OBJECTIVE

This procedure provides the operator actions which must be accomplished to mitigate the effects of an excess steam demand. The actions in this procedure are necessary to ensure that the plant is placed in a safe, stable condition. The goal of this procedure is to establish SDC entry conditions.

TECHNICAL REVIEW SIGNATURE _____ DATE 5/16/93

LEAD MANAGER REVIEW SIGNATURE John W. Dunner DATE 5/16/93

APPROVED BY:

SIGNATURE John W. Dunner DATE 5/16/93

Effective Date: 6-25-93

DDC ONLY
ASSIGNED COPY NUMBER:

1.0 ENTRY CONDITIONS (cont.)

___ 1.2 IF all of the entry conditions for an excess steam demand exist,
THEN perform both of the following:

___ Direct the primary operator to GO TO **Excess Steam Demand**, 41EP-1RO04, **Appendix A**, Primary Operator Actions, beginning with Step 3.1.

___ Direct the secondary operator to GO TO **Excess Steam Demand**, 41EP-1RO04, **Appendix B**, Secondary Operator Actions, beginning with Step 3.1.

___ 1.3 IF all of the entry conditions for an excess steam demand do NOT exist,
THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

CRS ACTIONS	CRS DETAILS
2.0 EMERGENCY NOTIFICATION AND SUPPORT	
___2.1 Ensure that the event is being classified in accordance with the Emergency Plan.	Direct an SRO or emergency coordinator qualified person to CONCURRENTLY PERFORM **Emergency Classification**, EPIP-02, beginning with Step 4.0.
___2.2 Inform an STA of the excess steam demand.	
___2.3 WHEN the STA arrives in the control room, THEN direct him to monitor safety function status and plant parameters. Continue in this procedure.	Direct the STA to PERFORM **Emergency Operations**, 41EP-1EO01, **Appendix S**, STA Responsibilities, beginning at the entry to the STA SFFC.

CRS ACTIONS | CRS DETAILS

2.0 EMERGENCY NOTIFICATION AND SUPPORT (cont.)

NOTE

After a thermal power change that exceeds 15% within a 1 hour period, **Tech Spec 3.4.7** requires that the RCS be sampled for the Dose Equivalent I-131.

___ 2.4 Direct Chemistry to perform all of the following:

___ Sample both steam generator hot legs for activity.

___ PERFORM **Primary Sampling Instructions**, 74OP-9SS01, to sample the RCS for boron concentration.

___ PERFORM **Reactor Coolant System Specific Activity Surveillance Test**, 74ST-9RC02, between 2 and 6 hours after the trip.

___ PERFORM **Operation of the Post Accident Sampling System**, 74OP-1SS02, beginning with Step 4.1, to place the PASS in service.

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL

___3.1 Ensure that an MSIS has actuated.

___3.2 Ensure that the secondary operator aligns both steam generators for hot leg sampling.

___3.3 Inform Chemistry of the status of systems needed to support sampling.

IF the nuclear cooling water system is NOT operating,
THEN RCS and steam generator samples can not be drawn.

IF the normal chilled water system is NOT operating,
OR NAN-S05 is de-energized,
THEN inform Chemistry to use alternate sample cooling for steam generator samples and PASS for RCS samples.

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

___ 3.4 IF, at any time during this procedure, pressurizer pressure is below the safety injection setpoint,
THEN ensure that all of the following conditions exist:

___ A SIAS and a CIAS has actuated.

___ No more than 1 RCP is operating in each loop.

___ Acceptable HPSI flow is established to the RCS.

See HPSI Delivery Curve, on the control board.

___ SESS indicates that the safety injection components are in their actuated condition.

___ SESS indicates that the containment isolation valves are closed.

Check that one of the following conditions exists:

___ SESS indicates that at least 1 containment isolation valve in each automatically isolated penetration is closed.

___ The valves in any open penetrations have been overridden open as required by plant conditions.

CRS ACTIONS | CRS DETAILS

3.0 EVENT CONTROL (cont.)

CAUTION

Maximizing the charging and safety injection flows may cause the pressurizer to overfill, which in turn may cause an RCS pressure excursion upon RCS heatup. Throttling or terminating flows may be necessary to prevent overfilling the pressurizer.

___ 3.5 IF a SIAS and a CIAS have actuated,
THEN continue in this procedure.

___ IF NOT, THEN GO TO Step 3.16 in this procedure.

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

CAUTION

Running the safety injection pumps on miniflow for longer than 1 hour may cause pump damage due to overheating.

CAUTION

Having only 1 HPSI injection valve per train in a throttled position will minimize erosion damage.

___ 3.6 IF all of the HPSI throttle criteria have been met,
– THEN direct the primary operator to throttle HPSI, while maintaining the HPSI throttle criteria.

Check that all of the following HPSI throttle criteria are met:

___ RCS subcooling is above the minimum subcooling limit. See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ RVLMS indicates that the RVUH level is at least 16%.

___ Pressurizer level is being maintained above 33%[40%].

___ At least 1 steam generator has a level above 2% [13%] WR and is maintaining RCS heat removal.

CRS ACTIONS | CRS DETAILS

3.0 EVENT CONTROL (cont.)

3.7 Steps 3.7 and 3.8 - PC may be throttling HPSI.

___3.9 IF both of the following conditions exist:

___ HPSI train A has been throttled.

___ All 4 HPSI injection valves are closed.

THEN direct the primary operator to override and stop HPSI pump A.

___3.10 IF both of the following conditions exist:

___ HPSI train B has been throttled.

___ All 4 HPSI injection valves are closed.

THEN direct the primary operator to override and stop HPSI pump B.

___3.11 IF all of the HPSI throttle criteria can NOT be maintained, THEN ensure that all of the following conditions exist:

___ 1. All available HPSI pumps are running.

___ 2. All of the HPSI throttle valves are fully open.

___ 3. Acceptable HPSI flow is established to the RCS. — See HPSI Delivery Curve, on the control board.

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

NOTE

While in Mode 3 with pressurizer pressure greater than 1837 psia [1620 - 2047 psia], the correct position of the LPSI throttle valves must be verified within 4 hrs following the completion of each valve stroking operation per **Tech Spec Surveillance Requirements** 3.5.2.g.

___3.12 IF a SIAS has actuated,
AND pressurizer pressure is greater than 260 psia [300 psia] and stable or increasing,
THEN perform all of the following:

___ 1. Direct the primary operator stop all operating LPSI pumps.

___ 2. Direct the primary operator close all the LPSI injection valves.

___ 3. Ensure that the position verification LCO requirements are met within 4 hours after the LPSI injection valves have been closed.

Calculate the time 4 hours after the LPSI throttle valves are closed.

Time that the LPSI throttle valves are closed.

_____
+ 4 hours
= _____time.

___3.13 IF pressurizer pressure can NOT be maintained above 260 psia [300 psia], THEN perform all of the following:

___ 1. Direct the primary operator start all of the available LPSI pumps.

___ 2. Direct the primary operator open both of the LPSI injection valves for any of the LPSI pumps that are running.

___ 3. Ensure that acceptable LPSI flow is established to the RCS.

See LPSI Delivery Curve, on the control board.

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

___ 3.14 IF, at any time during this procedure, a SIAS is actuated,
THEN direct the primary operator to energize all of the following electrical panels, 1 at a time:

___ NHN-M19.

___ NHN-M20.

___ NHN-M71.

___ NHN-M72.

___ Essential lighting panel QBN-D90.

___ Essential lighting panel QBN-D91.

3.15 SO is checking for steam generator dryout conditions.

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

NOTE

Stabilizing T_C prevents an uncontrolled pressurizer level increase which could result in possible solid plant operations or lifting of the pressurizer safety valves.

___ 3.16 IF pressurizer pressure reaches 2300 psia [2150 psia], THEN perform both of the following:

___ Ensure that the primary operator maintains pressurizer pressure below 2300 psia [2150 psia].

___ Ensure that the secondary operator stabilizes T_C in the loop with the highest pressure steam generator.

3.17 Steps 3.17 and 3.18 - SO is stabilizing T_C in the loop with the highest pressure steam generator.

3.19 PO is maintaining pressurizer pressure less than 2300 psia [2150 psia].

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

___ 3.20 IF, at any time during this procedure, any of the following conditions exist:

___ Minimum RCS subcooling is NOT acceptable.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ RCP NPSH is NOT acceptable.

See RCP NPSH Curve, on the control board.

___ CSAS actuates.

THEN ensure that the primary operator stops all of the operating RCPs.

___ 3.21 IF any RCPs are running,
AND RCP annunciator windows are in alarm for running RCPs,
THEN direct the primary operator to evaluate any RCP annunciator window that is in alarm.

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

___3.22 Evaluate the RWT level and charging system status and GO TO the applicable Step in this procedure.

Perform the decision table below:

RWT level stable and above 73%	RWT level below or approaching 73%			RWT level below or approaching 20%	
CHN-HV-536	CHB-V327	SFP level above alarm setpoint	• No charging pump suction paths available • CRS chooses to stop charging	SFP level above alarm setpoint	• No charging pump suction paths available • CRS chooses to stop charging
CHN-UV-501	• CHA-P01 and CHA-V755 • CHB-P01 and CHB-V756 • CHE-P01 and CHE-V757	PCN-V215		PCN-V215	
• CHA-P01 • CHB-P01 • CHE-P01		CHN-V144		CHN-V144	
		CHN-HV-532		CHN-HV-532	
		• CHA-P01 • CHB-P01 • CHE-P01		• CHA-P01 • CHB-P01 • CHE-P01	
GO TO Step 3.23 in this procedure.	GO TO Step 3.24 in this procedure.	GO TO Step 3.25 in this procedure.	GO TO Step 3.26 in this procedure.	GO TO Step 3.25 in this procedure.	GO TO Step 3.26 in this procedure.

CRS ACTIONS | CRS DETAILS

3.0 EVENT CONTROL (cont.)

___3.23 IF the RWT level is stable and above 73%,
THEN perform both of the following:

___ 1. Direct the primary operator to transfer the charging pump suction from the VCT to the RWT.

___ 2. GO TO Step 3.27 in this procedure.

NOTE

Charging pumps are not required for inventory control. If auxiliary spray or RCP seal injection is needed, then charging pump suction should be maintained.

