP Supplement 1:

- a. **OPERATE** PZR Pressure Control System.
- b. **MANUALLY OPERATE** PZR heaters and PZR spray.

☐ 6.2.

IF PZR pressure is less than 1605 psia, THEN PERFORM the following:

- a. **VERIFY** SIAS initiated ("SAFETY INJ INITIATED" EK-1342 in alarm)
OR PUSH left and right INJECTION INITIATE pushbuttons on EC-13.

- PB1-1
- PB1-2

- b. **ENSURE** ALL available HPSI and LPSI pumps operating with the associated loop isolation valves open.

☐ 6.3.

IF PZR pressure is less than 1300 psia, THEN STOP PCPs as needed to establish one PCP operating in each loop.

☐ 6.4.

IF PZR pressure is less than minimum PCP operation limits of EOP Supplement 1, THEN STOP ALL PCPs.



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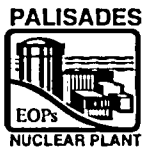
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|-------------------------------------|---------------------|-------------------------------------|----------------------------|

7. **DETERMINE** that Core Heat Removal acceptance criteria are met:

- ☐ a. **VERIFY** at least one PCP is operating.
- ☐ b. **VERIFY** Loop ΔT ($T_H - T_C$) is less than 10°F.

NOTE: Determine PCS subcooling using T_H with forced circulation and average of qualified CETs with natural circulation.

- ☐ c. **VERIFY** PCS at least 25°F subcooled.



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

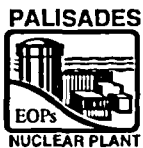
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| <p>8. DETERMINE that PCS Heat Removal acceptance criteria are met:</p> | |
| <p><input type="checkbox"/> a. VERIFY at least one S/G has BOTH of the following:</p> <ul style="list-style-type: none">• Level between 5% and 70%• Feedwater available to maintain S/G level | <p><input type="checkbox"/> a.1. For low level, ENSURE at least one S/G has feedwater flow of at least 165 gpm.</p> <p><input type="checkbox"/> a.2. For high level, REDUCE feedwater flow to the affected S/G.</p> <p><input type="checkbox"/> a.3. <u>IF</u> one S/G has indication of an ESDE or SGTR, <u>THEN SECURE</u> feedwater flow to the affected S/G.</p> |
| <p><input type="checkbox"/> b. VERIFY that T_{AVE} is between 525°F and 540°F.</p> | <p><input type="checkbox"/> b.1. <u>IF</u> T_{AVE} is greater than 540°F, <u>THEN RESTORE</u> T_{AVE} to between 525°F and 540°F using ANY of the following:</p> <ul style="list-style-type: none">• Turbine Bypass Valve (preferred)• Atmospheric Steam Dump Valves |

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INSTRUCTIONS

8.

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CONTINGENCY ACTIONS

(continued)

☐ b.2.

IF T_{AVE} is less than 525°F,
THEN **PERFORM** BOTH of the
following:

- 1) **ENSURE** Feedwater flow is NOT excessive.
- 2) **RESTORE** T_{AVE} to between 525°F and 540°F using ANY of the following:
 - Turbine Bypass Valve (preferred)
 - Atmospheric Steam Dump Valves



c. **VERIFY** BOTH S/G pressures are between 800 psia and 970 psia.

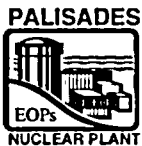
☐ c.1.

IF either S/G pressure is greater than 970 psia,
THEN **RESTORE** S/G pressure to less than 970 psia using ANY of the following:

- Turbine Bypass Valve (preferred)
- Atmospheric Steam Dump Valves

(continue)

(continue)



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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INSTRUCTIONS

8.

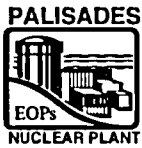
(continued)



CONTINGENCY ACTIONS

(continued)

- ☐ c.2. IF either S/G pressure is less than 800 psia,
THEN PERFORM ALL of the following:
- 1) **ENSURE** that the Turbine Bypass Valve is closed.
 - 2) **ENSURE** that the Atmospheric Steam Dump Valves are closed.
 - 3) **CLOSE BOTH MSIVs.**
 - CV-0510 ('A' S/G)
 - CV-0501 ('B' S/G)
- ☐ c.3. IF either S/G pressure is less than 500 psia,
THEN ENSURE CLOSED the following valves:
- 1) **BOTH MSIVs.**
 - CV-0510 ('A' S/G)
 - CV-0501 ('B' S/G)
 - 2) **Main Feed Regulating Valve and Bypass Feed Regulating Valve on affected S/G only:**
 - CV-0701 ('A' S/G)
 - CV-0735 ('A' S/G)
 - CV-0703 ('B' S/G)
 - CV-0734 ('B' S/G)



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INSTRUCTIONS

9. **DETERMINE** that Containment Isolation acceptance criteria are met:

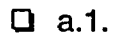


- a. **VERIFY** containment pressure less than 0.85 psig.

- PIA-1814
- PIA-1815



CONTINGENCY ACTIONS



- a.1. **IF** Containment pressure is greater than or equal to 4.0 psig, **THEN PERFORM ALL** of the following:

- 1) **VERIFY** Containment Isolation Signal initiated ("CIS INITIATED" EK-1126 in alarm)
OR PUSH left and right HIGH RADIATION INITIATE pushbuttons on EC-13.

- CHRL-CS
- CHRR-CS

- 2) **ENSURE CLOSED** the following:

- BOTH MSIVs:
 - CV-0510 ('A' S/G)
 - CV-0501 ('B' S/G)
- Main Feed Reg Valves:
 - CV-0701 ('A' S/G)
 - CV-0703 ('B' S/G)
- Bypass Feed Reg Valves:
 - CV-0735 ('A' S/G)
 - CV-0734 ('B' S/G)

(continue)

(continue)



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INSTRUCTIONS

9.

(continued)



CONTINGENCY ACTIONS

(continued)

- CCW Isolation Valves:

- CV-0910, (KEY: 337)
- CV-0911, (KEY: 338)
- CV-0940, (KEY: 336)

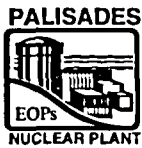
- 3) **ENSURE** SIAS initiated by performing the following:

- a. **VERIFY** "SAFETY INJ INITIATED" EK-1342 alarmed OR **PUSH** left and right INJECTION INITIATE pushbuttons on EC-13.

- PB1-1
- PB1-2

- b. **ENSURE** ALL available HPSI and LPSI pumps operating with the associated loop isolation valves open.

(continue)



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INSTRUCTIONS

9. (continued)



b. **VERIFY** Containment Area
Monitor alarms clear
and NO unexplained rise.

- RIA-1805
- RIA-1806
- RIA-1807
- RIA-1808



c. **VERIFY** Condenser Off Gas
Monitor RIA-0631 alarm clear
and NO unexplained rise.

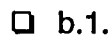


d. **VERIFY** Main Steam Line
Monitor alarms clear
and NO unexplained rise.

- RIA-2323
- RIA-2324



CONTINGENCY ACTIONS



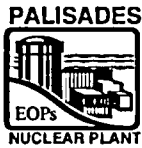
b.1. IF Containment radiation level is
greater than 1×10^1 R/hr on ANY
Containment Area Monitor,
THEN PERFORM BOTH of the
following:

1) **VERIFY** Containment Isolation
Signal initiated ("CIS INITIATED"
EK-1126 in alarm)
OR PUSH left and right HIGH
RADIATION INITIATE
pushbuttons on EC-13.

- CHRL-CS
- CHRR-CS

2) **CORROBORATE** Containment
Area Monitor readings by
comparing to Containment High
Range Monitor readings.

- RIA-2321
- RIA-2322



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INSTRUCTIONS

10. **DETERMINE** that Containment Atmosphere acceptance criteria are met:
- ☐ a. **VERIFY** Containment temperature less than 125°F.
 - ☐ b. **VERIFY** Containment pressure less than 0.85 psig.
 - PIA-1814
 - PIA-1815



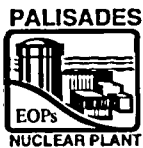
CONTINGENCY ACTIONS

- ☐ 10.1. **ENSURE** the Containment Air Coolers are in operation as follows:
- a. IF SIAS is NOT present, THEN ENSURE OPERATING ALL available Containment Air Cooler fans.
 - V-1A and V-1B
 - V-2A and V-2B
 - V-3A and V-3B
 - V-4A and V-4B
 - b. **OPEN** Containment Air Cooler high capacity outlet valves as Service Water System capacity permits:
 - CV-0867 ✱
 - CV-0861
 - CV-0864
 - CV-0873
- ☐ 10.2. IF Containment pressure is greater than or equal to 4.0 psig, THEN PERFORM ALL of the following:
- a. **ENSURE OPERATING ALL** available Containment Air Cooler 'A' fans.
 - V-1A
 - V-2A
 - V-3A
 - V-4A

(continue)

(continue)

✱ CV-0869 VHX-4 Inlet Valve will be closed if a SIAS has occurred



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INSTRUCTIONS

10.

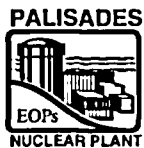
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CONTINGENCY ACTIONS

(continued)

- b. **ENSURE OPEN** ALL available Containment Spray Valves.
- c. **ENSURE ALL** available Containment Spray Pumps are operating.



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TITLE: STANDARD POST-TRIP ACTIONS



INSTRUCTIONS

11. **DETERMINE** that Vital Auxiliaries-Water acceptance criteria met by performing ALL of the following:



- a. **VERIFY** at least two Service Water Pumps operating.



- b. **VERIFY BOTH** Critical SW Headers in operation with pressures greater than 42 psig.



- c. **VERIFY OPERATING** at least one CCW Pump.



CONTINGENCY ACTIONS



- a.1. **START** available Service Water Pumps.



- b.1. **START** available Service Water Pumps.



- b.2. IF SW Header pressure is less than 42 psig, AND SIAS is NOT present, THEN PERFORM BOTH of the following:

1) **ENSURE CLOSED**

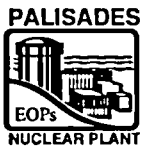
Containment Air Cooler high capacity valves as necessary to raise SW Header pressure greater than 42 psig.

- CV-0867
- CV-0861
- CV-0864
- CV-0873

- 2) IF SW Header pressure is less than 42 psig following the closing of containment Air Cooler high capacity valves, THEN ENSURE CLOSED Non-critical SW Isolation valve CV-1359.



- c.1. **START** available CCW Pumps.



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TITLE: STANDARD POST-TRIP ACTIONS

☒ INSTRUCTIONS

- ☐ 12. **DETERMINE** that Vital Auxiliaries-Air acceptance criteria met by verifying Instrument Air pressure greater than 85 psig.

☒ CONTINGENCY ACTIONS

- ☐ 12.1. **START** available Instrument Air Compressors as necessary.
- ☐ 12.2. IF Feedwater Purity Building Air supply is available,
THEN OPEN FWP Air Cross-tie Valve, CV-1221 as necessary.

End of Section 4.0



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5.0 OPERATOR ACTIONS

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| <input checked="" type="checkbox"/> <u>INSTRUCTIONS</u> | <input checked="" type="checkbox"/> <u>CONTINGENCY ACTIONS</u> |
|---------------------------------------------------------|----------------------------------------------------------------|

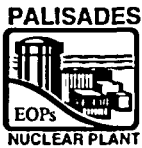
1. WHEN SIRWT level is less than or equal to 25%,
THEN:

- ☐ a. Prior to RAS, **PERFORM** Pre-RAS actions. Refer to EOP Supplement 42.
- ☐ b. IF RAS occurs,
THEN PERFORM Post-RAS actions. Refer to EOP Supplement 42.

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.

- ☐ 2. **ENSURE** CR HVAC is aligned for Emergency Mode Operation within 20 minutes of the time of the Reactor Trip by performing the following:
 - a. **ENSURE** at least one Air Filter Unit Fan associated with an operating train is ON:
 - V-26A
 - V-26B
 - b. **ENSURE OFF** the following fans:
 - V-94 Purge Fan
 - V-47 Switchgear Exhaust Fan



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5.0 OPERATOR ACTIONS

☒ INSTRUCTIONS

3. VERIFY BOTH of the following:

- ☐ a. At least one Condensate Pump operating.
- ☐ b. At least one Cooling Tower Pump operating.

- ☐ 4. IF an SIAS has initiated,
THEN PERFORM EOP
Supplement 5 "Checklist for
Safeguards Equipment Following
SIAS."

- ☐ 5. IF a CHP or CHR has initiated,
THEN PERFORM EOP
Supplement 6 "Checklist for
Containment Isolation and CCW
Restoration to Containment."

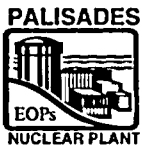
- ☐ 6. **COMMENCE** Emergency
Shutdown Checklist. Refer to
GOP-10, "Balance of Plant Actions
Following a Reactor Trip."

- ☐ 7. IF Reactor trip was due to
Equipment Fire,
THEN REFER TO ONP-25.1, "Fire
Which Threatens Safety Related
Equipment."

- ☐ 8. IF the MSIV AND MSIV bypass
valves are closed,
THEN ENSURE TRIPPED BOTH
Main Feed Pumps.

☒ CONTINGENCY ACTIONS

- ☐ 3.1. **CLOSE BOTH MSIVs.**
 - CV-0510
 - CV-0501



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5.0 OPERATOR ACTIONS

☒ INSTRUCTIONS ☒ CONTINGENCY ACTIONS

- ☐ 9. IF ALL of the following conditions exist:

- ALL safety function acceptance criteria met
- No contingency action was taken
- Control Room is habitable,

THEN GO TO EOP-2.0, "Reactor Trip Recovery."

- ☐ 10. IF ANY of the following conditions exist:

- ANY safety function acceptance criteria NOT met
- ANY contingency action was taken
- Control Room is NOT habitable,

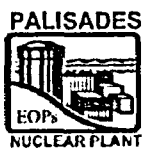
THEN REFER TO Attachment 1, "Event Diagnostic Flow Chart" AND **DIAGNOSE** the event.

End of Section 5.0

ATTACHMENT 2

EOP-4, "LOSS OF COOLANT ACCIDENT RECOVERY"

110 Pages Follow (Procedure Attachments not included)

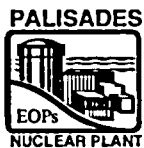


PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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| Issued Date | 1/6/05 |

LOSS OF COOLANT ACCIDENT RECOVERY

| | |
|--------------------|-------------------|
| <u>RLTucker</u> | <u>/ 1/5/05</u> |
| Procedure Sponsor | Date |
| <u>GGShaffer</u> | <u>/ 10/22/04</u> |
| Technical Reviewer | Date |
| <u>DCampbell</u> | <u>/ 10/26/04</u> |
| User Reviewer | Date |



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TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

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 operator actions which must be accomplished in the event of a Loss of Coolant Accident (LOCA) when the Shutdown Cooling System is NOT initially in service. These actions are necessary to ensure that the Plant is placed in a stable condition. The goals of this procedure are to mitigate the effects of a LOCA, isolate the break (if possible), and to establish long term cooling using the Safety Injection System or the Shutdown Cooling System. This procedure achieves these goals while maintaining adequate core cooling and minimizing radiological releases to the environment.

End of Section 1.0



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TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

2.0 ENTRY CONDITIONS

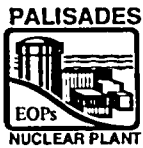
1. EOP-1.0, "Standard Post Trip Actions," has been performed.

OR

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

2. Plant conditions indicate that a LOCA has occurred as indicated by ANY of the following:
 - a. Abnormal Pressurizer level change (low or high)
 - b. Pressurizer pressure low for existing plant conditions
 - c. SIAS automatically activated
 - d. Standby Charging Pumps start
 - e. CHP or CHR alarms
 - f. Containment pressure, temperature or humidity high
 - g. Containment Sump level rising
 - h. Quench Tank level, temperature, or pressure high
 - i. Volume Control Tank level dropping

End of Section 2.0



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TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

3.0 EXIT CONDITIONS

1. The diagnosis of a LOCA is NOT confirmed.

OR

2. ANY of the Safety Function Status Check Sheet acceptance criteria are NOT satisfied
AND corrective actions to restore the safety function are NOT effective.

OR

3. The Loss of Coolant Accident Recovery procedure has accomplished its purpose by satisfying ALL of the following:

- a. ALL Safety Function Status Check Sheet acceptance criteria are being satisfied

- b. Shutdown Cooling entry conditions are satisfied

OR

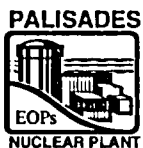
The break has been isolated

OR

The PCS is in long term cooling

- c. An appropriate approved plant procedure can be implemented

End of Section 3.0



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4.0 OPERATOR ACTIONS

INSTRUCTIONS

CONTINGENCY ACTIONS

CAUTION

During degraded Containment conditions, the operator should not rely on any single instrument indication due to large instrument errors. Alternate/additional instrumentation should be used to confirm trending of PCS conditions.

© 1. **CONFIRM** proper event diagnosis by performing ALL of the following:

a. **VERIFY** Attachment 1, "Safety Function Status Check Sheet" acceptance criteria:

- 1) Are satisfied at intervals of approximately fifteen minutes.

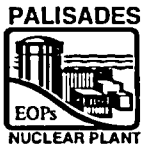
OR

- 2) Corrective actions to restore Attachment 1, "Safety Function Status Check Sheet," acceptance criteria are effective.

1.1. **GO TO ONE** of the following:

- EOP-1.0, "Standard Post Trip Actions," Attachment 1, "Event Diagnostic Flowchart" **AND** **RE-DIAGNOSE** the event.
- For events initiated from a lower mode, **GO TO** the EOP considered appropriate by the Shift Supervisor.
- EOP-9.0, "Functional Recovery Procedure."

(continue)



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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INSTRUCTIONS

CONTINGENCY ACTIONS

1. (continued)

b. 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.

c. Observation of NO abnormal S/G level rise (NOT attributable to feed flow or swell).

© 2. **REFER TO** the Site Emergency Plan AND **CLASSIFY** the event per EI-1, "Activation of the Site Emergency Plan/Emergency Classification."

3. **OPEN** the placekeeper AND **RECORD** the time of EOP entry.

4. IF PZR pressure is less than or equal to 1605 psia OR Containment pressure is greater than or equal to 4.0 psig, THEN **VERIFY** "SAFETY INJ INITIATED" (EK-1342) is alarmed.

4.1. **PUSH BOTH** left and right INJECTION INITIATE pushbuttons on EC-13.

- PB1-1
- PB1-2

© = Continuously applicable step

☞ = Hold Point



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

INSTRUCTIONS

5. IF SIAS is present,
THEN PERFORM ALL of the
following:
- a. **ENSURE** available safeguards
equipment operated or
operating. Refer to EOP
Supplement 5.
- b. **VERIFY** at least minimum SI
flow. Refer to EOP Supplement
4.
- c. IF Letdown Orifice Stop Valves
are closed,
THEN PLACE handswitches in
the CLOSE position:
- HS-2003
 - HS-2004
 - HS-2005

CONTINGENCY ACTIONS

- b.1. IF SI flow is NOT within the limits of
EOP Supplement 4,
THEN PERFORM ANY of the
following to restore SI flow:
- 1) **ENSURE** electrical power
available to SI pumps and
valves.
 - 2) **ENSURE** correct SI valve
lineup.
 - 3) **ENSURE** adequate SI pump
seal cooling.
 - 4) **START** additional SI pumps as
needed until SI flow is within the
limits of EOP Supplement 4.



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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INSTRUCTIONS

CONTINGENCY ACTIONS

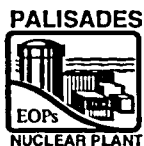
NOTE: P-50A and P-50B shall not be operated simultaneously when T_c is less than 300°F.

6. 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.
7. WHEN PCS temperature lowers,
THEN **ENSURE** PCPs configured as follows:

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

8. IF PCPs are operating,
THEN **VERIFY** PCP operating limits are satisfied. Refer to EOP Supplement 1.

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



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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INSTRUCTIONS

CONTINGENCY ACTIONS

9. IF open,
THEN CLOSE CWRTs Vent
Valves:

- CV-1064
- CV-1065

10. **ISOLATE** the LOCA by performing
ALL of the following:

- a. IF PZR pressure is less than
2100 psia,
THEN **VERIFY** BOTH PORVs
are closed.

- a.1. **CLOSE** the PORV block valves:

- MO-1042A
- MO-1043A

- b. **ENSURE CLOSED** Letdown
Stop Valves:

- CV-2001
- CV-2009

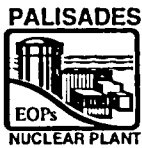
- c. **ENSURE CLOSED** PCS
Sample Isolation Valves:

- CV-1910
- CV-1911

- d. **ENSURE CLOSED** Reactor
Vessel and PZR Vent Valves on
C-11A:

- PRV-1067
- PRV-1068
- PRV-1069
- PRV-1070

(continue)



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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INSTRUCTIONS

CONTINGENCY ACTIONS

10. (continued)

e. **VERIFY BOTH** of the following conditions exist:

- CCW Radiation Monitor, RIA-0915, alarm clear
- "COMPONENT CLG SURGE TANK T-3 HI-LO LEVEL" (EK-1172) is clear

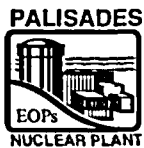
e.1. **IF** PCS to CCW leak is evident, **THEN** **PERFORM ALL** of the following:

- 1) **LOCATE** the leak. Refer to ONP-23.1, "Primary Coolant Leak."
- 2) **ISOLATE** the leak. Refer to ONP-23.1, "Primary Coolant Leak."
- 3) **IF** CCW was isolated to any operating PCP, **THEN** **SECURE** the affected PCP(s).

f. **VERIFY** PZR Relief Valve(s) NOT lifting by the following:

- Observation of Acoustic Monitor Panel indications on C-11A
- PZR Relief Valve Discharge Temperature indicators on C-12
- Observation of Quench Tank temperature, pressure and level

f.1. **REDUCE** PCS pressure to less than 1800 psia.



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11. IF LOCA is outside of containment as indicated by ANY of the following:

- Abnormal rise in Auxiliary Building Area Monitors.
- Abnormal rise in East or West ESS Room Sump levels.
- Abnormal rise in Dirty Waste Drain Tanks level

THEN PERFORM ALL of the following:

- a. LOCATE AND ISOLATE the leak.
- b. ENSURE applicable areas of the Auxiliary Building are isolated by performing the following:
 - 1) IF any of the following alarms have annunciated,
 - EK-1364, Gaseous Waste Monitoring Hi Radiation
 - EK-1366, Plant Area Monitoring Hi Radiation

CONTINGENCY ACTIONS

(continue)



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CONTINGENCY ACTIONS

11. (continued)

THEN REFER TO ARP-8,
"Safeguards Safety Injection
and Isolation Scheme EK-13
(EC-13)" AND PERFORM
Corrective Actions for any
alarming monitors listed.

2) **NOTIFY** plant personnel to
stay clear of the affected
areas of the Auxiliary
Building.

c. **INITIATE** actions to makeup to
the SIRWT. Refer to one of the
following:

- SOP-2A, "Chemical &
Volume Control System
Charging & Letdown"
- SOP-17A, "Clean
Radioactive Waste System"

d. **MANUALLY INITIATE** CIS by
pushing left or right HIGH
RADIATION INITIATE
pushbuttons on EC-13
AND PERFORM EOP
Supplement 6.

- CHRL-CS
- CHRR-CS

e. **NOTIFY** the TSC.



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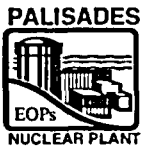
12. **PLACE** at least one Hydrogen Monitor in operation, ensuring the appropriate Key Switch in the "ACCI" position. Refer to SOP-38, "Gaseous Process Monitoring System."
13. **IF ANY** of the following conditions exist:
 - Containment pressure is greater than or equal to 4.0 psig
 - Any operable Containment Radiation Monitor rises to 1×10^1 R/hr,

THEN PERFORM ALL of the following:

- a. **VERIFY** "CIS INITIATED" (EK-1126) is alarmed.
- b. **VERIFY** Containment Isolation. Refer to EOP Supplement 6.

CONTINGENCY ACTIONS

- a.1. **MANUALLY INITIATE** CIS by pushing left or right HIGH RADIATION INITIATE pushbutton on EC-13.
 - CHRL-CS
 - CHRR-CS
- b.1. **CLOSE** valves that failed to automatically operate.



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14. IF Containment pressure is greater than or equal to 4.0 psig, THEN PERFORM ALL of the following:

- a. **VERIFY** Containment Spray alignment
AND at least minimal acceptable spray flow per following table:

| NUMBER OF RUNNING CS PUMPS | NUMBER OF OPEN CS VALVES | CS FLOW MUST BE AT LEAST: |
|----------------------------|--------------------------|---------------------------|
| RAS NOT Present | | |
| 1 | at least 1 | 2185 gpm total |
| 2 or 3 | 2 | 2939 gpm total |
| RAS Present | | |
| 1 | 1 | 1525 gpm |
| 2 or 3 | 2 | 3100 gpm total |

- b. **ENSURE** at least one Containment Air Cooler Accident Fan operating.

- V-1A
- V-2A
- V-3A
- V-4A

CONTINGENCY ACTIONS

- a.1. **OPEN** available Containment Spray valves to obtain required configuration and at least minimum flow.

