NMC
Committed to Nuclear Excellence

Palisades Nuclear Plant
Operated by Nuclear Management Company, LLC

September 15, 2006

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

Request for Authorization to Extend the Third 10-Year ISI Interval for Reactor Vessel Weld Examination

References: 1) *Westinghouse Owners Group Topical Report, WCAP-16168-NP, "Risk-Informed Extension of Reactor Vessel Inservice Inspection Interval," dated October 2003*

2) *Letter from Nuclear Regulatory Commission 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," dated January 27, 2005*

3) *Letter from NMC to NRC, "Request for Authorization to Extend the Third 10-Year ISI Interval for Reactor Vessel Weld Examination," dated March 31, 2005*

4) *Letter from NMC to NRC, "Response to Request for Additional Information Related to Request to Extend the Third 10-Year ISI Interval for Reactor Vessel Weld Examination," dated October 11, 2005*

5) *Letter from NRC to NMC, "Palisades Nuclear Plant – Request for Authorization to Extend the Third Inservice Inspection Interval for Reactor Vessel Weld Examination (TAC NO. MC6547)" dated November 29, 2005*

6) *Letter from NRC to NMC "Palisades Nuclear Plant – Corrected Page for Request for Authorization to Extend the Third Inservice Inspection Interval for Reactor Vessel Weld Examination (TAC NO. MC6547)" dated December 14, 2005*

27780 Blue Star Memorial Highway • Covert, Michigan 49043-9530
Telephone: 269.764.2000

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Per reference 3, NMC submitted a relief request to extend the ISI interval for reactor vessel weld exams by one refueling cycle. The relief request was approved by the NRC by letters dated November 29, 2005 and December 14, 2005 (References 5 and 6). Due to the current status of Reference 1, NMC is requesting approval of the relief request for an additional refueling cycle.

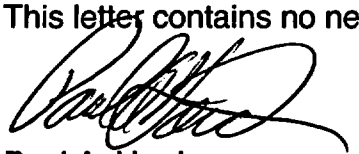
Pursuant to 10 CFR 50.55a(a)(3)(i), Nuclear Management Company, LLC (NMC) is requesting Nuclear Regulatory Commission (NRC) approval for the use of an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, paragraph IWB-2412, Inspection Program B, for the Palisades Nuclear Plant. NMC is submitting this relief request because the Westinghouse Owners Group Topical Report (Reference 1) is currently being reviewed by the NRC and not yet approved.

Palisades third inspection interval began on May 12, 1995, and considering the ASME Code-allowed extensions, will end on December 12, 2006. The examination of the reactor vessel welds (Category B-A), the nozzle-to-vessel welds and inner radius sections (Category B-D), and reactor vessel nozzle-to-piping welds (Category B-J), for the third interval is currently scheduled for the fall 2007 refueling outage, as allowed by the previously approved relief request (Reference 5 and 6). As a result of the adoption of a Risk Informed Inservice Inspection Program at Palisades, the Category B-J welds are presently included in the augmented inspection program as defense-in-depth exams.

NRC approval is requested to extend the third inspection interval for the Category B-A, B-D, and B-J welds for one additional refueling cycle for the subject examinations. The technical justification for this request is consistent with the guidance provided in Reference 2. The extension of the inspection interval for these examinations will still provide for an acceptable level of quality and safety, as described in the enclosed request. NMC requests approval by September 1, 2007.

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

Enclosures (1)
Attachments (5)

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

ENCLOSURE 1
REQUEST FOR AUTHORIZATION TO EXTEND THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL FOR REACTOR VESSEL WELD EXAMINATION
PALISADES NUCLEAR PLANT

1.0 ASME Code Component(s) Affected

The affected component is the Palisades Nuclear Plant reactor vessel (RV), specifically, the following American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI examination categories and item numbers covering examinations of the RV. These examination categories and item numbers are from IWB-2500 and Table IWB-2500-1 of the ASME BPV Code, Section XI.

Examination Category	Item No.	Description
B-A	B1.11	Circumferential Shell Welds
B-A	B1.12	Longitudinal Shell Welds
B-A	B1.21	Circumferential Head Welds
B-A	B1.22	Meridional Head Welds
B-A	B1.30	Shell-to-Flange Weld
B-D	B3.90	Nozzle-to-Vessel Welds
B-D	B3.100	Nozzle Inner Radius Areas
B-J*	B9.11	Circumferential Welds in Piping

* As a result of the adoption of a Risk Informed Inservice Inspection Program at Palisades, the Category B-J welds are presently included in the augmented inspection program as defense-in-depth exams.

(Throughout this request, the above examination categories are referred to as "the subject examinations," and the ASME BPV Code, Section XI, is referred to as "the Code.")

2.0 Applicable Code Edition and Addenda

The Palisades Nuclear Plant third interval Inservice Inspection (ISI) Program Plan is prepared to the 1989 Edition of the Code.

3.0 Applicable Code Requirement

IWB-2412, Inspection Program B, requires volumetric examination of essentially 100% of RV pressure retaining welds identified in Table IWB-2500-1, once each ten-year interval. In accordance with IWA-2430(d) and IWA-2430(e), Palisades third inspection interval is currently scheduled to conclude on December 12, 2006. However, the interval has been extended until the fall 2007 refueling outage for the subject examinations as allowed by a previously approved relief request (references 12 & 13).

4.0 Reason for Request

An alternative is requested from the requirement of IWA-2412, Inspection Program B, that volumetric examination of essentially 100% of RV pressure retaining welds, examination categories B-A, B-D and B-J, be performed once each ten-year interval. Extension of the inspection interval, for examination category B-A, B-D and B-J, by an additional refueling cycle beyond the currently scheduled inspection is requested for the subject examinations.

The intent of the requested additional refueling cycle extension is to allow for deferment of the subject examinations to allow time for NRC review of industry efforts to extend the ISI interval for the subject examinations from 10 to 20 years. These efforts use ASME Section XI, Code Case N-691 (Reference 4), as a basis for using risk-informed insights to show that extending the inspection interval from 10 to 20 years results in a change in RV failure frequency that satisfies the requirements of Regulatory Guide 1.174 (Reference 7). Following NRC approval of these efforts, NMC intends to submit a separate request to extend the current 10-year interval for Palisades Nuclear Plant to 20 years.

5.0 Proposed Alternative and Basis for Use

The third inspection interval for Palisades started on May 12, 1995, and will end on December 12, 2006. This inspection interval includes credit for the IWA-2430(d) allowed one-year extension and the IWA-2430(e) allowed 215-day extension, due to the 2001 extended maintenance outage. The subject examinations are currently scheduled during the fall 2007 refueling outage, as allowed by the previous relief request that was approved by letters dated November 29, 2005, and December 14, 2005 (References 12 & 13). The proposed inspection date is two refueling cycles beyond the Code-allowed inspection interval. In accordance with 10 CFR 50.55a(a)(3)(i), this interval extension is requested on the basis that the current inspection interval can be extended, while providing an acceptable level of quality and safety.

The requirements for a technical basis to extend the 10-year RV ISI interval by one refueling cycle are contained in a letter to the Westinghouse Owners Group, dated January 27, 2005 (Reference 3). This letter provides the basis for the one refueling cycle extension of the 10-year inspection interval for the subject examinations. This justification continues to be applicable as a basis for extending the inspection interval for the subject inspections by two refueling outages.

The technical justification for the extension of the inspection interval for the subject examinations was developed based on the guidance provided in Reference 3. The technical justification consists of five areas. These are:

- 5.1 Plant specific RV ISI history
- 5.2 Fleetwide RV ISI history
- 5.3 Degradation mechanisms in the RV
- 5.4 Material condition of the RV relative to embrittlement
- 5.5 Operational experience relative to RV structural integrity challenging events

5.1 Palisades Reactor Vessel Inservice Inspection History

Palisades is in its third ISI interval for the RV. Two inservice inspections have been performed on the Category B-A, B-D and B-J welds to date. In summary, these inspections have been performed in accordance with Regulatory Guide 1.150 (Reference 8), and have achieved acceptable coverage, with no reportable indications found. Based on the examination method and coverage obtained, it is reasonable to conclude that the examinations were of sufficient quality to detect any significant flaws that would challenge RV integrity. A detailed inspection history of the subject examinations is contained in Attachment 1.

The welds connecting the primary coolant system hot and cold leg loop piping to the RV nozzles are classified as Category B-J welds, in accordance with the ASME Code, Section XI, 1989 Edition. However, as a result of the adoption of a Risk Informed Inservice Inspection Program at Palisades, these welds are presently included in the augmented inspection program as defense-in-depth exams. These welds were last inspected in 1995, and the results of these exams are included in Attachment 1. By letter dated March 1, 2002 (Reference 9), Palisades submitted to the NRC the Risk Informed Inservice Inspection Program. In that submittal, Palisades committed to continue to inspect these welds as part of the ASME Code, Section XI, RV inspection program. By letter dated May 19, 2003 (Reference 11), the NRC issued the safety evaluation approving the Risk Informed Inspection Program. The inspection of these welds is tied to the inspection interval associated with the B-A and B-D welds. Therefore, these welds are included in this relief request

The segments connecting the primary coolant system hot and cold leg loop piping to the RV nozzles were ranked as low safety significant by the expert panel as part of the risk ranking process. Additionally, these segments contributed less than 0.01% of the system total piping segment core damage frequency. Therefore, the impact on the delta risk evaluation was inconsequential. Changing the inspection interval for these welds would have no effect on the conclusions in the analyses. These welds will be inspected during the next mechanized RV examination.