___3.24 IF the RWT level is below or approaching 73%,
THEN perform both of the following:

___ 1. Direct the primary operator to transfer charging pump suction to the bottom of the RWT, through CHB-V327.

___ 2. GO TO Step 3.27 in this procedure.

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

___3.25 IF the RWT level is NOT sufficient for charging pump operation,
AND charging pump suction must be maintained,
THEN perform both of the following:

___ 1. Direct the primary operator to transfer charging pump suction to the SFP.

___ 2. GO TO Step 3.27 in this procedure.

___3.26 IF the CRS chooses to stop charging,
OR charging pump suction can NOT be maintained,
THEN direct the primary operator to perform both of the following:

___ Isolate RCP seal bleedoff.

___ Place all of the charging pumps in PULL TO LOCK.

___3.27 Direct the secondary operator to align instrument air to the containment.

___3.28 IF nuclear cooling water is in service,
AND pressurizer level is greater than 33% [40%],
THEN direct the primary operator to open the letdown containment isolation valves.

___3.29 IF the letdown containment isolation valves are open,
THEN direct the primary operator to restore letdown.

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

NOTE

An excess steam demand may affect both steam generators. When both steam generators are affected, the least affected is considered intact. The most affected steam generator is considered to be faulted. The faulted steam generator will have lower pressure and level than the intact steam generator.

NOTE

Before the faulted steam generator dries out, its RCS loop T_c will be the lowest. After the faulted steam generator dries out, its RCS loop T_c will be the highest.

___3.30 Ensure that the secondary operator identifies the steam generator that is faulted.

Evaluate all of the parameters in the table below for each steam generator to identify the faulted steam generator:

Parameter	Steam Generator 1	Steam Generator 2
Lowest steam generator pressure	_____	_____
Lowest RCS loop T_c (before steam generator dryout)	_____	_____
Highest RCS loop T_c (following steam generator dryout)	_____	_____
Lowest steam generator level	_____	_____

Record the faulted steam generator _____.

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

NOTE

An excess steam demand may affect both steam generators. When both steam generators are affected, the least affected is considered intact. The most affected steam generator is considered to be faulted. The faulted steam generator will have lower pressure and level than the intact steam generator.

___3.31 Direct the secondary operator to isolate the faulted steam generator.

___3.32 WHEN the faulted steam generator has been isolated, THEN ensure that the isolated steam generator is the faulted steam generator.

Evaluate the parameters in the table below for the intact steam generator to ensure that the faulted steam generator is isolated:

Parameter	Steam Generator 1	Steam Generator 2
Pressure is stabilized or recovering in the intact steam generator	_____	_____
Level is stabilized or recovering in the intact steam generator	_____	_____
T_c is stabilized or recovering in the intact RCS loop	_____	_____

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

___ 3.33 IF the diagnosis was correct and the faulted steam generator has been isolated,
THEN GO TO Step 3.36 in this procedure.

___ IF NOT, THEN direct the secondary operator to perform all of the following:

___ 1. Restore the steam generator that was incorrectly isolated.

___ 2. Isolate the steam generator that was incorrectly diagnosed as being intact.

___ 3. Record the faulted steam generator.

Steam generator faulted _____.

3.34 SO may be restoring the incorrectly isolated steam generator.

3.35 SO may be isolating the steam generator that was considered intact.

CRS ACTIONS | CRS DETAILS

3.0 EVENT CONTROL (cont.)

NOTE

Equipment that has been overridden will require manual restoration should conditions degrade to the point where automatic actuation should take place.

___3.36 Direct the primary operator to check that containment pressure is less than 8.5 psig.

___3.37 IF a CSAS has actuated,
AND the containment pressure is less than 7.0 psig,
THEN direct the primary operator to override and stop CS.

___3.38 IF the CS pumps were placed in override,
AND the containment pressure increases to 8.5 psig,
THEN direct the primary operator to re-initiate CS.

___3.39 IF a CSAS has actuated,
THEN direct the secondary operator to stop all of the containment fans.

CRS ACTIONS	CRS DETAILS
3.0 EVENT CONTROL (cont.)	
___3.40 WHEN reactor power has decreased to 2 x 10-6%, THEN perform both of the following:	
___ 1. Ensure that, within 1 hour of the reactor trip, both of the startup channel high neutron flux alarms are operable.	Calculate the time 1 hour after the reactor tripped. Time of the reactor trip (from the CRS Safety Function Flowchart) _____ + 1 hour = _____hours.
___ 2. Direct the primary operator to CONCURRENTLY PERFORM Boron Dilution Alarm Channel Check, **Attachment A-3** to the Primary Operator Actions. Continue in this procedure.	
___3.41 IF informed that the channel check indicates an inoperable neutron flux alarm, THEN ensure that the LCO action requirements are met.	Direct an STA or a reactor operator, other than the primary or secondary operator, to PERFORM **Startup Channel High Neutron Flux Alarm Inoperable 3.1.2.7**, 41ST-1ZZ24, beginning with Step 1.1.
___3.42 IF less than 4 RCPs are running, THEN ensure that the primary operator places the pressurizer spray valves in MANUAL.	
3.43 PO may be performing Spray Valve Actuation Data Sheet.	

CRS ACTIONS | CRS DETAILS

3.0 EVENT CONTROL (cont.)

NOTE

Stabilizing T_c prevents an uncontrolled pressurizer level increase which could result in possible solid plant operations or lifting of the pressurizer safety valves.

___3.44 IF the faulted steam generator is above 2% [13%] WR level,
AND the condenser is available,
THEN direct the secondary operator to align the faulted steam generator for high rate blowdown to the condenser.

CRS ACTIONS

CRS DETAILS

3.0 EVENT CONTROL (cont.)

___3.45 IF the ADVs or AFA-P01 are being used,
THEN inform Radiation Protection and the RMS technician of the steam release.

___3.46 IF both of the following 13.8 kV buses are de-energized:

___ NAN-S01.

___ NAN-S02.

THEN direct an operator to CONCURRENTLY PERFORM **Emergency Operations**, 41EP-1EO01, **Appendix V**, Preparing For and Restoring Offsite Power, beginning with Step 1.1.

___3.47 Check that all Section 3.0 steps have been addressed.

CRS ACTIONS

CRS DETAILS

4.0 PLANT STATUS POINT

___ 4.1 IF Reactivity Control is satisfied, THEN continue in this procedure.

Check that the conditions from at least 1 of the columns, in the table below, are met:

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

All CEAs are inserted	Boration rate is greater than 40 gpm	• Reactor power is less than 10^{-4}% • Adequate shutdown margin is established • RCS boron concentration is greater than 2150 ppm
Reactor power is decreasing	Reactor power is decreasing	• Reactor power is decreasing • Reactor power is constant

CRS ACTIONS

4.0 PLANT STATUS POINT (cont.)

___ 4.2 IF Maintenance of Vital Auxiliaries is satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

CRS DETAILS

Check that all of the following criteria are met:

___ Main turbine is tripped.

___ Generator output breakers are open.

___ All of the buses in at least 1 train in the table below, are energized:

Bus	Train A	Train B
4.16 kV BUS	___PBA-S03	___PBB-S04
120 Vac BUSES	___PNA-D25	___PNB-D26
	___PNC-D27	___PND-D28
125 Vdc BUSES	___PKA-M41	___PKB-M42
	___PKC-M43	___PKD-M44

CRS ACTIONS

CRS DETAILS

4.0 PLANT STATUS POINT (cont.)

___ 4.3 IF RCS Pressure and Inventory Control are satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1E001, beginning at the entry to the Safety Function Flowcharts.

Check that all of the criteria are met for the existing pressurizer level condition listed in the table below:

Pressurizer level between 10 and 70% [25 - 74%]

___ RCS subcooling is acceptable. See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ RVLMS indicates that the Outlet Plenum level is at least 21%.

___ Charging and letdown, as available, are restoring pressurizer level.

___ At least 1 of the following conditions is met:

___ HPSI flow is acceptable. See HPSI Delivery Curve on the control board.

___ HPSI throttle criteria have been met.

Pressurizer level below 10% [25%]

___ RVLMS indicates that the Outlet Plenum level is at least 21%.

___ HPSI flow is acceptable. See HPSI Delivery Curve on the control board.

___ All available charging pumps are running.

CRS ACTIONS

CRS DETAILS

4.0 PLANT STATUS POINT (cont.)

___ 4.4 IF Heat Removal is satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO Emergency Operations, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

A. Calculate RCS operating loop ΔT. Th _____°F

\- T_c _____°F

= RCS operating loop ΔT _____°F

B. Check that all of the criteria are met for the existing RCP condition listed in the table below:

At least 1 RCP running	No RCPs running
___RCS loop ΔT is less than 10°F [17°F].	___RCS loop ΔT is less than 57°F [74°F].
___RCS T_c is less than 570°F [558°F].	___REP CET temperature is less than 600°F [610°F].
___RCS T_c is stable or decreasing.	___REP CET temperature is stable or decreasing.

C. Check that the intact steam generator meets the criteria for the existing level condition listed in the table below:

SG WR Level	2 Steam Generators Available	1 Steam Generator Available
Above 72% [78%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR
Between 2 and 72% [13 - 78%] WR	At least 250 gpm or 0.14 x 10^6 lb/hr feedwater flow	At least 500 gpm or 0.28 x 10^6 lb/hr feedwater flow
Below 2% [13%] WR	Between 250 and 1500 gpm or between 0.14 x 10^6 lb/hr and 0.83 x 10^6 lb/hr	Between 500 and 1500 gpm or between 0.28 x 10^6 lb/hr and 0.83 x 10^6 lb/hr

CRS ACTIONS

4.0 PLANT STATUS POINT (cont.)

___ 4.5 IF Containment Integrity is satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1E001, beginning at the entry to the Safety Function Flowcharts.

CRS DETAILS

Check that all of the following criteria are met:

___ At least 1 of the following pressure criteria is met:

___ Containment pressure is less than 3.0 psig.

___ CIAS has actuated.

___ None of the following available containment radiation monitors are in ALERT or HIGH alarm:

___ RU-1 or alternate. ___ RU-148.

___ RU-16. ___ RU-149.

___ RU-17.

___ None of the following available steam plant radiation monitors are in ALERT or HIGH alarm:

___ RU-139. ___ RU-140. ___ RU-141.

___ One of the following conditions is met:

___ No ALERT or HIGH alarm on RU-4 or RU-5.

___ Chemistry samples indicate no increased steam generator tube leakage.

CRS ACTIONS

CRS DETAILS

4.0 PLANT STATUS POINT (cont.)

___ 4.6 IF Containment Atmospheric Control is satisfied, THEN continue in this procedure.

Check that at least 1 of the following containment pressure criteria is met:

___ Containment pressure is less than 8.5 psig.

___ At least 1 CS header is delivering at least 3525 gpm.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1E001, beginning at the entry to the Safety Function Flowcharts.