- CV-3001
- CV-3002

AND

START available Containment Spray pumps

- P-54A
- P-54B
- P-54C



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CONTINGENCY ACTIONS

CAUTION

Operation of PCPs should be minimized when seal cooling is NOT present or controlled bleedoff is isolated.

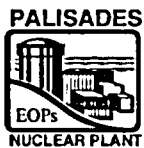
15. IF PCP seal cooling is unavailable,
THEN PERFORM ALL of the
following:

a. **CLOSE** PCP Controlled
Bleedoff valves:

- CV-2083
- CV-2099

b. **CLOSE** PCP Controlled
Bleedoff Relief Stop, CV-2191.

c. **RESTORE** PCP seal cooling.
Refer to ONP-6.2, "Loss of
Component Cooling."



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CONTINGENCY ACTIONS

CAUTION

Continued operation of the sprays after pressure has been reduced to an acceptable level increases the possibility of wetting electrical connectors (which may result in electrical grounds, shorts and other malfunctions) and containment sump screen clogging.

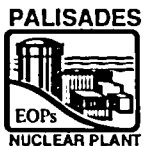
- © 16. IF the Containment Spray System is operating,
AND ALL of the following conditions are satisfied:

| Parameter | Condition |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Containment pressure | less than 3 psig |
| Containment Spray operation | NOT required for CTMT ambient cooling |
| | NOT required for HPSI subcooling |
| | NOTE: These conditions must be met prior to securing the last Containment Spray pump. |
| | NOT needed for iodine removal as determined by Chemistry <u>OR ALL</u> of the following: <ul style="list-style-type: none">• Containment high range Gamma monitors read less than 1800 R/Hr• Containment isolated per EOP Supplement 6• less than one hour has elapsed since reactor trip |

(Continue)

© = Continuously applicable step

⌛ = Hold Point



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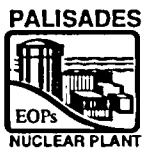
16. (Continued)

THEN STOP spray pumps one at a time, waiting to see the effect of reduced spray flow as follows:

- a. IF three Containment Spray Pumps are operating,
THEN STOP one Containment Spray Pump as directed by the CRS.
- b. IF Containment pressure is less than 3 psig,
AND two Containment Spray Pumps are operating,
THEN PERFORM the following as directed by the CRS:
 - 1) **CLOSE** one Containment Spray Valve as follows:
 - a) **PLACE** one CHP Bypass Switch to BYPASS:
 - HS-3001C, CV-3001 (Key: 397)
 - HS-3002C, CV-3002 (Key : 396)
 - b) **ENSURE CLOSED** associated Containment Spray Valve:
 - CV-3001
 - CV-3002

(Continue)

- a.1. IF Containment Pressure rises to 3 to 4 psig
AND two Containment Spray Pumps operating,
THEN START Containment Spray Pump.
- b.1. IF Containment Pressure rises to 3 to 4 psig
AND one Containment Spray Pump operating,
THEN
 - 1) **START** Containment Spray Pump.
 - 2) **OPEN** Containment Spray Valve.



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INSTRUCTIONS

CONTINGENCY ACTIONS

16. (Continued)

2) **STOP** one Containment
Spray Pump.

c. IF Containment pressure is less
than 3 psig AND one
Containment Spray Pump is
operating,
THEN STOP the Containment
Spray Pump as directed by the
CRS.

c.1. IF Containment Pressure rises to 3
to 4 psig AND no Containment
Spray Pump operating, THEN

1) Ensure one Containment
Spray Valve open.

2) **START** Containment Spray
Pump.

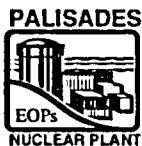
d. WHEN ALL Containment Spray
Pumps have been stopped,
THEN ENSURE CLOSED
BOTH Containment Spray
Valves.

1) **ENSURE BOTH** CHP
Bypass Switches in
BYPASS:

- HS-3001C, CV-3001
Bypass (Key: 397)
- HS-3002C, CV-3002
Bypass (Key: 396)

2) **ENSURE CLOSED BOTH**
Conatinment Spray Valves:

- CV-3001
- CV-3002



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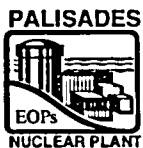
INSTRUCTIONS

CONTINGENCY ACTIONS

17. WHEN all Containment Spray Pumps have been stopped, THEN PERFORM ALL of the following:
- a. IF MFW or Condensate pumps are operating AND feedwater from these sources is NOT desired, THEN PLACE ALL of the following controllers in MANUAL AND CLOSE:
- 1) Feedwater Regulating Valves
 - LIC-0701 ('A' S/G)
 - LIC-0703 ('B' S/G)
 - 2) Feedwater Regulating Bypass Valves
 - LIC-0735 ('A' S/G)
 - LIC-0734 ('B' S/G)
- b. IF CCW to containment has NOT been restored, THEN PLACE the following CCW valve keyswitches to CLOSE:

| CCW Valve | Keyswitch | Key |
|-----------|-----------|-----|
| CV-0910 | HS-0910 | 337 |
| CV-0911 | HS-0911 | 338 |
| CV-0940 | HS-0940 | 336 |

(Continue)



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CONTINGENCY ACTIONS

17. (Continued)

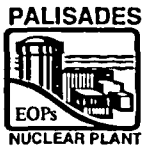
NOTE: Automatic reinitiation of spray will not occur until after SIAS has been reset.

- c. **RESET** CHP circuits by pushing left and right HIGH PRESSURE RESET pushbuttons on C-13

- CHPL - Reset
- CHPR - Reset

- d. WHEN CHP has been reset, THEN ENSURE both Containment Spray Valve CHP Bypass Keyswitches are in NORMAL:

- HS-3001C
- HS-3002C



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18. **VERIFY BOTH** of the following:

- At least one Cooling Tower Pump operating
 - P-39A
 - P-39B
- At least one Condensate Pump operating
 - P-2A
 - P-2B

CONTINGENCY ACTIONS

18.1. **ENSURE CLOSED BOTH MSIVs:**

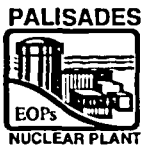
- CV-0510 ('A' S/G)
- CV-0501 ('B' S/G)

18.2. **ENSURE CLOSED** from the Control Room BOTH MSIV Bypass valves:

- MO-0510 ('A' S/G)
- MO-0501 ('B' S/G)
- a. IF ANY MSIV Bypass valves were open when power/position indication was lost, THEN LOCALLY CLOSE ANY open MSIV Bypass valve.
- b. **ENSURE CLOSED** ALL S/G Blowdown Valves:

| 'A' S/G | 'B' S/G |
|---------|---------|
| CV-0739 | CV-0738 |
| CV-0771 | CV-0770 |
| CV-0767 | CV-0768 |

19. IF the LOCA is isolated, THEN GO TO Step 64.



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CONTINGENCY ACTIONS

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.

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

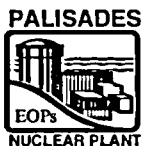
NOTE: IF emergency boration is in progress, THEN cooldown may commence/continue while the required shutdown margin value is calculated.

- © 21. **VERIFY** PCS boron concentration greater than or equal to required boron concentration as verified by sample or hand calculation. Refer to EOP Supplement 35.

- a. IF Emergency boration is in progress
AND PCS boron concentration is greater than or equal to required boron concentration,
THEN SECURE emergency boration. Refer to EOP Supplement 40.

- 21.1. IF PCS boron concentration is less than required boron concentration, THEN PERFORM BOTH of the following:

- a. **ENSURE** emergency boration is in progress.
- b. WHEN required boron concentration is reached, THEN SECURE emergency boration. Refer to EOP Supplement 40.



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CAUTION

A maximum PZR cooldown rate of 200°F/Hr and a maximum PZR Spray ΔT (PZR vapor temp - spray temp) of 350°F should be observed to prevent damage to the PZR or Spray Nozzle.

NOTE: PZR level indication decalibration will occur during cooldown. Correction curves in EOP Supplement 9, "Pressurizer Level Corrections Hot Calibrated" or EOP Supplement 10, "Pressurizer Level Corrections Cold Calibrated" should be used.

NOTE: S/G level indication decalibration will occur during cooldown. Correction curves in EOP Supplement 11, "S/G Level Correction" should be used.

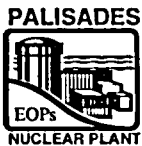
NOTE: Steam flow through two of the four Atmospheric Steam Dump Valves should be adequate to establish an initial cooldown rate of 75°F/hr.

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

(continue)

© = Continuously applicable step

⌄ = Hold Point



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CONTINGENCY ACTIONS

22. (continued)

22. **COMMENCE** steaming S/Gs as follows:

a. **REFER TO** the following:

- EOP Supplement 1, Pressure and Temperature Limit Curves
- EOP Supplement 33, PCS Heatup/Cooldown Rate Data

b. IF safety injection flow is causing a cooldown in excess of required limits, THEN **OPERATE** the Turbine Bypass Valve to maintain all of the following as applicable:

- S/Gs within 50 psi of Psat for Average of Qualified CETs
- As required to establish or support natural circulation
- As required to establish or support two phase natural circulation

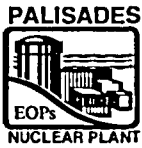
b.1. **OPERATE** Atmospheric Steam Dump Valves.

1) IF desired to enhance temperature control, THEN **ISOLATE** two Atmospheric Steam Dump Valves. Refer to Table 22-1.

(Continue)

© = Continuously applicable step

⌚ = Hold Point



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22. (Continued)

- c. WHEN PCS cooldown rate can be controlled within required limits, THEN OPERATE the Turbine Bypass Valve to cooldown at the maximum allowed rate.

CONTINGENCY ACTIONS

- c.1. **OPERATE** Atmospheric Steam Dump Valves.
- 1) IF desired to enhance temperature control, THEN ISOLATE two Atmospheric Steam Dump Valves. Refer to Table 22-1.

Table 22-1

| | |
|---------|-----------------------------------------------------------------------|
| 'A' S/G | MV-MS101, ASDV CV-0782 Inlet <u>OR</u> MV-CA782, A/S to CV-0782 |
| | MV-MS103, ASDV CV-0781 Inlet <u>OR</u> MV-CA781, A/S to CV-0781 |
| 'B' S/G | MV-MS102, ASDV CV-0779 Inlet <u>OR</u> MV-CA779, A/S to CV-0779 |
| | MV-MS104, ASDV CV-0780 Inlet <u>OR</u> MV-CA780, A/S to CV-0780 |

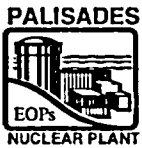
CAUTION

Operating P-50A and P-50B simultaneously when T_c is less than 300°F is prohibited by Technical Specifications.

- d. **ENSURE** not more than two PCPs operating (preferably one in each loop.)

© = Continuously applicable step

⌚ = Hold Point



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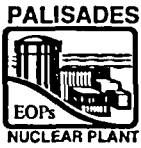
CONTINGENCY ACTIONS

23. IF BOTH of the following conditions exist for each S/G:

- At least three of four S/G pressure sigmas indicate between 510 and 550 psia (indicators between alarm flags)
- A controlled cooldown is in progress

THEN **BLOCK** MSIS for the S/G meeting the above conditions by performing ALL the following:

- a. **BLOCK** MSIV closure signal for the applicable S/G by pushing the appropriate pushbutton on Control Panel C-01:
 - HS/LPE-50A ('A' S/G)
 - HS/LPE-50B ('B' S/G)
- b. **VERIFY** "STEAM GEN VALVES ISOLATION LOCKOUT" (EK-0970) is alarmed.
- c. **ENSURE CLOSED** BOTH Main Feed Reg Valves:
 - CV-0701 ('A' S/G)
 - CV-0703 ('B' S/G)
- d. **ENSURE CLOSED** BOTH Bypass Feed Reg Valves:
 - CV-0735 ('A' S/G)
 - CV-0734 ('B' S/G)



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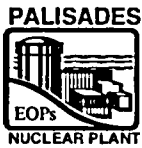
INSTRUCTIONS

CONTINGENCY ACTIONS

NOTE: Use the following instruments to determine spray nozzle ΔT :

- PZR Vapor Phase Temperature, TI-0101
- Spray line temperature, TIA-0103 or TIA-0104 (use the lowest temperature if using main sprays)
- Charging line temperature, TI-0212 (if using Auxiliary Spray)

© 24. **RECORD** each occurrence of PZR Spray operation with a ΔT (PZR vapor phase temp minus spray temp) greater than 200°F in the Narrative Log.



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NOTE: Use ANY of the following to determine Average of Qualified CETs:

- PPC point "KCETA"
(Average of Qualified CETs)
- PPC Incore Qualified CET
Map (PPC page 313)
- Manual calculation. Refer to
SOP-34, "Plant Process
Computer (PPC) System."

© 25. **VERIFY** SI Pump throttling criteria are satisfied by ALL of the following:

- a. Based on the Average of Qualified CETs, PCS subcooling meets ONE of the following:
 - At least 25°F subcooled for non-degraded Containment conditions
 - Greater than the minimum subcooling curve on EOP Supplement 1 for degraded Containment conditions
- b. Corrected PZR level is greater than 20% (40% for degraded Containment) and controlled. **REFER TO** EOP Supplements 9 and 10.

(continue)

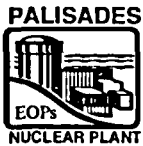
CONTINGENCY ACTIONS

25.1. IF ANY of the SI Pump throttling criteria can NOT be maintained, **THEN RAISE** HPSI flow **AND** **START** HPSI Pumps as necessary.

| PUMP | VALVE | |
|---------|---------|-------------------------|
| | NUMBER | DESCRIPTION |
| Train 1 | | |
| P-66B | MO-3009 | HPSI Train 1 to Loop 1B |
| | MO-3011 | HPSI Train 1 to Loop 2A |
| | MO-3007 | HPSI Train 1 to Loop 1A |
| | MO-3013 | HPSI Train 1 to Loop 2B |
| Train 2 | | |
| P-66A | MO-3066 | HPSI Train 2 to Loop 1B |
| | MO-3064 | HPSI Train 2 to Loop 2A |
| | MO-3068 | HPSI Train 2 to Loop 1A |
| | MO-3062 | HPSI Train 2 to Loop 2B |

© = Continuously applicable step

☞ = Hold Point



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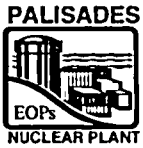
CONTINGENCY ACTIONS

25. (continued)

- c. At least one S/G is available for PCS heat removal with corrected level being maintained or being restored to between 60% and 70%.
REFER TO EOP Supplement 11.
- d. Operable RVLMS channels indicate greater than 102 inches above the bottom of fuel alignment plate (621' 8").

NOTE: Reactor Vessel Upper Head voiding resulting from controlled PCS pressure reductions is not expected to result in safety functions being jeopardized.

- © 26. **COMMENCE** depressurization of the PCS to 270 psia by performing ANY of the following:
 - a. **OPERATE** PZR heaters and Main or Auxiliary PZR sprays.
 - b. IF SI Pump throttling criteria are met,
THEN PERFORM ANY of the following:
 - 1) **CONTROL** Charging and Letdown.
 - 2) **THROTTLE** HPSI flow.



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27. IF ALL of the following conditions exist:

- PZR pressure is less than 1687 psia
- SIAS is NOT actuated or blocked
- "Safety Injection Signal Block Permit" (EK-1369) is alarmed
- A controlled cooldown and/or controlled depressurization is in progress,

THEN **BLOCK** SIAS by performing ALL of the following:

a. **PLACE AND HOLD** SIAS block handswitch PB3-1 to **BLOCK**.

1) **VERIFY** the following annunciator in alarm:

- "SAFETY INJ BLOCK RELAY SI-1" (EK-1337)

2) **RELEASE** SIAS block handswitch PB3-1.

(continue)



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CONTINGENCY ACTIONS

27. (continued)

b. **PLACE AND HOLD** SIAS block
handswitch PB3-2 to BLOCK.

1) **VERIFY** the following
annunciators in alarm:

- "SAFETY INJ BLOCK
RELAY SI-2" (EK-1338)
- "SAFETY INJ
BLOCKED" (EK-1339)

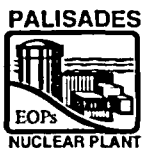
2) **RELEASE** SIAS block
handswitch PB3-2.

28. **IF** HPSI Pumps are operating
AND SI Pump throttling criteria are
satisfied,
THEN THROTTLE HPSI flow
OR STOP one HPSI Pump at a
time.

| PUMP | VALVE | |
|---------|---------|-------------------------|
| | NUMBER | DESCRIPTION |
| Train 1 | | |
| P-66B | MO-3009 | HPSI Train 1 to Loop 1B |
| | MO-3011 | HPSI Train 1 to Loop 2A |
| | MO-3007 | HPSI Train 1 to Loop 1A |
| | MO-3013 | HPSI Train 1 to Loop 2B |
| Train 2 | | |
| P-66A | MO-3066 | HPSI Train 2 to Loop 1B |
| | MO-3064 | HPSI Train 2 to Loop 2A |
| | MO-3068 | HPSI Train 2 to Loop 1A |
| | MO-3062 | HPSI Train 2 to Loop 2B |

© = Continuously applicable step

⌚ = Hold Point



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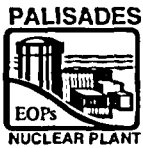
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CONTINGENCY ACTIONS

29. IF LPSI Pumps are operating
AND PZR pressure is being
controlled greater than 200 psia,
THEN **PERFORM BOTH** of the
following:
- a. **STOP** the operating LPSI
Pumps:
 - P-67A
 - P-67B
 - b. **CLOSE** the LPSI injection
valves:
 - MO-3008 LPSI Loop 1A
 - MO-3010 LPSI Loop 1B
 - MO-3012 LPSI Loop 2A
 - MO-3014 LPSI Loop 2B
30. IF PZR pressure lowers to less
than 200 psia
AND LPSI pumps have been
stopped,
THEN **PERFORM BOTH** of the
following:
- a. **ENSURE OPERATING ALL**
available LPSI pumps:
 - P-67A
 - P-67B
 - b. **ENSURE OPEN** LPSI injection
valves:
 - MO-3008 LPSI Loop 1A
 - MO-3010 LPSI Loop 1B
 - MO-3012 LPSI Loop 2A
 - MO-3014 LPSI Loop 2B



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- © 31. As resources permit, **INITIATE** preparations for either of the following:
- a. Post-RAS injection from Spent Fuel Pool. Refer to EOP Supplement 44.
 - b. Refill of SIRW Post-RAS. Refer to EOP Supplement 43.
32. IF Letdown is isolated AND BOTH of the following conditions exist:
- SI Pump throttling criteria are met
 - Letdown is needed or desired,
- THEN RESTORE Letdown. Refer to EOP Supplement 27.



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NOTE: PZR level instrument de-calibration occurs due to PCS pressure and containment temperature changes. Level correction is per EOP Supplements 9 and 10.

NOTE: IF the PCS is in a water solid condition for PCS Pressure Control, THEN the PZR level limit of 85% may be exceeded.

NOTE: PZR level should be maintained greater than 36% (40% for degraded Containment) to have continued availability of PZR Heaters.

33. IF SI Pump throttling criteria are met, THEN MAINTAIN corrected PZR level between 20% and 85% (42% to 57% preferred) by performing ANY of the following:

- a. **THROTTLE** HPSI flow.
- b. **CONTROL** Charging and Letdown.

(continue)



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33. (continued)

- 1) **ENSURE** normal charging path aligned as follows:
 - a) **OPEN** Charging Line Stop Valve, CV-2111.
 - b) **OPEN** at least one Charging Stop Valve:
 - CV-2113
 - CV-2115
 - c) IF BOTH Charging Stop Valves fail to open THEN **ENSURE** greater than 33 gpm flow through CK-CVC2112.

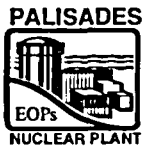
(continue)

CONTINGENCY ACTIONS

NOTE: IF an interruption in boration via Charging Pump to HPSI Train 2 occurs, THEN a different SI cold leg injection nozzle should be used when restoring flow.

- 1.1) IF the normal charging path is NOT available AND HPSI Train 2 is available, THEN **CHARGE** to the PCS via the HPSI header by performing ALL of the following:
 - 1) **STOP** ALL Charging Pumps.
 - 2) **CLOSE** Charging Line Stop Valve, CV-2111.
 - 3) **CLOSE** Letdown Orifice Stop Valves:
 - CV-2003
 - CV-2004
 - CV-2005
 - 4) **CLOSE** Letdown Containment Isolation Valve CV-2009.
 - 5) **ENSURE CLOSED** HPSI Pump B Discharge to Train 2, CV-3018.

(continue)



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33. (continued)

CONTINGENCY ACTIONS

(continued)

6) **OPEN** ONE HPSI Train 2
Injection Valve:

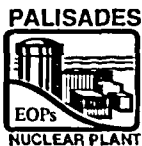
- MO-3062
- MO-3064
- MO-3066
- MO-3068

7) **PLACE** SIT Pressure Indicating
Controller associated with valve
opened above to **MANUAL AND**
CLOSE:

- PIC-0338, MO-3062
- PIC-0347, MO-3064
- PIC-0346, MO-3066
- PIC-0342, MO-3068

8) **OPEN** Charging Pump
Discharge to Train 2, MO-3072.

9) **START** Charging pumps as
necessary to control PZR level.



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- © 34. **MAINTAIN** PCS pressure within the limits of EOP Supplement 1 by performing ANY of the following:

a. **CONTROL** the following:

- PZR heaters
- Main Spray
- Auxiliary Spray (Supplement 37)

- b. IF SI Pump throttling criteria are met,
THEN CONTROL HPSI, Charging, and Letdown flows.

CONTINGENCY ACTIONS

- 34.1. IF the PCS is oversubcooled OR PZR pressure is greater than the maximum limits of EOP Supplement 1,
THEN PERFORM ANY of the following to restore subcooling or PCS pressure to within the appropriate limit:

- a. **OPERATE** available S/G(s) to stop the cooldown
AND STABILIZE Qualified CET temperatures and Loop T_{cs} .

- b. **OPERATE** the following to lower PZR pressure within allowable limits:

- Main Spray
- Auxiliary Spray (Supplement 37)

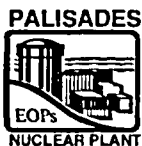
- c. IF SI Pump throttling criteria are met,
THEN CONTROL HPSI, Charging, and Letdown flows.

- 34.2. IF PCS cooldown rate exceeds Technical Specification limits,
THEN PERFORM ANY of the following to restore the cooldown rate to within Technical Specification limits:

- a. **OPERATE** available S/G(s) to stop the cooldown
AND STABILIZE Qualified CET temperatures and Loop T_{cs} .

(continue)

(continue)



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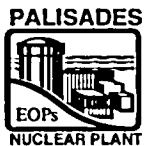
34. (continued)

- © 35. **ENSURE** at least one S/G has corrected level being maintained or being restored to between 60% and 70%. Refer to EOP Supplement 11.

CONTINGENCY ACTIONS

(continued)

- b. **OPERATE** the following to maintain PZR pressure within limits of EOP Supplement 1:
- PZR heaters
 - Main Spray
 - Auxiliary Spray (Supplement 37)
 - Letdown
- c. As directed by the Shift Supervisor, **CONTINUE** the PCS cooldown at less than or equal to Technical Specification limits. Refer to EOP Supplement 33.



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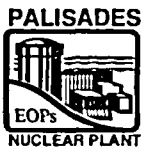
© 36. **PERFORM ALL** of the following:

a. **CALCULATE** minimum PCS
cooldown rate. Refer to
EOP Supplement 2.

b. **VERIFY BOTH** of the following:

- The calculated cooldown
rate does NOT exceed
Technical Specification
limits.
- The calculated cooldown
rate is achievable with the
existing PCS heat removal
path.

b.1. IF additional sources of inventory
which allow the requirements to be
met are NOT available,
THEN GO TO EOP-9.0,
"Functional Recovery Procedure."



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CONTINGENCY ACTIONS

© 37. **MONITOR** for formation of PCS voiding as indicated by ANY of the following:

- Indicated Charging and Letdown flows do NOT correspond to PZR level trend.
- PZR level rising significantly faster than trend expected from Auxiliary Spray flow.
- Core ΔT (Average of Qualified CETs - T_C) or Loop ΔT ($T_H - T_C$) rising for same secondary steaming and Auxiliary Feed rates.
- Any operable PCS temperature indication is less than 25°F subcooled.
- Operable RVLMS indicates voiding in the Reactor Vessel.

38. IF PCS voiding is indicated
AND ANY of the following exist:

- PCS pressure reduction is inhibited
- PCS heat removal is inhibited
- The Shift Supervisor directs void elimination,

THEN PERFORM void elimination actions. Refer to EOP Supplement 26.

© = Continuously applicable step

☞ = Hold Point



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39. IF ANY of the following AC or DC buses are NOT energized, THEN RESTORE power to the affected buses. Refer to the following applicable procedure:

| BUS | PROCEDURE |
|-----------------|-------------------------------------------|
| 1C or 1D | EOP Supplement 29 |
| 1E with No SIAS | EOP Supplement 29 |
| 1E with SIAS | SOP-30 |
| Y10 | ONP-24.1, "Loss of Preferred AC Bus Y10" |
| Y20 | ONP-24.2, "Loss of Preferred AC Bus Y20" |
| Y30 | ONP-24.3, "Loss of Preferred AC Bus Y30" |
| Y40 | ONP-24.4, "Loss of Preferred AC Bus Y40" |
| Y01 | ONP-24.5, "Loss of Instrument AC Bus Y01" |
| Any DC Bus | ONP-2.3, "Loss of DC Power" |

CONTINGENCY ACTIONS

- 39.1. IF Bus 1D and Bus 1E are NOT energized, THEN as resources permit, **PROVIDE** power to PZR Heaters from Bus 1C. Refer to ONP-2.1, "Loss of AC Power," Attachment 1.