5.2 Fleetwide Reactor Vessel Inservice Inspection History

As part of the technical basis for ASME Code Case N-691, a survey of RV ISI history for 14 pressurized water reactors (PWRs) was performed. These 14 plants represented 301 total years of service, and included RVs fabricated by various vendors. These plants reported that no reportable findings had been discovered during examinations of their RVs category B-A, B-D, and B-J welds.

It is widely recognized in the fracture mechanics community that fatigue crack growth of embedded flaws is substantially smaller than that of surface breaking flaws. Surface breaking flaws in the RV cladding are typically a result of lack of fusion defects between bands of cladding. In studies performed by Pacific Northwest National Laboratory for the NRC Pressurized Thermal Shock (PTS) Risk

Reevaluation, it was determined that in plants with multi-pass cladding, for a flaw to exist through the cladding, two flaws would have to be aligned on top of one another. The probability of this occurring is very low (<.0001). The Palisades RV is constructed with multi-pass cladding, and therefore, has a low probability of containing through-cladding surface-breaking flaws.

All PWR plants, except one, have performed their first 10-year ISI of the subject examinations. No surface-breaking or near-surface flaws of any significance have been found in any of these inspections performed per the requirements of Regulatory Guide 1.150 or ASME Section XI, Appendix VIII.

5.3 Degradation Mechanisms in the Reactor Vessel

The welds for which the subject examinations are conducted are similar metal low alloy steel welds. The only currently known degradation mechanism for this type of weld is fatigue due to thermal and mechanical cycling from operational transients. Studies have shown that while flaw growth of simulated flaws in a RV would be small, the operational transient which has the greatest contribution to flaw growth is the cooldown transient. The cooldown transient is a low frequency transient, and is not expected to occur more than once during the requested inspection extension period. Therefore, any flaw growth during the requested deferral period will be inherently small.

The fatigue usage factors for the welds in the subject examinations are much less than the ASME Code design limit of 1.0 after 40 years of operation. These usage factors are calculated using a very conservative design duty cycle. It is very unlikely that more than a few of these events (e.g. heatup or cooldown) would actually occur during the extension period of this proposed alternative.

It is important to note that this request does not apply to any dissimilar metal welds, including Alloy 600 basemetal, or Alloy 82/182 weld material where primary water stress corrosion cracking is a concern.

5.4 Material Condition of the Reactor Vessel Relative to Embrittlement

The RV beltline is the limiting area in terms of embrittlement for the subject examinations. The composition of each material in the RV beltline, along with fluence and embrittlement data, can be found in the NRC RV Integrity Database (RVID). This information is provided for Palisades in the table below.

Palisades-Specific Material Values Drawn from the RVID									
Major Material Region Description				Cu	Ni	P	Un-Irradiated RT_{NDT}		RT_{PTS}
#	Type	ID	Location	[wt%]	[wt%]	[wt%]	[°F]	Method	@EOL
1	Axial Weld	3-112A	lower	0.213	1.010	0.019	- 56	Generic	268.6
2	Axial Weld	3-112B	lower	0.213	1.010	0.019	- 56	Generic	268.6
3	Axial Weld	3-112C	lower	0.213	1.010	0.019	- 56	Generic	268.6
4	Axial Weld	2-112A	upper	0.213	1.010	0.019	- 56	Generic	268.6
5	Axial Weld	2-112B	upper	0.213	1.010	0.019	- 56	Generic	268.6
6	Axial Weld	2-112C	upper	0.213	1.010	0.019	- 56	Generic	268.6
7	Circ Weld	9-112	intermediate	0.203	1.018	0.013	- 56	Generic	281.5
8	Plate	D3804-1	lower	0.190	0.480	0.016	0	ASME NB-2331	187.3
9	Plate	D3804-2	lower	0.190	0.500	0.015	-30	MTEB 5-2	159.9
10	Plate	D3804-3	lower	0.120	0.550	0.010	-25	MTEB 5-2	106.6
11	Plate	D3803-1	upper	0.240	0.510	0.009	-5	ASME NB-2331	194.4
12	Plate	D3803-2	upper	0.240	0.520	0.010	-30	MTEB 5-2	194.9
13	Plate	D3803-3	upper	0.240	0.500	0.011	-5	ASME NB-2331	194.4

10 CFR 50.61 currently provides PTS screening criteria of RT_{PTS} equal to 270°F for plates and axial welds, and RT_{PTS} equal to 300°F for circumferential welds. For Palisades, the axial welds are the limiting material, and their RT_{PTS} value at end of life (EOL) approaches the current PTS screening criteria. However, it is recognized by the NRC and industry that a large amount of conservatism exists in the current PTS screening criteria. In the NRC PTS Risk Re-evaluation, results have shown that it may be possible to remove an amount of conservatism equivalent to reducing a plant's RT_{PTS} value by at least 70°F. While the exact amount of conservatism that will be removed has not been determined, it is clear that Palisades will be below the current PTS screening criteria during the extension period, and further below the potential revised PTS screening criteria.

5.5 Operational Experience Relative to Reactor Vessel Structural Integrity Challenging Events

It is widely recognized that the greatest possible challenge to RV integrity for a PWR is PTS. A PTS event can be generally described as a rapid cooling of the RV followed by late repressurization. Plants have taken steps such as implementing emergency operating procedures (EOPs) and operator training to lower the likelihood of a PTS event occurring. Due to the implementation of such measures, the number of occurrences of PTS events fleetwide is very small. When considered over the combined fleetwide PWR operating history, the frequency of PTS events is very small. When considering the frequency of PTS events, and the length of the requested extension, the probability of a PTS event occurring during the requested extension is also very low. Combining the low probability of a PTS event with the low probability of a flaw existing in the RV, the probability of RV failure due to PTS is very small.

Palisades has implemented EOPs and operator training to prevent the occurrence of PTS events. Palisades EOPs include caution statements at critical locations warning the operator of the potential for causing PTS.

Palisades has not performed an analysis in accordance with the requirements of Regulatory Guide 1.154 (Reference 10). Palisades minimizes the amount of neutron fluence accumulated at the RV beltline using a low leakage core, to keep the RV below the PTS screening criterion, obviating the need to perform this analysis.

There is a significant reduction in risk if the safety injection water temperature is increased. In an effort to minimize plant risk, a Palisades system operating procedure was revised stating the "...preferred [safety injection refueling water tank] SIRWT temperature band is 85°F to 90°F," and "...the SIRWT should be maintained greater than or equal to 80°F whenever the PCS is in Mode 1, 2, 3, or 4."

Additionally, Palisades has performed an assessment of the operating characteristics of the plant 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 were present is very low for the various accident sequences. This assessment is contained in Attachment 1.

The current requirements for inspection of RV pressure-containing welds have been in effect since the 1989 Edition of the Code. The industry has expended significant cost and man-rem exposure that have shown no service-induced flaws in the RV for ASME Section XI, Category B-A, B-D, or B-J, RV welds. ASME Section XI Code Case N-691 and industry efforts have shown that risk-insights can be used to extend the RV inservice inspection interval from 10 to 20 years. This extension satisfies the change in risk requirements of Regulatory Guide 1.174, and in accordance with 10 CFR 50.55a(3)(*i*), maintains an acceptable level of quality and safety. Based on these efforts having shown that the risk of vessel failure with a 10-year inspection interval extension is low and achieves an acceptable level of quality and safety, it is reasonable to conclude that a two refueling cycle extension will also achieve an acceptable level of quality and safety. Furthermore, Section 5 provides a qualitative

basis that the risk associated with extending the inspection interval by one refueling cycle is small. Therefore, NMC considers the proposed alternative for the subject examinations at Palisades to provide an acceptable level of quality and safety in accordance with 10 CFR 50.55a(3)(i).

6.0 Duration of Proposed Alternative

The alternative is requested to extend the third ISI interval by two refueling cycles beyond the ASME Code required 10-year inspection interval, the Code-allowed twelve month extension, and the Code-allowed 215-day extension. This request is applicable to the third inspection interval only. If this relief request is approved, the third ISI interval for the subject exams will end at the conclusion of the spring 2009 refueling outage.

7.0 Precedent

By letters dated March 31, 2005, and October 11, 2005, NMC submitted this same relief request for Palisades Nuclear Plant. By letters dated November 29, 2005 (TAC NO. MC6547), and December 14, 2005 (TAC NO. MC6547) (References 12 and 13), the NRC approved the relief request for PNP. NMC is resubmitting the same relief request, for an additional one refueling cycle, updated with the information provided by letter dated October 11, 2005 (Ref 14).

8.0 References

1. WCAP-16168-NP, "Risk-Informed Extension of Reactor Vessel In-Service Inspection Interval," October 2003.

2. NRC to WOG, "WOG Request for the Staff Review of Topical Report WCAP-16168-NP "Risk-Informed Extension of Reactor Vessel In-Service Inspection Intervals," August 18, 2004.

3. NRC to WOG, "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, " January 27, 2005.

4. ASME Boiler and Pressure Vessel Code, Code Case N-691, "Application of Risk-Informed Insights to Increase the Inspection Interval for Pressurized Water Reactor Vessels," Section XI, Division 1, November 2003.

5. NRC Memorandum, Thadani to Collins, "Technical Basis for Revision of the Pressurized Thermal Shock (PTS) Screening Criteria in the PTS Rule (10CFR50.61)," December 31, 2002.

6. NRC Reactor Vessel Integrity Database, Version 2.0.1, July 6, 2000.

7. Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," dated November 2002.

8. Regulatory Guide 1.150, "Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations," dated February 1983.

9. NMC to NRC, "Relief Request: Alternate ASME Code, Section XI, Risk-Informed Inservice inspection Program," dated March 1, 2002.

10. Regulatory Guide 1.154, "Format and Content of Plant-Specific Pressurized Thermal Shock Safety Analysis Reports for Pressurized Water Reactors," dated January 1987.