CRS ACTIONS

CRS DETAILS

5.0 PLANT STABILIZATION

5.1 *PO and SO are beginning their normal response to new alarms.*

CAUTION

Overriding an AFAS and throttling flow when the steam generator level is below 2% [13%] WR may result in a loss of heat removal.

NOTE

AFW valves that are in override will not auto actuate. Operator action will be required to maintain the steam generator levels.

___ 5.2 IF an AFAS has actuated,
THEN perform both of the following:

___ 1. Ensure that the intact steam generator level is being maintained.

Establish the minimum required feedwater flow to the intact steam generator as listed in the table below:

SG WR Level	Flow Required
Above 72% [78%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR.
Between 2 and 72% [13 - 78%] WR	At least 500 gpm or 0.28 x 10^6 lb/hr feedwater flow
Below 2% [13%] WR	• AFAS actuated and not throttled • Between 500 and 1500 gpm or between 0.28 and 0.83 x 10^6 lb/hr

___ 2. GO TO Step 5.10 in this procedure.

CRS ACTIONS

CRS DETAILS

5.0 PLANT STABILIZATION (cont.)

___5.3 IF an AFAS has NOT actuated,
THEN direct the secondary operator to ensure that an auxiliary feed pump is placed in service.

Evaluate the table below and direct the secondary operator to GO TO the appropriate step to ensure that an auxiliary feed pump is placed in service:

Start-up Auxiliary Feedwater Pump, AFN-P01	Essential Electric Driven Auxiliary Feedwater Pump, AFB-P01	Essential Steam Driven Auxiliary Feedwater Pump, AFA-P01
Direct the secondary operator to GO TO Step 5.7 in his procedure, to start AFN-P01.	Direct the secondary operator to GO TO Step 5.4 in his procedure, to start AFB-P01.	Direct the secondary operator to GO TO Step 5.5 in his procedure, to start AFA-P01.

5.4 *Steps 5.4 and 5.5 - SO may be placing an essential AFW pump in service.*

___5.6 IF Essential Steam Driven Auxiliary Feedwater Pump, AFA-P01, has been started,
THEN inform Radiation Protection and the RMS technician of the steam release.

5.7 *Steps 5.7 through 5.9 - SO may be placing the startup AFW pump in service.*

CRS ACTIONS

CRS DETAILS

5.0 PLANT STABILIZATION (cont.)

___ 5.10 WHEN AFW flow is established,
THEN direct the secondary operator to remove both of the operating main feed pumps from service.

Continue in this procedure.

5.11 *Steps 5.11 and 5.12 - SO is stopping the main feedwater pumps.*

CRS ACTIONS

CRS DETAILS

5.0 PLANT STABILIZATION (cont.)

CAUTION

Overriding an AFAS and throttling flow when the steam generator level is below 2% [13%] WR may result in a loss of heat removal.

NOTE

AFW valves that are in override will not auto actuate. Operator action will be required to maintain the steam generator levels.

5.13 WHEN AFW has been restored to the intact steam generator, THEN direct the secondary operator to maintain the intact steam generator level between 72 and 80% [78 - 84%].

Establish the required feedwater flow to the intact steam generator as listed in the table below:

SG WR Level	Flow Required
Above 72% [78%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR.
Between 2 and 72% [13 78%] WR	At least 500 gpm or 0.28 x 10^6 lb/hr feedwater flow
Below 2% [13%] WR	• AFAS actuated and not throttled • Between 500 and 1500 gpm or between 0.28 and 0.83 x 10^6 lb/hr

Continue in this procedure.

CRS ACTIONS

CRS DETAILS

5.0 PLANT STABILIZATION (cont.)

___5.14 Direct the primary operator to place the hydrogen analyzers in service.

5.15 *PO is recording the time the hydrogen analyzers were placed in service.*

___5.16 IF a CSAS has occurred,
THEN ensure the primary operator isolates bleedoff flow.

___5.17 Direct the primary operator to maintain pressurizer level between 10 and 70% [25 - 74%] and trending to between 33 and 53% [40 - 50%].

___5.18 Direct the secondary operator to stop the heater drain pumps.

CRS ACTIONS

CRS DETAILS

5.0 PLANT STABILIZATION (cont.)

___5.19 IF all of the following conditions exist:

___ Establishing cooling to the containment is desired.

___ Plant cooling water is available.

___ Nuclear cooling water is available.

___ At least 1 normal chiller is available.

___ Containment pressure is below 7.0 psig.

THEN direct the secondary operator to establish cooling to the containment.

___5.20 IF the NC water containment isolation valves are open, THEN direct the secondary operator to override and start at least 1 CEDM ACU.

5.21 Step 5.21 and 5.22 - SO may be starting containment normal ACUs and a normal chiller.

___5.23 Direct the secondary operator to align an auxiliary steam supply.

___5.24 IF auxiliary steam is being supplied from the cross-tie header, THEN direct the secondary operator to shift gland seal from main steam to auziliary steam.

___5.25 Direct the secondary operator to restore gland seal to the main turbine.

CRS ACTIONS

CRS DETAILS

5.0 PLANT STABILIZATION (cont.)

___5.26 Direct the secondary operator to CONCURRENTLY PERFORM **Emergency Operations**, 41EP-1EO01, **Appendix E**, Secondary Equipment Shutdown Checklist, beginning with Step 1.1.

___5.27 Direct the primary operator to CONCURRENTLY PERFORM **Emergency Operations**, 41EP-1EO01, **Appendix F**, Water Inventory Record, beginning with Step 1.1.

CAUTION

Following an RCS cooldown, an overpressurization of the RCS may result in a pressurized thermal shock.

___5.28 Direct the primary operator to maintain pressurizer pressure within the acceptable region.

Direct the primary operator to CONCURRENTLY PERFORM Spray Valve Actuation Data Sheet, **Attachment A-4** to the Primary Operator Actions.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

5.0 PLANT STABILIZATION (cont.)

___ 5.29 IF the containment pressure increases,
THEN ensure that the containment pressure is being controlled.

A. Evaluate the containment pressure on all of the following:

___ HCA-PI-351A. ___ HCC-PI-351C.

___ HCB-PI-351B. ___ HCD-PI-351D.

B. Direct the primary operator to perform the operator actions in the table below, after evaluating the highest valid containment pressure:

Indicated Containment Pressure	Operator Actions
Above 3 psig	___ Ensure that a SIAS and a CIAS have actuated.
Between 3 and 8.5 psig	___ Ensure that one of the following conditions exists: ___ 1. At least 2 containment air handling units and at least 1 CEDM fan are in service. ___ 2. At least 1 CS header is delivering at least 3525 gpm.
Above 8.5 psig	___ Ensure that a CSAS has actuated with all of the following conditions met: ___ 1. At least 1 CS header is delivering at least 3525 gpm. ___ 2. The hydrogen analyzers are operating. ___ 3. All RCPs are stopped.

___ 5.30 Check that all Section 5.0 steps have been addressed.

CRS ACTIONS

CRS DETAILS

6.0 PLANT STATUS POINT

___ 6.1 IF Reactivity Control is satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO Emergency Operations, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

Check that the conditions from at least 1 of the columns, in the table below, are met:

All CEAs are inserted	Boration rate is greater than 40 gpm	• Reactor power is less than 10^{-4}% • Adequate shutdown margin is established • RCS boron concentration is greater than 2150 ppm
Reactor power is decreasing	Reactor power is decreasing	• Reactor power is decreasing • Reactor power is constant

CRS ACTIONS

6.0 PLANT STATUS POINT (cont.)

___ 6.2 IF Maintenance of Vital Auxiliaries is satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

CRS DETAILS

Check that all of the buses in at least 1 train in the table below, are energized:

Bus	Train A	Train B
4.16 kV BUS	___PBA-S03	___PBB-S04
120 Vac BUSES	___PNA-D25	___PNB-D26
	___PNC-D27	___PND-D28
125 Vdc BUSES	___PKA-M41	___PKB-M42
	___PKC-M43	___PKD-M44

CRS ACTIONS

CRS DETAILS

6.0 PLANT STATUS POINT (cont.)

___ 6.3 IF RCS Pressure and Inventory Control are satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

Check that all of the criteria are met for the existing pressurizer level condition listed in the table below:

Pressurizer level between 10 and 70% [25 - 74%]

___ RCS subcooling is acceptable. See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ RVLMS indicates that the Outlet Plenum level is at least 21%.

___ Charging and letdown, as available, are restoring pressurizer level.

___ At least 1 of the following conditions is met:

___ HPSI flow is acceptable. See HPSI Delivery Curve on the control board.

___ HPSI throttle criteria have been met.

Pressurizer level below 10% [25%]

___ RVLMS indicates that the Outlet Plenum level is at least 21%.

___ HPSI flow is acceptable. See HPSI Delivery Curve on the control board.

___ All available charging pumps are running.

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

6.0 PLANT STATUS POINT (cont.)

___ 6.4 IF Heat Removal is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO Emergency Operations, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

A. Calculate RCS operating loop ΔT. T_h _____ °F

– T_c _____ °F

= RCS operating loop ΔT _____ °F

B. Check that all of the criteria are met for the existing RCP condition listed in the table below:

At least 1 RCP running	No RCPs running
___ RCS loop ΔT is less than 10°F [17°F].	___ RCS loop ΔT is less than 57°F [74°F].
___ RCS T_c is less than 570°F [558°F].	___ REP CET temperature is less than 600°F [610°F].
___ RCS T_c is stable or decreasing.	___ REP CET temperature is stable or decreasing.