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CONTINGENCY ACTIONS

40. IF offsite power was lost
AND offsite power is available,
THEN RESTORE power to plant
equipment by performing ALL of
the following:

a. IF NONE of the following are
energized:

- 'R' Bus
- 'F' Bus
- Cook 1 Line,

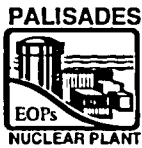
THEN INITIATE actions to
restore power to 'F' or 'R' Bus,
as available. Refer to EOP
Supplement 21.

b. WHEN ANY of the following are
energized:

- 'R' Bus
- 'F' Bus
- Cook 1 Line,

THEN INITIATE actions to
restore Plant power. Refer to
EOP Supplement 29.

(continue)



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CONTINGENCY ACTIONS

40. (continued)

- c. **RESTORE** power to the affected bus(es). Refer to the following applicable procedure:

| BUS | PROCEDURE |
|---------------------|-----------------------------|
| 1E (without SIS) | EOP Supplement 29 |
| 1E (with SIS) | SOP-30 |
| 1A or 1B | ONP-2.1, "Loss of AC Power" |

- d. **RESTART** plant equipment as desired.



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CAUTION

Each D/G is limited to the following load rating:

- 2500 KW continuous
- 2750 KW two hours per 24 hour period

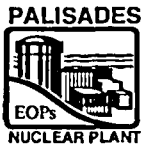
41. WHEN 2400V Bus 1C or Bus 1D is energized,
THEN as resources permit,
ENERGIZE Plant buses by
performing ALL of the following:

a. IF Bus 1C is energized,
THEN PERFORM ALL of the
following:

- 1) **ENSURE CLOSED** the
following breakers:
 - 152-115 (Bus 1C to
Transformers 11 and 19)
 - 152-108 (Bus 1C to
Transformer 13)

41.1. IF equipment needed to maintain
Safety Functions is available from
a de-energized 2400V Vital Bus
AND a power supply is available,
THEN ENERGIZE the bus
AND RESTORE the needed
equipment.

(continue)



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CONTINGENCY ACTIONS

41. (continued)

2) **ENSURE** 480V MCCs are energized as appropriate:

- MCC 1: 52-1906
(Bus 19)
- MCC 3: 52-1301
(Bus 13)
- MCC 7: 52-1103
(Bus 11)

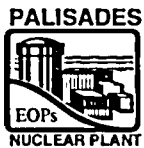
b. IF Bus 1D is energized,
THEN PERFORM the following:

1) **ENSURE CLOSED** 152-201
(Bus 1D to
Transformers 12 and 20)

2) **ENSURE** 480V MCCs energized as appropriate:

- MCC 2: 52-2006
(Bus 20)
- MCC 8: 52-1201
(Bus 12)

(continue)



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CONTINGENCY ACTIONS

41. (continued)

NOTE: IF only one MCC is available (MCC 1 or MCC 2), THEN BOTH vital DC Buses should be powered from the two Battery Chargers supplied by the same energized MCC.

c. **ENSURE CLOSED** Battery Charger Feeder Breakers from available MCCs:

1) MCC 1

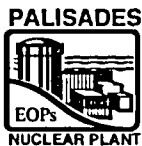
- Charger No 1 Feeder
52-146
- Charger No 4 Feeder
52-186

2) MCC 2

- Charger No 2 Feeder
52-225
- Charger No 3 Feeder
52-285

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

d.1. **PLACE** Battery Chargers in operation. Refer to SOP-30, "Station Power."



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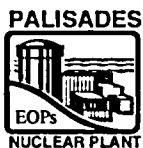
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INSTRUCTIONS

42. IF ALL PCPs are stopped,
THEN VERIFY natural circulation
flow in at least one PCS loop by
ALL of the following:
- Core ΔT less than 50°F
(Average of Qualified CETs
minus T_c)
 - Loop T_H s and Loop T_C s
constant or lowering
 - Average of Qualified CETs at
least 25°F subcooled
 - Difference between Loop T_H
and Average of Qualified CETs
is less than or equal to 15°F
43. IF ALL PCPs are stopped,
AND natural circulation criteria are
NOT satisfied,
THEN ENSURE ALL of the
following conditions exist:
- All available Charging pumps
are operating
 - SI flow is within the limits of
EOP Supplement 4
 - At least one S/G is available for
removing heat from PCS with
level being maintained or
restored to between 60%
and 70%
 - Average of Qualified CETs is
less than superheated

CONTINGENCY ACTIONS

- 42.1. **ENSURE** proper control of S/G
feeding and steaming rates.



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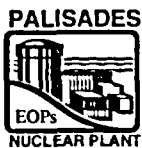
44. WHEN BOTH of the following conditions exist:

- PZR Pressure within limits of EOP Supplement 1
- PCS Cooldown rate is within required limits

THEN PLACE LTOP in service as follows:

- a. **ENSURE OPEN** PORV Isolation Valves. Refer to SOP-1B, "Primary Coolant System - Cooldown," Attachment 6.
- b. **PLACE BOTH** of the following PORV LTOP enable keyswitches to ENABLE:
 - HS-0105A (Key: 1)
 - HS-0105B (Key: 4)
- c. **PLACE BOTH** of the following PORV Handswitches to AUTO:
 - HS-1042B
 - HS-1043B
- d. **MAINTAIN** PZR pressure within limits of EOP Supplement 1.

45. WHEN PCP restart is desired,
THEN **RESTART** desired PCPs.
Refer to EOP Supplement 3.



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46. WHEN required shutdown boron concentration has been established (approximately 30 to 45 minutes using all charging pumps), THEN ALIGN Charging Pump suction to SIRWT. Refer to EOP Supplement 40.

- © 47. **VERIFY** the containment sump level is rising as the SIRWT level is lowering.

CONTINGENCY ACTIONS

- 47.1. IF Containment Sump level is NOT rising as SIRWT level lowers, THEN PERFORM ALL of the following:

- a. **CONFIRM** the LOCA is outside containment.
- b. **INITIATE** actions to makeup to the SIRWT. Refer to one of the following:
 - SOP-2A, "Chemical & Volume Control System Charging & Letdown"
 - SOP-17A, "Clean Radioactive Waste System"
- c. IF "CIS INITIATED" (EK-1126) is clear, THEN MANUALLY INITIATE CIS by pushing left or right HIGH RADIATION INITIATE pushbuttons on EC-13 AND PERFORM EOP Supplement 6.
 - CHRL-CS
 - CHRR-CS
- d. **NOTIFY** the TSC.



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48. WHEN SIRWT level less than or equal to 25%,
THEN prior to RAS, **PERFORM**
Pre-RAS Actions. Refer to EOP
Supplement 42.

CONTINGENCY ACTIONS

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.

49. IF Control Room HVAC
Compressor VC-10 or VC-11
tripped on high temperature due to
low SW flow,
THEN RESET AND START VC-10
or VC-11.



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INSTRUCTIONS

CONTINGENCY ACTIONS

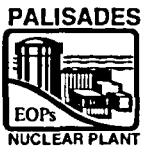
NOTE: Subsequent to the actions in Step 50, the TSC must approve closure of ANY of the failed open valves.

50. WHEN Containment water level approaches the level specified below, THEN ENSURE OPEN the following valves
AND OPEN associated breakers:

| Cntmt Water Level | Valve | | |
|-------------------------|-----------|--------|-------------------------|
| | Number | Bkr | Description |
| 595' 9" | MCC No. 1 | | |
| | MO-3008 | 52-141 | LPSI Loop 1A |
| | MO-3010 | 52-147 | LPSI Loop 1B |
| | MCC No. 2 | | |
| | MO-3012 | 52-247 | LPSI Loop 2A |
| 596' 4" | MO-3014 | 52-251 | LPSI Loop 2B |
| | MCC No. 1 | | |
| | MO-3009 | 52-197 | HPSI Train 1 to Loop 1B |
| | MO-3011 | 52-157 | HPSI Train 1 to Loop 2A |
| | MO-3007 | 52-137 | HPSI Train 1 to Loop 1A |
| | MO-3013 | 52-151 | HPSI Train 1 to Loop 2B |
| | MCC No. 2 | | |
| | MO-3066 | 52-257 | HPSI Train 2 to Loop 1B |
| | MO-3064 | 52-237 | HPSI Train 2 to Loop 2A |
| | MO-3068 | 52-261 | HPSI Train 2 to Loop 1A |
| | MO-3062 | 52-241 | HPSI Train 2 to Loop 2B |

© = Continuously applicable step

☞ = Hold Point



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

INSTRUCTIONS

CONTINGENCY ACTIONS

CAUTION

Premature initiation of RAS can lead to insufficient Containment Sump inventory for SI Pump operation. Minimum Containment Water level of 594' 1" is necessary for adequate ESS pump NPSH.

51. WHEN BOTH of the following conditions exist:

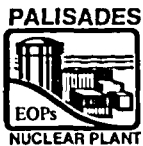
- LOCA inside Containment
- SIRWT level lowers to less than 2%

THEN REFER TO EOP

Supplement 42

AND PERFORM the following:

- a. Post-RAS actions
 - b. **MONITOR** for indications of sump screen clogging.
52. IF Containment Water level is less than 594' 1" following a RAS,
THEN CONSULT with TSC for additional guidance.



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INSTRUCTIONS

53. IF RAS is initiated,
THEN PERFORM the following:

a. IF BOTH HPSI Pumps are
operating,
THEN VERIFY total HPSI Pump
flow greater than 100 gpm.

b. IF one HPSI Pump is operating,
THEN VERIFY the operating
HPSI Pump has flow greater
than 50 gpm.

CONTINGENCY ACTIONS

a.1. IF total HPSI Pump flow less than
100 gpm,
THEN PERFORM ALL of the
following:

1) **STOP** ALL Charging Pumps.
Refer to EOP Supplement 39,
"Alternate Methods of Reducing
PCS Pressure," as needed to
control PZR pressure.

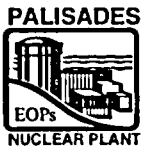
2) IF total HPSI Pump still has flow
less than 100 gpm,
THEN STOP one HPSI Pump.

b.1. IF the operating HPSI Pump has
flow less than 50 gpm,
THEN PERFORM ALL of the
following:

1) **STOP** ALL Charging Pumps.
Refer to EOP Supplement 39,
"Alternate Methods of Reducing
PCS Pressure," as needed to
control PZR pressure.

2) IF the operating HPSI Pump still
has flow less than 50 gpm,
THEN STOP the HPSI Pump.

3) **CONSULT** with the TSC for
further guidance.



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TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

INSTRUCTIONS

- © 54. IF containment sump screen clogging is indicated, THEN PERFORM the following:
- IF 3 Containment Spray Pumps are operating, THEN STOP one Containment Spray Pump (P-54B or P-54C preferred.)
 - THROTTLE** HPSI flow to achieve 200 to 250 gpm flow to each operating train using either Option 1 or Option 2:

CONTINGENCY ACTIONS

- IF HPSI loop isolation valves are de-energized, THEN PERFORM the following:
 - STOP** one HPSI pump.
 - ENERGIZE** and **CLOSE** two HPSI loop isolation valves associated with the operating HPSI pump (Refer to Option 1 or 2).

(Continue)

(Continue)

© = Continuously applicable step

⌚ = Hold Point



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INSTRUCTIONS

54.

(Continued)

| OPTION 1 | | |
|-----------------|---------|-----------------------|
| POSITION | NUMBER | DESCRIPTION |
| Train 1 (P-66B) | | |
| Closed | MO-3009 | HPSI Trn 1 to Loop 1B |
| Closed | MO-3013 | HPSI Trn 1 to Loop 2B |
| Throttled | MO-3011 | HPSI Trn 1 to Loop 2A |
| Throttled | MO-3007 | HPSI Trn 1 to Loop 1A |
| Train 2 (P-66A) | | |
| Closed | MO-3064 | HPSI Trn 2 to Loop 2A |
| Closed | MO-3068 | HPSI Trn 2 to Loop 1A |
| Throttled | MO-3066 | HPSI Trn 2 to Loop 1B |
| Throttled | MO-3062 | HPSI Trn 2 to Loop 2B |

| OPTION 2 | | |
|-----------------|---------|-----------------------|
| POSITION | NUMBER | DESCRIPTION |
| Train 1 (P-66B) | | |
| Closed | MO-3011 | HPSI Trn 1 to Loop 2A |
| Closed | MO-3007 | HPSI Trn 1 to Loop 1A |
| Throttled | MO-3009 | HPSI Trn 1 to Loop 1B |
| Throttled | MO-3013 | HPSI Trn 1 to Loop 2B |
| Train 2 (P-66A) | | |
| Closed | MO-3066 | HPSI Trn 2 to Loop 1B |
| Closed | MO-3062 | HPSI Trn 2 to Loop 2B |
| Throttled | MO-3064 | HPSI Trn 2 to Loop 2A |
| Throttled | MO-3068 | HPSI Trn 2 to Loop 1A |

CONTINGENCY ACTIONS

(Continued)

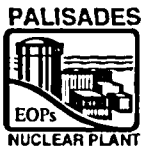
| OPTION 1 | | |
|-----------------|---------|-----------------------|
| BKR | NUMBER | DESCRIPTION |
| Train 1 (P-66B) | | |
| 52-197 | MO-3009 | HPSI Trn 1 to Loop 1B |
| 52-151 | MO-3013 | HPSI Trn 1 to Loop 2B |
| Train 2 (P-66A) | | |
| 52-237 | MO-3064 | HPSI Trn 2 to Loop 2A |
| 52-261 | MO-3068 | HPSI Trn 2 to Loop 1A |

| OPTION 2 | | |
|-----------------|---------|-----------------------|
| BKR | NUMBER | DESCRIPTION |
| Train 1 (P-66B) | | |
| 52-157 | MO-3011 | HPSI Trn 1 to Loop 2A |
| 52-137 | MO-3007 | HPSI Trn 1 to Loop 1A |
| Train 2 (P-66A) | | |
| 52-257 | MO-3066 | HPSI Trn 2 to Loop 1B |
| 52-241 | MO-3062 | HPSI Trn 2 to Loop 2B |

(Continue)

© = Continuously applicable step

⌘ = Hold Point



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

INSTRUCTIONS

CONTINGENCY ACTIONS

54. (Continued)

c. **STOP** remaining operating
Containment Spray Pumps as
follows:

1) IF containment pressure
greater than 4 psig OR CHP
NOT reset,
THEN CLOSE one
containment spray valve.

a) **PLACE** one CHP Bypass
Switch to BYPASS:

- HS-3001C, CV-3001
(Key: 397)
- HS-3002C, CV-3002
(Key : 396)

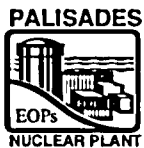
b) **ENSURE CLOSED**
associated Containment
Spray Valve:

- CV-3001
- CV-3002

2) **STOP** all Containment
Spray Pumps.

- P-54A
- P-54B
- P-54C

(Continue)



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INSTRUCTIONS

CONTINGENCY ACTIONS

54.

(Continued)

- 3) **ENSURE BOTH CHP**
Bypass Switches in
BYPASS.

- HS-3001C, CV-3001
(Key: 397)
- HS-3002C, CV-3002
(Key : 396)

- 4) **ENSURE CLOSED BOTH**
Containment Spray Valves:

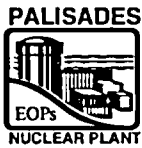
- CV-3001
- CV-3002

- d. **MONITOR** HPSI pump for
improved or stable
performance.

- d.1. IF HPSI pump performance does
NOT improve,
THEN PERFORM the following:

- 1) IF HPSI loop isolation valves
are energized,
THEN THROTTLE HPSI
flow to 50 to 100 gpm on
each operating train (low in
the band preferred.)
- 2) IF HPSI pump performance
is NOT improved,
THEN STOP HPSI pump.
- 3) IF HPSI pump performance
improves,
THEN RAISE flow to a point
where stable pump
performance can be
maintained.

(Continue)



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

INSTRUCTIONS

CONTINGENCY ACTIONS

54. (Continued)

e. **NOTIFY** TSC to begin monitoring for SAMG entry conditions.

f. **GO TO** EOP-9.0

55. **PLACE** the following ESS Room Sump Pump handswitches in OFF AND CAUTION TAG "Do Not Use - LOCA in Progress":

- East P-72A (42-165ASS)
- East P-72B (42-165BSS)
- West P-73A (42-155ASS)
- West P-73B (42-155BSS)

56. IF Charging Pump suction is aligned to the SIRWT AND RAS has initiated, THEN PERFORM ALL of the following:

a. **STOP ALL** Charging Pumps:

- P-55A
- P-55B
- P-55C

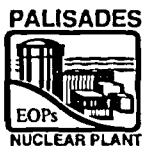
b. **RACK OUT ALL** Charging Pump breakers:

| CHARGING PUMP | BREAKER |
|---------------|--------------------|
| P-55A | 52-1205 |
| P-55B | 52-1308 52-1206 |
| P-55C | 52-1105 |

(continue)

© = Continuously applicable step

☞ = Hold Point



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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INSTRUCTIONS

CONTINGENCY ACTIONS

56. (continued)

- c. **PLACE** a Caution Tag on their handswitches that reads "Do NOT Use - No suction source available"

- 52-1205CS
- 52-1206CS
- 52-1105CS

57. IF ALL operable Containment Area Radiation Monitors indicate less than 1×10^1 R/hr
AND Containment pressure is less than 3.0 psig,
THEN **RESET** CHR by pushing the following:

- The **RESET** pushbutton on each Containment Area Radiation Monitor.
- BOTH left and right HIGH **RADIATION RESET** pushbuttons on C-13.



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INSTRUCTIONS

58. IF PZR pressure is between 350 psia and 300 psia as read on PI-0104 (NR) or PR-0125 and controlled AND a controlled cooldown is in progress, THEN ISOLATE SITs as follows:

- a. UNLOCK AND CLOSE the following breakers:

| BREAKER | OUTLET VALVE | SIT |
|---------|--------------|-------|
| 52-2129 | MO-3041 | T-82A |
| 52-2329 | MO-3045 | T-82B |
| 52-2229 | MO-3049 | T-82C |
| 52-2429 | MO-3052 | T-82D |

KEY: 190

- b. CLOSE the following SIT Outlet Valves:

| BREAKER | OUTLET VALVE | KEY |
|---------|--------------|-----|
| 52-2129 | MO-3041 | 98 |
| 52-2329 | MO-3045 | 99 |
| 52-2229 | MO-3049 | 100 |
| 52-2429 | MO-3052 | 101 |

(continue)

CONTINGENCY ACTIONS

NOTE: Failure of Instrument Air to containment will prevent venting the SITs.

- 58.1. IF ANY SIT could NOT be isolated, THEN VENT the unisolated SIT using ONE of the following:

- a. VENT to containment as follows:

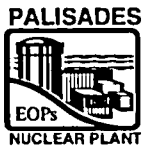
- 1) ENSURE CLOSED CWRT Vent Isolation Valves:

- CV-1064
- CV-1065

- 2) VENT each unisolated SIT one tank at a time by opening the Vent Valve and closing when tank is vented.

| SIT | VENT VALVE |
|-------|------------|
| T-82A | CV-3067 |
| T-82B | CV-3065 |
| T-82C | CV-3063 |
| T-82D | CV-3051 |

(continue)



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INSTRUCTIONS

58. (continued)

CONTINGENCY ACTIONS

(continued)

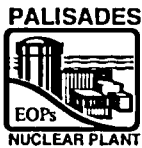
3) WHEN ALL the following conditions are met:

- Unisolated SITs are vented and their associated vent valve closed
- Plant conditions allow venting containment

THEN OPEN CWRT Vent Isolation Valves:

- CV-1064
- CV-1065

b. **VENT** unisolated SITs via Clean Waste Receiver Tank Header per SOP-3, "Safety Injection and Shutdown Cooling System."



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INSTRUCTIONS

59. IF the elapsed time from event initiation (EOP Entry) is 5.5 hours AND Shutdown Cooling will NOT be in service prior to 6.5 hours after event initiation (EOP Entry) AND ANY of the following conditions are satisfied:

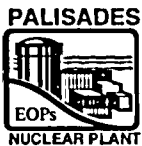
- Based on the Average of Qualified CETs, PCS subcooling meets ONE of the following:
 - Less than 25°F subcooled for non-degraded Containment conditions
 - Less than the minimum subcooling curve on EOP Supplement 1 for degraded Containment conditions
- Corrected PZR level is less than 20% (40% for degraded Containment) (Refer to EOP Supplements 9 and 10)
- Operable RVLMS channels indicate less than 102 inches above the bottom of fuel alignment plate,

THEN ESTABLISH simultaneous hot and cold leg injection by performing ALL of the following in the order listed:

(continue)

CONTINGENCY ACTIONS

59.1. IF hot leg injection can NOT be established via the normal path, THEN INITIATE hot leg injection via HPSI flow through the PZR. Refer to EOP Supplement 20.



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INSTRUCTIONS

CONTINGENCY ACTIONS

59. (continued)

- a. **CLOSE** HPSI Train 2 to Cold Leg Valve, MO-3080.
(KEY: 117)
- b. **OPEN** HPSI Train 2 to Hot Leg Valve, MO-3082.
(KEY: 118)
- c. **CLOSE** HPSI Train 1 to Cold Leg Valve, MO-3081.
(KEY: 115)
- d. **OPEN** HPSI Train 1 to Hot Leg Valve, MO-3083.
(KEY: 116)
- e. IF HPSI Train 2 is in operation,
THEN VERIFY HPSI flow to Loop 1 hot leg on FI-0316A.
- f. IF HPSI Train 1 is in operation,
THEN VERIFY HPSI flow to Loop 1 hot leg on FI-0317A.
- g. **OBSERVE** HPSI flow to PCS cold legs on the following indicators:
 - FI-0308A
 - FI-0310A
 - FI-0312A
 - FI-0313A

(continue)

© = Continuously applicable step

☞ = Hold Point



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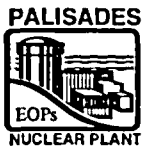
59. (continued)

h. **VERIFY** total HPSI flow to
Loop 1 hot leg is approximately
equal to total HPSI flow to cold
legs.

- FI-0316A
- FI-0317A

i. **VERIFY** the following:

- Total HPSI flow is within
acceptable limits. Refer to
EOP Supplement 4.
- Containment spray flow is
within acceptable limits.
Refer to SFSC, Table CA.



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INSTRUCTIONS

60. IF measured Containment hydrogen concentration is between 1% and 3%,
THEN PERFORM ALL the following:

CONTINGENCY ACTIONS

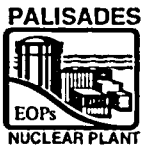
CAUTION

Each D/G is limited to a 2500 KW continuous load rating and a 2750 KW two-hour load rating. A hydrogen recombiner will draw a maximum of 75 KW.

- a. **PLACE** at least one Hydrogen Recombiner in service. Refer to SOP-5, "Containment Air Cooling and Hydrogen Recombining System."
- b. **OPEN** MCC 9 Feeder Breaker, 52-1304.

LOCATION: On Bus 13

61. IF SI Pump Throttling criteria are satisfied,
THEN RESET SIAS. Refer to SOP-3, "Safety Injection and Shutdown Cooling System," Attachment 4.



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INSTRUCTIONS

CONTINGENCY ACTIONS

62. WHEN ALL of the following
Shutdown Cooling System entry
conditions are met:

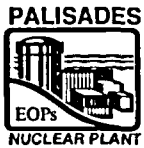
- PCS parameters are acceptable
for existing Containment
conditions:

| Parameter | Containment Less Than 175°F AND Less Than 3 psig at all times during the event | Containment Greater Than or Equal To 175°F OR Greater Than or Equal To 3 psig at any time during the event |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| PCS Pressure | Less Than 270 psia | REFER TO EOP Supplement 1 |
| PZR Level | Greater than 36% and controlled | Greater than 40% and controlled |
| Avg of Qualified CETs Subcooling | Greater than 25°F | REFER TO EOP Supplement 1 |
| Avg of Qualified CETs and Loop T _{LS} Temperature | Less than 300°F | REFER TO EOP Supplement 1 |

- TSC has determined that PCS
activity is acceptable for
circulation outside Containment.
- Containment Spray Pumps are
NOT in use for Containment
Atmosphere safety function.
- Shutdown Cooling System
monitoring equipment power is
available from Y01.

OR

(Continue)



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TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

INSTRUCTIONS

CONTINGENCY ACTIONS

62. (Continued)

Alternate measures for loss of Y01 are established. **REFER TO ONP-17, "Loss of Shutdown Cooling."**

- LTOP operable.
- Power to the following Shutdown Cooling Return Valves is available:
 - MO-3015 (MCC-1)
 - MO-3016 (MCC-2)

OR

Access to Containment is acceptable for manual valve operation.