11. NRC to NMC,"Palisades Plant – Risk-Informed Inservice Inspection Program (TAC NO. MB4420)," dated May 19, 2003.

12. Letter from NRC to NMC "Palisades Nuclear Plant – Request for Authorization to Extend the Third Inservice Inspection Interval for Reactor Vessel Weld Examination (TAC NO. MC6547)" dated November 29, 2005

13. Letter from NRC to NMC "Palisades Nuclear Plant – Corrected Page for Request for Authorization to Extend the Third Inservice Inspection Interval for Reactor Vessel Weld Examination (TAC NO. MC6547)" dated December 14, 2005

14. Letter from NMC to NRC, "Response to Request for Additional Information Related to Request to Extend the Third 10-Year ISI Interval for Reactor Vessel Weld Examination," dated October 11, 2005

Attachment 1
PALISADES PTS ASSESSMENT

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 2, followed by entry into EOP-4.0, "Loss of Coolant Accident Recovery," provided as Attachment 3.

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 5.

PCS temperature is controlled by steaming the steam generators in accordance with EOP-4.0, Step 4.23. 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 4.26 (a continuously applicable step) provides SI throttle criteria. Step 4.34 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 4.33 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 4.35 (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 4.71 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," (SPTA) followed by entry into EOP-6.0, "Excess Steam Demand Event," provided as Attachment 4.

During performance of the 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 4.23). 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 4.26 (a continuously applicable step) provides SI throttle criteria. Step 4.34 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 4.35 (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 4.35.1 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 4.23).

ATTACHMENT 2

EOP-1, "STANDARD POST TRIP ACTIONS"

25 Pages Follow (Procedure Attachments not included)

PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE	Proc No	EOP-1.0
	Revision	12
	Issued Date	2/11/02

STANDARD POST-TRIP ACTIONS

[signature]	1/29/02
Procedure Sponsor	Date
GGPalmisano	1/2/02
Technical Reviewer	Date
GWSleeper	1/1/01
User Reviewer	Date

TITLE: STANDARD POST-TRIP ACTIONS

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

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

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

TITLE: STANDARD POST-TRIP ACTIONS

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.

TITLE: STANDARD POST-TRIP ACTIONS

☑ INSTRUCTIONS	☑ CONTINGENCY ACTIONS
2. **DETERMINE** that Main Turbine-Generator acceptance criteria are met:	
☐ a. **VERIFY** Main Turbine is tripped.	☐ 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. o 25F7 o 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.

TITLE: STANDARD POST-TRIP ACTIONS

☑ INSTRUCTIONS	☑ CONTINGENCY ACTIONS
3. **CONTROL** the Feedwater System as follows:	
❑ a. **PLACE** ALL operating Main Feed Pump Individual Speed Controllers to MAN. • HIC-0526 • HIC-0529	
❑ b. IF BOTH Main Feed Pumps are operating, THEN **RAMP** ONE Main Feed Pump to minimum speed.	❑ b.1. IF a Main Feed Pump's speed can NOT be lowered, THEN **TRIP** the Main Feed Pump.
❑ c. WHEN T_{AVE} lowers towards 525°F (535°F preferred), THEN **RAMP** the remaining Main Feed Pump to minimum speed.	❑ c.1. IF a Main Feed Pump's speed can NOT be lowered, THEN **TRIP** the Main Feed Pump.
❑ d. **ENSURE CLOSED** ALL Main Feed Regulating Valves and ALL Bypass Feed Regulating Valves for BOTH S/Gs: • CV-0701 ('A' S/G) • CV-0735 ('A' S/G) • CV-0703 ('B' S/G) • CV-0734 ('B' S/G)	❑ d.1. IF ALL Main Feed Regulating Valves AND ALL Bypass Feed Regulating Valves can NOT be closed, THEN **TRIP** the operating Main Feed Pumps.

TITLE: STANDARD POST-TRIP ACTIONS

☑ INSTRUCTIONS	☑ CONTINGENCY ACTIONS
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.	☐ 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.	

(continue)

☑ 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

TITLE: STANDARD POST-TRIP ACTIONS

☑ 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.

TITLE: STANDARD POST-TRIP ACTIONS

☑ 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.

☑ INSTRUCTIONS

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.

☑ CONTINGENCY ACTIONS

TITLE: STANDARD POST-TRIP ACTIONS

☑ INSTRUCTIONS	☑ CONTINGENCY ACTIONS
8. **DETERMINE** that **PCS Heat Removal** acceptance criteria are met:	
❑ a. **VERIFY** at least one S/G has BOTH of the following: • Level between 5% and 70% • Feedwater available to maintain S/G level	❑ a.1. For low level, **ENSURE** at least one S/G has feedwater flow of at least 165 gpm. ❑ a.2. For high level, **REDUCE** feedwater flow to the affected S/G. ❑ a.3. IF one S/G has indication of an ESDE or SGTR, THEN **SECURE** feedwater flow to the affected S/G.
❑ b. **VERIFY** that T_{AVE} is between 525°F and 540°F.	❑ b.1. IF T_{AVE} is greater than 540°F, THEN **RESTORE** T_{AVE} to between 525°F and 540°F using ANY of the following: • Turbine Bypass Valve (preferred) • Atmospheric Steam Dump Valves

(continue)

(continue)

TITLE: STANDARD POST-TRIP ACTIONS

☑ INSTRUCTIONS	☑ CONTINGENCY ACTIONS
8. (continued)	**(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)**

☑ 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)

TITLE: STANDARD POST-TRIP ACTIONS

☑ INSTRUCTIONS	☑ CONTINGENCY ACTIONS
9. **DETERMINE** that **Containment Isolation** acceptance criteria are met:	
☐ a. **VERIFY** containment pressure less than 0.85 psig. • PIA-1814 • PIA-1815	☐ 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: o CV-0510 ('A' S/G) o CV-0501 ('B' S/G) • Main Feed Reg Valves: o CV-0701 ('A' S/G) o CV-0703 ('B' S/G) • Bypass Feed Reg Valves: o CV-0735 ('A' S/G) o CV-0734 ('B' S/G)

(continue)

(continue)

☑	INSTRUCTIONS	☑	CONTINGENCY ACTIONS
9.	**(continued)**		**(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)

TITLE: STANDARD POST-TRIP ACTIONS

☑ INSTRUCTIONS	☑ CONTINGENCY ACTIONS
9. (continued)	
☐ b. **VERIFY** Containment Area Monitor alarms clear and NO unexplained rise. • RIA-1805 • RIA-1806 • RIA-1807 • RIA-1808	☐ b.1. IF Containment radiation level is greater than 1 x 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
☐ 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	

TITLE: STANDARD POST-TRIP ACTIONS

☑ 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

(continue)

☑ 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)

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

☑ INSTRUCTIONS	☑ CONTINGENCY ACTIONS
10. (continued)	**(continued)**
	b. **ENSURE OPEN** ALL available Containment Spray Valves.
	c. **ENSURE** ALL available Containment Spray Pumps are operating.

TITLE: STANDARD POST-TRIP ACTIONS

☑ INSTRUCTIONS	☑ CONTINGENCY ACTIONS
11. **DETERMINE** that **Vital Auxiliaries-Water** acceptance criteria met by performing ALL of the following:	
❑ a. **VERIFY** at least two Service Water Pumps operating.	❑ a.1. **START** available Service Water Pumps.
❑ b. **VERIFY** BOTH Critical SW Headers in operation with pressures greater than 42 psig.	❑ 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. **VERIFY OPERATING** at least one CCW Pump.	❑ c.1. **START** available CCW Pumps.

TITLE: STANDARD POST-TRIP ACTIONS

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

5.0 OPERATOR ACTIONS

☑ INSTRUCTIONS ☑ CONTINGENCY ACTIONS

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

TITLE: STANDARD POST-TRIP ACTIONS

5.0 **OPERATOR ACTIONS**

☑ INSTRUCTIONS	☑ CONTINGENCY ACTIONS
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.	
	☐ 3.1. **CLOSE** BOTH MSIVs. • CV-0510 • CV-0501

TITLE: STANDARD POST-TRIP ACTIONS

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 3

EOP-4, "LOSS OF COOLANT ACCIDENT RECOVERY"

112 Pages Follow (Procedure Attachments not included)

PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE	Proc No	EOP-4.0
	Revision	17
	Issued Date	12/15/05

LOSS OF COOLANT ACCIDENT RECOVERY

RLTucker	/12/13/05
Procedure Sponsor	Date
VLMoceri	/11/28/05
Technical Reviewer	Date
DBCampbell	/11/4/05
User Reviewer	Date

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

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

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

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)

	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, "Emergency Classification and Actions."	
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

INSTRUCTIONS	CONTINGENCY ACTIONS
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.	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.
c. IF Letdown Orifice Stop Valves are closed, THEN **PLACE** handswitches in the CLOSE position: • HS-2003 • HS-2004 • HS-2005	

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.

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)

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.

INSTRUCTIONS	CONTINGENCY ACTIONS
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	

(continue)

INSTRUCTIONS	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.	

INSTRUCTIONS	CONTINGENCY ACTIONS
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.	a.1. **MANUALLY INITIATE** CIS by pushing left or right HIGH RADIATION INITIATE pushbutton on EC-13. • CHRL-CS • CHRR-CS
b. **VERIFY** Containment Isolation. Refer to EOP Supplement 6.	b.1. **CLOSE** valves that failed to automatically operate.

INSTRUCTIONS	CONTINGENCY ACTIONS
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:	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

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	2940 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

INSTRUCTIONS

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."