C. Check that the intact steam generator meets all of the criteria for the existing level condition listed in the table below:

SG WR Level	2 Steam Generators Available	1 Steam Generator Available
Above 72% [78%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR
Between 2 and 72% [13 - 78%] WR	At least 250 gpm or 0.14 x 10^6 lb/hr feedwater flow	At least 500 gpm or 0.28 x 10^6 lb/hr feedwater flow
Below 2% [13%] WR	Between 250 and 1500 gpm or between 0.14 x 10^6 lb/hr and 0.83 x 10^6 lb/hr	Between 500 and 1500 gpm or between 0.28 x 10^6 lb/hr and 0.83 x 10^6 lb/hr

CRS ACTIONS

CRS DETAILS

6.0 PLANT STATUS POINT (cont.)

___ 6.5 IF containment isolation criteria for Containment Integrity is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

Check that at least 1 of the following pressure criteria is met:

___ Containment pressure is less than 3.0 psig.

___ CIAS has actuated.

___ 6.6 IF containment radiation monitors criteria for Containment Integrity is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

A. Evaluate any alarm on all of the following containment radiation monitors that are in service:

___ RU-1 or alternate.
___ RU-16.
___ RU-17.
___ RU-148.
___ RU-149.

B. Check that none of the containment radiation monitors that were evaluated have ALERT or HIGH alarms:

___ RU-1 or alternate.
___ RU-16.
___ RU-17.
___ RU-148.
___ RU-149.

C. IF no containment radiation monitors are available,
OR the CRS suspects that the containment radiation monitor indications are not correct,
THEN direct Chemistry to sample the containment atmosphere.

CRS ACTIONS

6.6 PLANT STATUS POINT (cont.)

___ 6.7 IF steam plant radiation monitors criteria for Containment Integrity is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

CRS DETAILS

A. Evaluate any alarm on all of the following steam plant radiation monitors that are in service:

___ RU-139. ___ RU-140. ___ RU-141.

___ RU-4. ___ RU-5.

B. Check that none of the steam plant radiation monitors that were evaluated have ALERT or HIGH alarms:

___ RU-139. ___ RU-140. ___ RU-141.

___ RU-4. ___ RU-5.

C. IF no steam plant radiation monitors are available,
OR the CRS suspects that the steam plant radiation monitor indications are not correct,
THEN direct Chemistry to sample the steam generators.

CRS ACTIONS

CRS DETAILS

6.0 PLANT STATUS POINT (cont.)

___ 6.8 IF Containment Atmospheric Control is satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

Check that at least 1 of the following containment pressure criteria is met:

___ Containment pressure is less than 8.5 psig.

___ At least 1 CS header is delivering at least 3525 gpm.

CRS ACTIONS

CRS DETAILS

7.0 SYSTEM ENHANCEMENT

___7.1 WHEN plant conditions and personnel availability permit addressing locked in alarms without adversely affecting the plant recovery,
THEN direct an operator to perform both of the following, as time permits:

___ 1. Review all locked in alarms.

___ 2. Ensure that the appropriate alarm response actions have been taken.

Continue in this procedure.

___7.2 IF offsite power has been lost,
AND has been restored to the startup transformers,
THEN direct an operator to PERFORM **Emergency Operations**, 41EP-1EO01, **Appendix V**, Preparing For and Restoring Offsite Power, beginning with Step 2.1.

___7.3 IF at least 2 RCPs are running,
THEN GO TO Step 7.12 in this procedure.

CRS ACTIONS

CRS DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

CAUTION

Major seal failure may occur if the RCPs are restarted after either of the following conditions:
1. Seal injection and cooling water were lost for longer than 20 minutes.
2. Seal bleedoff was not stopped within 1 minute of the loss of cooling water and seal injection.

RCPs should not be started if either of these conditions has occurred, except to prevent core damage.

___ 7.4 IF the RCP seal operating limits have NOT been exceeded, OR it is necessary to run an RCP to prevent core damage, THEN continue in this procedure.

___ IF NOT, THEN GO TO Step 7.12 in this procedure.

Check that both of the following conditions exist:

___ Seal injection and nuclear cooling water have been interrupted to the RCP seals for less than 20 minutes.

___ Seal bleedoff was stopped within 1 minute of the start of the event.

CRS ACTIONS

CRS DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

CAUTION

Operating RCP combinations of pumps 1A and 2B, or pumps 1B and 2A may cause RCP bearing damage.

NOTE

1 RCP operating in each loop is the optimal pump configuration to be used during emergency or recovery operations. If 2 RCPs are to be started, the preferred combinations are pumps 1A and 2A, or pumps 1B and 2B.

___ 7.5 Check that the plant conditions and equipment will support RCP operation.

Check that all of the following conditions exist:

___ RCS subcooling is acceptable.

___ Pressurizer pressure is above the NPSH limits.

___ At least 1 steam generator is maintaining RCS heat removal and has a level maintained above 2% [13%] WR.

___ Power is available from NAN-S01 or NAN-S02.

___ Cooling water to the RCPs is in service.

Check that at least 1 of the following conditions exists:

___ RVLMS indicates that the RVUH level is 100% and pressurizer level is being maintained at or above 33% [40%].

___ RVLMS indicates that the RVUH level is 67% and pressurizer level is being maintained at or above 66% [81%].

CRS ACTIONS

7.0 SYSTEM ENHANCEMENT (cont.)

___ 7.6 IF the plant conditions and equipment will NOT support RCP operation,
THEN GO TO Step 7.12 in this procedure.

___ 7.7 IF plant conditions and equipment will support RCP operation,
THEN direct the primary operator to establish the prerequisites for starting RCP's.

CRS DETAILS

Ensure that all of the following prerequisites exist for each RCP to be started:

___ Seal injection is in service.

___ Seal bleedoff is in service.

___ The oil lift pump has been running for 7 minutes.

___ TURB & GEN AUX TRIP & LO RELAY, G5/186R-1 and G3/186R-2, on 1-E-MAN-C01, are reset.

___ The RCP handswitch on B04 is in the normal after stop, green flagged, position.

___ RCP Speed Switch Trip Relay 214 SLOW SPEED AL is reset.

___ RCP Breaker 286 L/O Relay is reset.

___ One of the following is energized:

___ E-NNN-D15 for starting RCP 1A or 1B.

___ E-NNN-D16 for starting RCP 2A or 2B.

CRS ACTIONS

CRS DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

___7.8 Ensure that any alarming RCP annunciator windows are evaluated.

___7.9 IF the prerequisites for starting RCPs can NOT be established, THEN GO TO Step 7.12 in this procedure.

CAUTION

When starting RCPs, a pressurizer level drop due to RCS void collapse and contraction may occur. A loss of pressurizer level control may result in a loss of RCP NPSH and RCS subcooling. RCP and fuel damage may occur if the RCPs and the RCS operate in this condition.

NOTE

1 RCP operating in each loop is the optimal pump configuration to be used during emergency or recovery operations. If 2 RCPs are to be started, the preferred combinations are pumps 1A and 2A, or pumps 1B and 2B.

___7.10 WHEN the prerequisites for starting RCPs are established, THEN perform both of the following:

___ 1. Inform the other units that an RCP will be started and will affect diesel generator operation.

___ 2. Direct the primary operator to start 1 RCP.

CRS ACTIONS | CRS DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

NOTE

1 RCP operating in each loop is the optimal pump configuration to be used during emergency or recovery operations. If 2 RCPs are to be started, the preferred combinations are pumps 1A and 2A, or pumps 1B and 2B.

___ 7.11 IF only 1 RCP is running,
THEN perform all of the following:

___ 1. Inform the other units that an RCP will be started and will affect diesel generator operation.

___ 2. Ensure that the RCS pressure and temperature are stable.

___ 3. Direct the primary operator to start a second RCP, preferably 1 in the opposite loop.

___ 7.12 Ensure that pressurizer level is between 10 and 70% [25 - 74%] and is trending to between 33 and 53% [40 - 50%].

CRS ACTIONS

CRS DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

NOTE

Safety injection flow into the hot and cold legs will cause RCS T_h and T_c to read lower temperatures than actually exist.

___ 7.13 IF no RCPs are running,
THEN check that the conditions for natural circulation exist in the RCS loop with the intact steam generator.

Check that all of the following conditions exist:

___ RCS loop ΔT is less than 57°F [74°F].

T_h _____°F

$- T_c$ _____°F

$=$ RCS loop ΔT _____°F

___ T_h and T_c are constant or decreasing.

___ RCS subcooling is acceptable.
See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ The ΔT between RCS loop T_h and REP CET temperature is less than 10°F [15°F].

RCS loop T_h _____°F

– REP CET temperature _____°F

$= \Delta T$ _____°F

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

___7.14 IF no RCPs are running,
AND natural circulation conditions do NOT exist,
THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

___7.15 Check that the proper equipment has actuated for any actuated safety signals.

Direct an operator(s) to CONCURRENTLY PERFORM the referenced appendix of **Emergency Operations**, 41EP-1EO01, for any safety signals that have actuated:

Actuated Safety Signal	Appendix
___CSAS	**Appendix K**, Verification of CSAS, beginning with Step 1.1
___SIAS	**Appendix G**, Verification of SIAS, beginning with Step 1.1
___CIAS	**Appendix H**, Verification of CIAS, beginning with Step 1.1
___AFAS	**Appendix I**, Verification of AFAS, beginning with Step 1.1
___MSIS	**Appendix J**, Verification of MSIS, beginning with Step 1.1

CRS ACTIONS	CRS DETAILS
7.0 SYSTEM ENHANCEMENT (cont.)	
___ 7.16 IF a CSAS has actuated, THEN check that the CSAS reset criteria are met.	Check that the containment pressure is less than 7.0 psig, as indicated on all of the following available indicators: ___ HCA-PI-351A. ___ HCB-PI-351B. ___ HCC-PI-351C. ___ HCD-PI-351D.
___ 7.17 IF a SIAS has actuated, THEN check that the SIAS reset criteria are met.	Check that both of the following criteria are met: ___ HPSI pumps are stopped. ___ Containment pressure is less than 3.0 psig.

CRS ACTIONS

CRS DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

___ 7.18 IF a CIAS has actuated,
THEN check that the CIAS reset criteria are met.

Check that both of the following criteria are met:

___ Containment pressure is less than 3.0 psig.

___ None of the following containment radiation monitors are in ALERT or HIGH alarm:

___ RU-1 or alternate.

___ RU-16.

___ RU-17.

___ RU-148.

___ RU-149.

CRS ACTIONS

CRS DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

___7.19 IF the safety signal reset criteria are satisfied,
THEN direct an operator to reset the safety signals and restore equipment to standby.