THEN **PERFORM** the following:

(continue)



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INSTRUCTIONS

CONTINGENCY ACTIONS

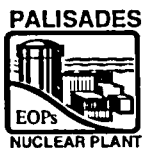
62. (continued)

- a. IF hot leg injection is in use,
THEN SECURE hot leg
injection as follows:
 - 1) **CLOSE** HPSI Train 2 to Hot
Leg Valve, MO-3082.
(KEY: 118)
 - 2) **OPEN** HPSI Train 2 to Cold
Leg Valve, MO-3080.
(KEY: 117)
 - 3) **CLOSE** HPSI Train 1 to Hot
Leg Valve, MO-3083.
(KEY: 116)
 - 4) **OPEN** HPSI Train 1 to Cold
Leg Valve, MO-3081.
(KEY: 115)
- b. **STOP** operating HPSI and LPSI
Pumps.
- c. **ENSURE** SIAS is reset. Refer
to SOP-3, "Safety Injection and
Shutdown Cooling System,"
Attachment 4.
- d. **GO TO** GOP-9, "Mode 3
≥ 525 °F to Mode 4 or Mode 5"
or TSC/PRC approved
procedure.

63. IF SDC entry conditions can NOT
be established,
THEN MAINTAIN long-term
cooling.

© = Continuously applicable step

⌚ = Hold Point



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

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64. IF the LOCA is isolated,
THEN PERFORM Steps 65
through 96.

NOTE: Use ANY of the following to
determine Average of Qualified
CETs:

- PPC point "KCETA"
(Average of Qualified CETs)
- PPC Incore Qualified CET
Map (PPC page 313)
- Manual calculation. Refer to
SOP-34, "Plant Process
Computer (PPC) System."

- © 65. **VERIFY** SI Pump throttling criteria
are satisfied by ALL of the
following:

- a. Based on the Average of
Qualified CETs, PCS
subcooling meets ONE of the
following:
- At least 25°F subcooled for
non-degraded Containment
conditions
 - Greater than the minimum
subcooling curve on EOP
Supplement 1 for degraded
Containment conditions

CONTINGENCY ACTIONS

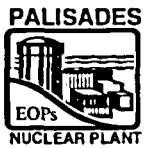
- 65.1. IF ANY of the SI Pump throttling
criteria can NOT be maintained,
THEN RAISE HPSI flow AND
START HPSI Pumps as necessary.

| PUMP | VALVE | |
|---------|---------|-------------------------|
| | NUMBER | DESCRIPTION |
| Train 1 | | |
| P-66B | MO-3009 | HPSI Train 1 to Loop 1B |
| | MO-3011 | HPSI Train 1 to Loop 2A |
| | MO-3007 | HPSI Train 1 to Loop 1A |
| | MO-3013 | HPSI Train 1 to Loop 2B |
| Train 2 | | |
| P-66A | MO-3066 | HPSI Train 2 to Loop 1B |
| | MO-3064 | HPSI Train 2 to Loop 2A |
| | MO-3068 | HPSI Train 2 to Loop 1A |
| | MO-3062 | HPSI Train 2 to Loop 2B |

(continue)

© = Continuously applicable step

☪ = Hold Point



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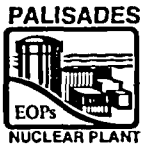
TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

INSTRUCTIONS

CONTINGENCY ACTIONS

65. (continued)

- b. Corrected PZR level is greater than 20% (40% for degraded Containment) and controlled.
REFER TO EOP Supplements 9 and 10.
- c. At least one S/G is available for PCS heat removal with corrected level being maintained or being restored to between 60% and 70%.
REFER TO EOP Supplement 11.
- d. Operable RVLMS channels indicate greater than 102 inches above the bottom of fuel alignment plate (621' 8").



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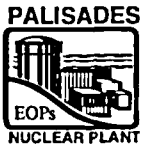
66. IF HPSI Pumps are operating
AND SI Pump throttling criteria are
satisfied,
THEN THROTTLE HPSI flow
OR STOP one HPSI Pump at a
time.

CONTINGENCY ACTIONS

| PUMP | VALVE | |
|---------|---------|-------------------------|
| | NUMBER | DESCRIPTION |
| Train 1 | | |
| P-66B | MO-3009 | HPSI Train 1 to Loop 1B |
| | MO-3011 | HPSI Train 1 to Loop 2A |
| | MO-3007 | HPSI Train 1 to Loop 1A |
| | MO-3013 | HPSI Train 1 to Loop 2B |
| Train 2 | | |
| P-66A | MO-3066 | HPSI Train 2 to Loop 1B |
| | MO-3064 | HPSI Train 2 to Loop 2A |
| | MO-3068 | HPSI Train 2 to Loop 1A |
| | MO-3062 | HPSI Train 2 to Loop 2B |

© = Continuously applicable step

⌘ = Hold Point



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INSTRUCTIONS

CONTINGENCY ACTIONS

67. IF LPSI Pumps are operating
AND PZR pressure is being
controlled greater than 200 psia,
THEN PERFORM BOTH of the
following:
- a. **STOP** the operating LPSI
Pumps:
 - P-67A
 - P-67B
 - b. **CLOSE** the LPSI injection
valves:
 - MO-3008 LPSI Loop 1A
 - MO-3010 LPSI Loop 1B
 - MO-3012 LPSI Loop 2A
 - MO-3014 LPSI Loop 2B
68. IF PZR pressure lowers to less
than 200 psia
AND LPSI pumps have been
stopped,
THEN PERFORM BOTH of the
following:
- a. **ENSURE OPERATING ALL**
available LPSI pumps:
 - P-67A
 - P-67B
 - b. **ENSURE OPEN** LPSI injection
valves:
 - MO-3008 LPSI Loop 1A
 - MO-3010 LPSI Loop 1B
 - MO-3012 LPSI Loop 2A
 - MO-3014 LPSI Loop 2B



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INSTRUCTIONS

69. IF Letdown is isolated
AND BOTH of the following
conditions exist:

- SI Pump throttling criteria are met
- Letdown is needed or desired,

THEN RESTORE Letdown. Refer
to EOP Supplement 27.

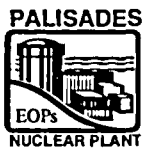
- © 70. **VERIFY** the PCS is NOT in a water
solid condition as indicated by
BOTH of the following:

- a. No exaggerated or severe
pressure response to PCS
inventory or temperature
changes.
- b. ANY of the following:
 - Corrected PZR level is less
than 100%. **REFER TO**
EOP Supplements 9 and 10
 - RVLMS indicates voiding

CONTINGENCY ACTIONS

- 70.1. IF water solid PCS condition is
indicated,
THEN MAINTAIN the PCS within
the limits of EOP Supplement 1 by
ANY of the following:

- a. **OPERATE** available S/G(s) to
control the cooldown
AND STABILIZE Qualified CET
temperatures and Loop T_{cs}.
- b. IF SI Pump throttling criteria are
met,
THEN CONTROL HPSI,
Charging, and Letdown flows.



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71. IF it is desired to draw a bubble in the PZR,
THEN **PERFORM** ALL of the following:

- a. **ENSURE ENERGIZED** ALL available PZR heaters.
- b. IF ANY of the following conditions exist:
 - Both S/G pressures can be maintained below the existing PCS pressure
 - At least one PCP is operating

THEN **PERFORM** ALL of the following to reduce PCS pressure:

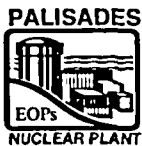
- 1) IF SI Pump throttling criteria are met,
THEN **CONTROL** Charging, Letdown, and HPSI flow.
- 2) **INITIATE** PCS cooldown within Technical Specification limits.
- 3) **MONITOR** the PCS cooldown rate using PPC. Refer to EOP Supplement 33.

(continue)

CONTINGENCY ACTIONS

© = Continuously applicable step

⌄ = Hold Point



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INSTRUCTIONS

CONTINGENCY ACTIONS

71. (continued)

4) **MAINTAIN** PCS temperature and pressure within the limits of EOP Supplement 1.

5) **MAINTAIN** 25°F subcooling.

c. IF a bubble forms in the Reactor Vessel Upper Head region, THEN **PERFORM BOTH** of the following:

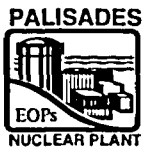
1) **CONTROL** Charging, Letdown, and HPSI flow to maintain PCS level greater than the 102 inches above the bottom of fuel alignment plate (621' 8").

2) **CONTINUE** efforts to draw a bubble in the PZR.

72. IF SI Pump throttling criteria are met, THEN **MAINTAIN** corrected PZR level between 20% and 85% (42% to 57% preferred) by performing **ANY** of the following (Refer to EOP Supplements 9 and 10):

a. **CONTROL** Charging and Letdown.

b. **THROTTLE** HPSI flow.



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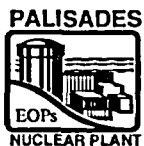
INSTRUCTIONS

- © 73. **MAINTAIN** PCS pressure within the limits of EOP Supplement 1 by performing ANY of the following:
- a. **CONTROL** the following:
- PZR heaters
 - Main Spray
 - Auxiliary Spray (Supplement 37)
- b. IF SI Pump throttling criteria are met,
THEN CONTROL HPSI, Charging, and Letdown flows.

(continue)

CONTINGENCY ACTIONS

- 73.1. IF the PCS is oversubcooled OR PZR pressure is greater than the maximum limits of EOP Supplement 1,
THEN PERFORM ANY of the following to restore subcooling or PCS pressure to within the appropriate limit:
- a. **OPERATE** available S/G(s) to stop the cooldown
AND STABILIZE Qualified CET temperatures and Loop T_{cs}.
- b. **OPERATE** the following to lower PZR pressure within allowable limits:
- Main Spray
 - Auxiliary Spray (Supplement 37)
- c. IF SI Pump throttling criteria are met,
THEN CONTROL HPSI, Charging, and Letdown flows.
- 73.2. IF PCS cooldown rate exceeds Technical Specification limits,
THEN PERFORM ANY of the following to restore the cooldown rate to within Technical Specification limits:
- a. **OPERATE** available S/G(s) to stop the cooldown
AND STABILIZE Qualified CET temperatures and Loop T_{cs}.
(continue)



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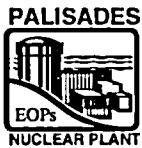
73. (continued)

- © 74. **ENSURE** at least one S/G has corrected level being maintained or being restored to between 60% and 70%. Refer to EOP Supplement 11.

CONTINGENCY ACTIONS

(continued)

- b. **OPERATE** the following to maintain PZR pressure within limits of EOP Supplement 1:
- PZR heaters
 - Main Spray
 - Auxiliary Spray (Supplement 37)
 - Letdown
- c. As directed by the Shift Supervisor, **CONTINUE** the PCS cooldown at less than or equal to Technical Specification limits. Refer to EOP Supplement 33.



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CONTINGENCY ACTIONS

© 75. **PERFORM ALL** of the following:

a. **CALCULATE** minimum PCS
cooldown rate. Refer to
EOP Supplement 2.

b. Verify BOTH of the following:

- The calculated cooldown rate does NOT exceed Technical Specification limits.
- The calculated cooldown rate is achievable with the existing PCS heat removal path.

b.1. IF additional sources of inventory which allow the requirements to be met are NOT available, THEN GO TO EOP-9.0, "Functional Recovery Procedure."

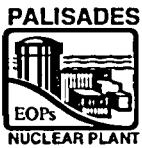
76. **EVALUATE** the need for a plant cooldown based on ALL of the following:

- Technical Specifications require plant cooldown
- Plant equipment repair requires plant cooldown
- Availability of Auxiliary systems
- Available Feedwater reserve inventory
- The Shift Supervisor deems plant cooldown is necessary

77. IF a plant cooldown is NOT required, THEN GO TO Step 87 .

© = Continuously applicable step

☞ = Hold Point



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NOTE: IF emergency boration is in progress, THEN cooldown may commence/continue while the required shutdown margin value is calculated.

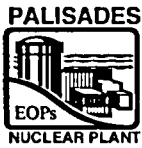
© 78. **VERIFY** PCS boron concentration greater than or equal to required boron concentration as verified by sample or hand calculation. Refer to EOP Supplement 35.

- a. IF Emergency boration is in progress
AND PCS boron concentration is greater than or equal to required boron concentration,
THEN SECURE emergency boration. Refer to EOP Supplement 40.

CONTINGENCY ACTIONS

78.1. IF PCS boron concentration is less than required boron concentration, THEN PERFORM BOTH of the following:

- a. **ENSURE** emergency boration is in progress.
- b. WHEN required boron concentration is reached, THEN SECURE emergency boration. Refer to EOP Supplement 40.



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CONTINGENCY ACTIONS

CAUTION

A maximum PZR cooldown rate of 200°F/Hr and a maximum PZR Spray ΔT (PZR vapor temp - spray temp) of 350°F should be observed to prevent damage to the PZR or Spray Nozzle.

NOTE: PZR level indication decalibration will occur during cooldown. Correction curves in EOP Supplement 9, "Pressurizer Level Corrections Hot Calibrated" or EOP Supplement 10, "Pressurizer Level Corrections Cold Calibrated" should be used.

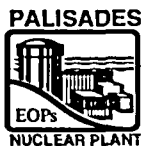
NOTE: S/G level indication decalibration will occur during cooldown. Correction curves in EOP Supplement 11, "S/G Level Correction" should be used.

NOTE: Steam flow through two of the four Atmospheric Steam Dump Valves should be adequate to establish an initial cooldown rate of 75°F/hr.

(continue)

© = Continuously applicable step

☞ = Hold Point



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CONTINGENCY ACTIONS

79. (continued)

© 79. **COMMENCE** steaming S/Gs as follows:

a. **REFER TO** the following:

- EOP Supplement 1, Pressure and Temperature Limit Curves
- EOP Supplement 33, PCS Heatup/Cooldown Rate Data

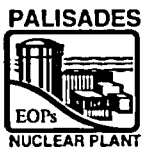
b. IF safety injection flow is causing a cooldown in excess of required limits, THEN **OPERATE** the Turbine Bypass Valve to maintain all of the following as applicable:

- S/Gs within 50 psi of Psat for Average of Qualified CETs
- As required to establish or support natural circulation
- As required to establish or support two phase natural circulation

b.1. **OPERATE** Atmospheric Steam Dump Valves.

- 1) IF desired to enhance temperature control, THEN **ISOLATE** two Atmospheric Steam Dump Valves. Refer to Table 79-1.

(Continue)



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INSTRUCTIONS

79. (Continued)

- c. WHEN PCS cooldown rate can be controlled within required limits, THEN OPERATE the Turbine Bypass Valve to cooldown at the maximum allowed rate.

CONTINGENCY ACTIONS

- c.1. **OPERATE** Atmospheric Steam Dump Valves.
- 1) IF desired to enhance temperature control, THEN ISOLATE two Atmospheric Steam Dump Valves. Refer to Table 79-1.

Table 79-1

| | |
|---------|-----------------------------------------------------------------------|
| 'A' S/G | MV-MS101, ASDV CV-0782 Inlet <u>OR</u> MV-CA782, A/S to CV-0782 |
| | MV-MS103, ASDV CV-0781 Inlet <u>OR</u> MV-CA781, A/S to CV-0781 |
| 'B' S/G | MV-MS102, ASDV CV-0779 Inlet <u>OR</u> MV-CA779, A/S to CV-0779 |
| | MV-MS104, ASDV CV-0780 Inlet <u>OR</u> MV-CA780, A/S to CV-0780 |

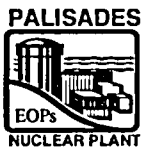
CAUTION

Operating P-50A and P-50B simultaneously when T_c is less than 300°F is prohibited by Technical Specifications.

- d. **ENSURE** not more than two PCPs operating (preferably one in each loop.)

© = Continuously applicable step

☞ = Hold Point



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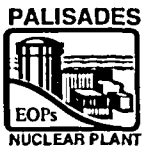
80. WHEN BOTH of the following conditions exist:

- PZR Pressure within limits of EOP Supplement 1
- PCS Cooldown rate is within required limits

THEN **PLACE** LTOP in service as follows:

- a. **ENSURE OPEN** PORV Isolation Valves. Refer to SOP-1B, "Primary Coolant System - Cooldown," Attachment 6.
- b. **PLACE** BOTH of the following PORV LTOP enable keyswitches to **ENABLE**:
 - HS-0105A (Key: 1)
 - HS-0105B (Key: 4)
- c. **PLACE** BOTH of the following PORV Handswitches to **AUTO**:
 - HS-1042B
 - HS-1043B
- d. **MAINTAIN** PZR pressure within limits of EOP Supplement 1.

CONTINGENCY ACTIONS



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NOTE: Use the following instruments to determine spray nozzle ΔT :

- PZR Vapor Phase Temperature, TI-0101
- Spray line temperature, TIA-0103 or TIA-0104 (use the lowest temperature if using main sprays)
- Charging line temperature, TI-0212 (if using Auxiliary Spray)

- © 81. **RECORD** each occurrence of PZR Spray operation with a ΔT (PZR vapor phase temp minus spray temp) greater than 200°F in the Narrative Log.



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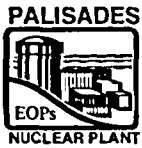
TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

INSTRUCTIONS

CONTINGENCY ACTIONS

NOTE: Reactor Vessel Upper Head voiding resulting from controlled PCS pressure reductions is not expected to result in safety functions being jeopardized.

- © 82. **COMMENCE** depressurization of the PCS to 270 psia by performing ANY of the following:
- a. **OPERATE** PZR heaters and Main or Auxiliary PZR sprays.
 - b. IF SI Pump throttling criteria are met,
THEN PERFORM ANY of the following:
 - 1) **CONTROL** Charging and Letdown.
 - 2) **THROTTLE** HPSI flow.



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83. IF BOTH of the following conditions exist for each S/G:

- At least three of four S/G pressure sigmas indicate between 510 and 550 psia (indicators between alarm flags)
- A controlled cooldown is in progress

THEN **BLOCK** MSIS for the S/G meeting the above conditions by performing ALL the following:

a. **BLOCK** MSIV closure signal for the applicable S/G by pushing the appropriate pushbutton on Control Panel C-01:

- HS/LPE-50A ('A' S/G)
- HS/LPE-50B ('B' S/G)

b. **VERIFY** "STEAM GEN VALVES ISOLATION LOCKOUT" (EK-0970) is alarmed.

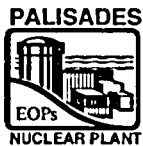
c. **ENSURE CLOSED** BOTH Main Feed Reg Valves:

- CV-0701 ('A' S/G)
- CV-0703 ('B' S/G)

d. **ENSURE CLOSED** BOTH Bypass Feed Reg Valves:

- CV-0735 ('A' S/G)
- CV-0734 ('B' S/G)

CONTINGENCY ACTIONS



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84. IF ALL of the following conditions exist:

- PZR pressure is less than 1687 psia
- SIAS is NOT actuated or blocked
- "Safety Injection Signal Block Permit" (EK-1369) is alarmed
- A controlled cooldown and/or controlled depressurization is in progress,

THEN **BLOCK** SIAS by performing ALL of the following:

a. **PLACE AND HOLD** SIAS block handswitch PB3-1 to **BLOCK**.

1) **VERIFY** the following annunciator in alarm:

- "SAFETY INJ BLOCK RELAY SI-1" (EK-1337)

2) **RELEASE** SIAS block handswitch PB3-1.

(continue)



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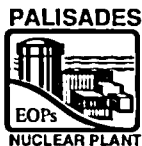
(continued)

b. **PLACE AND HOLD** SIAS block
handswitch PB3-2 to BLOCK.

1) **VERIFY** the following
annunciators in alarm:

- "SAFETY INJ BLOCK
RELAY SI-2" (EK-1338)
- "SAFETY INJ
BLOCKED" (EK-1339)

2) **RELEASE** SIAS block
handswitch PB3-2.



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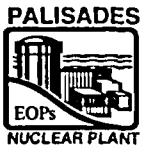
© 85. **MONITOR** for formation of PCS voiding as indicated by ANY of the following:

- Indicated Charging and Letdown flows do NOT correspond to PZR level trend.
- PZR level rising significantly faster than trend expected from Auxiliary Spray flow.
- Core ΔT (Average of Qualified CETs - T_c) or Loop ΔT ($T_H - T_c$) rising for same secondary steaming and Auxiliary Feed rates.
- Any operable PCS temperature indication is less than 25°F subcooled.
- Operable RVLMS indicates voiding in the Reactor Vessel.

86. IF PCS voiding is indicated AND ANY of the following exist:

- PCS pressure reduction is inhibited
- PCS heat removal is inhibited
- The Shift Supervisor directs void elimination,

THEN PERFORM void elimination actions. Refer to EOP Supplement 26.



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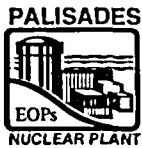
INSTRUCTIONS

87. IF ANY of the following AC or DC buses are NOT energized, THEN RESTORE power to the affected buses. Refer to the following applicable procedure:

| BUS | PROCEDURE |
|-----------------|-------------------------------------------|
| 1C or 1D | EOP Supplement 29 |
| 1E with No SIAS | EOP Supplement 29 |
| 1E with SIAS | SOP-30 |
| Y10 | ONP-24.1, "Loss of Preferred AC Bus Y10" |
| Y20 | ONP-24.2, "Loss of Preferred AC Bus Y20" |
| Y30 | ONP-24.3, "Loss of Preferred AC Bus Y30" |
| Y40 | ONP-24.4, "Loss of Preferred AC Bus Y40" |
| Y01 | ONP-24.5, "Loss of Instrument AC Bus Y01" |
| Any DC Bus | ONP-2.3, "Loss of DC Power" |

CONTINGENCY ACTIONS

- 87.1. IF Bus 1D and Bus 1E are NOT energized, THEN as resources permit, **PROVIDE** power to PZR Heaters from Bus 1C. Refer to ONP-2.1, "Loss of AC Power," Attachment 1.



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TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

INSTRUCTIONS

CONTINGENCY ACTIONS

88. IF offsite power was lost
AND offsite power is available,
THEN RESTORE power to plant
equipment by performing ALL of
the following:
- a. IF NONE of the following are
energized:
- 'R' Bus
 - 'F' Bus
 - Cook 1 Line,
- THEN INITIATE actions to
restore power to 'F' or 'R' Bus,
as available. Refer to EOP
Supplement 21.
- b. WHEN ANY of the following are
energized:
- 'R' Bus
 - 'F' Bus
 - Cook 1 Line,
- THEN INITIATE actions to
restore Plant power. Refer to
EOP Supplement 29.

(continue)

© = Continuously applicable step

⌚ = Hold Point



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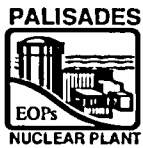
CONTINGENCY ACTIONS

88. (continued)

- c. **RESTORE** power to the affected bus(es). Refer to the following applicable procedure:

| BUS | PROCEDURE |
|---------------------|--------------------------------|
| 1E (without SIS) | EOP Supplement 29 |
| 1E (with SIS) | SOP-30 |
| 1A or 1B | ONP-2.1, "Loss of AC Power" |

- d. **RESTART** plant equipment as desired.



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INSTRUCTIONS

CONTINGENCY ACTIONS

CAUTION

Each D/G is limited to the following load rating:

- 2500 KW continuous
- 2750 KW two hours per 24 hour period

89. WHEN 2400V Bus 1C or Bus 1D is energized,
THEN as resources permit,
ENERGIZE Plant buses by
performing ALL of the following:

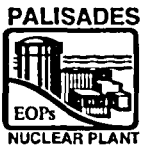
a. IF Bus 1C is energized,
THEN PERFORM ALL of the
following:

1) **ENSURE CLOSED** the
following breakers:

- 152-115 (Bus 1C to
Transformers 11 and 19)
- 152-108 (Bus 1C to
Transformer 13)

89.1. IF equipment needed to maintain
Safety Functions is available from
a de-energized 2400V Vital Bus
AND a power supply is available,
THEN ENERGIZE the bus
AND RESTORE the needed
equipment.

(continue)



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INSTRUCTIONS

CONTINGENCY ACTIONS

89.

(continued)

- 2) **ENSURE** 480V MCCs are energized as appropriate:

- MCC 1: 52-1906
(Bus 19)
- MCC 3: 52-1301
(Bus 13)
- MCC 7: 52-1103
(Bus 11)

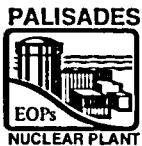
- b. IF Bus 1D is energized,
THEN PERFORM the following:

- 1) **ENSURE CLOSED** 152-201
(Bus 1D to
Transformers 12 and 20)
- 2) **ENSURE** 480V MCCs
energized as appropriate:
 - MCC 2: 52-2006
(Bus 20)
 - MCC 8: 52-1201
(Bus 12)

(continue)

© = Continuously applicable step

⌄ = Hold Point



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INSTRUCTIONS

CONTINGENCY ACTIONS

89. (continued)

NOTE: IF only one MCC is available (MCC 1 or MCC 2), **THEN** BOTH vital DC Buses should be powered from the two Battery Chargers supplied by the same energized MCC.

c. **ENSURE CLOSED** Battery Charger Feeder Breakers from available MCCs:

1) MCC 1

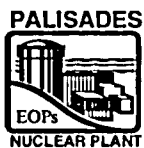
- Charger No 1 Feeder
52-146
- Charger No 4 Feeder
52-186

2) MCC 2

- Charger No 2 Feeder
52-225
- Charger No 3 Feeder
52-285

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

d.1. **PLACE** Battery Chargers in operation. Refer to SOP-30, "Station Power."



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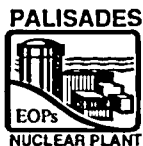
TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

INSTRUCTIONS

90. IF ALL PCPs are stopped,
THEN VERIFY natural circulation
flow in at least one PCS loop by
ALL of the following:
- Core ΔT less than 50°F
(Average of Qualified CETs
minus T_c)
 - Loop T_H s and Loop T_C s
constant or lowering
 - Average of Qualified CETs at
least 25°F subcooled
 - Difference between Loop T_H
and Average of Qualified CETs
is less than or equal to 15°F
91. WHEN PCP restart is desired,
THEN RESTART desired PCPs.
Refer to EOP Supplement 3.
92. IF a plant cooldown is NOT in
progress,
THEN GO TO a TSC approved
procedure.