INSTRUCTIONS	CONTINGENCY ACTIONS
© 16. IF the Containment Spray System is operating, AND ALL of the following conditions are satisfied: • RAS has NOT actuated • Containment Pressure less than 33 psia PI-1805 PI-1812 • Containment Air Coolers operating in accident mode (Refer to SFSC Table CA) • SIS Actuated with flow within the requirements of EOP Supplement 4 THEN **PERFORM** the following: a. IF three Containment Spray Pumps are operating, THEN **STOP** one of the following Containment Spray pumps. • P-54B • P-54C b. IF two Containment Spray Pumps are operating, THEN **PERFORM** the following: 1) **CLOSE** one Containment Spray Valve as follows: **(Continue)**	16.1. IF Containment Pressure rises to greater than or equal to 70 psia, THEN **ENSURE** the following: a. All available Containment Spray Pumps operating. Refer to EOP Supplement 42 for starting additional spray pumps. b. All available Containment Air Coolers operating in accident mode (Refer to SFSC Table CA.)

INSTRUCTIONS	CONTINGENCY ACTIONS
16. **(Continued)** a) **PLACE** one CHP Bypass Switch to BYPASS: • HS-3001C, CV-3001 (Preferred, Key: 397) • HS-3002C, CV-3002 (Key: 396) b) **ENSURE CLOSED** associated Containment Spray Valve: • CV-3001 (preferred) • CV-3002 c) **STOP** one of the following Containment Spray Pumps: • P-54B • P-54C	
c. **VERIFY** Containment pressure maintained less than 70 psia. PI-1805 PI-1812	

INSTRUCTIONS

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.

© 17. IF any Containment Spray Pumps 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 OR ALL of the following: • 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

17.1. IF Containment Pressure rises to greater than 3 psig
AND no Containment Spray Pump operating,
THEN

1) **OPEN** one Containment Spray Valve.

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

(Continue)

INSTRUCTIONS	CONTINGENCY ACTIONS
17. **(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 (Preferred, Key: 397) • HS-3002C, CV-3002 (Key : 396) b) **ENSURE CLOSED** associated Containment Spray Valve: • CV-3001(Preferred) • CV-3002 **(Continue)**	

INSTRUCTIONS	CONTINGENCY ACTIONS
17. **(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.	
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	

INSTRUCTIONS

CONTINGENCY ACTIONS

18. 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)

INSTRUCTIONS	CONTINGENCY ACTIONS

18. **(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

INSTRUCTIONS

19. **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

20. IF the LOCA is isolated, THEN **GO TO** Step 65.

CONTINGENCY ACTIONS

19.1. **ENSURE CLOSED** BOTH MSIVs:

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

19.2. **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

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.	
21. **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.	
© 22. **VERIFY** PCS boron concentration greater than or equal to required boron concentration as verified by sample or hand calculation. Refer to EOP Supplement 35.	22.1. IF PCS boron concentration is less than required boron concentration, THEN **PERFORM** BOTH of the following:
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.	a. **ENSURE** emergency boration is in progress. b. WHEN required boron concentration is reached, THEN **SECURE** emergency boration. Refer to EOP Supplement 40.

INSTRUCTIONS

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.

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

(continue)

INSTRUCTIONS	CONTINGENCY ACTIONS
23. **(continued)**	
23. **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 23-1.

(Continue)

INSTRUCTIONS	CONTINGENCY ACTIONS
23. **(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.	c.1. **OPERATE** Atmospheric Steam Dump Valves. 1) IF desired to enhance temperature control, THEN **ISOLATE** two Atmospheric Steam Dump Valves. Refer to Table 23-1.

Table 23-1

'A' S/G	MV-MS101, ASDV CV-0782 Inlet OR MV-CA782, A/S to CV-0782
	MV-MS103, ASDV CV-0781 Inlet OR MV-CA781, A/S to CV-0781
'B' S/G	MV-MS102, ASDV CV-0779 Inlet OR MV-CA779, A/S to CV-0779
	MV-MS104, ASDV CV-0780 Inlet OR 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 Techncial Specifications.

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

INSTRUCTIONS	CONTINGENCY ACTIONS

24. 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)

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)	
© 25. **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.	

INSTRUCTIONS	CONTINGENCY ACTIONS
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."	
© 26. **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.	26.1. 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)

INSTRUCTIONS

CONTINGENCY ACTIONS

26. **(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.

© 27. **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.

INSTRUCTIONS	CONTINGENCY ACTIONS
28. 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)

INSTRUCTIONS

CONTINGENCY ACTIONS

28. **(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.

29. 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

INSTRUCTIONS	CONTINGENCY ACTIONS
30. 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	
31. 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	

INSTRUCTIONS	CONTINGENCY ACTIONS
© 32. 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.	
33. 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.	

INSTRUCTIONS	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.	
34. 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)

INSTRUCTIONS	CONTINGENCY ACTIONS
34. **(continued)**	
	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) **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.	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)	**(continue)**

INSTRUCTIONS	CONTINGENCY ACTIONS
34. **(continued)**	**(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.

INSTRUCTIONS

© 35. **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

35.1. 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.

35.2. 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)

	INSTRUCTIONS	CONTINGENCY ACTIONS
35.	**(continued)**	**(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.
© 36.	**ENSURE** at least one S/G has corrected level being maintained or being restored to between 60% and 70%. Refer to EOP Supplement 11.	

INSTRUCTIONS	CONTINGENCY ACTIONS
© 37. **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."

INSTRUCTIONS	CONTINGENCY ACTIONS
© 38. **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.	
39. 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.	

INSTRUCTIONS

40. 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

40.1. 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.

INSTRUCTIONS	CONTINGENCY ACTIONS
41. 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)

INSTRUCTIONS

CONTINGENCY ACTIONS

41. **(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.

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

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

42.1. 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.

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)

(continue)

INSTRUCTIONS | CONTINGENCY ACTIONS

42. **(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)

INSTRUCTIONS	CONTINGENCY ACTIONS
42. **(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."

INSTRUCTIONS	CONTINGENCY ACTIONS
43. 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	43.1. **ENSURE** proper control of S/G feeding and steaming rates.
44. 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	

INSTRUCTIONS	CONTINGENCY ACTIONS

45. 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.

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

INSTRUCTIONS	CONTINGENCY ACTIONS
47. 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.	
© 48. **VERIFY** the containment sump level is rising as the SIRWT level is lowering.	48.1. 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.

INSTRUCTIONS	CONTINGENCY ACTIONS
49. WHEN SIRWT level less than or equal to 25%, THEN prior to RAS, **PERFORM** Pre-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.

50. 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.	

INSTRUCTIONS

CONTINGENCY ACTIONS

NOTE: Subsequent to the actions in Step 51, the TSC must approve closure of ANY of the failed open valves.

51. 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
	MO-3014	52-251	LPSI Loop 2B
596' 4"	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

INSTRUCTIONS

CONTINGENCY ACTIONS

CAUTION

Premature initiation of RAS can lead to insufficient Containment Sump inventory for SI Pump operation. Minimum Containment Water level of 593' 6" is necessary for adequate ESS pump NPSH.

52. 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.

53. IF Containment Water level is less than 593' 6" following a RAS, THEN **PERFORM** the following:

a. **NOTIFY** TSC.

b. **INVESTIGATE** cause of low containment water level.

c. **MONITOR** for indications of inadequate ESS pump NPSH.

INSTRUCTIONS	CONTINGENCY ACTIONS
54. 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.	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. IF one HPSI Pump is operating, THEN **VERIFY** the operating HPSI Pump has flow greater than 50 gpm.	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.

INSTRUCTIONS	CONTINGENCY ACTIONS
© 55. IF containment sump screen clogging is indicated, THEN **PERFORM** the following:	
a. IF 3 Containment Spray Pumps are operating, THEN **STOP** one Containment Spray Pump (P-54B or P-54C preferred.)	
b. **THROTTLE** HPSI flow to achieve 200 to 250 gpm flow to each operating train using either Option 1 or Option 2:	b.1. IF HPSI loop isolation valves are de-energized, THEN **PERFORM** the following: 1) **STOP** one HPSI pump. 2) **ENERGIZE** and **CLOSE** two HPSI loop isolation valves associated with the operating HPSI pump (Refer to Option 1 or 2).

(Continue) **(Continue)**

INSTRUCTIONS

CONTINGENCY ACTIONS

55. **(Continued)**

(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

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)

INSTRUCTIONS | CONTINGENCY ACTIONS

55. **(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)

INSTRUCTIONS	CONTINGENCY ACTIONS
55. **(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)

INSTRUCTIONS

CONTINGENCY ACTIONS

55. **(Continued)**

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

f. **GO TO** EOP-9.0

56. **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)

57. 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)

INSTRUCTIONS	CONTINGENCY ACTIONS
57. **(continued)** c. **PLACE** a Caution Tag on their handswitches that reads "Do NOT Use - No suction source available" • 52-1205CS • 52-1206CS • 52-1105CS	
58. 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.	

INSTRUCTIONS

59. 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.

59.1. 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)

INSTRUCTIONS	CONTINGENCY ACTIONS
59. **(continued)**	**(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."

INSTRUCTIONS

60. 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

60.1. 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.

INSTRUCTIONS

CONTINGENCY ACTIONS

60. **(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)

INSTRUCTIONS	CONTINGENCY ACTIONS
60. **(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.	

INSTRUCTIONS	CONTINGENCY ACTIONS
61. IF measured Containment hydrogen concentration is between 1% and 3%, THEN **PERFORM** ALL the following: a. **CONTACT** TSC. b. **OPEN** MCC 9 Feeder Breaker, 52-1304. LOCATION: On Bus 13	
62. IF SI Pump Throttling criteria are satisfied, THEN **RESET** SIAS. Refer to SOP-3, "Safety Injection and Shutdown Cooling System," Attachment 4.	