Direct the operators to CONCURRENTLY PERFORM the referenced appendix of **Emergency Operations**, 41EP-1EO01, for any safety signals that have actuated and have met the safety signal reset criteria:

Actuated Safety Signal	Appendix
___CSAS	**Appendix Q**, Resetting CSAS, beginning with Step 1.1
___SIAS	**Appendix M**, Resetting SIAS, beginning with Step 1.1
___CIAS	**Appendix N**, Resetting CIAS, beginning with Step 1.1

___7.20 IF a CSAS has actuated,
THEN continue in this procedure.

___ IF NOT, THEN GO TO Step 7.24 in this procedure.

CRS ACTIONS

CRS DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

___ 7.21 Place the hydrogen recombiners in service:

___ 1. Ensure that at least 1 hydrogen recombiner is installed.

IF the recombiner is NOT installed,
THEN direct Mechanical Maintenance to PERFORM **Hydrogen Recombiner Installation And Removal**, 31MT-9HP01, beginning with Step 1.1.

___ 2. IF the containment hydrogen is between 0.5 and 2.8%,
THEN place at least 1 hydrogen recombiner in service.

Direct an operator to PERFORM at least 1 of the following sections in **Containment Hydrogen Control And Hydrogen Purge Exhaust System**, 41OP-1HP02:

___ Begin with Step 4.1 for Train A Hydrogen Recombiner.

___ Begin with Step 8.1 for Train B Hydrogen Recombiner.

CRS ACTIONS

CRS DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

___7.22 IF the containment hydrogen increases to 2.8% or greater, AND the emergency coordinator concurs, THEN place the hydrogen purge unit in service.

A. Ensure that the hydrogen purge unit is installed.

B. Direct an operator to PERFORM at least 1 of the following sections in **Containment Hydrogen Control And Hydrogen Purge Exhaust System**, 41OP-1HP02:

___ Begin with Step 6.1 for Train A Hydrogen Purge Exhaust.

___ Begin with Step 10.1 for Train B Hydrogen Purge Exhaust.

___7.23 IF all of the following conditions exist:

___ Containment hydrogen removal is in progress.

___ Containment hydrogen decreases to less than 0.5%.

___ The TSC concurs that containment hydrogen will not increase to greater than 0.5%.

THEN remove both of the following from service:

___ Hydrogen recombiners.

___ Hydrogen purge system.

Direct an operator to PERFORM the following sections in **Containment Hydrogen Control And Hydrogen Purge Exhaust System**, 41OP-1HP02:

___ Begin with Step 5.1 for Train A Hydrogen Recombiner.

___ Begin with Step 9.1 for Train B Hydrogen Recombiner.

___ Begin with Step 7.1 for Train A Hydrogen Purge Exhaust.

___ Begin with Step 11.1 for Train B Hydrogen Purge Exhaust.

___7.24 Check that all Section 7.0 steps have been addressed.

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

8.0 PLANT STATUS POINT

___8.1 IF Reactivity Control is satisfied,
THEN continue in this procedure.

Check that the conditions from at least 1 of the columns, in the table below, are met:

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

All CEAs are inserted	Boration rate is greater than 40 gpm	• Reactor power is less than 10^{-4}% • Adequate shutdown margin is established • RCS boron concentration is greater than 2150 ppm
Reactor power is decreasing	Reactor power is decreasing	• Reactor power is decreasing • Reactor power is constant

CRS ACTIONS

CRS DETAILS

8.0 PLANT STATUS POINT (cont.)

___8.2 IF Maintenance of Vital Auxiliaries is satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO Emergency Operations, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

Check that all of the buses in at least 1 train in the table below, are energized:

Bus	Train A	Train B
4.16 kV BUS	___PBA-S03	___PBB-S04
120 Vac BUSES	___PNA-D25	___PNB-D26
	___PNC-D27	___PND-D28
125 Vdc BUSES	___PKA-M41	___PKB-M42
	___PKC-M43	___PKD-M44

CRS ACTIONS

CRS DETAILS

8.0 PLANT STATUS POINT (cont.)

___ 8.3 IF RCS Pressure and Inventory Control are satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

Check that all of the criteria are met for the existing pressurizer level condition listed in the table below:

Pressurizer level between 10 and 70% [25 - 74%]

___ RCS subcooling is acceptable. See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ RVLMS indicates that the Outlet Plenum level is at least 21%.

___ Charging and letdown, as available, are restoring pressurizer level.

___ At least 1 of the following conditions is met:

___ HPSI flow is acceptable. See HPSI Delivery Curve on the control board.

___ HPSI throttle criteria have been met.

Pressurizer level below 10% [25%]

___ RVLMS indicates that the Outlet Plenum level is at least 21%.

___ HPSI flow is acceptable. See HPSI Delivery Curve on the control board.

___ All available charging pumps are running.

FOR INFORMATION ONLY

CRS ACTIONS

8.0 PLANT STATUS POINT (cont.)

___ 8.4 IF Heat Removal is satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1E001, beginning at the entry to the Safety Function Flowcharts.

CRS DETAILS

A. Calculate RCS operating loop ΔT. T_h _____ °F

$- T_c$ _____ °F

= RCS operating loop ΔT _____ °F

B. Check that all of the criteria are met for the existing RCP condition listed in the table below:

At least 1 RCP running	No RCPs running
___RCS loop ΔT is less than 10°F [17°F].	___RCS loop ΔT is less than 57°F [74°F].
___RCS T_c is less than 570°F [558°F].	___REP CET temperature is less than 600°F [610°F].
___RCS T_c is stable or decreasing.	___REP CET temperature is stable or decreasing.

C. Check that the intact steam generator meets all of the criteria for the existing level condition listed in the table below:

SG WR Level	2 Steam Generators Available	1 Steam Generator Available
Above 72% [78%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR
Between 2 and 72% [13 - 78%] WR	At least 250 gpm or 0.14 x 10^6 lb/hr feedwater flow	At least 500 gpm or 0.28 x 10^6 lb/hr feedwater flow
Below 2% [13%] WR	Between 250 and 1500 gpm or between 0.14 x 10^6 lb/hr and 0.83 x 10^6 lb/hr	Between 500 and 1500 gpm or between 0.28 x 10^6 lb/hr and 0.83 x 10^6 lb/hr

CRS ACTIONS

CRS DETAILS

8.0 PLANT STATUS POINT (cont.)

___ 8.5 IF containment isolation criteria for Containment Integrity is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

___ 8.6 IF containment radiation monitors criteria for Containment Integrity is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

Check that at least 1 of the following pressure criteria is met:

___ Containment pressure is less than 3.0 psig.

___ CIAS has actuated.

A. Evaluate any alarm on all of the following containment radiation monitors that are in service:

___ RU-1 or alternate. ___ RU-148.

___ RU-16. ___ RU-149.

___ RU-17.

B. Check that none of the containment radiation monitors that were evaluated have ALERT or HIGH alarms:

___ RU-1 or alternate. ___ RU-148.

___ RU-16. ___ RU-149.

___ RU-17.

C. IF no containment radiation monitors are available,
OR the CRS suspects that the containment radiation monitor indications are not correct,
THEN direct Chemistry to sample the containment atmosphere.

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

8.0 PLANT STATUS POINT (cont.)

___ 8.7 IF steam plant radiation monitors criteria for Containment Integrity is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

A. Evaluate any alarm on all of the following steam plant radiation monitors that are in service:

___ RU-139. ___ RU-140. ___ RU-141.

___ RU-4. ___ RU-5.

B. Check that none of the steam plant radiation monitors that were evaluated have ALERT or HIGH alarms:

___ RU-139. ___ RU-140. ___ RU-141.

___ RU-4. ___ RU-5.

C. IF no steam plant radiation monitors are available,
OR the CRS suspects that the steam plant radiation monitor indications are not correct,
THEN direct Chemistry to sample the steam generators.

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

8.0 PLANT STATUS POINT (cont.)

___ 8.8 IF Containment Atmospheric Control is satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

Check that at least 1 of the following containment pressure criteria is met:

___ Containment pressure is less than 8.5 psig.

___ At least 1 CS header is delivering at least 3525 gpm.

Check that at least 1 of the following containment hydrogen concentration criteria is met:

___ CS has not actuated.

___ Hydrogen concentration is less than 0.5%.

___ Both of the following conditions are met:

___ Hydrogen concentration is between 0.5 and 2.8%.

___ A hydrogen recombiner is being placed in operation or is operating.

___ The hydrogen purge system is operating.

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

9.0 PLANT COOLDOWN

___9.1 IF the diesel generators are running,
AND are NOT required to supply either of the following buses:

___ PBA-S03.

___ PBB-S04.

THEN shut down any unloaded diesel generator.

Direct an operator to PERFORM **Diesel Generator Operations After ESFAS Actuations**, 41AO-1ZZ52, beginning with Step 1.1.

NOTE

The STA completes **Shutdown Margin**, 72ST-1RX09 during the performance of the STA Safety Function Flowchart. Credited boron concentration is determined in 72ST-1RX09 and takes credit for xenon reactivity. The target boron concentration is determined in **Attachment S-2** to the STA's appendix. It is the limiting boron concentration required during the RCS cooldown.

___9.2 Determine the credited RCS boron concentration and the target RCS boron concentration for the cooldown to 350°F [338°F].

A. Record the credited RCS boron concentration. Refer to 72ST-1RX09, **Shutdown Margin.**

Credited RCS boron concentration _____ ppm

B. Direct the STA to PERFORM **Emergency Operations**, 41EP-1E001, **Appendix S**, STA Responsibilities, **Attachment S-2**, Boration During Cooldown Worksheet.

C. Record the target RCS boron concentration required for the RCS cooldown. Refer to **Attachment S-2**.

Target RCS boron concentration _____ ppm

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

9.0 PLANT COOLDOWN

___9.3 IF the credited RCS boron concentration is less than the target RCS boron concentration,
THEN direct the STA to evaluate the difference and determine whether the makeup during the cooldown will provide adequate boration.

___9.4 IF the credited RCS boron concentration is less than the target RCS boron concentration,
AND the STA has determined that adequate boration will NOT occur during the cooldown,
THEN borate the RCS by the amount specified as the Required Boration on the Boration During Cooldown Worksheet.