CONTINGENCY ACTIONS

- 90.1. **ENSURE** proper control of S/G
feeding and steaming rates.



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INSTRUCTIONS

93. IF PZR pressure is between 350 psia and 300 psia as read on PI-0104 (NR) or PR-0125 and controlled AND a controlled cooldown is in progress, THEN ISOLATE SITs as follows:

- a. UNLOCK AND CLOSE the following breakers:

| BREAKER | OUTLET VALVE | SIT |
|---------|--------------|-------|
| 52-2129 | MO-3041 | T-82A |
| 52-2329 | MO-3045 | T-82B |
| 52-2229 | MO-3049 | T-82C |
| 52-2429 | MO-3052 | T-82D |

KEY: 190

- b. CLOSE the following SIT Outlet Valves:

| BREAKER | OUTLET VALVE | KEY |
|---------|--------------|-----|
| 52-2129 | MO-3041 | 98 |
| 52-2329 | MO-3045 | 99 |
| 52-2229 | MO-3049 | 100 |
| 52-2429 | MO-3052 | 101 |

(continue)

CONTINGENCY ACTIONS

NOTE: Failure of Instrument Air to containment will prevent venting the SITs.

- 93.1. IF ANY SIT could NOT be isolated, THEN VENT the unisolated SIT using ONE of the following:

- a. VENT to containment as follows:

- 1) ENSURE CLOSED CWRT Vent Isolation Valves:

- CV-1064
- CV-1065

- 2) VENT each unisolated SIT one tank at a time by opening the Vent Valve and closing when tank is vented.

| SIT | VENT VALVE |
|-------|------------|
| T-82A | CV-3067 |
| T-82B | CV-3065 |
| T-82C | CV-3063 |
| T-82D | CV-3051 |

(continue)



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INSTRUCTIONS

93. (continued)

CONTINGENCY ACTIONS

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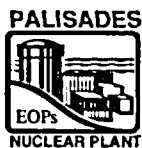
3) WHEN ALL the following conditions are met:

- Unisolated SITs are vented and their associated vent valve closed
- Plant conditions allow venting containment

THEN OPEN CWRT Vent Isolation Valves:

- CV-1064
- CV-1065

b. **VENT** unisolated SITs Via Clean Waste Receiver Tank Header per SOP-3, "Safety Injection and Shutdown Cooling System."



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

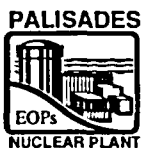
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CONTINGENCY ACTIONS

94. IF a SIAS or CHR signal is actuated
AND is no longer needed,
THEN RESET the signal as follows:
- a. IF SI Pump throttling criteria are satisfied
AND Containment pressure is less than 3.0 psig,
THEN RESET SIAS. Refer to SOP-3, "Safety Injection and Shutdown Cooling System," Attachment 4.
 - b. IF ALL operable Containment Area Radiation Monitors indicate less than 1×10^1 R/hr
THEN RESET CHR by pushing BOTH left and right HIGH RADIATION RESET pushbuttons on C-13.



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95. IF ALL of the following conditions are met:

- T_c is below 325°F
AND prior to T_{cs} less than 300°F
- SI Pump throttling criteria are met
- HPSI pumps are NOT required for inventory control
- A cooldown is in progress,

THEN DISABLE BOTH HPSI pumps by removing Control Power fuses and fuse holders from the following breakers:

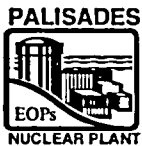
- 152-207, HP Safety Injection Pump P-66A

LOCATION: 'D' Bus

- 152-113, HP Safety Injection Pump P-66B

LOCATION: 'C' Bus

CONTINGENCY ACTIONS



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CONTINGENCY ACTIONS

96. WHEN ALL of the following Shutdown Cooling System entry conditions are met:

- PCS parameters are acceptable for existing Containment conditions:

| Parameter | Containment Less Than 175°F AND Less Than 3 psig at all times during the event | Containment Greater Than or Equal To 175°F OR Greater Than or Equal To 3 psig at any time during the event |
|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| PCS Pressure | Less Than 270 psia | REFER TO EOP Supplement 1 |
| PZR Level (corrected) | Greater Than 36% and controlled | Greater than 40% and controlled |
| Avg of Qualified CETs Subcooling | Greater Than 25°F | REFER TO EOP Supplement 1 |
| Avg of Qualified CETs and Loop T _{HS} Temperature | Less Than 300°F | REFER TO EOP Supplement 1 |

- TSC has determined that PCS activity is acceptable for circulation outside Containment.
- Containment Spray Pumps are not in use for Containment Atmosphere safety function.

(continue)



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INSTRUCTIONS

CONTINGENCY ACTIONS

96. (continued)

- Shutdown Cooling System monitoring equipment power is available from Y01

OR

Alternate measures for loss of Y01 are established per ONP-17, "Loss of Shutdown Cooling."

- LTOP is operable.
- Power to the following Shutdown Cooling Return Valves is available:
 - MO-3015 (MCC-1)
 - MO-3016 (MCC-2)

OR

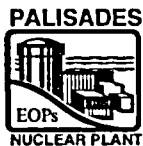
Access to Containment is acceptable for manual valve operation,

THEN GO TO GOP-9, "Mode 3 ≥ 525°F To Mode 4 or Mode 5" or TSC/PRC approved procedure.

End Of Section 4.0

© = Continuously applicable step

⌚ = Hold Point



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5.0 PLACEKEEPER

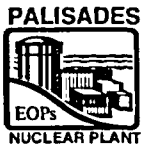
EOP ENTRY TIME: _____

TIME OF SIAS: _____

| <u>STEP</u> | <u>INSTRUCTIONS</u> | <u>PAGE</u> | <u>START</u> | <u>DONE</u> |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|-------------|
| 4. | Verify SIAS initiated | 5 | _____ | _____ |
| 5. | Ensure adequate SI flow and safeguards equipment status | 6 | _____ | _____ |
| 6. | 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 | 7 | _____ | _____ |
| 7. | Ensure proper PCP configuration as PCS temperature lowers | 7 | _____ | _____ |
| 8. | Verify operating limits for any running PCP | 7 | _____ | _____ |
| 9. | If open, then close CWRTs vent valves. | 8 | _____ | _____ |
| 10. | Isolate the LOCA | 8 | _____ | _____ |
| 11. | If the LOCA is outside of Containment, isolate the leak and initiate CIS | 10 | _____ | _____ |
| 12. | Place Hydrogen Monitor in service | 12 | _____ | _____ |
| 13. | If the Containment has pressure greater than or equal to 4.0 psig or has high radiation, ensure Containment Isolation signal initiated | 12 | _____ | _____ |
| 14. | If the Containment pressure is greater than or equal to 4.0 psig, verify available Containment Spray Pumps running | 13 | _____ | _____ |
| 15. | If PCP seal cooling is lost, isolate seal leakoff and restore PCP seal cooling | 14 | _____ | _____ |
| 16. | Secure Containment Spray | 15 | _____ | © |
| 17. | Reset CHP | 18 | _____ | _____ |

© = Continuously applicable step

☞ = Hold Point



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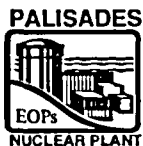
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5.0 PLACEKEEPER

| <u>STEP</u> | <u>INSTRUCTIONS</u> | <u>PAGE</u> | <u>START</u> | <u>DONE</u> |
|-------------|----------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|-------------|
| 18. | Verify condenser cooling or isolate steam to condenser | 20 | _____ | _____ |
| 19. | If the LOCA is isolated, go to Step 64 | 20 | _____ | _____ |
| 20. | Ensure at least one train of CR HVAC in Emergency Mode. | 21 | _____ | _____ |
| 21. | Verify PCS boron concentration greater than or equal to required boron concentration. | 21 | _____ | © |
| 22. | Commence steaming S/G(s) | 23 | _____ | _____ |
| 23. | When Main Steam pressure is between 510 and 550 psia, block MSIS | 25 | _____ | _____ |
| 24. | Record each occurrence of PZR spray with ΔT greater than 200°F | 26 | _____ | © |
| 25. | Verify SI Pump throttling criteria are satisfied | 27 | _____ | © |
| 26. | Commence depressurizing the PCS to 270 psia | 28 | _____ | © |
| 27. | When PZR pressure is less than 1687 psia and SIAS is not actuated, BLOCK SIAS | 29 | _____ | _____ |
| 28. | If HPSI Pumps are operating and SI Pump throttling criteria are satisfied, throttle HPSI flow or stop pumps | 30 | _____ | _____ |
| 29. | If LPSI Pumps are operating and PZR pressure is being controlled greater than 200 psia, stop pumps and close valves | 31 | _____ | _____ |
| 30. | If PZR pressure lowers uncontrollably to less than 200 psia and LPSI Pumps have been stopped, restart LPSI pumps and open valves | 31 | _____ | _____ |
| 31. | As resources permit, prepare post-RAS injection sources. | 32 | _____ | © |

© = Continuously applicable step

☪ = Hold Point



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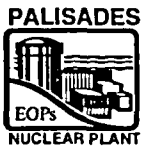
5.0 PLACEKEEPER

| <u>STEP</u> | <u>INSTRUCTIONS</u> | <u>PAGE</u> | <u>START</u> | <u>DONE</u> |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|-------------|
| 32. | If Letdown is isolated and conditions allow, restore Letdown | 32 | _____ | _____ |
| 33. | If SI Pump throttling criteria are met, then maintain PZR level between 20% and 85% (42% to 57% preferred) | 33 | _____ | _____ |
| 34. | Maintain PCS pressure within the limits of EOP Supplement 1 | 36 | _____ | © |
| 35. | Ensure at least one S/G has corrected level being maintained or restored to between 60% and 70% | 37 | _____ | © |
| 36. | Verify calculated cooldown rate does not exceed Technical Specification limits and the cooldown is achievable with the existing PCS heat removal path | 38 | _____ | © |
| 37. | Monitor PCS for void formation | 39 | _____ | © |
| 38. | If PCS voiding is indicated, perform void elimination | 39 | _____ | _____ |
| 39. | If any vital AC or DC buses are not energized, restore power to affected buses | 40 | _____ | _____ |
| 40. | If offsite power was lost and is available, restore power to plant equipment | 41 | _____ | _____ |
| 41. | When 2400V Bus 1C or 1D is energized, then energize Plant buses | 43 | _____ | _____ |
| 42. | Verify natural circulation flow in at least one loop | 46 | _____ | _____ |
| 43. | Verify two phase natural circulation | 46 | _____ | _____ |
| 44. | Place LTOP in service | 47 | _____ | _____ |

© = Continuously applicable step

☞ = Hold Point

👉 = Hold Point



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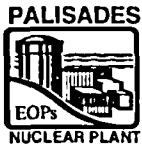
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5.0 PLACEKEEPER

| STEP | INSTRUCTIONS | PAGE | START | DONE |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|-------|
| 57. | If Containment Area Radiation Monitors indicate less than 1×10^1 R/hr and Containment pressure is less than 3.0 psig, reset CHR | 58 | _____ | _____ |
| 58. | If PZR pressure is between 350 psia and 300 psia and a cooldown is in progress, isolate SITs | 59 | _____ | _____ |
| 59. | If the elapsed time from the start of the LOCA is 5.5 hours and SDC will not be inservice prior to 6.5 hours after the LOCA and any HPSI throttle criteria are not met, initiate hot leg injection | 61 | _____ | _____ |
| 60. | If Containment hydrogen concentration is between 1% and 3%, place at least one Hydrogen Recombiner in service | 64 | _____ | _____ |
| 61. | Reset SIAS | 64 | _____ | _____ |
| 62. | If SDC entry conditions are met, go to GOP-9 | 65 | _____ | _____ |
| 63. | If SDC entry conditions can not be established, maintain long-term cooling | 67 | _____ | _____ |
| ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ Isolated LOCA steps 64 to 96 ◀ ◀ ◀ ◀ ◀ ◀ ◀ ◀ ◀ ◀ | | | | |
| 64. | If the LOCA is isolated, perform Steps 65 through 96 | 68 | _____ | _____ |
| 65. | Verify SI Pump throttling criteria are satisfied | 68 | _____ | © |
| 66. | If HPSI Pumps are operating and SI Pump throttling criteria are satisfied, throttle HPSI flow or stop pumps | 70 | _____ | _____ |
| 67. | If LPSI Pumps are operating and PZR pressure is being controlled greater than 200 psia, stop pumps and close valves | 71 | _____ | _____ |

© = Continuously applicable step

☞ = Hold Point



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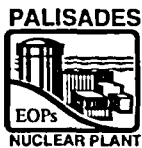
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5.0 PLACEKEEPER

| <u>STEP</u> | <u>INSTRUCTIONS</u> | <u>PAGE</u> | <u>START</u> | <u>DONE</u> |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|-------------|
| 68. | If PZR pressure lowers uncontrollably to less than 200 psia and LPSI Pumps have been stopped, restart LPSI pumps and open valves | 71 | _____ | _____ |
| 69. | If Letdown is isolated and conditions allow, restore Letdown | 72 | _____ | _____ |
| 70. | Verify the PCS is not in a water solid condition | 72 | _____ | © |
| 71. | If it is desired to draw a bubble in the PZR, perform the actions to draw a bubble in the PZR | 73 | _____ | _____ |
| 72. | If SI Pump throttling criteria are met, maintain corrected PZR level between 20% and 85% using Charging, Letdown and HPSI | 74 | _____ | _____ |
| 73. | Maintain PCS pressure within the limits of EOP Supplement 1 | 75 | _____ | © |
| 74. | Ensure at least one S/G has corrected level being maintained or restored to between 60% and 70% | 76 | _____ | © |
| 75. | Verify calculated cooldown rate does not exceed Technical Specification limits and the cooldown is achievable with the existing PCS heat removal path | 77 | _____ | © |
| 76. | Evaluate the need for a plant cooldown | 77 | _____ | ☞ |
| 77. | Routing step if plant cooldown not required | 77 | _____ | _____ |
| 78. | Verify PCS boron concentration greater than or equal to cold shutdown boron concentration | 78 | _____ | © |
| 79. | Commence steaming S/G(s) | 79 | _____ | © |
| 80. | When PZR Pressure and PCS cooldown within limits, then place LTOP in service. | 82 | _____ | _____ |

© = Continuously applicable step

☞ = Hold Point



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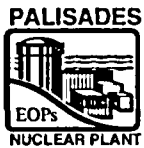
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5.0 PLACEKEEPER

| <u>STEP</u> | <u>INSTRUCTIONS</u> | <u>PAGE</u> | <u>START</u> | <u>DONE</u> |
|-------------|----------------------------------------------------------------------------------------------|-------------|--------------|-------------|
| 81. | Record each occurrence of PZR spray with ΔT greater than 200°F | 83 | _____ | © |
| 82. | Commence depressurizing the PCS to 270 psia | 84 | _____ | © |
| 83. | When Main Steam pressure is between 510 and 550 psia, block MSIS | 85 | _____ | _____ |
| 84. | When PZR pressure is less than 1687 psia and SIAS is not actuated, BLOCK SIAS | 86 | _____ | _____ |
| 85. | Monitor PCS for void formation | 88 | _____ | © |
| 86. | If PCS voiding is indicated, perform void elimination | 88 | _____ | _____ |
| 87. | If any vital AC or DC buses are not energized, restore power to affected buses | 89 | _____ | _____ |
| 88. | If offsite power was lost and is available, restore power to plant equipment | 90 | _____ | _____ |
| 89. | When 2400V Bus 1C or 1D is energized, then energize Plant buses | 92 | _____ | _____ |
| 90. | Verify natural circulation flow in at least one loop | 95 | _____ | _____ |
| 91. | If desired, restart PCPs | 95 | _____ | _____ |
| 92. | Seek TSC guidance if plant cooldown not in progress | 95 | _____ | _____ |
| 93. | If PZR pressure is between 350 psia and 300 psia and a cooldown is in progress, isolate SITs | 96 | _____ | _____ |
| 94. | Reset unnecessary safety actuation signals | 98 | _____ | _____ |

© = Continuously applicable step

☞ = Hold Point



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TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

5.0 PLACEKEEPER

| <u>STEP</u> | <u>INSTRUCTIONS</u> | <u>PAGE</u> | <u>START</u> | <u>DONE</u> |
|-------------|--------------------------------------------------------------------------------|-------------|--------------|-------------|
| 95. | Disable both HPSI pumps when listed conditions are met | 99 | _____ | _____ |
| 96. | When all shutdown cooling system entry conditions are met, exit this procedure | 100 | _____ | _____ |

END OF SECTION 5.0

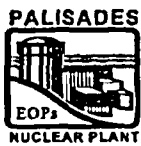
© = Continuously applicable step

⌛ = Hold Point

ATTACHMENT 3

EOP-6, "EXCESS STEAM DEMAND EVENT"

70 Pages Follow (Procedure Attachments not included)



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| Revision | 14 |
| Issued Date | 8/19/04 |

EXCESS STEAM DEMAND EVENT

RLTucker / 8/19/04

Procedure Sponsor Date

GGPalmisano / 10/9/03

Technical Reviewer Date

DCampbell / 10/9/03

User Reviewer Date



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TITLE: EXCESS STEAM DEMAND EVENT

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 operator actions which must be accomplished in the event of an Excess Steam Demand Event (ESDE). These actions are necessary to ensure that the Plant is placed in a safe, stable condition.

The goal of this procedure is to safely establish a plant condition that will allow the implementation of an appropriate existing procedure or a procedure provided by the Plant Technical Support Center for operation of the plant in hot shutdown or below.

End of Section 1.0



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TITLE: EXCESS STEAM DEMAND EVENT

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. Plant conditions indicate an Excess Steam Demand Event has occurred. ANY of the following may be present:
 - a. Loud noise indicative of a high energy steam line break.
 - b. Lowering PCS T_{AVE} .
 - c. Steam flow/feed flow mismatch.
 - d. Rise in feedwater flow.
 - e. Possible rise in Containment temperature, humidity, and Containment Sump level, with no significant radiation level increase on Containment Hi Range radiation monitors (Containment Area Monitors may fail high due to high temperature and humidity conditions).
 - f. Low pressure in affected S/G(s) following MSIV closure.
 - g. Possible rise in reactor power.

End of Section 2.0



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TITLE: EXCESS STEAM DEMAND EVENT

3.0 EXIT CONDITIONS

1. The diagnosis of an Excess Steam Demand Event is NOT confirmed.

OR

2. ANY of the Safety Function Status Check Sheet acceptance criteria are NOT satisfied
AND corrective actions to restore the safety function are NOT effective.

OR

3. The Excess Steam Demand Event procedure has accomplished its purpose by satisfying ALL of the following:
 - a. All Safety Function Status Check acceptance criteria are being satisfied.
 - b. Shutdown Cooling Entry conditions are satisfied or a cooldown is NOT required and maintaining the plant in Hot Shutdown condition is desired.
 - c. An appropriate, approved procedure to implement exists or has been approved by the plant Technical Support Center.

End of Section 3.0



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TITLE: EXCESS STEAM DEMAND EVENT

4.0 OPERATOR ACTIONS

INSTRUCTIONS

CONTINGENCY ACTIONS

CAUTION

During degraded Containment conditions, the operator should not rely on any single instrument indication due to large instrument errors. Alternate/additional instrumentation should be used to confirm trending of PCS conditions.

© 1. **CONFIRM** proper event diagnosis by performing ALL of the following:

a. **VERIFY** Attachment 1, "Safety Function Status Check Sheet" acceptance criteria:

- 1) Are satisfied at intervals of approximately fifteen minutes.

OR

- 2) Corrective actions to restore Attachment 1, "Safety Function Status Check Sheet," acceptance criteria are effective.

1.1. **GO TO ONE** of the following:

- EOP-1.0, "Standard Post Trip Actions," Attachment 1, "Event Diagnostic Flowchart" AND **RE-DIAGNOSE** the event.
- For events initiated from a lower mode, **GO TO** the EOP considered appropriate by the Shift Supervisor.
- EOP-9.0, "Functional Recovery Procedure."

(continue)

© = Continuously applicable step

☞ = Hold Point



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TITLE: EXCESS STEAM DEMAND EVENT

INSTRUCTIONS

CONTINGENCY ACTIONS

1. (continued)

b. 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.

c. Observation of NO abnormal S/G level rise (NOT attributable to feed flow or swell).

© 2. **REFER TO** the Site Emergency Plan AND **CLASSIFY** the event per EI-1, "Activation of the Site Emergency Plan/Emergency Classification."

3. **OPEN** the placekeeper AND **RECORD** the time of EOP entry.

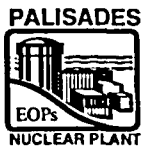
4. IF PZR pressure is less than or equal to 1605 psia OR Containment pressure is greater than or equal to 4.0 psig, THEN **VERIFY** "SAFETY INJ INITIATED" (EK-1342) is alarmed.

4.1. **PUSH BOTH** left and right INJECTION INITIATE pushbuttons on EC-13.

- PB1-1
- PB1-2

© = Continuously applicable step

⌚ = Hold Point



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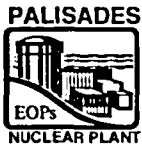
TITLE: EXCESS STEAM DEMAND EVENT

INSTRUCTIONS

5. IF SIAS is present,
THEN PERFORM ALL of the
following:
- a. **ENSURE** available safeguards
equipment operated or
operating. Refer to EOP
Supplement 5.
- b. **VERIFY** at least minimum SI
flow. Refer to EOP
Supplement 4.
- c. IF Letdown Orifice Stop Valves
are closed,
THEN PLACE handswitches in
the CLOSE position:
- HS-2003
 - HS-2004
 - HS-2005

CONTINGENCY ACTIONS

- b.1. IF SI flow is NOT within the limits of
EOP Supplement 4,
THEN PERFORM ANY of the
following to restore SI flow:
- 1) **ENSURE** electrical power
available to SI pumps and
valves.
 - 2) **ENSURE** correct SI valve
lineup.
 - 3) **ENSURE** adequate SI pump
seal cooling.
 - 4) **START** additional SI pumps as
needed until SI flow is within the
limits of EOP Supplement 4.



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INSTRUCTIONS

CONTINGENCY ACTIONS

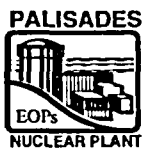
NOTE: Failure to close MSIV and MSIV bypass valves on the unaffected S/G will result in steaming the unaffected S/G through the break.

6. **ENSURE** MSIVs and MSIV Bypass Valves are closed:

| S/G | VALVE | DESCRIPTION |
|-----|---------|-------------|
| 'A' | CV-0510 | MSIV |
| | MO-0510 | MSIV BYPASS |
| 'B' | CV-0501 | MSIV |
| | MO-0501 | MSIV BYPASS |

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

7. IF PZR pressure lowers to less than 1300 psia
AND SIAS is initiated,
THEN PERFORM BOTH of the following:
- ENSURE** one PCP is stopped in each loop.
 - IF PCS is less than 25°F subcooled,
THEN ENSURE ALL PCPs stopped.



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TITLE: EXCESS STEAM DEMAND EVENT

INSTRUCTIONS

CONTINGENCY ACTIONS

8. **COMMENCE** emergency boration to establish PCS boron concentration greater than or equal to the boron concentration needed for T_{AVE} greater than 525°F as verified by sample or hand calculation. Refer to EOP Supplement 35.

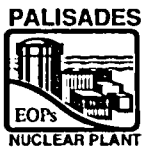
- a. WHEN PCS boron concentration is greater than or equal to the required boron concentration, THEN emergency boration may be secured. **REFER TO EOP Supplement 40.**

9. WHEN PCS temperature lowers, THEN ENSURE PCPs configured as follows:

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

10. IF PCPs are operating, THEN VERIFY PCP operating limits are satisfied. Refer to EOP Supplement 1.

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



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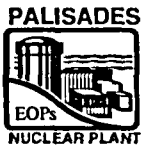
INSTRUCTIONS

11. **VERIFY BOTH** of the following:
- At least one Cooling Tower Pump operating
 - P-39A
 - P-39B
 - At least one Condensate Pump operating
 - P-2A
 - P-2B

CONTINGENCY ACTIONS

- 11.1. **ENSURE CLOSED BOTH MSIVs:**
- CV-0510 ('A' S/G)
 - CV-0501 ('B' S/G)
- 11.2. **ENSURE CLOSED** from the Control Room BOTH MSIV Bypass valves:
- MO-0510 ('A' S/G)
 - MO-0501 ('B' S/G)
- a. IF ANY MSIV Bypass valves were open when power/position indication was lost, **THEN LOCALLY CLOSE ANY** open MSIV Bypass valve.
- b. **ENSURE CLOSED ALL S/G** Blowdown Valves:

| 'A' S/G | 'B' S/G |
|---------|---------|
| CV-0739 | CV-0738 |
| CV-0771 | CV-0770 |
| CV-0767 | CV-0768 |



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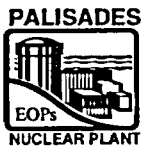
INSTRUCTIONS

CONTINGENCY ACTIONS

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.