INSTRUCTIONS

CONTINGENCY ACTIONS

63. 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_{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.
- Shutdown Cooling System monitoring equipment power is available from Y01.

OR

(Continue)

INSTRUCTIONS	CONTINGENCY ACTIONS
63. **(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)

INSTRUCTIONS	CONTINGENCY ACTIONS

63. **(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 approved procedure.

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

INSTRUCTIONS

65. IF the LOCA is isolated, THEN **PERFORM** Steps 66 through 97.

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."

© 66. **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

(continue)

CONTINGENCY ACTIONS

66.1. 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

INSTRUCTIONS

CONTINGENCY ACTIONS

66. **(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").

INSTRUCTIONS

CONTINGENCY ACTIONS

67. 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

INSTRUCTIONS	CONTINGENCY ACTIONS
68. 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	
69. 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	

INSTRUCTIONS	CONTINGENCY ACTIONS
70. 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.	
© 71. **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	71.1. 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.

INSTRUCTIONS	CONTINGENCY ACTIONS
72. 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)

INSTRUCTIONS

CONTINGENCY ACTIONS

72. **(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.

73. 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.

INSTRUCTIONS	CONTINGENCY ACTIONS
© 74. **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.	74.1. 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. 74.2. 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)**

INSTRUCTIONS	CONTINGENCY ACTIONS
74. **(continued)**	**(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.
© 75. **ENSURE** at least one S/G has corrected level being maintained or being restored to between 60% and 70%. Refer to EOP Supplement 11.	

INSTRUCTIONS	CONTINGENCY ACTIONS
© 76. **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."
77. **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	
78. IF a plant cooldown is NOT required, THEN **GO TO** Step 88.	

INSTRUCTIONS	CONTINGENCY ACTIONS
NOTE: IF emergency boration is in progress, THEN cooldown may commence/continue while the required shutdown margin value is calculated.	
© 79. **VERIFY** PCS boron concentration greater than or equal to required boron concentration as verified by sample or hand calculation. Refer to EOP Supplement 35.	79.1. 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.
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.	

TITLE: LOSS OF COOLANT ACCIDENT RECOVERY

INSTRUCTIONS

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)

	INSTRUCTIONS	CONTINGENCY ACTIONS
80.	**(continued)**	
© 80.	**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 80-1.

(Continue)

INSTRUCTIONS

CONTINGENCY ACTIONS

80. **(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.

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

1) IF desired to enhance temperature control, THEN **ISOLATE** two Atmospheric Steam Dump Valves. Refer to Table 80-1.

Table 80-1

'A' S/G	MV-MS101, ASDV CV-0782 Inlet OR MV-CA782, A/S to CV-0782
	MV-MS103, ASDV CV-0781 Inlet OR MV-CA781, A/S to CV-0781
'B' S/G	MV-MS102, ASDV CV-0779 Inlet OR MV-CA779, A/S to CV-0779
	MV-MS104, ASDV CV-0780 Inlet OR 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 Techncial Specifications.

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

INSTRUCTIONS	CONTINGENCY ACTIONS

81. 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.

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)	
© 82. **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.	

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.

© 83. **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.

INSTRUCTIONS	CONTINGENCY ACTIONS
84. 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)	

INSTRUCTIONS	CONTINGENCY ACTIONS
85. 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)

INSTRUCTIONS	CONTINGENCY ACTIONS
85. **(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.	

INSTRUCTIONS	CONTINGENCY ACTIONS
© 86. **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.	
87. 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.	

INSTRUCTIONS

88. 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

88.1. 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.

INSTRUCTIONS	CONTINGENCY ACTIONS
89. 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)

INSTRUCTIONS

CONTINGENCY ACTIONS

89. **(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.

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

90. 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)

90.1. 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)

INSTRUCTIONS	CONTINGENCY ACTIONS

90. **(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)

INSTRUCTIONS	CONTINGENCY ACTIONS
90. **(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."

INSTRUCTIONS	CONTINGENCY ACTIONS
91. 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	91.1. **ENSURE** proper control of S/G feeding and steaming rates.
92. WHEN PCP restart is desired, THEN **RESTART** desired PCPs. Refer to EOP Supplement 3.	
93. IF a plant cooldown is NOT in progress, THEN **GO TO** a TSC approved procedure.	

INSTRUCTIONS

94. 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.

94.1. 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)

INSTRUCTIONS	CONTINGENCY ACTIONS
94. **(continued)**	**(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."

INSTRUCTIONS	CONTINGENCY ACTIONS
95. 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.	

INSTRUCTIONS	CONTINGENCY ACTIONS
96. 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	

INSTRUCTIONS

CONTINGENCY ACTIONS

97. 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)

INSTRUCTIONS	CONTINGENCY ACTIONS
97. **(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: o MO-3015 (MCC-1) o 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 approved procedure.	

End Of Section 4.0

5.0 **PLACEKEEPER**

EOP ENTRY TIME: _____ **TIME OF SIAS:** _____

STEP	INSTRUCTIONS	PAGE	START	DONE
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.	Early Secure Containment Spray	15	_____	©
17.	Secure Containment Spray	17	_____	©

5.0 **PLACEKEEPER**

STEP	INSTRUCTIONS	PAGE	START	DONE
18.	Reset CHP	20	_____	_____
19.	Verify condenser cooling or isolate steam to condenser	22	_____	_____
20.	If the LOCA is isolated, go to Step 65	22	_____	_____
21.	Ensure at least one train of CR HVAC in Emergency Mode.	23	_____	_____
22.	Verify PCS boron concentration greater than or equal to required boron concentration.	23	_____	©
23.	Commence steaming S/G(s)	25	_____	_____
24.	When Main Steam pressure is between 510 and 550 psia, block MSIS	27	_____	_____
25.	Record each occurrence of PZR spray with ΔT greater than 200°F	28	_____	©
26.	Verify SI Pump throttling criteria are satisfied	29	_____	©
27.	Commence depressurizing the PCS to 270 psia	30	_____	©
28.	When PZR pressure is less than 1687 psia and SIAS is not actuated, BLOCK SIAS	31	_____	_____
29.	If HPSI Pumps are operating and SI Pump throttling criteria are satisfied, throttle HPSI flow or stop pumps	32	_____	_____
30.	If LPSI Pumps are operating and PZR pressure is being controlled greater than 200 psia, stop pumps and close valves	33	_____	_____
31.	If PZR pressure lowers uncontrollably to less than 200 psia and LPSI Pumps have been stopped, restart LPSI pumps and open valves	33	_____	_____

5.0 **PLACEKEEPER**

STEP	INSTRUCTIONS	PAGE	START	DONE
32.	As resources permit, prepare post-RAS injection sources.	34	_____	©
33.	If Letdown is isolated and conditions allow, restore Letdown	34	_____	_____
34.	If SI Pump throttling criteria are met, then maintain PZR level between 20% and 85% (42% to 57% preferred)	35	_____	_____
35.	Maintain PCS pressure within the limits of EOP Supplement 1	38	_____	©
36.	Ensure at least one S/G has corrected level being maintained or restored to between 60% and 70%	39	_____	©
37.	Verify calculated cooldown rate does not exceed Technical Specification limits and the cooldown is achievable with the existing PCS heat removal path	40	_____	©
38.	Monitor PCS for void formation	41	_____	©
39.	If PCS voiding is indicated, perform void elimination	41	_____	_____
40.	If any vital AC or DC buses are not energized, restore power to affected buses	42	_____	_____
41.	If offsite power was lost and is available, restore power to plant equipment	43	_____	_____
42.	When 2400V Bus 1C or 1D is energized, then energize Plant buses	45	_____	_____
43.	Verify natural circulation flow in at least one loop	48	_____	_____

5.0 **PLACEKEEPER**

STEP	INSTRUCTIONS	PAGE	START	DONE
44.	Verify two phase natural circulation	48	_____	_____
45.	Place LTOP in service	49	_____	_____
46.	If desired, restart PCPs	49	_____	_____
47.	When cold shutdown boron concentration is established, swap Charging pump suction from the BASTs to the SIRWT	50	_____	_____
48.	Verify Containment Sump level rises as the SIRWT level drops	50	_____	©
49.	When SIRWT level less than or equal to 25%, then prior to RAS, perform Pre-RAS Actions.	51	_____	_____
50.	If VC-10 or VC-11 trip on high temperature due to low SW flow, reset and start VC-10 or VC-11	51	_____	_____
51.	When Containment water level approaches SI valve elevations, open and disable SI valves	52	_____	_____
	▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸ **RAS STEPS 52 to 57** ◂◂◂◂◂◂◂◂◂◂◂◂◂◂◂			
52.	When SIRWT level lowers to below 2% and LOCA is inside Containment, then perform Post-RAS Actions.	53	_____	_____
53.	If Containment water level is less than expected post RAS, consult with the TSC for additional guidance	53	_____	_____
54.	If RAS is initiated, ensure adequate HPSI pump flow	54	_____	_____
55.	Actions for when sump screen clogging is indicated.	55	_____	©
56.	Place ESS Room Sump Pumps in OFF and add caution tag	59	_____	_____