Refer to **Emergency Operations**, 41EP-1EO01, **Appendix S**, STA Responsibilities, **Attachment S-2**, Boration During Cooldown Worksheet.

Direct the primary operator to borate to the required boron concentration.

___9.5 WHEN any of the following conditions are met:

___ The credited RCS boron concentration is greater than the target RCS boron concentration.

___ The STA has determined that adequate boration will occur during the cooldown.

___ The required boration is complete.

___ Pressurizer level approaches 80% [74%] and letdown is isolated.

THEN continue in this procedure.

9.6 *SO is performing RCS and Pressurizer Cooldown Log.*

CRS ACTIONS

CRS DETAILS

9.0 PLANT COOLDOWN (cont.)

___9.7 IF the MSIVs on the intact steam generator can NOT be opened,
THEN GO TO Step 9.12 in this procedure.

___9.8 IF the condenser is available,
AND steaming to the condenser is desired,
THEN direct the secondary operator to bypass and open the MSIVs on the intact steam generator.

9.9 Steps 9.9 and 9.11 - SO may be opening the MSIVs.

___9.12 IF all of the following conditions exist:

___ Pressurizer pressure approaches the low pressure pretrip setpoint.

___ The pretrip alarm, LO PZR PRESS CH PRE-TRIP, actuates.

___ SIAS is NOT actuated.

THEN perform both of the following:

___ 1. Ensure that the pressure reduction is due to deliberate actions.

___ 2. Direct the secondary operator to maintain the automatic Pressurizer Pressure - Low setpoint below pressurizer pressure.

CRS ACTIONS

CRS DETAILS

9.0 PLANT COOLDOWN (cont.)

___9.13 Evaluate the method of RCS depressurization.

Evaluate the method of RCS depressurization by performing the following decision table and direct the primary operator to GO TO the applicable step in this procedure for RCS depressurization to between 350 and 395 psia [280 and 330 psia]:

Main Spray	Auxiliary Spray		
• RCP 1A • RCP 1B	• PRESSURIZER AUX SPRAY VLV, CHA-HV-205 • PRESSURIZER AUX SPRAY VLV, CHB HV-203		
	2 or more charging pumps running	No charging pumps running	1 charging pump running
GO TO Step 9.14 in this procedure.	GO TO Step 9.15 in this procedure.	GO TO Step 9.16 in this procedure.	GO TO Step 9.17 in this procedure.

CRS ACTIONS

CRS DETAILS

9.0 PLANT COOLDOWN (cont.)

9.14 *PO may be depressurizing the RCS with main spray.*

9.15 *PO may be depressurizing the RCS using 2 charging pumps and auxiliary spray.*

9.16 *PO may be restarting a charging pump to use for auxiliary spray.*

9.17 *PO may be restarting a second charging pump and depressurizing the RCS with auxiliary spray.*

9.18 *PO may be isolating RCP seal bleedoff and depressurizing the RCS using 1 charging pump and auxiliary spray.*

9.19 *Steps 9.19 through 9.25 - PO may be restoring RCP seal injection and bleedoff after using auxiliary spray.*

CRS ACTIONS

CRS DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

The maximum allowed RCS cooldown rate is 100°F/hr, in accordance with **Tech Spec 3.4.8.1**. The maximum allowed pressurizer cooldown rate is 200°F/hr, in accordance with **Tech Spec 3.4.8.2**.

NOTE

Step 9.26 provides the action that the operator should take if the RCS becomes over cooled during the cooldown that follows Step 9.30.

___ 9.26 IF the cooldown rate exceeds 100°F/hr,
THEN direct the secondary operator to reduce the cooldown rate to less than 100°F/hr, while maintaining the RCS P/T limits.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

NOTE

Step 9.27 provides the action that the operator should take if the RCS becomes oversubcooled during the cooldown that follows Step 9.30.

___ 9.27 IF the RCS becomes oversubcooled,
THEN ensure that the primary operator depressurizes the plant using main or auxiliary spray to restore pressurizer pressure to within the acceptable region.

A. Direct the primary operator to CONCURRENTLY PERFORM Spray Valve Actuation Data Sheet, **Attachment A-4** to the Primary Operator Actions.

B. See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

The maximum allowed RCS cooldown rate is 100°F/hr, in accordance with **Tech Spec 3.4.8.1**. The maximum allowed pressurizer cooldown rate is 200°F/hr, in accordance with **Tech Spec 3.4.8.2**.

NOTE

If any RCPs are operating, use RCS T_h to determine the cooldown endpoint.If no RCPs are operating, use REP CET to determine the cooldown endpoint.

___9.28 IF the SBCS is available,
THEN direct the secondary operator to begin a controlled plant cooldown to an RCS T_h of below 350°F [338°F], using the SBCS.

___9.29 IF the SBCS is NOT available,
THEN direct the secondary operator to begin a controlled plant cooldown to an RCS T_h of below 350°F [338°F], using the ADVs.

9.30 SO is starting a plant cooldown to below 350°F [338°F].

___9.31 IF the ADVs are used to cool down the RCS,
THEN inform Radiation Protection and the RMS technician of the steam release.

Continue in this procedure.

CRS ACTIONS

CRS DETAILS

9.0 PLANT COOLDOWN (cont.)

___9.32 Maintain pressurizer level between 10 and 70% [25 - 74%] and trending to between 33 and 53% [40 - 50%].

___9.33 Maintain pressurizer pressure within the acceptable region throughout the cooldown.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

Direct the primary operator to CONCURRENTLY PERFORM Spray Valve Actuation Data Sheet, **Attachment A-4** to the Primary Operator Actions.

___9.34 Maintain the intact steam generator level between 50 and 70% NR throughout the cooldown.

CRS ACTIONS

CRS DETAILS

9.0 PLANT COOLDOWN (cont.)

___9.35 WHEN pressurizer pressure is less than 1000 psia [1000 psia],
AND letdown is in service,
THEN ensure that the primary operator aligns the standby letdown control valve.

Continue in this procedure.

___9.36 WHEN pressurizer pressure is less than 1000 psia [1000 psia],
AND letdown is in service,
THEN ensure that the primary operator aligns the standby backpressure control valve.

Continue in this procedure.

___9.37 WHEN pressurizer pressure is less than 750 psia [860 psia],
THEN direct the primary operator to depressurize the SITs to between 300 and 310 psig.

Continue in this procedure.

___9.38 WHEN pressurizer pressure is less than 410 psia [390 psia],
AND RCS T_h is less than 350°F [338°F],
THEN direct the primary operator to isolate the SITs.

Continue in this procedure.

CRS ACTIONS | CRS DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

Voiding in the RCS may be indicated by any of the following indications, parameter changes, or trends:

1. Letdown flow is greater than the charging flow.
2. Pressurizer level is increasing significantly more than expected while operating pressurizer spray.
3. Pressurizer level is decreasing significantly more than expected while operating pressurizer heaters.
4. The RVLMS indicates less than 100% RVUH level.
5. HJTC unheated thermocouple temperature indicates saturated conditions in the RVUH.
6. The RCS cannot be depressurized.

___ 9.39 IF RCS voiding prevents RCS depressurization,
THEN PERFORM **Emergency Operations**, 41EP-1EO01, **Appendix A**, RCS Void Determination and Control, beginning with Step 1.1.

RETURN TO Step 9.40 in this procedure.

CRS ACTIONS

CRS DETAILS

9.0 PLANT COOLDOWN (cont.)

___9.40 Ensure that SDC system entry conditions are established.

Ensure that all of the following conditions exist:

___ Pressurizer level is being maintained greater than 33% [40%].

___ RCS subcooling is acceptable.
See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ Pressurizer pressure is less than 395 psia [330 psia].

___ RCS T_h is less than 350°F [338°F].

___9.41 Check that all Section 9.0 steps have been addressed.

CRS ACTIONS

CRS DETAILS

10.0 PLANT STATUS POINT

___ 10.1 IF Reactivity Control is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

Check that the conditions from at least 1 of the columns, in the table below, are met:

All CEAs are inserted	Boration rate is greater than 40 gpm	• Reactor power is less than 10^{-4}% • Adequate shutdown margin is established • RCS boron concentration is greater than 2150 ppm
Reactor power is decreasing	Reactor power is decreasing	• Reactor power is decreasing • Reactor power is constant

CRS ACTIONS

CRS DETAILS

10.0 PLANT STATUS POINT (cont.)

___ 10.2 IF Maintenance of Vital Auxiliaries is satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

Check that all of the buses in at least 1 train in the table below, are energized:

Bus	Train A	Train B
4.16 kV BUS	___PBA-S03	___PBB-S04
120 Vac BUSES	___PNA-D25	___PNB-D26
	___PNC-D27	___PND-D28
125 Vdc BUSES	___PKA-M41	___PKB-M42
	___PKC-M43	___PKD-M44

CRS ACTIONS

CRS DETAILS

10.0 PLANT STATUS POINT (cont.)

___ 10.3 IF RCS Pressure and Inventory Control are satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1E001, beginning at the entry to the Safety Function Flowcharts.

Check that all of the criteria are met for the existing pressurizer level condition listed in the table below:

Pressurizer level between 10 and 70% [25 - 74%]

___ RCS subcooling is acceptable. See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ RVLMS indicates that the Outlet Plenum level is at least 21%.

___ Charging and letdown, as available, are restoring pressurizer level.

___ At least 1 of the following conditions is met:

___ HPSI flow is acceptable. See HPSI Delivery Curve on the control board.

___ HPSI throttle criteria have been met.

Pressurizer level below 10% [25%]

___ RVLMS indicates that the Outlet Plenum level is at least 21%.

___ HPSI flow is acceptable. See HPSI Delivery Curve on the control board.

___ All available charging pumps are running.

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

10.0 PLANT STATUS POINT (cont.)

___ 10.4 IF Heat Removal is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

A. Calculate RCS operating loop ΔT. T_h _____ °F

$- T_c$ _____ °F

= RCS operating loop ΔT _____ °F

B. Check that all of the criteria are met for the existing RCP condition listed in the table below:

At least 1 RCP running	No RCPs running
___RCS loop ΔT is less than 10°F [17°F].	___RCS loop ΔT is less than 57°F [74°F].
___RCS T_c is less than 570°F [558°F].	___REP CET temperature is less than 600°F [610°F].
___RCS T_c is stable or decreasing.	___REP CET temperature is stable or decreasing.