12. **ENSURE** at least one train of CR HVAC in Emergency Mode. Refer to SOP-24, "Ventilation and Air Conditioning System."
- © 13. **DETERMINE** the most affected S/G by considering ALL of the following:
 - High steam flow from S/G
 - Lowering S/G pressure
 - Lowering S/G level
 - Lowering Loop T_c temperature



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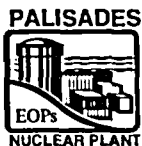
INSTRUCTIONS

CONTINGENCY ACTIONS

NOTE: Maintenance of heat removal via the least affected S/G during dual events (SGTR/SGTR, ESD/ESD, or SGTR/ESD combinations) is preferable to isolation of both S/Gs and going to once-through-cooling.

14. IF MSIS has NOT isolated the leak, THEN ISOLATE the most affected steam generator. Refer to the following applicable EOP supplement:

- EOP Supplement 17 ('A' S/G)
- EOP Supplement 18 ('B' S/G)



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INSTRUCTIONS

15. **VERIFY** the correct S/G is isolated by comparing ALL of the following:

- S/G pressures
- S/G levels
- PCS Loop T_C temperatures

CONTINGENCY ACTIONS

15.1. IF the wrong S/G was isolated, THEN PERFORM ALL of the following on the least affected S/G:

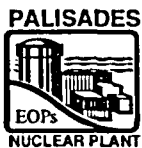
a. **OPEN** the Atmospheric Steam Dump Valve air supply valves and manual isolation valves. Refer to the following applicable EOP Supplement:

- EOP Supplement 17 ('A' S/G)
- EOP Supplement 18 ('B' S/G)

b. **ESTABLISH** Auxiliary Feedwater flow through ANY associated AFW valve:

| 'A' S/G | 'B' S/G |
|---------------------|---------------------|
| CV-0737A CV-0749 | CV-0736A CV-0727 |

15.2. **GO TO** Step 14 to isolate the affected S/G.



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TITLE: EXCESS STEAM DEMAND EVENT

INSTRUCTIONS

CONTINGENCY ACTIONS

CAUTION

When ALL PCPs are stopped, steaming the least affected S/G must occur prior to dryout of the most affected S/G to prevent lifting PZR Code Safety Valves or Pressurized Thermal Shock rupture of the PCS.

- © 16. **STABILIZE** PCS temperature as follows:
- a. **MAINTAIN** level in the least affected S/G between 60% and 70%.
 - b. IF the steam leak is isolated, THEN ESTABLISH steam flow from BOTH S/Gs using the Atmospheric Steam Dump Valves.

(continue)

© = Continuously applicable step

⌚ = Hold Point



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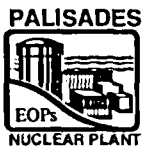
16. (continued)

WARNING

IF Containment pressure is higher than the most affected S/G pressure
AND the ESDE is inside of containment,
THEN opening of the ASDVs on the most affected S/G will provide a direct release path to the environment.

NOTE: Steaming BOTH S/Gs using ASDVs is permitted prior to isolation of the most affected S/G if necessary to control temperature /pressure of the least affected S/G.

- c. IF the steam leak is NOT isolated,
THEN STEAM the least affected S/G as necessary to maintain the following, as applicable:
- WHEN T_{cs} in the affected loop are lowering,
THEN MAINTAIN the least affected S/G pressure within 50 psid above the most affected S/G pressure
 - WHEN T_{cs} in the affected loop are NOT lowering,
THEN STABILIZE PCS T_{cs} using the least affected S/G



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INSTRUCTIONS

NOTE: Use ANY of the following to determine Average of Qualified CETs:

- PPC point "KCETA"
(Average of Qualified CETs)
- PPC Incore Qualified CET
Map (PPC page 313)
- Manual calculation. Refer to
SOP-34, "Plant Process
Computer (PPC) System."

© 17. **VERIFY** SI Pump throttling criteria are satisfied by ALL of the following:

- a. Based on the Average of Qualified CETs, PCS subcooling meets ONE of the following:
- At least 25°F subcooled for non-degraded Containment conditions
 - Greater than the minimum subcooling curve on EOP Supplement 1 for degraded Containment conditions
- b. Corrected PZR level is greater than 20% (40% for degraded Containment) and controlled. **REFER TO** EOP Supplements 9 and 10.

CONTINGENCY ACTIONS

17.1. IF ANY of the SI Pump throttling criteria can NOT be maintained, THEN RAISE HPSI flow AND START HPSI Pumps as necessary.

| PUMP | VALVE | |
|---------|---------|-------------------------|
| | NUMBER | DESCRIPTION |
| Train 1 | | |
| P-66B | MO-3009 | HPSI Train 1 to Loop 1B |
| | MO-3011 | HPSI Train 1 to Loop 2A |
| | MO-3007 | HPSI Train 1 to Loop 1A |
| | MO-3013 | HPSI Train 1 to Loop 2B |
| Train 2 | | |
| P-66A | MO-3066 | HPSI Train 2 to Loop 1B |
| | MO-3064 | HPSI Train 2 to Loop 2A |
| | MO-3068 | HPSI Train 2 to Loop 1A |
| | MO-3062 | HPSI Train 2 to Loop 2B |

(continue)

© = Continuously applicable step

⌘ = Hold Point



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INSTRUCTIONS

CONTINGENCY ACTIONS

17. (continued)

- c. At least one S/G is available for PCS heat removal with corrected level being maintained or being restored to between 60% and 70%.
REFER TO EOP Supplement 11.

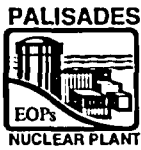
- d. Operable RVLMS channels indicate greater than 102 inches above the bottom of fuel alignment plate (621' 8").

18. IF HPSI Pumps are operating
AND SI Pump throttling criteria are satisfied,
THEN THROTTLE HPSI flow
OR STOP one HPSI Pump at a time.

| PUMP | VALVE | |
|---------|---------|-------------------------|
| | NUMBER | DESCRIPTION |
| Train 1 | | |
| P-66B | MO-3009 | HPSI Train 1 to Loop 1B |
| | MO-3011 | HPSI Train 1 to Loop 2A |
| | MO-3007 | HPSI Train 1 to Loop 1A |
| | MO-3013 | HPSI Train 1 to Loop 2B |
| Train 2 | | |
| P-66A | MO-3066 | HPSI Train 2 to Loop 1B |
| | MO-3064 | HPSI Train 2 to Loop 2A |
| | MO-3068 | HPSI Train 2 to Loop 1A |
| | MO-3062 | HPSI Train 2 to Loop 2B |

© = Continuously applicable step

⌚ = Hold Point



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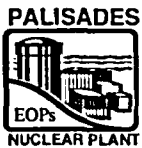
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INSTRUCTIONS

CONTINGENCY ACTIONS

19. IF LPSI Pumps are operating
AND PZR pressure is being
controlled greater than 200 psia,
THEN **PERFORM BOTH** of the
following:
 - a. **STOP** the operating LPSI
Pumps:
 - P-67A
 - P-67B
 - b. **CLOSE** the LPSI injection
valves:
 - MO-3008 LPSI Loop 1A
 - MO-3010 LPSI Loop 1B
 - MO-3012 LPSI Loop 2A
 - MO-3014 LPSI Loop 2B
20. IF PZR pressure lowers to less
than 200 psia
AND LPSI pumps have been
stopped,
THEN **PERFORM BOTH** of the
following:
 - a. **ENSURE OPERATING ALL**
available LPSI pumps:
 - P-67A
 - P-67B
 - b. **ENSURE OPEN** LPSI injection
valves:
 - MO-3008 LPSI Loop 1A
 - MO-3010 LPSI Loop 1B
 - MO-3012 LPSI Loop 2A
 - MO-3014 LPSI Loop 2B



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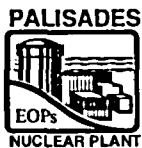
NOTE: Failure to maintain greater than 100 gpm AFW flow to at least one S/G will result in an automatic start of the next available AFW pump if the pump controls are in Auto.

- © 21. **ENSURE** the least affected S/G has corrected level being maintained or being restored to between 60% and 70%. Refer to EOP Supplement 11.

NOTE: Use the following instruments to determine spray nozzle ΔT :

- PZR Vapor Phase Temperature, TI-0101
- Spray line temperature, TIA-0103 or TIA-0104 (use the lowest temperature if using main sprays)
- Charging line temperature, TI-0212 (if using Auxiliary Spray)

- © 22. **RECORD** each occurrence of PZR Spray operation with a ΔT (PZR vapor phase temp minus spray temp) greater than 200°F in the Reactor Logbook.



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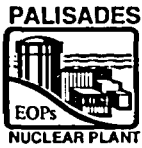
- © 23. **MAINTAIN** PCS pressure within the limits of EOP Supplement 1 by performing ANY of the following:
- a. **CONTROL** the following:
- PZR heaters
 - Main Spray
 - Auxiliary Spray (Supplement 37)
- b. IF SI Pump throttling criteria are met,
THEN CONTROL HPSI, Charging, and Letdown flows.

(continue)

CONTINGENCY ACTIONS

- 23.1. IF the PCS is oversubcooled OR PZR pressure is greater than the maximum limits of EOP Supplement 1,
THEN PERFORM ANY of the following to restore subcooling or PCS pressure to within the appropriate limit:
- a. **OPERATE** available S/G(s) to stop the cooldown
AND STABILIZE Qualified CET temperatures and Loop T_{cs}.
- b. **OPERATE** the following to lower PZR pressure within allowable limits:
- Main Spray
 - Auxiliary Spray (Supplement 37)
- c. IF SI Pump throttling criteria are met,
THEN CONTROL HPSI, Charging, and Letdown flows.

(continue)



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INSTRUCTIONS

23. (continued)

CONTINGENCY ACTIONS

(continued)

d. IF ALL of the following conditions are met:

- Above actions to lower PCS pressure are NOT effective
- PORVs are required to open to reduce PCS pressure
- PZR level is less than 85%

THEN PERFORM BOTH of the following:

1) **OPEN** PORV Isolation Valves:

- MO-1042A
- MO-1043A

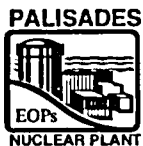
CAUTION

Rupture of the Quench Tank rupture disk is likely during any sustained opening of PORVs. This would result in rising Containment atmosphere temperature and pressure. Quench Tank temperature and pressure should be monitored during PORV operation.

2) **CYCLE** the PORVs as necessary to maintain BOTH of the following:

(continue)

(continue)



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INSTRUCTIONS

23. (continued)

(continue)

CONTINGENCY ACTIONS

(continued)

- PZR corrected level less than 85% (**REFER TO** EOP Supplements 9 and 10)
- PZR pressure within the limits of EOP Supplement 1.

3) **IF** ALL of the following PORV closing criteria are met:

- PZR pressure is less than 2100 psia
- PZR pressure is less than the maximum limits of EOP Supplement 1
- PORVs are NOT required open to reduce PZR pressure,

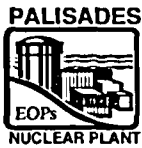
THEN CLOSE the PORVs:

- PRV-1042B
- PRV-1043B

4) **IF** the PORV closing criteria are met
AND either PORV will NOT close,
THEN CLOSE associated PORV Isolation Valve:

- MO-1042A
- MO-1043A

(continue)



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INSTRUCTIONS

23. (continued)

(continue)

CONTINGENCY ACTIONS

(continued)

5) **ENSURE** started the following containment cooling fans:

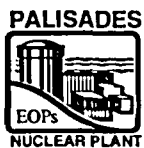
a) ALL available Containment Air Cooler 'A' fans for ALL available Containment Air Coolers.

b) IF SIAS not present, THEN ALL available Containment Air Cooler 'B' fans for ALL available Containment Air Coolers.

6) IF ANY of the following conditions exist:

- Containment pressure is greater than or equal to 4.0 psig.
- Any operable CONTAINMENT Radiation Monitor rises to 1×10^1 R/hr,

THEN PERFORM ALL of the following:



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INSTRUCTIONS

23. (continued)

(continue)

CONTINGENCY ACTIONS

(continued)

- a) **VERIFY "CIS INITIATED"**
(EK-1126) is alarmed
OR

MANUALLY INITIATE
CIS by pushing left or
right HIGH RADIATION
INITIATE pushbuttons on
EC-13:

- CHRL-CS
- CHRR-CS

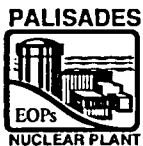
- b) **VERIFY** Containment
Isolation. Refer to EOP
Supplement 6.

- 7) IF the Pressure Control
safety function is still in
jeopardy,
THEN GO TO EOP-9.0.

- 23.2. IF PCS cooldown rate exceeds
Technical Specification limits,
THEN PERFORM ANY of the
following to restore the cooldown
rate to within Technical
Specification limits:

- a. **OPERATE** available S/G(s) to
stop the cooldown
AND STABILIZE Qualified CET
temperatures and Loop T_{cs}.

(continue)



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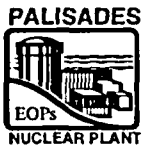
23. (continued)

24. **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."

CONTINGENCY ACTIONS

(continued)

- b. **OPERATE** the following to maintain PZR pressure within limits of EOP Supplement 1:
- PZR heaters
 - Main Spray
 - Auxiliary Spray (Supplement 37)
 - Letdown
- c. As directed by the Shift Supervisor, **CONTINUE** the PCS cooldown at less than or equal to Technical Specification limits. Refer to EOP Supplement 33.



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25. IF ANY of the following conditions exist:

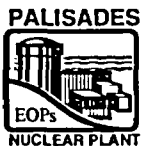
- Containment pressure is greater than or equal to 4.0 psig
- Any operable Containment Radiation Monitor rises to 1×10^1 R/hr,

THEN PERFORM ALL of the following:

- a. **VERIFY** "CIS INITIATED" (EK-1126) is alarmed.
- b. **VERIFY** Containment Isolation. Refer to EOP Supplement 6.

CONTINGENCY ACTIONS

- a.1. **MANUALLY INITIATE** CIS by pushing left or right HIGH RADIATION INITIATE pushbutton on EC-13.
 - CHRL-CS
 - CHRR-CS
- b.1. **CLOSE** valves that failed to automatically operate.



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INSTRUCTIONS

26. IF Containment pressure is greater than or equal to 4.0 psig, THEN PERFORM ALL of the following:

- a. **VERIFY** Containment Spray alignment
AND at least minimal acceptable spray flow per following table:

| NUMBER OF RUNNING CS PUMPS | NUMBER OF OPEN CS VALVES | CS FLOW MUST BE AT LEAST: |
|----------------------------|--------------------------|---------------------------|
| RAS NOT Present | | |
| 1 | at least 1 | 2185 gpm total |
| 2 or 3 | 2 | 2939 gpm total |
| RAS Present | | |
| 1 | 1 | 1540 gpm |
| 2 or 3 | 2 | 3113 gpm total |

- b. **ENSURE** at least one Containment Air Cooler Accident Fan operating.

- V-1A
- V-2A
- V-3A
- V-4A

CONTINGENCY ACTIONS

- a.1. **OPEN** available Containment Spray valves to obtain required configuration and at least minimum flow.

- CV-3001
- CV-3002

AND

START available Containment Spray pumps

- P-54A
- P-54B
- P-54C



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27. IF Containment pressure rises to greater than or equal to 35 psia AND CCW Containment Isolation Valves were opened, THEN PLACE the following CCW Containment Isolation Valve keyswitches to CLOSE:

| CCW Valve | Keyswitch | Key |
|-----------|-----------|-----|
| CV-0910 | HS-0910 | 337 |
| CV-0911 | HS-0911 | 338 |
| CV-0940 | HS-0940 | 336 |

CONTINGENCY ACTIONS

CAUTION

Operation of PCPs should be minimized when seal cooling is NOT present or controlled bleedoff is isolated.

28. IF PCP seal cooling is unavailable, THEN PERFORM ALL of the following:
- CLOSE** PCP Controlled Bleedoff valves:
 - CV-2083
 - CV-2099
 - CLOSE** PCP Controlled Bleedoff Relief Stop, CV-2191.
 - RESTORE** PCP seal cooling. Refer to ONP-6.2, "Loss of Component Cooling."



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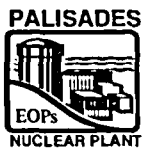
INSTRUCTIONS

- © 29. **VERIFY** the containment sump level is rising as the SIRWT level is lowering.

30. WHEN SIRWT level less than or equal to 25%,
THEN prior to RAS, **PERFORM** Pre-RAS Actions. Refer to EOP Supplement 42.

CONTINGENCY ACTIONS

- 29.1. IF Containment Sump level is NOT rising as SIRWT level lowers,
THEN **PERFORM BOTH** of the following:
- a. **INITIATE** actions to makeup to the SIRWT. Refer to ONE of the following:
 - SOP-2A, "Chemical & Volume Control System Charging & Letdown"
 - SOP-17A, "Clean Radioactive Waste System"
 - b. IF "CIS INITIATED" (EK-1126) is clear,
THEN **MANUALLY INITIATE** CIS by pushing left or right HIGH RADIATION INITIATE pushbuttons on EC-13.



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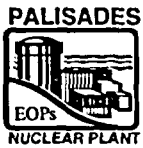
INSTRUCTIONS

CONTINGENCY ACTIONS

CAUTION

Premature initiation of RAS can lead to insufficient Containment Sump inventory for SI Pump operation. Minimum Containment Water level of 594' 1" is necessary for adequate ESS pump NPSH.

31. WHEN SIRWT level lowers to below 2%,
THEN PERFORM Post-RAS Actions. Refer to EOP Supplement 42.



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INSTRUCTIONS

CONTINGENCY ACTIONS

32. IF Charging Pump suction is aligned to the SIRWT AND RAS has initiated, THEN PERFORM ALL of the following:

a. STOP ALL Charging Pumps:

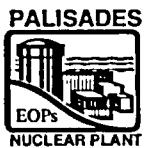
- P-55A
- P-55B
- P-55C

b. RACK OUT ALL Charging Pump breakers:

| CHARGING PUMP | BREAKER |
|---------------|--------------------|
| P-55A | 52-1205 |
| P-55B | 52-1308 52-1206 |
| P-55C | 52-1105 |

- c. PLACE a Caution Tag on their handswitches that reads "Do NOT Use - No suction source available"

- 52-1205CS
- 52-1206CS
- 52-1105CS



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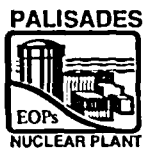
TITLE: EXCESS STEAM DEMAND EVENT

INSTRUCTIONS

CONTINGENCY ACTIONS

33. WHEN Containment pressure is less than 3.0 psig,
AND CHP has initiated,
THEN PERFORM ALL of the following:
- a. IF CV-3001, Containment Spray Valve, is open,
THEN PLACE HS-3001A to the OPEN position.
 - b. IF CV-3002, Containment Spray Valve, is open,
THEN PLACE HS-3002A to the OPEN position.
 - c. IF MFW or Condensate pumps are operating
AND feedwater from these sources is NOT desired,
THEN PLACE ALL of the following controllers in MANUAL
AND CLOSE:
 - 1) Feedwater Regulating Valves
 - LIC-0701 ('A' S/G)
 - LIC-0703 ('B' S/G)
 - 2) Feedwater Regulating Bypass Valves
 - LIC-0735 ('A' S/G)
 - LIC-0734 ('B' S/G)

(continue)



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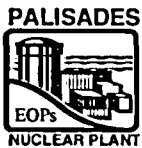
33. (continued)

- d. IF CCW to containment has NOT been restored, THEN PLACE the following CCW valve keyswitches to CLOSE:

| CCW Valve | Keyswitch | Key |
|-----------|-----------|-----|
| CV-0910 | HS-0910 | 337 |
| CV-0911 | HS-0911 | 338 |
| CV-0940 | HS-0940 | 336 |

NOTE: Automatic reinitiation of spray will not occur until after SIAS has been reset.

- e. **RESET** CHP circuits by pushing left and right HIGH PRESSURE RESET pushbuttons on C-13
- CHPL - Reset
 - CHPR - Reset



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CONTINGENCY ACTIONS

CAUTION

Continued operation of the sprays after pressure has been reduced to an acceptable level increases the possibility of wetting electrical connectors which may result in electrical grounds, shorts and other malfunctions.

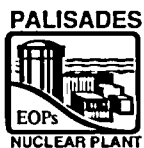
34. IF the Containment Spray System is operating,
AND ALL of the following conditions are satisfied:

| Parameter | Condition |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Containment pressure | less than 3 psig |
| Containment Spray operation | NOT required for CTMT ambient cooling |
| | NOT required for HPSI subcooling |
| | NOTE: These conditions must be met prior to securing the last Containment Spray pump. |
| | NOT needed for iodine removal as determined by Chemistry <u>OR ALL</u> of the following: <ul style="list-style-type: none">Containment high range Gamma monitors read less than 1800 R/HrContainment isolated per EOP Supplement 6less than one hour has elapsed since reactor trip |

(continue)

© = Continuously applicable step

⌄ = Hold Point



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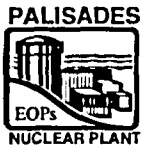
34. (continued)

THEN Containment Spray Pumps may be secured by performing the following:

NOTE: Securing spray pumps one at a time and waiting a short period to see the effect of reduced sprays will aid in the determination of the need for continued spray.

- a. IF three Containment Spray Pumps are operating,
THEN STOP one Containment Spray Pump as directed by the Shift Supervisor.
- b. IF two Containment Spray Pumps are operating,
THEN PERFORM the following as directed by the Shift Supervisor:
 - 1) **CLOSE** one Containment Spray Valve.
 - CV-3001
 - CV-3002
 - 2) **STOP** one Containment Spray Pump.
- c. IF one Containment Spray Pump is operating,
THEN STOP the Containment Spray Pump as directed by the Shift Supervisor.

(continue)



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CONTINGENCY ACTIONS

34. (continued)

- d. WHEN ALL Containment Spray Pumps have been stopped,
THEN ENSURE CLOSED
BOTH Containment Spray Valves.

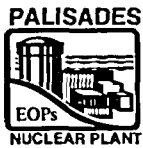
- CV-3001
- CV-3002

- e. IF CHP has been reset,
THEN ENSURE both
Containment Spray Valve CHP
Bypass Keyswitches are in
NORMAL:

- HS-3001C
- HS-3002C

35. IF ALL operable Containment Area Radiation Monitors indicate less than 1×10^1 R/hr
AND Containment pressure is less than 3.0 psig,
THEN RESET CHR by pushing the following:

- The RESET pushbutton on each Containment Area Radiation Monitor.
- BOTH left and right HIGH RADIATION RESET pushbuttons on C-13.



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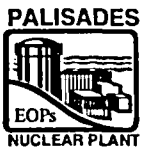
NOTE: Subsequent to the actions in Step 36, the TSC must approve closure of ANY of the failed open valves.

36. **WHEN** Containment water level approaches the level specified below, **THEN ENSURE OPEN** the following valves
AND OPEN associated breakers:

| Cntmt Water Level | Valve | | |
|-------------------------|-----------|--------|-------------------------|
| | Number | Bkr | Description |
| 595' 9" | MCC No. 1 | | |
| | MO-3008 | 52-141 | LPSI Loop 1A |
| | MO-3010 | 52-147 | LPSI Loop 1B |
| | MCC No. 2 | | |
| | MO-3012 | 52-247 | LPSI Loop 2A |
| 596' 4" | MO-3014 | 52-251 | LPSI Loop 2B |
| | MCC No. 1 | | |
| | MO-3009 | 52-197 | HPSI Train 1 to Loop 1B |
| | MO-3011 | 52-157 | HPSI Train 1 to Loop 2A |
| | MO-3007 | 52-137 | HPSI Train 1 to Loop 1A |
| | MO-3013 | 52-151 | HPSI Train 1 to Loop 2B |
| | MCC No. 2 | | |
| | MO-3066 | 52-257 | HPSI Train 2 to Loop 1B |
| | MO-3064 | 52-237 | HPSI Train 2 to Loop 2A |
| | MO-3068 | 52-261 | HPSI Train 2 to Loop 1A |
| | MO-3062 | 52-241 | HPSI Train 2 to Loop 2B |

© = Continuously applicable step

⌄ = Hold Point



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37. IF Letdown is isolated
AND BOTH of the following
conditions exist:

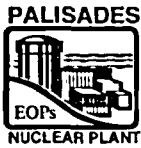
- SI Pump throttling criteria are met
- Letdown is needed or desired,

THEN RESTORE Letdown. Refer to EOP Supplement 27.

38. IF ANY of the following criteria are met:

- PCS boron concentration is at the required shutdown boron concentration based on sample or hand calculation. **REFER TO** EOP Supplement 35.
- "CONCENTRATED BORIC ACID TANK LO-LO LEVEL" (EK-0716 and EK-0722) are alarmed.

THEN ALIGN the Charging Pump suction to the VCT (if Letdown is in service) or SIRWT as directed by the Shift Supervisor. Refer to EOP Supplement 40.



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© 39. **VERIFY** the PCS is NOT in a water solid condition as indicated by BOTH of the following:

- a. No exaggerated or severe pressure response to PCS inventory or temperature changes.
- b. ANY of the following:
 - Corrected PZR level is less than 100%. **REFER TO** EOP Supplements 9 and 10
 - RVLMS indicates voiding

40. IF it is desired to draw a bubble in the PZR,
THEN PERFORM ALL of the following:

- a. **ENSURE ENERGIZED ALL** available PZR heaters.
- b. IF ANY of the following conditions exist:
 - Both S/G pressures can be maintained below the existing PCS pressure
 - At least one PCP is operating

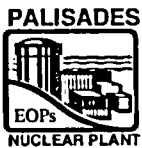
THEN PERFORM ALL of the following to reduce PCS pressure:

(continue)

CONTINGENCY ACTIONS

39.1. IF water solid PCS condition is indicated,
THEN MAINTAIN the PCS within the limits of EOP Supplement 1 by ANY of the following:

- a. **OPERATE** available S/G(s) to control the cooldown
AND STABILIZE Qualified CET temperatures and Loop T_{cs}.
- b. IF SI Pump throttling criteria are met,
THEN CONTROL HPSI, Charging, and Letdown flows.