5.0 **PLACEKEEPER**

STEP	INSTRUCTIONS	PAGE	START	DONE
57.	If Charging Pump suction is aligned to the SIRWT and RAS has initiated then, disable the Charging Pumps and add caution tag	59	_____	_____
58.	If Containment Area Radiation Monitors indicate less than 1 x 10^1 R/hr and Containment pressure is less than 3.0 psig, reset CHR	60	_____	_____
59.	If PZR pressure is between 350 psia and 300 psia and a cooldown is in progress, isolate SITs	61	_____	_____
60.	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	63	_____	_____
61.	If Containment hydrogen concentration is between 1% and 3%, notify TSC and open MCC-9 feeder breaker	66	_____	_____
62.	Reset SIAS	66	_____	_____
63.	If SDC entry conditions are met, go to GOP-9	67	_____	_____
64.	If SDC entry conditions can not be established, maintain long-term cooling	69	_____	_____
	▸▸▸▸▸▸▸▸▸▸▸▸ **Isolated LOCA steps 65 to 97** ◂◂◂◂◂◂◂◂◂◂◂◂			
65.	If the LOCA is isolated, perform Steps 66 through 97	70	_____	_____
66.	Verify SI Pump throttling criteria are satisfied	70	_____	©
67.	If HPSI Pumps are operating and SI Pump throttling criteria are satisfied, throttle HPSI flow or stop pumps	72	_____	_____

5.0 **PLACEKEEPER**

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

5.0 **PLACEKEEPER**

STEP	INSTRUCTIONS	PAGE	START	DONE
80.	Commence steaming S/G(s)	82	_____	©
81.	When PZR Pressure and PCS cooldown within limits, then place LTOP in service.	84	_____	_____
82.	Record each occurrence of PZR spray with ΔT greater than 200°F	85	_____	©
83.	Commence depressurizing the PCS to 270 psia	86	_____	©
84.	When Main Steam pressure is between 510 and 550 psia, block MSIS	87	_____	_____
85.	When PZR pressure is less than 1687 psia and SIAS is not actuated, BLOCK SIAS	88	_____	_____
86.	Monitor PCS for void formation	90	_____	©
87.	If PCS voiding is indicated, perform void elimination	90	_____	_____
88.	If any vital AC or DC buses are not energized, restore power to affected buses	91	_____	_____
89.	If offsite power was lost and is available, restore power to plant equipment	92	_____	_____
90.	When 2400V Bus 1C or 1D is energized, then energize Plant buses	94	_____	_____
91.	Verify natural circulation flow in at least one loop	97	_____	_____
92.	If desired, restart PCPs	97	_____	_____
93.	Seek TSC guidance if plant cooldown not in progress	97	_____	_____

5.0 **PLACEKEEPER**

STEP	INSTRUCTIONS	PAGE	START	DONE
94.	If PZR pressure is between 350 psia and 300 psia and a cooldown is in progress, isolate SITs	98	_____	_____
95.	Reset unnecessary safety actuation signals	100	_____	_____
96.	Disable both HPSI pumps when listed conditions are met	101	_____	_____
97.	When all shutdown cooling system entry conditions are met, exit this procedure	102	_____	_____

END OF SECTION 5.0

ATTACHMENT 4

EOP-6, "EXCESS STEAM DEMAND EVENT"

70 Pages Follow (Procedure Attachments not included)

PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE	Proc No	EOP-6.0
	Revision	15
	Issued Date	12/15/05

EXCESS STEAM DEMAND EVENT

RLTucker	/12/13/05
Procedure Sponsor	Date
VLMoceri	/11/28/05
Technical Reviewer	Date
DBCampbell	/11/4/05
User Reviewer	Date

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

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

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

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)

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, "Emergency Classification and Actions."	
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

INSTRUCTIONS	CONTINGENCY ACTIONS
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.	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.
c. IF Letdown Orifice Stop Valves are closed, THEN **PLACE** handswitches in the CLOSE position: • HS-2003 • HS-2004 • HS-2005	

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:

   a. **ENSURE** one PCP is stopped in each loop.

   b. IF PCS is less than 25°F subcooled,
   THEN **ENSURE** ALL PCPs stopped.

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.

INSTRUCTIONS	CONTINGENCY ACTIONS
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	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

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

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)	

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.

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)

INSTRUCTIONS | CONTINGENCY ACTIONS

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

INSTRUCTIONS

CONTINGENCY ACTIONS

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.

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)

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

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

INSTRUCTIONS

CONTINGENCY ACTIONS

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 Narrative Log.

INSTRUCTIONS	CONTINGENCY ACTIONS
© 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.	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)	**(continue)**

INSTRUCTIONS	CONTINGENCY ACTIONS
23. **(continued)**	**(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)**

	INSTRUCTIONS	CONTINGENCY ACTIONS
23.	**(continued)**	**(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)**

	INSTRUCTIONS	CONTINGENCY ACTIONS
23.	**(continued)**	**(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:

(continue) **(continue)**

	INSTRUCTIONS	CONTINGENCY ACTIONS
23.	**(continued)**	**(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) **(continue)**

INSTRUCTIONS	CONTINGENCY ACTIONS
23. **(continued)**	**(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.
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."	

INSTRUCTIONS	CONTINGENCY ACTIONS
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.	a.1. **MANUALLY INITIATE** CIS by pushing left or right HIGH RADIATION INITIATE pushbutton on EC-13. • CHRL-CS • CHRR-CS
b. **VERIFY** Containment Isolation. Refer to EOP Supplement 6.	b.1. **CLOSE** valves that failed to automatically operate.

INSTRUCTIONS	CONTINGENCY ACTIONS
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:	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

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	2940 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

INSTRUCTIONS

CONTINGENCY ACTIONS

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

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:

    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."

TITLE: EXCESS STEAM DEMAND EVENT

INSTRUCTIONS	CONTINGENCY ACTIONS
© 29. **VERIFY** the containment sump level is rising as the SIRWT level is lowering.	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.
30. WHEN SIRWT level less than or equal to 25%, THEN prior to RAS, **PERFORM** Pre-RAS Actions. Refer to EOP Supplement 42.	

INSTRUCTIONS | CONTINGENCY ACTIONS

CAUTION

Premature initiation of RAS can lead to insufficient Containment Sump inventory for SI Pump operation. Minimum Containment Water level of 593' 6" 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.

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

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)

INSTRUCTIONS | CONTINGENCY ACTIONS

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

INSTRUCTIONS 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 OR ALL of the following: • 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)

INSTRUCTIONS	CONTINGENCY ACTIONS

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)

INSTRUCTIONS	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.	

INSTRUCTIONS

CONTINGENCY ACTIONS

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
	MO-3014	52-251	LPSI Loop 2B
596' 4"	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

INSTRUCTIONS

CONTINGENCY ACTIONS

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.

TITLE: EXCESS STEAM DEMAND EVENT

INSTRUCTIONS

© 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.

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.

INSTRUCTIONS	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)

INSTRUCTIONS	CONTINGENCY ACTIONS
41. **(continued)**	
	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) **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.	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)	**(continue)**

INSTRUCTIONS	CONTINGENCY ACTIONS
41. **(continued)**	**(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.

TITLE: EXCESS STEAM DEMAND EVENT

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.

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)

INSTRUCTIONS

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.

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

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

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.

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)

(continue)

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)

INSTRUCTIONS	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.	

INSTRUCTIONS	CONTINGENCY ACTIONS
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	46.1. **ENSURE** proper control of S/G feeding and steaming rates.
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	

INSTRUCTIONS	CONTINGENCY ACTIONS
48. IF measured Containment hydrogen concentration is between 1% and 3%, THEN **PERFORM** ALL the following:	
a. **CONTACT** TSC.	
b. **OPEN** MCC 9 Feeder Breaker, 52-1304. LOCATION: On Bus 13	

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	

INSTRUCTIONS	CONTINGENCY ACTIONS
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 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.	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.

INSTRUCTIONS	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.

INSTRUCTIONS

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)

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."	

INSTRUCTIONS

CONTINGENCY ACTIONS

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)

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)

INSTRUCTIONS

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.

INSTRUCTIONS	CONTINGENCY ACTIONS
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.	

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)

	INSTRUCTIONS	CONTINGENCY ACTIONS
61.	**(continued)**	**(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."

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.	

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_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.
- Shutdown Cooling System monitoring equipment power is available from Y01

(continue)

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 approved procedure.	

End of Section 4.0

5.0 **PLACEKEEPER**

EOP ENTRY TIME: _____

STEP	INSTRUCTIONS	PAGE	START	DONE
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	_____	_____

5.0 PLACEKEEPER

EOP ENTRY TIME: _____

STEP	INSTRUCTIONS	PAGE	START	DONE
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	_____	©

5.0 **PLACEKEEPER**

EOP ENTRY TIME: _____

STEP	INSTRUCTIONS	PAGE	START	DONE
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	_____	_____

5.0 **PLACEKEEPER**

EOP ENTRY TIME: _____

STEP	INSTRUCTIONS	PAGE	START	DONE
41.	If SI Pump throttling criteria are met, then maintain PZR level between 20% and 85% (42% to 57% preferred)	40	_____	_____
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%, notify TSC and open MCC-9 feeder breaker	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	_____	_____

5.0 **PLACEKEEPER**

EOP ENTRY TIME: _____

STEP	INSTRUCTIONS	PAGE	START	DONE
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	_____	_____
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 5

EOP SUPPLEMENT 1, "PRESSURE TEMPERATURE LIMIT CURVES"