C. Check that the intact steam generator meets all of the criteria for the existing level condition listed in the table below:

SG WR Level	2 Steam Generators Available	1 Steam Generator Available
Above 72% [78%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR
Between 2 and 72% [13 - 78%] WR	At least 250 gpm or 0.14 x 10^6 lb/hr feedwater flow	At least 500 gpm or 0.28 x 10^6 lb/hr feedwater flow
Below 2% [13%] WR	Between 250 and 1500 gpm or between 0.14 x 10^6 lb/hr and 0.83 x 10^6 lb/hr	Between 500 and 1500 gpm or between 0.28 x 10^6 lb/hr and 0.83 x 10^6 lb/hr

CRS ACTIONS

CRS DETAILS

10.0 PLANT STATUS POINT (cont.)

___ 10.5 IF containment isolation criteria for Containment Integrity is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

___ 10.6 IF containment radiation monitors criteria for Containment Integrity is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

Check that at least 1 of the following pressure criteria is met:

___ Containment pressure is less than 3.0 psig.

___ CIAS has actuated.

A. Evaluate any alarm on all of the following containment radiation monitors that are in service:

___ RU-1 or alternate.
___ RU-16.
___ RU-17.
___ RU-148.
___ RU-149.

B. Check that none of the containment radiation monitors that were evaluated have ALERT or HIGH alarms:

___ RU-1 or alternate.
___ RU-16.
___ RU-17.
___ RU-148.
___ RU-149.

C. IF no containment radiation monitors are available,
OR the CRS suspects that the containment radiation monitor indications are not correct,
THEN direct Chemistry to sample the containment atmosphere.

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

10.0 PLANT STATUS POINT (cont.)

___ 10.7 IF steam plant radiation monitors criteria for Containment Integrity is satisfied,
THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO Emergency Operations, 41EP-1E001, beginning at the entry to the Safety Function Flowcharts.

A. Evaluate any alarm on all of the following steam plant radiation monitors that are in service:

___ RU-139. ___ RU-140. ___ RU-141.

___ RU-4. ___ RU-5.

B. Check that none of the steam plant radiation monitors that were evaluated have ALERT or HIGH alarms:

___ RU-139. ___ RU-140. ___ RU-141.

___ RU-4. ___ RU-5.

C. IF no steam plant radiation monitors are available,
OR the CRS suspects that the steam plant radiation monitor indications are not correct,
THEN direct Chemistry to sample the steam generators.

FOR INFORMATION ONLY

CRS ACTIONS

10.0 PLANT STATUS POINT (cont.)

___ 10.8 IF Containment Atmospheric Control is satisfied, THEN continue in this procedure.

___ IF NOT, THEN direct the team to GO TO **Emergency Operations**, 41EP-1EO01, beginning at the entry to the Safety Function Flowcharts.

CRS DETAILS

Check that at least 1 of the following containment pressure criteria is met:

___ Containment pressure is less than 8.5 psig.

___ At least 1 CS header is delivering at least 3525 gpm.

Check that at least 1 of the following containment hydrogen concentration criteria is met:

___ CS has not actuated.

___ Hydrogen concentration is less than 0.5%.

___ Both of the following conditions are met:

___ Hydrogen concentration is between 0.5 and 2.8%.

___ A hydrogen recombiner is being placed in operation or is operating.

___ The hydrogen purge system is operating.

CRS ACTIONS

CRS DETAILS

11.0 PROCEDURE EXIT

___ 11.1 Ensure that the equipment log entries have been made in the control room log.

Ensure that all of the following have been recorded:

___ Source of feedwater.

___ RCP status.

___ Feedwater pump status.

___ 11.2 Ensure that the event classification has been logged in the unit log.

Ensure that all of the following have been recorded:

___ Time the event was classified.

___ Event classification.

___ Time the event terminated.

CRS ACTIONS

CRS DETAILS

11.0 PROCEDURE EXIT (cont.)

NOTE

The following list of LCOs is not inclusive.

___ 11.3 Ensure that any of the reactivity control systems Tech Spec LCOs that were entered have been complied with and that the LCO status is entered in the unit log.

Ensure that any applicable LCOs have been complied with and entered:

___ Shutdown margin is adequate with all of the CEAs inserted.
Refer to **Tech Spec 3.1.1.1.**

___ Shutdown margin is adequate with any CEA withdrawn.
Refer to **Tech Spec 3.1.1.1.**

___ Charging pumps are operable.
Refer to **Tech Spec 3.1.2.4.**

CRS ACTIONS

CRS DETAILS

11.0 PROCEDURE EXIT (cont.)

NOTE

The following list of LCOs is not inclusive.

___ 11.4 Ensure that any Tech Spec LCOs that were entered have been complied with and that the LCO status is entered in the unit log.

A. Ensure that any applicable LCOs have been complied with and entered:

___ RCS loops are operable.
Refer to **Tech Spec 3.4.1.2.**

___ Each steam generator is operable.
Refer to **Tech Spec 3.4.4,** and surveillance requirement **4.4.4.3.c.4.**

___ ECCS train A subsystems are operable.
Refer to **Section XI Valve Stroke Timing & Position Indication Verification - Mode 1 Thru 6 - Safety Injection A Train ECCS Throttle Valves,** 73ST-1XI11, and **Tech Spec 3.5.2.**

___ ECCS train B subsystems are operable. Refer to **Section XI Valve Stroke Timing & Position Indication Verification - Mode 1 Thru 6 - Safety Injection B Train ECCS Throttle Valves,** 73ST-1XI12, and **Tech Spec 3.5.2.**

___ Chemistry is in specification.
Refer to **Tech Spec 3.4.6.**

___ Identify ECCS conditional requirements that plant conditions have incurred and complete a TSCCR for those items.Refer to **Tech Spec 3.5.3, Action b.**

B. Evaluate for any other LCOs that may have been entered.

FOR INFORMATION ONLY

CRS ACTIONS

CRS DETAILS

11.0 PROCEDURE EXIT (cont.)

___11.5 IF Spray Valve Actuation Data Sheet, **Attachment A-4** to the Primary Operator Actions, or RCS and Pressurizer Cooldown Log, **Attachment B-3** to the Secondary Operator Actions, was used,
THEN ensure that the data in the attachments is being transferred into **RCS and Pressurizer Heatup and Cooldown Rates**, 40ST-9RC01.

___11.6 GO TO **Hot Standby to Cold Shutdown Mode 3 to Mode 5**, 41OP-1ZZ10, beginning with Step 4.1.

END OF PROCEDURE

PRIMARY OPERATOR ACTIONS

OBJECTIVE

This appendix provides the primary operator actions which must be accomplished after an excess steam demand. The actions in this procedure are necessary to ensure that the plant is placed in a safe, stable condition. The goal of this procedure is to establish SDC entry conditions.

1.0 ENTRY CONDITIONS

NOTE

Entry Conditions are performed by the CRS.

2.0 EMERGENCY NOTIFICATION AND SUPPORT

NOTE

Emergency Notification and Support is performed by the CRS.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL

3.1 SO is ensuring an MSIS.

3.2 SO is aligning both steam generators for hot leg sample.

3.3 CRS may inform Chemistry to use alternate sample cooling methods.

___3.4 IF, at any time during this procedure, pressurizer pressure is below the safety injection setpoint,
THEN ensure that all of the following conditions exist:

___ A SIAS and a CIAS have actuated.

___ No more than 1 RCP is operating in each loop.

___ Acceptable HPSI flow is established to the RCS.

See HPSI Delivery Curve, on the control board.

___ SESS indicates that the safety injection components are in their actuated condition.

___ SESS indicates that the containment isolation valves are closed.

Check that one of the following conditions exists:

___ SESS indicates that at least 1 containment isolation valve in each automatically isolated penetration is closed.

___ The valves in any open penetrations have been overridden open as required by plant conditions.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

CAUTION

Maximizing the charging and safety injection flows may cause the pressurizer to overfill, which in turn may cause an RCS pressure excursion upon RCS heatup. Throttling or terminating flows may be necessary to prevent overfilling the pressurizer.

___3.5 IF a SIAS and a CIAS have actuated,
THEN continue in this appendix.

___ IF NOT, THEN GO TO Step 3.16 in this appendix.

___3.6 Ensure that all of the following HPSI throttle criteria are met:

___ RCS subcooling is above the minimum subcooling limit.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ RVLMS indicates that the RVUH level is at least 16%.

___ Pressurizer level is being maintained above 33% [40%].

___ At least 1 steam generator has a level above 2% [13%] WR and is maintaining RCS heat removal.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

CAUTION

Having only 1 HPSI injection valve per train in a throttled position will minimize erosion damage.

___ 3.7 IF the CRS has directed,
AND all of the HPSI throttle criteria have been met,
THEN override and throttle HPSI A flow, while maintaining the HPSI throttle criteria.

Override and throttle closed the HPSI HEADER A TO RC LOOP VLVs, 1 valve at a time:

___ HPSI HEADER A TO RC LOOP 1A VLV, SIA-HS-637.

___ HPSI HEADER A TO RC LOOP 1B VLV, SIA-HS-647.

___ HPSI HEADER A TO RC LOOP 2A VLV, SIA-HS-617.

___ HPSI HEADER A TO RC LOOP 2B VLV, SIA-HS-627.

___ 3.8 IF the CRS has directed,
AND all of the HPSI throttle criteria have been met,
THEN override and throttle HPSI B flow, while maintaining the HPSI throttle criteria.

Override and throttle closed the HPSI HEADER B TO RC LOOP VLVs, 1 valve at a time:

___ HPSI HEADER B TO RC LOOP 1A VLV, SIB-HS-636.

___ HPSI HEADER B TO RC LOOP 1B VLV, SIB-HS-646.

___ HPSI HEADER B TO RC LOOP 2A VLV, SIB-HS-616.

___ HPSI HEADER B TO RC LOOP 2B VLV, SIB-HS-626.

PRIMARY OPERATOR ACTIONS	PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

CAUTION

Running the safety injection pumps on miniflow for longer than 1 hour may cause pump damage due to overheating.

___3.9 IF all of the following conditions exist:

___ The CRS has directed.

___ HPSI train A has been throttled.

___ All 4 HPSI injection valves are closed.

THEN override and stop HPSI pump A.