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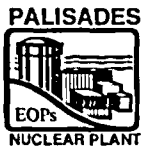
INSTRUCTIONS

CONTINGENCY ACTIONS

40.

(continued)

- 1) IF SI Pump throttling criteria are met,
THEN CONTROL Charging, Letdown, and HPSI flow.
- 2) **INITIATE** PCS cooldown within Technical Specification limits.
- 3) **MONITOR** the PCS cooldown rate using PPC. Refer to EOP Supplement 33.
- 4) **MAINTAIN** PCS temperature and pressure within the limits of EOP Supplement 1.
- 5) **MAINTAIN** 25°F subcooling.
- c. IF a bubble forms in the Reactor Vessel Upper Head region,
THEN PERFORM BOTH of the following:
 - 1) **CONTROL** Charging, Letdown, and HPSI flow to maintain PCS level greater than the 102 inches above the bottom of fuel alignment plate (621' 8").
 - 2) **CONTINUE** efforts to draw a bubble in the PZR.



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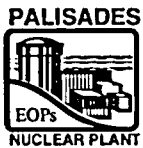
CONTINGENCY ACTIONS

- NOTE:** PZR level instrument de-calibration occurs due to PCS pressure and containment temperature changes. Level correction is per EOP Supplements 9 and 10.
- NOTE:** IF the PCS is in a water solid condition for PCS Pressure Control,
THEN the PZR level limit of 85% may be exceeded.
- NOTE:** PZR level should be maintained greater than 36% (40% for degraded Containment) to have continued availability of PZR Heaters.
41. IF SI Pump throttling criteria are met,
THEN MAINTAIN corrected PZR level between 20% and 85% (42% to 57% preferred) by performing ANY of the following:
- a. **THROTTLE** HPSI flow.
 - b. **CONTROL** Charging and Letdown.

(continue)

© = Continuously applicable step

⌚ = Hold Point



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INSTRUCTIONS

41. (continued)

- 1) **ENSURE** normal charging path aligned as follows:
 - a) **OPEN** Charging Line Stop Valve, CV-2111.
 - b) **OPEN** at least one Charging Stop Valve:
 - CV-2113
 - CV-2115
 - c) IF BOTH Charging Stop Valves fail to open THEN **ENSURE** greater than 33 gpm flow through CK-CVC2112.

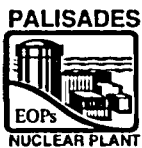
(continue)

CONTINGENCY ACTIONS

NOTE: IF an interruption in boration via Charging Pump to HPSI Train 2 occurs, THEN a different SI cold leg injection nozzle should be used when restoring flow.

- 1.1) IF the normal charging path is NOT available AND HPSI Train 2 is available, THEN **CHARGE** to the PCS via the HPSI header by performing ALL of the following:
 - 1) **STOP** ALL Charging Pumps.
 - 2) **CLOSE** Charging Line Stop Valve, CV-2111.
 - 3) **CLOSE** Letdown Orifice Stop Valves:
 - CV-2003
 - CV-2004
 - CV-2005
 - 4) **CLOSE** Letdown Containment Isolation Valve CV-2009.
 - 5) **ENSURE CLOSED** HPSI Pump B Discharge to Train 2, CV-3018.

(continue)



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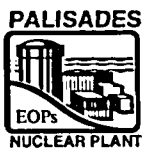
INSTRUCTIONS

41. (continued)

CONTINGENCY ACTIONS

(continued)

- 6) **OPEN** ONE HPSI Train 2 Injection Valve:
 - MO-3062
 - MO-3064
 - MO-3066
 - MO-3068
- 7) **PLACE** SIT Pressure Indicating Controller associated with valve opened above to **MANUAL AND CLOSE**:
 - PIC-0338, MO-3062
 - PIC-0347, MO-3064
 - PIC-0346, MO-3066
 - PIC-0342, MO-3068
- 8) **OPEN** Charging Pump Discharge to Train 2, MO-3072.
- 9) **START** Charging pumps as necessary to control PZR level.



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INSTRUCTIONS

42. IF ANY of the following AC or DC buses are NOT energized, THEN RESTORE power to the affected buses. Refer to the following applicable procedure:

| BUS | PROCEDURE |
|-----------------|-------------------------------------------|
| 1C or 1D | EOP Supplement 29 |
| 1E with No SIAS | EOP Supplement 29 |
| 1E with SIAS | SOP-30 |
| Y10 | ONP-24.1, "Loss of Preferred AC Bus Y10" |
| Y20 | ONP-24.2, "Loss of Preferred AC Bus Y20" |
| Y30 | ONP-24.3, "Loss of Preferred AC Bus Y30" |
| Y40 | ONP-24.4, "Loss of Preferred AC Bus Y40" |
| Y01 | ONP-24.5, "Loss of Instrument AC Bus Y01" |
| Any DC Bus | ONP-2.3, "Loss of DC Power" |

CONTINGENCY ACTIONS

- 42.1. IF Bus 1D and Bus 1E are NOT energized, THEN as resources permit, **PROVIDE** power to PZR Heaters from Bus 1C. Refer to ONP-2.1, "Loss of AC Power," Attachment 1.



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INSTRUCTIONS

CONTINGENCY ACTIONS

43. IF offsite power was lost
AND offsite power is available,
THEN RESTORE power to plant
equipment by performing ALL of
the following:

a. IF NONE of the following are
energized:

- 'R' Bus
- 'F' Bus
- Cook 1 Line,

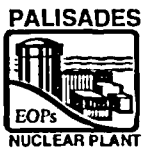
THEN INITIATE actions to
restore power to 'F' or 'R' Bus,
as available. Refer to EOP
Supplement 21.

b. WHEN ANY of the following are
energized:

- 'R' Bus
- 'F' Bus
- Cook 1 Line,

THEN INITIATE actions to
restore Plant power. Refer to
EOP Supplement 29.

(continue)



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CONTINGENCY ACTIONS

43. (continued)

- c. **RESTORE** power to the affected bus(es). Refer to the following applicable procedure:

| BUS | PROCEDURE |
|---------------------|--------------------------------|
| 1E (without SIS) | EOP Supplement 29 |
| 1E (with SIS) | SOP-30 |
| 1A or 1B | ONP-2.1, "Loss of AC Power" |

- d. **RESTART** plant equipment as desired.



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INSTRUCTIONS

CAUTION

Each D/G is limited to the following load rating:

- 2500 KW continuous
- 2750 KW two hours per 24 hour period

CONTINGENCY ACTIONS

44. WHEN 2400V Bus 1C or Bus 1D is energized,
THEN as resources permit,
ENERGIZE Plant buses by
performing ALL of the following:

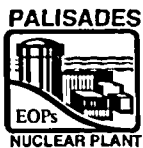
a. IF Bus 1C is energized,
THEN **PERFORM ALL** of the
following:

1) **ENSURE CLOSED** the
following breakers:

- 152-115 (Bus 1C to
Transformers 11 and 19)
- 152-108 (Bus 1C to
Transformer 13)

44.1. IF equipment needed to maintain
Safety Functions is available from a
de-energized 2400V Vital Bus
AND a power supply is available,
THEN **ENERGIZE** the bus
AND **RESTORE** the needed
equipment.

(continue)



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INSTRUCTIONS

CONTINGENCY ACTIONS

44. (continued)

2) **ENSURE** 480V MCCs are energized as appropriate:

- MCC 1: 52-1906
(Bus 19)
- MCC 3: 52-1301
(Bus 13)
- MCC 7: 52-1103
(Bus 11)

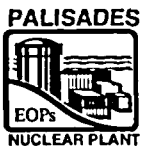
b. IF Bus 1D is energized,
THEN PERFORM the following:

1) **ENSURE CLOSED** 152-201
(Bus 1D to
Transformers 12 and 20)

2) **ENSURE** 480V MCCs energized as appropriate:

- MCC 2: 52-2006
(Bus 20)
- MCC 8: 52-1201
(Bus 12)

(continue)



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CONTINGENCY ACTIONS

44. (continued)

NOTE: IF only one MCC is available (MCC 1 or MCC 2), THEN BOTH vital DC Buses should be powered from the two Battery Chargers supplied by the same energized MCC.

c. **ENSURE CLOSED** Battery Charger Feeder Breakers from available MCCs:

1) MCC 1

- Charger No 1 Feeder
52-146
- Charger No 4 Feeder
52-186

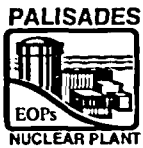
2) MCC 2

- Charger No 2 Feeder
52-225
- Charger No 3 Feeder
52-285

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

d.1. **PLACE** Battery Chargers in operation. Refer to SOP-30, "Station Power."

45. WHEN PCP restart is desired, THEN RESTART desired PCPs. Refer to EOP Supplement 3.



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INSTRUCTIONS

46. IF ALL PCPs are stopped,
THEN VERIFY natural circulation
flow in at least one PCS loop by
ALL of the following:
- Core ΔT less than 50°F
(Average of Qualified CETs
minus T_C)
 - Loop T_{Hs} and Loop T_{Cs}
constant or lowering
 - Average of Qualified CETs at
least 25°F subcooled
 - Difference between Loop T_H
and Average of Qualified CETs
is less than or equal to 15°F
47. IF ALL PCPs are stopped,
AND natural circulation criteria are
NOT satisfied,
THEN ENSURE ALL of the
following conditions exist:
- All available Charging pumps
are operating
 - SI flow is within the limits of
EOP Supplement 4
 - At least one S/G is available for
removing heat from PCS with
level being maintained or
restored to between 60%
and 70%
 - Average of Qualified CETs is
less than superheated

CONTINGENCY ACTIONS

- 46.1. **ENSURE** proper control of S/G
feeding and steaming rates.



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INSTRUCTIONS

48. IF measured Containment hydrogen concentration is between 1% and 3%,
THEN PERFORM ALL the following:

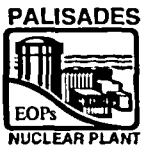
CONTINGENCY ACTIONS

CAUTION

Each D/G is limited to a 2500 KW continuous load rating and a 2750 KW two-hour load rating. A hydrogen recombiner will draw a maximum of 75 KW.

- PLACE** at least one Hydrogen Recombiner in service. Refer to SOP-5, "Containment Air Cooling and Hydrogen Recombining System."
- OPEN** MCC 9 Feeder Breaker, 52-1304.

LOCATION: On Bus 13



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INSTRUCTIONS

CONTINGENCY ACTIONS

© 49. **PERFORM** ALL of the following:

a. **CALCULATE** minimum PCS
cooldown rate. Refer to
EOP Supplement 2.

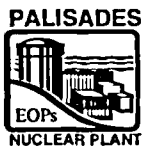
b. **VERIFY BOTH** of the following:

- The calculated cooldown rate does NOT exceed Technical Specification limits.
- The calculated cooldown rate is achievable with the existing PCS heat removal path.

b.1. IF additional sources of inventory which allow the requirements to be met are NOT available, THEN GO TO EOP-9.0, "Functional Recovery Procedure."

50. **EVALUATE** the need for a plant cooldown based on ALL of the following:

- Technical Specifications require plant cooldown
- Plant equipment repair requires plant cooldown
- Availability of Auxiliary systems
- Available Feedwater reserve inventory
- The Shift Supervisor deems plant cooldown is necessary



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51. IF plant cooldown is NOT desired,
THEN PERFORM ANY of the
following:

- **MAINTAIN** the plant in a stabilized condition.
- **GO TO** an alternate TSC/PRC approved procedure.

NOTE: IF emergency boration is in progress, THEN cooldown may commence/continue while the required shutdown margin value is calculated.

© 52. **VERIFY** PCS boron concentration greater than or equal to required boron concentration as verified by sample or hand calculation. Refer to EOP Supplement 35.

- a. IF Emergency boration is in progress
AND PCS boron concentration is greater than or equal to required boron concentration,
THEN SECURE emergency boration. Refer to EOP Supplement 40.

CONTINGENCY ACTIONS

52.1. IF PCS boron concentration is less than required boron concentration,
THEN PERFORM BOTH of the following:

- a. **ENSURE** emergency boration is in progress.
- b. WHEN required boron concentration is reached,
THEN SECURE emergency boration. Refer to EOP Supplement 40.



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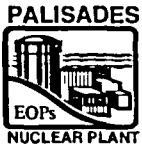
CONTINGENCY ACTIONS

53. WHEN BOTH of the following conditions exist:

- PZR Pressure within limits of EOP Supplement 1
- PCS Cooldown rate is within required limits

THEN PLACE LTOP in service as follows:

- a. **ENSURE OPEN** PORV Isolation Valves. Refer to SOP-1B, "Primary Coolant System - Cooldown," Attachment 6.
- b. **PLACE BOTH** of the following PORV LTOP enable keyswitches to ENABLE:
 - HS-0105A (Key: 1)
 - HS-0105B (Key: 4)
- c. **PLACE BOTH** of the following PORV Handswitches to AUTO:
 - HS-1042B
 - HS-1043B
- d. **MAINTAIN** PZR pressure within limits of EOP Supplement 1.



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CONTINGENCY ACTIONS

CAUTION

A maximum PZR cooldown rate of 200°F/Hr and a maximum PZR Spray ΔT (PZR vapor temp - spray temp) of 350°F should be observed to prevent damage to the PZR or Spray Nozzle.

NOTE: PZR level indication decalibration will occur during cooldown. Correction curves in EOP Supplement 9, "Pressurizer Level Corrections Hot Calibrated" or EOP Supplement 10, "Pressurizer Level Corrections Cold Calibrated" should be used.

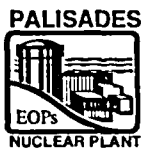
NOTE: Reactor Vessel Upper Head voiding resulting from controlled PCS pressure reductions is not expected to result in safety functions being jeopardized.

NOTE: Steam flow through two of the four Atmospheric Steam Dump Valves should be adequate to establish an initial cooldown rate of 75°F/hr.

54. **COOLDOWN** by performing the following:

- a. **DETERMINE** the PCS cooldown rate since event initiation using EOP Supplement 33.

(continue)



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INSTRUCTIONS

CONTINGENCY ACTIONS

54. (continued)

- b. WHEN the PCS cooldown rate is within required limits, THEN COMMENCE a cooldown within the required limits using the Atmospheric Steam Dump Valves.

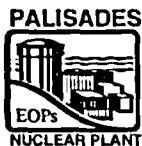
NOTE: P-50A and P-50B shall not be operated simultaneously when T_c is less than 300°F.

- c. **ENSURE** not more than two PCPs operating (preferably one pump in each loop).

- d. **MONITOR** the PCS cooldown rate. Refer to EOP Supplement 33.

55. **MAXIMIZE** PZR spray flow while controlling PCS pressure by using PZR heaters to equalize PCS and PZR boron concentration.

56. IF the PCS is to be opened AND PCS activity is acceptable for flow outside of containment, THEN DEGASIFY the PCS. Refer to SOP-2A, "Chemical And Volume Control System Charging And Letdown; Concentrated Boric Acid."



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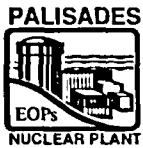
57. IF BOTH of the following conditions exist for each S/G:

- At least three of four S/G pressure sigmas indicate between 510 and 550 psia (indicators between alarm flags)
- A controlled cooldown is in progress

THEN **BLOCK** MSIS for the S/G meeting the above conditions by performing ALL the following:

- a. **BLOCK** MSIV closure signal for the applicable S/G by pushing the appropriate pushbutton on Control Panel C-01:
 - HS/LPE-50A ('A' S/G)
 - HS/LPE-50B ('B' S/G)
- b. **VERIFY** "STEAM GEN VALVES ISOLATION LOCKOUT" (EK-0970) is alarmed.
- c. **ENSURE CLOSED BOTH** Main Feed Reg Valves:
 - CV-0701 ('A' S/G)
 - CV-0703 ('B' S/G)
- d. **ENSURE CLOSED BOTH** Bypass Feed Reg Valves:
 - CV-0735 ('A' S/G)
 - CV-0734 ('B' S/G)

CONTINGENCY ACTIONS



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INSTRUCTIONS

CONTINGENCY ACTIONS

58. IF ALL of the following conditions exist:

- PZR pressure is less than 1687 psia
- SIAS is NOT actuated or blocked
- "Safety Injection Signal Block Permit" (EK-1369) is alarmed
- A controlled cooldown and/or controlled depressurization is in progress,

THEN **BLOCK** SIAS by performing ALL of the following:

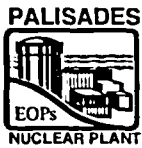
a. **PLACE AND HOLD** SIAS block handswitch PB3-1 to **BLOCK**.

1) **VERIFY** the following annunciator in alarm:

- "SAFETY INJ BLOCK RELAY SI-1" (EK-1337)

2) **RELEASE** SIAS block handswitch PB3-1.

(continue)



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CONTINGENCY ACTIONS

58. (continued)

b. **PLACE AND HOLD** SIAS block
handswitch PB3-2 to BLOCK.

1) **VERIFY** the following
annunciators in alarm:

- "SAFETY INJ BLOCK
RELAY SI-2" (EK-1338)
- "SAFETY INJ
BLOCKED" (EK-1339)

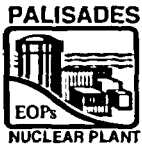
2) **RELEASE** SIAS block
handswitch PB3-2.

© 59. **MONITOR** for formation of PCS
voiding as indicated by ANY of the
following:

- Indicated Charging and
Letdown flows do NOT
correspond to PZR level trend.
- PZR level rising significantly
faster than trend expected from
Auxiliary Spray flow.
- Core ΔT (Average of Qualified
CETs - T_C) or Loop ΔT (T_H - T_C)
rising for same secondary
steaming and Auxiliary Feed
rates.
- Any operable PCS temperature
indication is less than 25°F
subcooled.
- Operable RVLMS indicates
voiding in the Reactor Vessel.

© = Continuously applicable step

⌚ = Hold Point



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60. IF PCS voiding is indicated
AND ANY of the following exist:

- PCS pressure reduction is inhibited
- PCS heat removal is inhibited
- The Shift Supervisor directs void elimination,

THEN PERFORM void elimination actions. Refer to EOP Supplement 26.

CONTINGENCY ACTIONS



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INSTRUCTIONS

61. IF PZR pressure is between 350 psia and 300 psia as read on PI-0104 (NR) or PR-0125 and controlled
AND a controlled cooldown is in progress,
THEN ISOLATE SITs as follows:

- a. UNLOCK AND CLOSE the following breakers:

| BREAKER | OUTLET VALVE | SIT |
|---------|--------------|-------|
| 52-2129 | MO-3041 | T-82A |
| 52-2329 | MO-3045 | T-82B |
| 52-2229 | MO-3049 | T-82C |
| 52-2429 | MO-3052 | T-82D |

KEY: Locked Valve Key

- b. CLOSE the following SIT Outlet Valves:

| BREAKER | OUTLET VALVE | KEY |
|---------|--------------|-----|
| 52-2129 | MO-3041 | 98 |
| 52-2329 | MO-3045 | 99 |
| 52-2229 | MO-3049 | 100 |
| 52-2429 | MO-3052 | 101 |

(continue)

CONTINGENCY ACTIONS

NOTE: Failure of Instrument Air to containment will prevent venting the SITs.

- 61.1. IF ANY SIT could NOT be isolated,
THEN VENT the unisolated SIT
using ONE of the following:

- a. VENT to containment as follows:

- 1) ENSURE CLOSED CWRT
Vent Isolation Valves:

- CV-1064
- CV-1065

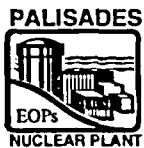
- 2) VENT each unisolated SIT
one tank at a time by opening
the Vent Valve and closing
when tank is vented.

| SIT | VENT VALVE |
|-------|------------|
| T-82A | CV-3067 |
| T-82B | CV-3065 |
| T-82C | CV-3063 |
| T-82D | CV-3051 |

- 3) WHEN ALL the following
conditions are met:

- Unisolated SITs are
vented and their
associated vent valve
closed
- Plant conditions allow
venting containment

(continue)



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61. (continued)

CONTINGENCY ACTIONS

(continued)

THEN OPEN CWRT Vent
Isolation Valves:

- CV-1064
- CV-1065

- b. **VENT** unisolated SITs via Clean
Waste Receiver Tank Header
per SOP-3, "Safety Injection and
Shutdown Cooling System."



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TITLE: EXCESS STEAM DEMAND EVENT

INSTRUCTIONS

CONTINGENCY ACTIONS

62. IF ALL of the following conditions are met:

- T_c is below 325°F
AND prior to T_{cs} less than 300°F
- SI Pump throttling criteria are met
- HPSI pumps are NOT required for inventory control
- A cooldown is in progress,

THEN DISABLE BOTH HPSI pumps by removing Control Power fuses and fuse holders from the following breakers:

- 152-207, HP Safety Injection Pump P-66A

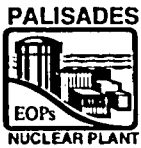
LOCATION: 'D' Bus

- 152-113, HP Safety Injection Pump P-66B

LOCATION: 'C' Bus

63. IF SI Pump Throttling criteria are satisfied,

THEN RESET SIAS. Refer to SOP-3, "Safety Injection and Shutdown Cooling System," Attachment 4.



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INSTRUCTIONS

CONTINGENCY ACTIONS

64. WHEN ALL of the following
Shutdown Cooling System entry
conditions are met:

- PCS parameters are acceptable
for existing Containment
conditions:

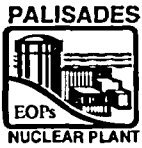
| Parameter | Containment Less Than 175°F AND Less Than 3 psig at all times during the event | Containment Greater Than or Equal To 175°F OR Greater Than or Equal To 3 psig at any time during the event |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| PCS Pressure | Less Than 270 psia | REFER TO EOP Supplement 1 |
| PZR Level (corrected) | Greater Than 36% and controlled | Greater than 40% and controlled |
| Avg of Qualified CETs Subcooling | Greater Than 25°F | REFER TO EOP Supplement 1 |
| Avg of Qualified CETs and Loop T _{h,s} Temperature | Less Than 300°F | REFER TO EOP Supplement 1 |

- TSC has determined that PCS
activity is acceptable for
circulation outside Containment.
- Containment Spray Pumps are
not in use for Containment
Atmosphere safety function.
- Shutdown Cooling System
monitoring equipment power is
available from Y01

(continue)

© = Continuously applicable step

⌚ = Hold Point



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INSTRUCTIONS

CONTINGENCY ACTIONS

64. (continued)

OR

Alternate measures for loss of
Y01 are established per
ONP-17, "Loss of Shutdown
Cooling."

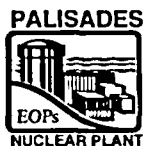
- LTOP is operable.
- Power to the following
Shutdown Cooling Return
Valves is available:
 - MO-3015 (MCC-1)
 - MO-3016 (MCC-2)

OR

Access to Containment is
acceptable for manual valve
operation,

THEN GO TO GOP-9, "Plant
Cooldown From Hot
Standby/Shutdown" or TSC/PRC
approved procedure.