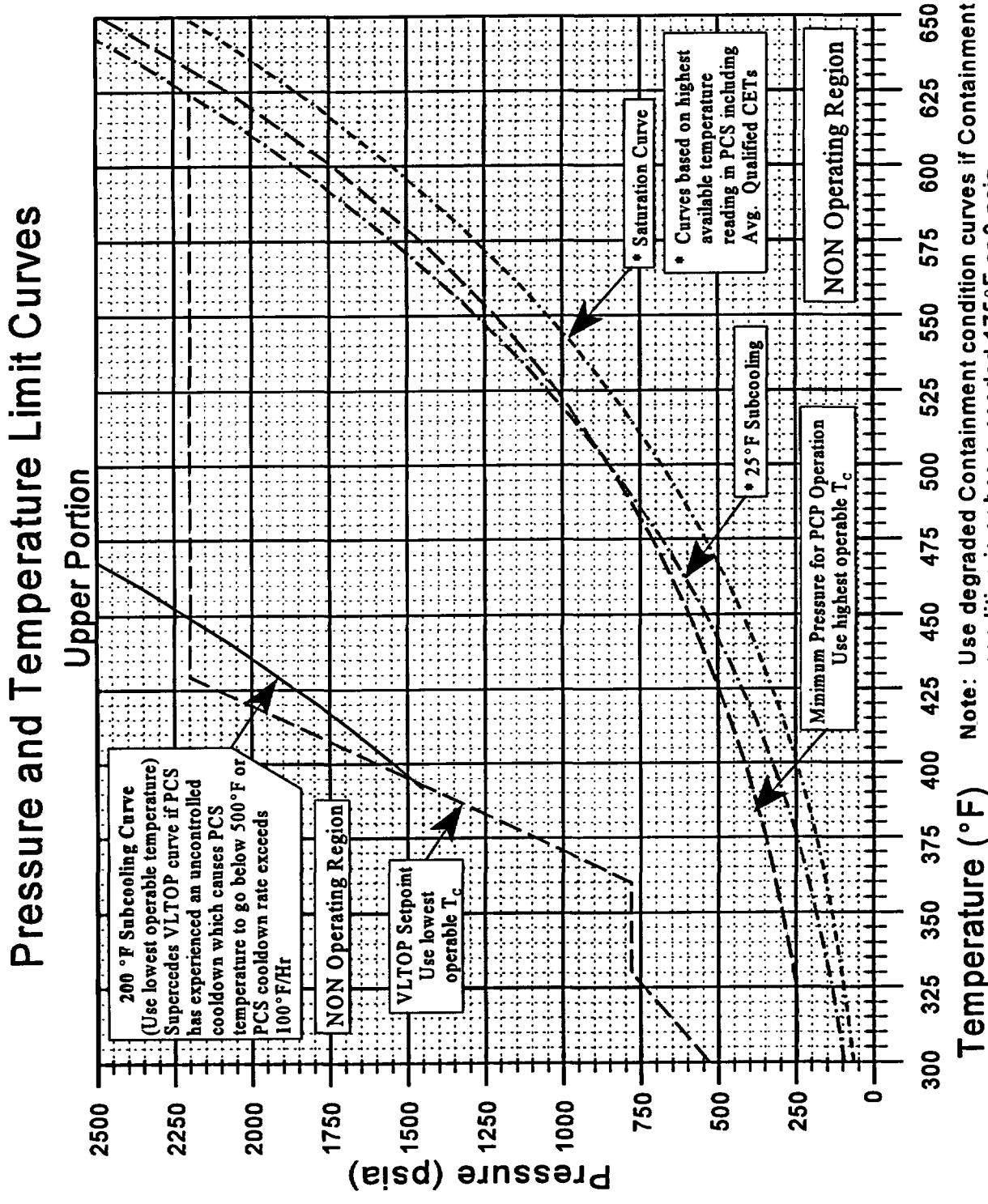
5 Pages Follow

PALISADES NUCLEAR PLANT

PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

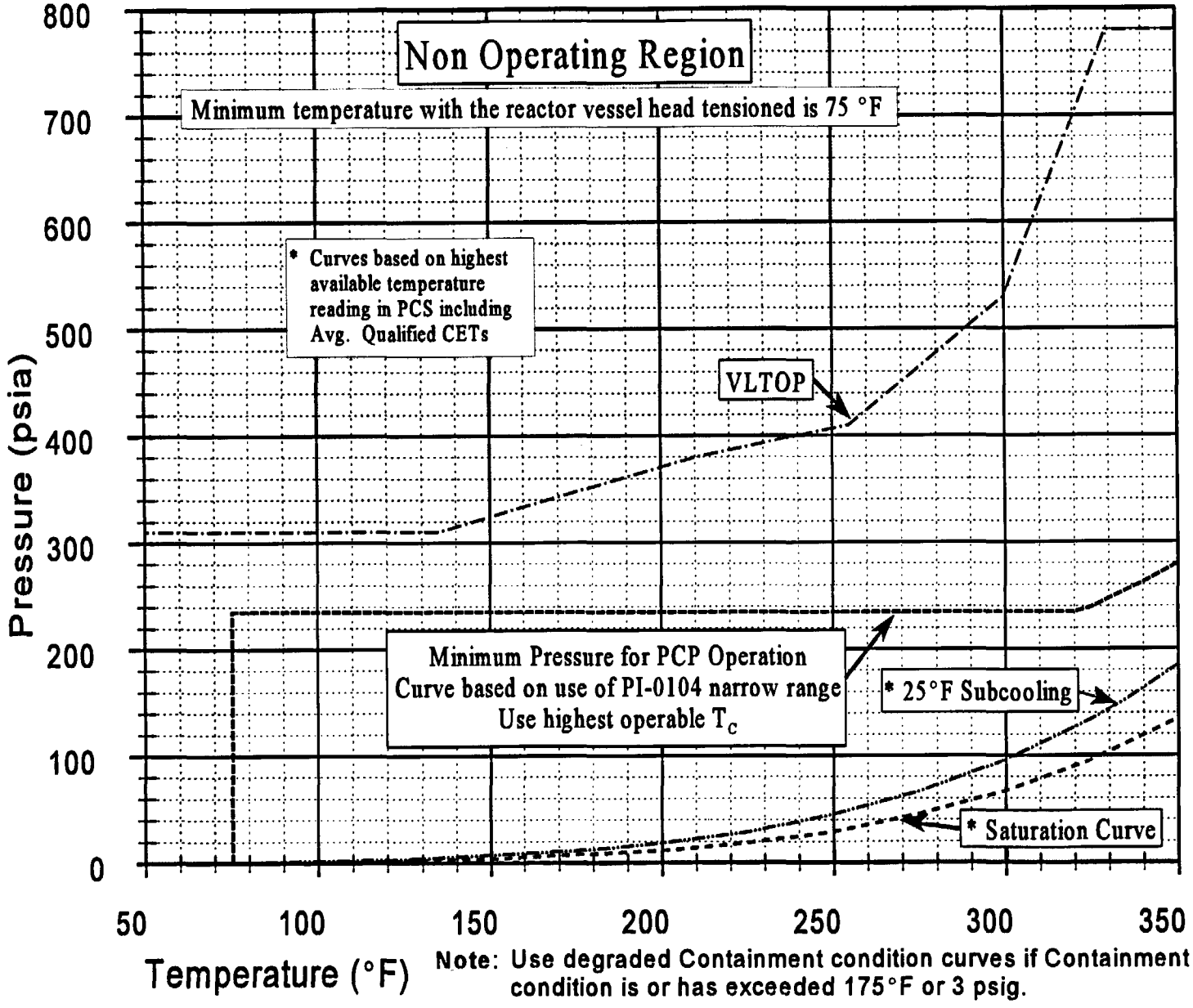
Proc No EOP Supplement	
Supplement	1
Revision	5
Page	1 of 5

TITLE: Pressure Temperature Limit Curves



Pressure and Temperature Limit Curves

Lower Portion



Note: Use degraded Containment condition curves if Containment condition is or has exceeded 175°F or 3 psig.