End of Section 4.0



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5.0 PLACEKEEPER

EOP ENTRY TIME: _____

| <u>STEP</u> | <u>INSTRUCTIONS</u> | <u>PAGE</u> | <u>START</u> | <u>DONE</u> |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|-------------|
| 4. | Verify SIAS initiated | 5 | _____ | _____ |
| 5. | Ensure adequate SI flow and safeguards equipment status | 6 | _____ | _____ |
| 6. | Ensure MSIVs and MSIV Bypass Valves are closed | 7 | _____ | _____ |
| 7. | 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 | 7 | _____ | _____ |
| 8. | Determine required margin boron concentration | 8 | _____ | _____ |
| 9. | Ensure proper PCP configuration as PCS temperature lowers | 8 | _____ | _____ |
| 10. | Verify operating limits for any running PCP | 8 | _____ | _____ |
| 11. | Verify condenser cooling or isolate steam to condenser | 9 | _____ | _____ |
| 12. | Ensure at least one train of CR HVAC in Emergency Mode. | 10 | _____ | _____ |
| 13. | Determine the most affected S/G | 10 | _____ | © |
| 14. | Isolate the most affected steam generator | 11 | _____ | _____ |
| 15. | Verify the correct S/G is isolated | 12 | _____ | _____ |
| 16. | Stabilize PCS temperature | 13 | _____ | © |
| 17. | Verify SI Pump throttling criteria are satisfied | 15 | _____ | © |
| 18. | If HPSI Pumps are operating and SI Pump throttling criteria are satisfied, throttle HPSI flow or stop pumps | 16 | _____ | _____ |

© = Continuously applicable step

☞ = Hold Point



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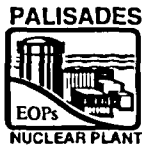
5.0 PLACEKEEPER

EOP ENTRY TIME: _____

| <u>STEP</u> | <u>INSTRUCTIONS</u> | <u>PAGE</u> | <u>START</u> | <u>DONE</u> |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|-------------|
| 19. | If LPSI Pumps are operating and PZR pressure is being controlled greater than 200 psia, stop pumps and close valves | 17 | _____ | _____ |
| 20. | If PZR pressure lowers uncontrollably to less than 200 psia and LPSI Pumps have been stopped, restart LPSI pumps and open valves | 17 | _____ | _____ |
| 21. | Ensure the least affected S/G has level being maintained or being restored to between 60% and 70% | 18 | _____ | © |
| 22. | Record each occurrence of PZR spray with ΔT greater than 200°F | 18 | _____ | © |
| 23. | Maintain PCS pressure within the limits of EOP Supplement 1 | 19 | _____ | © |
| 24. | Place Hydrogen Monitor in service | 24 | _____ | _____ |
| 25. | If the Containment has pressure greater than or equal to 4.0 psig or has high radiation, ensure Containment Isolation signal initiated | 25 | _____ | _____ |
| 26. | If the Containment pressure is greater than or equal to 4.0 psig, verify available Containment Spray Pumps running | 26 | _____ | _____ |
| 27. | If Containment pressure rises to greater than or equal to 35 psia, then close the CCW containment isolation valves | 27 | _____ | _____ |
| 28. | If PCP seal cooling is lost, isolate seal leakoff and restore PCP seal cooling | 27 | _____ | _____ |
| 29. | Verify Containment Sump level rises as the SIRWT level drops | 28 | _____ | © |

© = Continuously applicable step

⌚ = Hold Point



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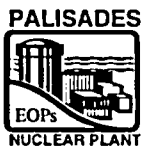
5.0 PLACEKEEPER

EOP ENTRY TIME: _____

| <u>STEP</u> | <u>INSTRUCTIONS</u> | <u>PAGE</u> | <u>START</u> | <u>DONE</u> |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|-------------|
| 30. | When SIRWT level less than or equal to 25%, then prior to RAS, perform Pre-RAS Actions. | 28 | _____ | _____ |
| 31. | When SIRWT level lowers to below 2%, then perform Post-RAS Actions. | 29 | _____ | _____ |
| 32. | If Charging Pump suction is aligned to the SIRWT and RAS has initiated then, disable the Charging Pumps and add caution tag | 30 | _____ | _____ |
| 33. | When Containment pressure is less than 3.0 psig and CHP has initiated, align components and reset CHP | 31 | _____ | _____ |
| 34. | If Containment Spray System is operating and conditions are satisfied, secure Containment Spray | 33 | _____ | _____ |
| 35. | If Containment Area Radiation Monitors indicate less than 1×10^1 R/hr and Containment pressure is less than 3.0 psig, reset CHR | 35 | _____ | _____ |
| 36. | When Containment water level approaches SI valve elevations, open and disable SI valves | 36 | _____ | _____ |
| 37. | If Letdown is isolated and conditions allow, restore Letdown | 37 | _____ | _____ |
| 38. | If requirements are met, then establish charging pump suction from the VCT or SIRWT | 37 | _____ | _____ |
| 39. | Verify the PCS is not in a water solid condition | 38 | _____ | © |
| 40. | If it is desired to draw a bubble in the PZR, perform the actions to draw a bubble in the PZR | 38 | _____ | _____ |
| 41. | If SI Pump throttling criteria are met, then maintain PZR level between 20% and 85% (42% to 57% preferred) | 40 | _____ | _____ |

© = Continuously applicable step

☞ = Hold Point



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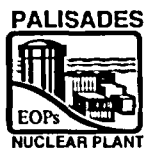
5.0 PLACEKEEPER

EOP ENTRY TIME: _____

| <u>STEP</u> | <u>INSTRUCTIONS</u> | <u>PAGE</u> | <u>START</u> | <u>DONE</u> |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|-------------|
| 42. | If any vital AC or DC buses are not energized, restore power to affected buses | 43 | _____ | _____ |
| 43. | If offsite power was lost and is available, restore power to plant equipment | 44 | _____ | _____ |
| 44. | When 2400V Bus 1C or 1D is energized, then energize Plant buses | 46 | _____ | _____ |
| 45. | If desired, restart PCPs | 48 | _____ | _____ |
| 46. | Verify natural circulation flow in at least one loop | 49 | _____ | _____ |
| 47. | Verify two phase natural circulation | 49 | _____ | _____ |
| 48. | If Containment hydrogen concentration is between 1% and 3%, place at least one Hydrogen Recombiner in service | 50 | _____ | _____ |
| 49. | Verify calculated cooldown rate does not exceed Technical Specification limits and the cooldown is achievable with the existing PCS heat removal path | 51 | _____ | © |
| 50. | Evaluate the need for a plant cooldown | 51 | _____ | ☞ |
| 51. | Determine alternatives if plant cooldown is not desired | 52 | _____ | ☞ |
| 52. | Verify PCS boron concentration greater than or equal to required boron concentration. | 52 | _____ | © |
| 53. | When PZR Pressure and PCS Cooldown rate within required limits, place LTOP in service. | 53 | _____ | _____ |
| 54. | Commence a PCS cooldown | 54 | _____ | _____ |
| 55. | Maximize PZR spray flow while controlling PCS pressure by using PZR heaters to equalize PCS and PZR boron concentration | 55 | _____ | _____ |

© = Continuously applicable step

☞ = Hold Point



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5.0 PLACEKEEPER

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| <u>STEP</u> | <u>INSTRUCTIONS</u> | <u>PAGE</u> | <u>START</u> | <u>DONE</u> |
|-------------|----------------------------------------------------------------------------------------------|-------------|--------------|-------------|
| 56. | If the PCS will be opened and PCS activity allows, then lineup for PCS degasification | 55 | _____ | _____ |
| 57. | When Main Steam pressure is between 510 and 550 psia, block MSIS | 56 | _____ | _____ |
| 58. | When PZR pressure is less than 1687 psia and SIAS is not actuated, BLOCK SIAS | 57 | _____ | _____ |
| 59. | Monitor PCS for void formation | 58 | _____ | © |
| 60. | If PCS voiding is indicated, perform void elimination | 59 | _____ | _____ |
| 61. | If PZR pressure is between 350 psia and 300 psia and a cooldown is in progress, isolate SITs | 60 | _____ | _____ |
| 62. | Disable both HPSI pumps when listed conditions are met | 62 | _____ | _____ |
| 63. | Reset SIAS | 62 | _____ | _____ |
| 64. | When all shutdown cooling system entry conditions are met, exit this procedure | 63 | _____ | _____ |

End of Section 5.0

ATTACHMENT 4

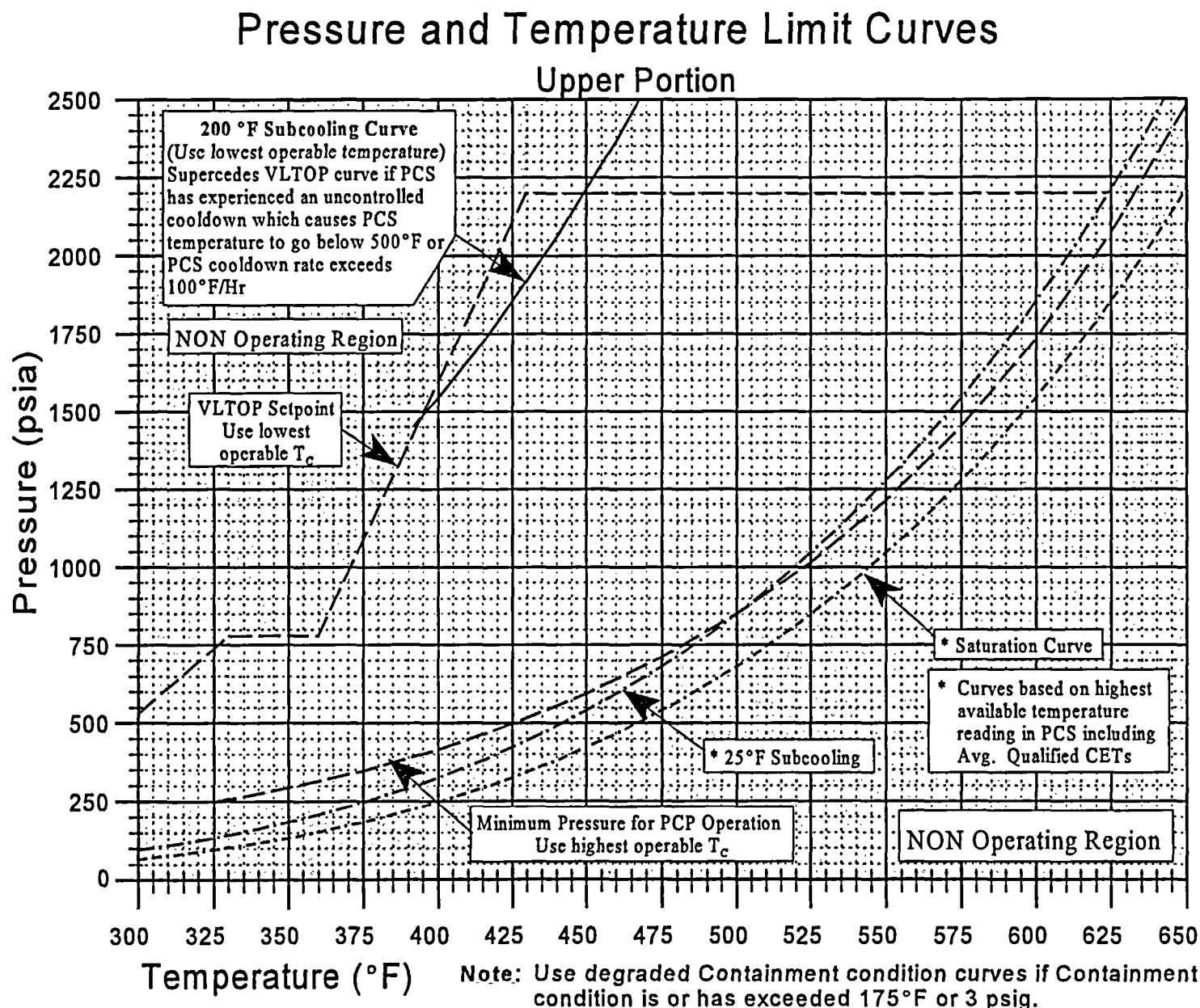
EOP SUPPLEMENT 1, "PRESSURE TEMPERATURE LIMIT CURVES"

5 Pages Follow

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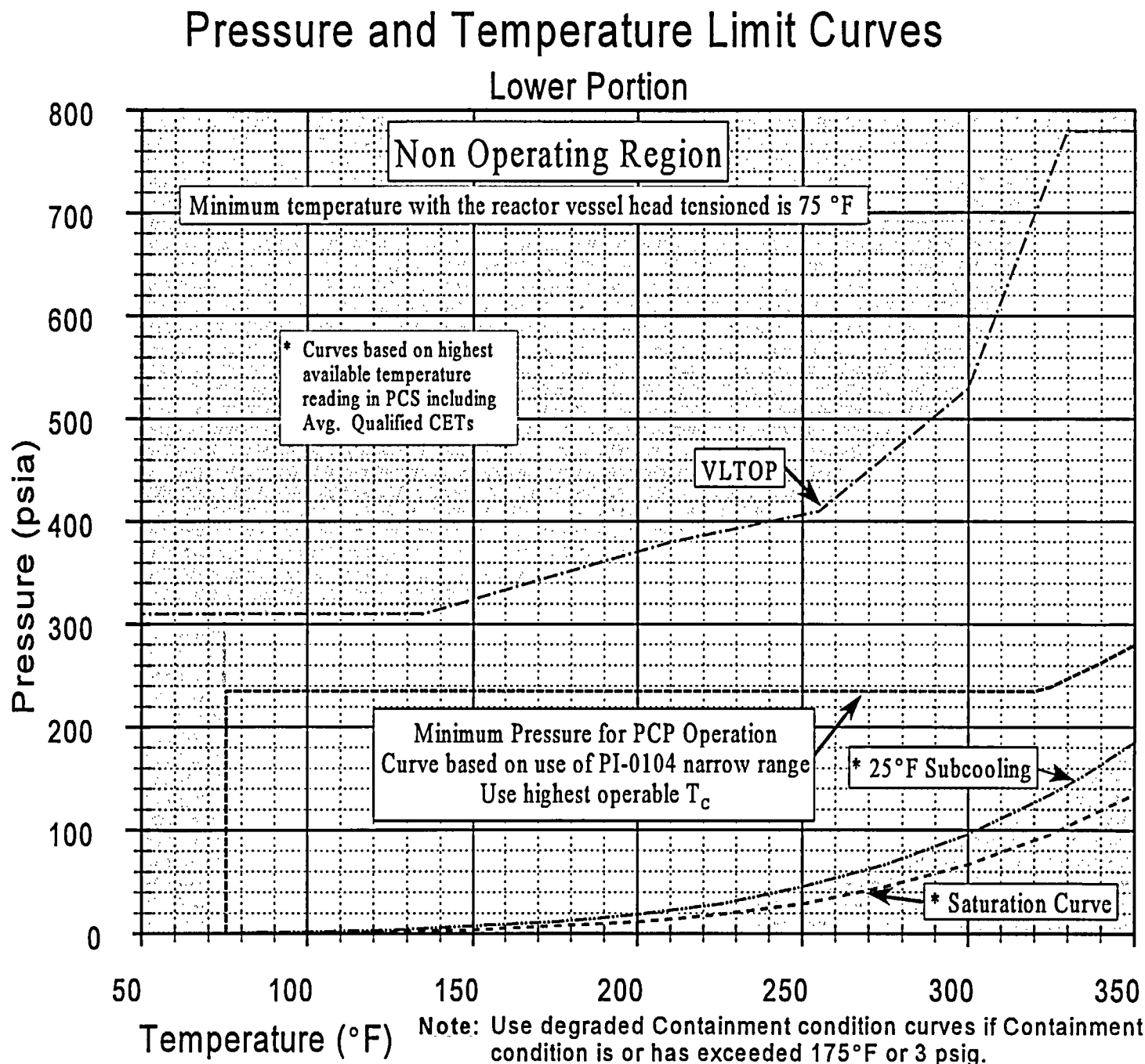
TITLE: Pressure Temperature Limit Curves



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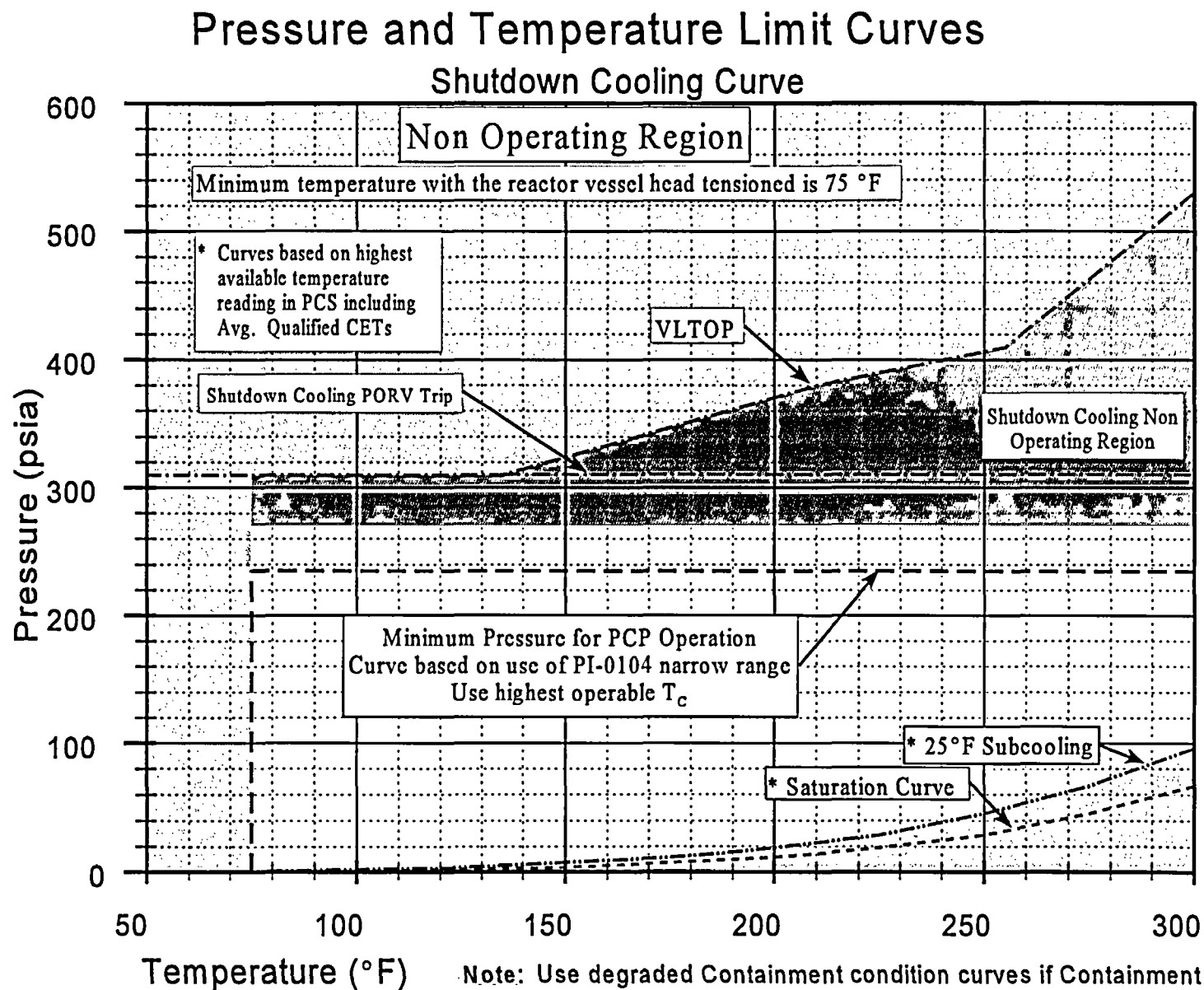
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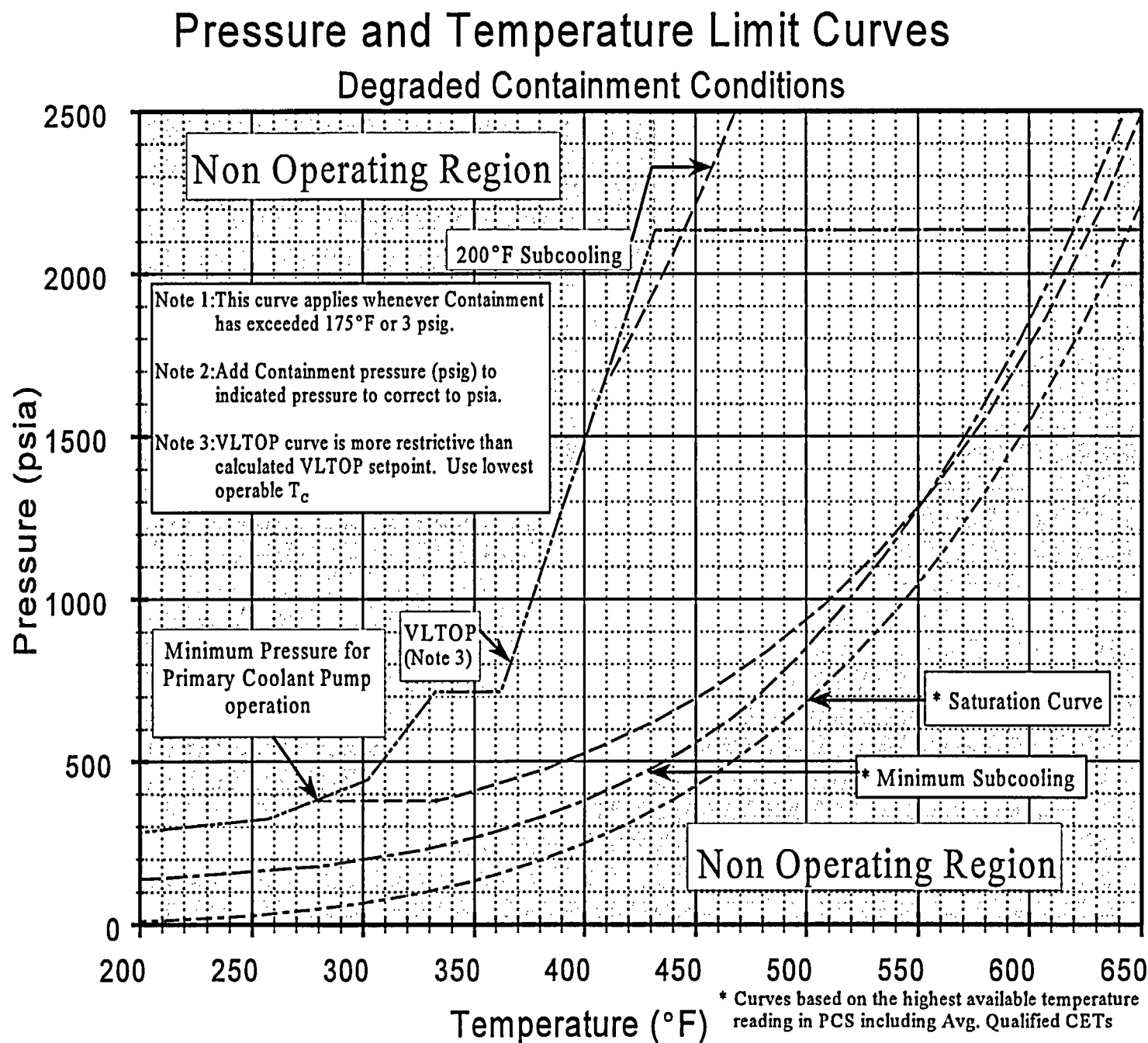
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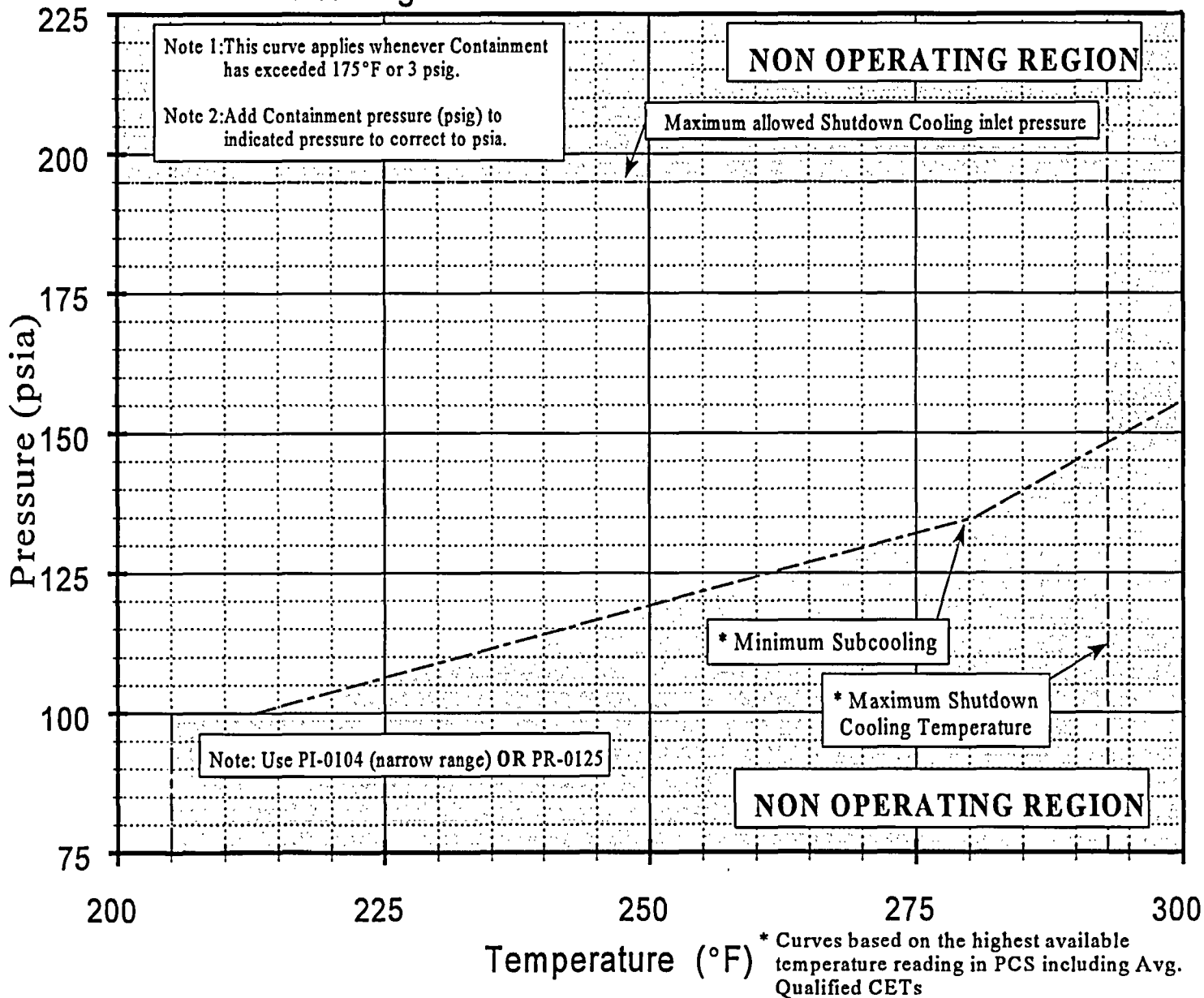
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TITLE: Pressure Temperature Limit Curves



Shutdown Cooling Entry Window For Degraded Containment Conditions



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TITLE: Pressure Temperature Limit Curves

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