TITLE: Pressure Temperature Limit Curves

PALISADES NUCLEAR PLANT
EMERGENCY OPERATING PROCEDURE

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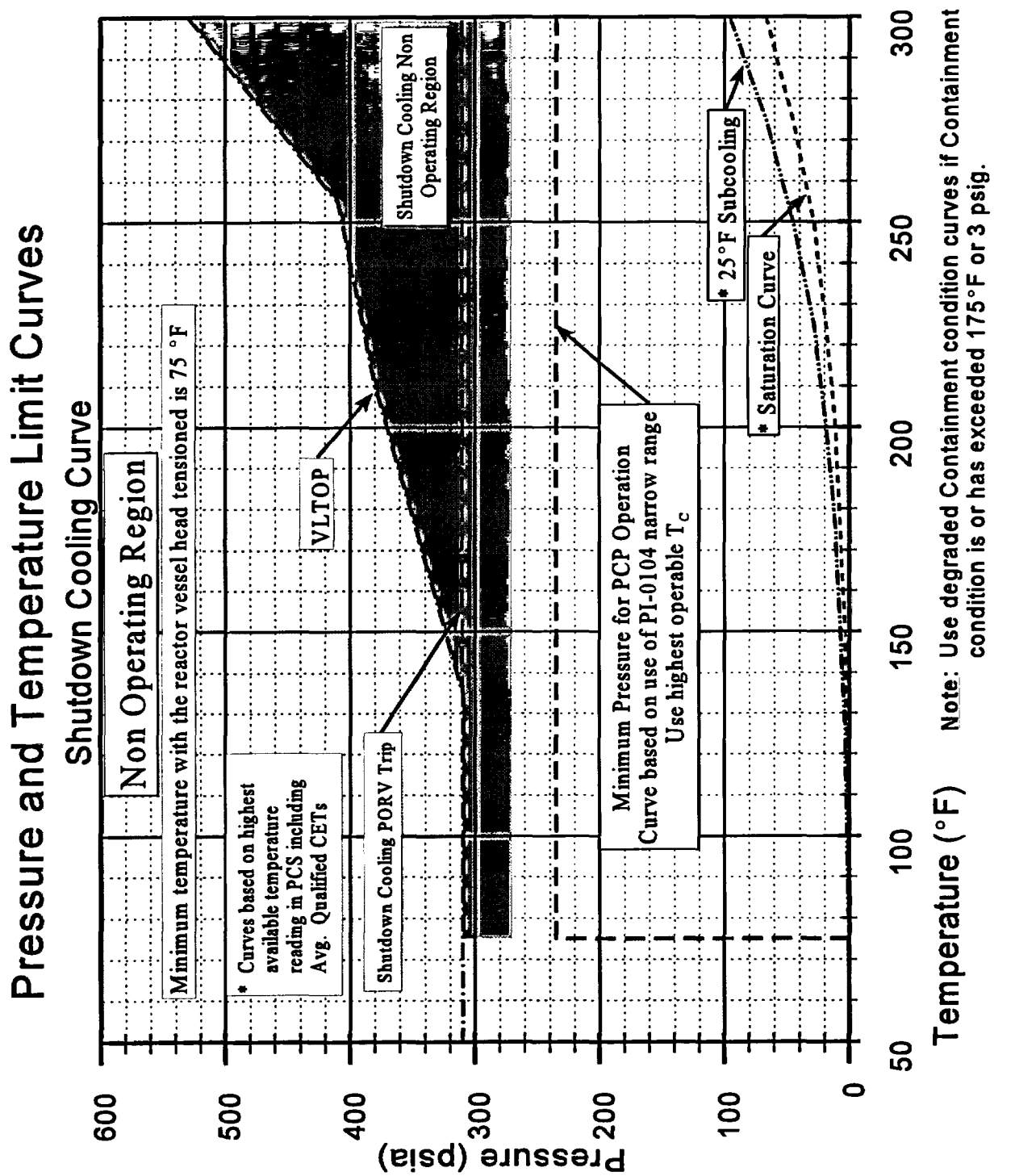
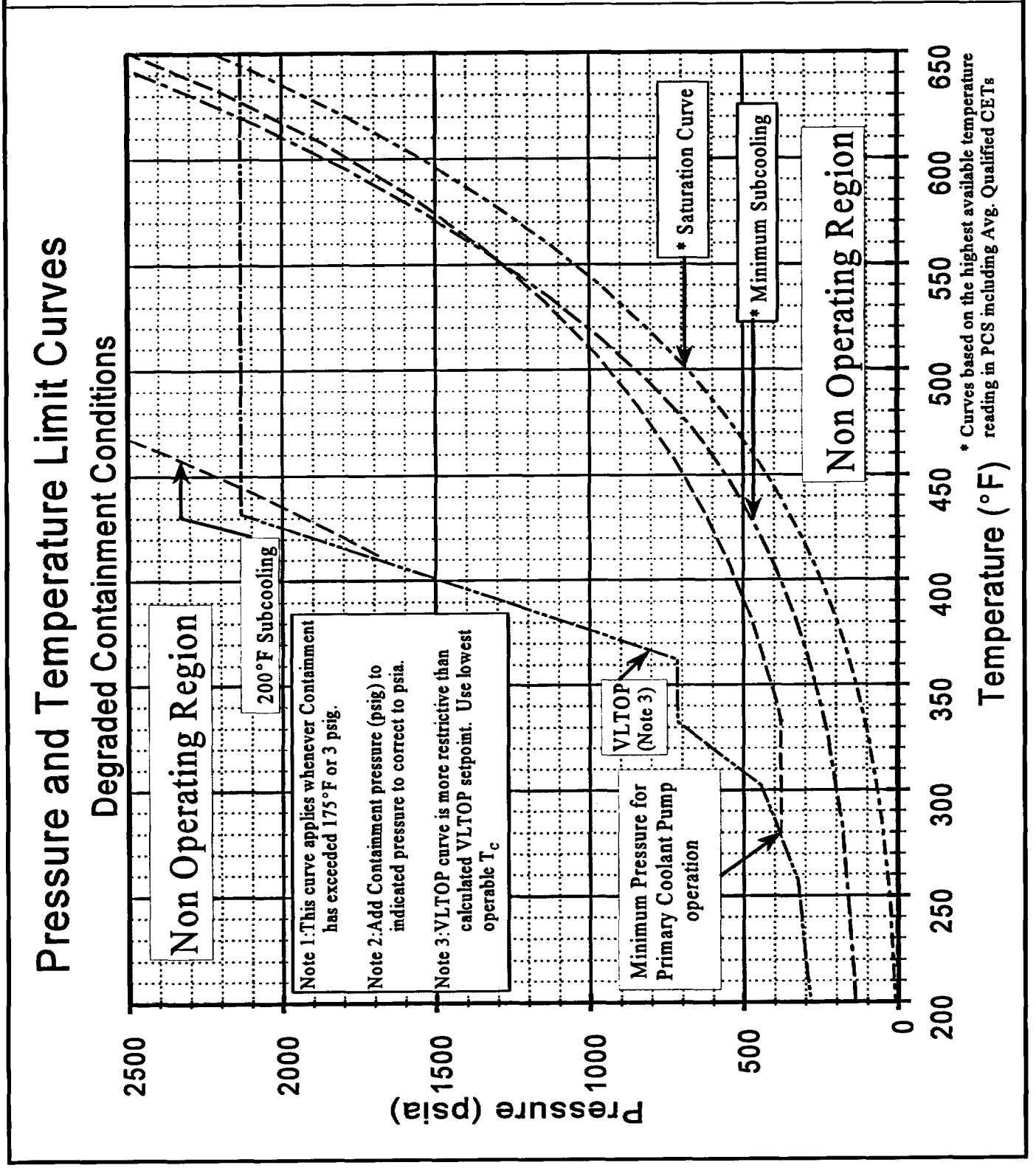
TITLE: Pressure Temperature Limit Curves



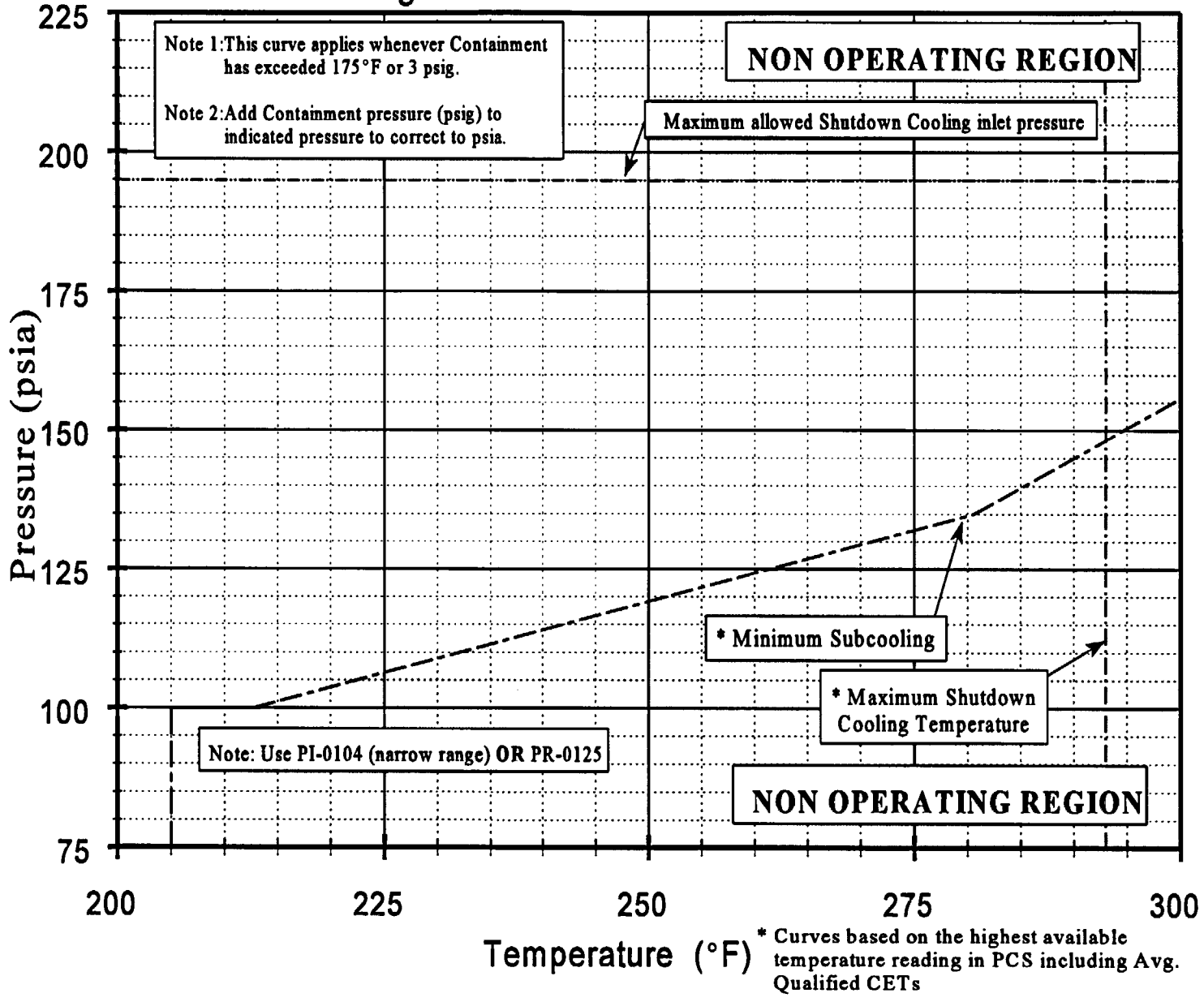
Note: Use degraded Containment condition curves if Containment condition is or has exceeded 175°F or 3 psig.

TITLE: Pressure Temperature Limit Curves



Shutdown Cooling Entry Window

For Degraded Containment Conditions



* Curves based on the highest available temperature reading in PCS including Avg. Qualified CETs

TITLE: Pressure Temperature Limit Curves

PALISADES NUCLEAR PLANT
EMERGENCY OPERATING PROCEDURE

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