A. Check all of the following valves:

___ HPSI HEADER A TO RC LOOP 1A VLV, SIA-HS-637.

___ HPSI HEADER A TO RC LOOP 1B VLV, SIA-HS-647.

___ HPSI HEADER A TO RC LOOP 2A VLV, SIA-HS-617.

___ HPSI HEADER A TO RC LOOP 2B VLV, SIA-HS-627.

B. Override and stop HPSI PUMP A, SIA-HS-1.

___3.10 IF all of the following conditions exist:

___ The CRS has directed.

___ HPSI train B has been throttled.

___ All 4 HPSI injection valves are closed.

THEN override and stop HPSI pump B.

A. Check all of the following valves:

___ HPSI HEADER B TO RC LOOP 1A VLV, SIB-HS-636.

___ HPSI HEADER B TO RC LOOP 1B VLV, SIB-HS-646.

___ HPSI HEADER B TO RC LOOP 2A VLV, SIB-HS-616.

___ HPSI HEADER B TO RC LOOP 2B VLV, SIB-HS-626.

B. Override and stop HPSI PUMP B, SIB-HS-2.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___3.11 IF all of the HPSI throttle criteria can NOT be maintained, THEN ensure that all of the following conditions exist:

___ 1. Inform the CRS that the HPSI throttle criteria are not met.

___ 2. All available HPSI pumps are running.

___ 3. All of the HPSI throttle valves are fully open.

___ 4. Acceptable HPSI flow is established to the RCS.

See HPSI Delivery Curve, on the control board.

___3.12 IF all of the following conditions exist:

___ The CRS has directed.

___ A SIAS has actuated.

___ Pressurizer pressure is greater than 260 psia [300 psia] and stable or increasing.

THEN perform both of the following:

___ Stop all operating LPSI pumps.

___ Close all LPSI injection vales.

A. Override and stop both LPSI pumps:

___ LPSI PUMP A, SIA-HS-3.

___ LPSI PUMP B, SIB-HS-4.

B. Override and close all of the LPSI injection valves:

___ LPSI HEADER A TO RC LOOP 1A, SIA-HS-635.

___ LPSI HEADER A TO RC LOOP 1B, SIA-HS-645.

___ LPSI HEADER B TO RC LOOP 2A, SIB-HS-615.

___ LPSI HEADER B TO RC LOOP 2B, SIB-HS-625.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___ 3.13 IF pressurizer pressure can NOT be maintained above 260 psia [300 psia], THEN perform all of the following:

___ 1. Start all of the available LPSI pumps.

___ 2. Open both of the LPSI injection valves for any of the LPSI pumps that are running.

___ 3. Ensure that acceptable LPSI flow is established to the RCS.

___ LPSI HEADER A TO RC LOOP 1A, SIA-HS-635.

___ LPSI HEADER A TO RC LOOP 1B, SIA-HS-645.

___ LPSI HEADER B TO RC LOOP 2A, SIB-HS-615.

___ LPSI HEADER B TO RC LOOP 2B, SIB-HS-625.

See LPSI Delivery Curve, on the control board.

___ 3.14 IF the CRS has directed,
AND at any time during this procedure, a SIAS is actuated,
THEN energize all of the following electrical panels, 1 at a time:

Direct an auxiliary operator to override and close all of the following breakers, 1 at a time:

___ NHN-M19.

___ 480V MCC E-NHN-M19, 1-E-PGA-L35D2, located in class switchgear room A.

___ NHN-M20.

___ 480V-MCC E-NHN-M20, 1-E-PGB-L36D2, located in class switchgear room B.

___ NHN-M71.

___ 480 V MCC 1-E-NHN-M71, 1-E-PGA-L33B3, located in class switchgear room A.

___ NHN-M72.

___ 480V MCC E-NHN-M72, 1-E-PGB-L34B3, located in class switchgear room B.

___ Essential lighting panel QBN-D90.

___ MAIN ESSENTIAL LIGHTING PANEL E-QBN-D90, 1-E-PGB-L36D4, located in class switchgear room B.

___ Essential lighting panel QBN-D91.

___ MAIN ESSENTIAL LIGHTING PANEL E-QBN-D91, 1-E-PGA-L35D3, located in class switchgear room A.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

3.15 SO is checking for steam generator dryout conditions.

___3.16 Maintain pressurizer pressure less than 2300 psia [2150 psia].

3.17 Steps 3.17 and 3.18 - SO is stabilizing T_C in the loop with the highest pressure steam generator.

___3.19 IF, at any time during this procedure, any auxiliary spray valve will be opened,
OR any main spray valve will be opened with any RCP stopped,
THEN CONCURRENTLY PERFORM Spray Valve Actuation Data Sheet, **Attachment A-4** to this appendix.

FOR INFORMATION ONLY

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___ 3.20 IF, at any time during this procedure, any of the following conditions exist:

___ Minimum RCS subcooling is NOT acceptable.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ RCP NPSH is NOT acceptable.

See RCP NPSH Curve, on the control board.

___ CSAS actuates.

THEN stop all of the operating RCPs.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___3.21 IF all of the following conditions exist:

___ The CRS has directed.

___ Any RCPs are running.

___ RCP annunciator windows are in alarm for the running RCPs.

THEN evaluate the alarm.

Refer to the alarm response procedure indicated in the table below to evaluate any alarming RCP annunciator windows.

Annunciator window	Alarm response procedure
___RCP SEAL SYS TRBL (3A11A)	**Panel B03A Alarm Responses**
___RCP SEAL INJ FLOW HI-HI OR LO (3A11B)	**Panel B03A Alarm Responses**
___RCP SEAL INJ TEMP HI-HI OR LO-LO (3A12A)	**Panel B03A Alarm Responses**
___RCP CONT BLEED-OFF PRESS HI-HI (3A12B)	**Panel B03A Alarm Responses**
___RCP TRBL (4A02A, 4A03A, 4A04A, 4A05A)	**Panel B04A Alarm Responses**
___RCP LO NCW FLOW (4D01A, 4D01B, 4D02A, 4D02B)	**Panel B04D Alarm Responses**
___RCP LO NCW FLOW (4E01A, 4E01B, 4E02A, 4E02B)	**Panel B04E Alarm Responses**

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

NOTE

The CRS also performs this decision table.

___3.22 Evaluate the RWT level and charging system status and GO TO the applicable step in this appendix.

Perform the decision table below:

RWT level stable and above 73%	RWT level below or approaching 73%			RWT level below or approaching 20%	
CHN-HV-536	CHB-V327	SFP level above alarm setpoint	• No charging pump suction paths available • CRS chooses to stop charging	SFP level above alarm setpoint	• No charging pump suction paths available • CRS chooses to stop charging
CHN-UV-501	• CHA-P01 and CHA-V755 • CHB-P01 and CHB-V756 • CHE-P01 and CHE-V757	PCN-V215		PCN-V215	
• CHA-P01 • CHB-P01 • CHE-P01		CHN-V144		CHN-V144	
		CHN-HV-532		CHN-HV-532	
		• CHA-P01 • CHB-P01 • CHE-P01		• CHA-P01 • CHB-P01 • CHE-P01	
GO TO Step 3.23 in this appendix.	GO TO Step 3.24 in this appendix.	GO TO Step 3.25 in this appendix.	GO TO Step 3.26 in this appendix.	GO TO Step 3.25 in this appendix.	GO TO Step 3.26 in this appendix.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___ 3.23 IF the CRS has directed,
AND the RWT level is stable above 73%,
THEN perform both of the following:

___ 1. Transfer the charging pump suction from the VCT to the RWT.

___ 2. GO TO Step 3.28 in this appendix.

A. Stop any operating BAMPs.

B. IF power is available,
THEN perform all of the following:

___ a. Open RWT GRAVITY FEED TO CHRG PMPS SUCT VLV, CHN-HS-536.

___ b. Close VOLUME CONTROL TANK OUTLET VLV, CHN-HS-501.

___ c. Start the charging pumps as necessary.

C. IF power is NOT available,
THEN perform all of the following:

___ a. Ensure that a Radiation Protection technician accompanies the operator to perform the area surveys.

___ b. Direct an auxiliary operator to manually align both of the following valves:

___ a) Open RWT GRAVITY FEED TO CHRG PMPS SUCT VLV, CHE-HV-536, located in the BAMP room, on the 70 ft elevation.

___ b) Close VOLUME CONTROL TANK OUTLET, CHN-UV-501, located in the auxiliary building, on the 115 ft elevation.

___ c) Start the charging pumps as necessary.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___3.24 IF the CRS has directed,
AND the RWT level is below or approaching 73%,
THEN perform both of the following:

___ 1. Transfer charging pump suction to the bottom of the RWT, through RWT TO CHARGING PUMPS SUCTION, CHB-V327.

A. Ensure that a Radiation Protection technician accompanies the operator to perform the area surveys.

B. Direct an auxiliary operator to align the valves in Charging Pump Suction from the RWT, **Attachment A-1** to this appendix.

C. Start the charging pumps as necessary.

___ 2. GO TO Step 3.28 in this appendix.

___3.25 IF all of the following conditions exist:

___ The CRS has directed.

___ The RWT level is NOT sufficient for charging pump operation.

___ Charging pump suction must be maintained.

THEN perform both of the following:

___ 1. Transfer charging pump suction to the SFP.

A. Ensure that a Radiation Protection technician accompanies the operator to perform the area surveys.

B. Direct an auxiliary operator to align the valves in Charging Pump Suction from the SFP, **Attachment A-2** to this appendix.

C. Close RFL WATER TANK TO BAM PUMPS SUCT VLV, CHN-HS-532.

D. Open RWT GRAVITY FEED TO CHRG PMPS SUCT VLV, CHN-HS-536.

E. Close VOLUME CONTROL TANK OUTLET VLV, CHN-HS-501.

___ 2. GO TO Step 3.28 in this appendix.

F. Start the charging pumps as necessary.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___ 3.26 IF the CRS has directed,
AND charging pump suction can NOT be maintained,
THEN perform both of the following:

___ Isolate RCP seal bleedoff.

___ Place all of the charging pumps in PULL TO LOCK.

Perform all of the following to place all of the charging pumps in PULL TO LOCK:

___ Ensure that OUTSIDE CNTMT ISOL VLV, IAA-HS-2, is open.

___ Isolate seal bleedoff by closing all of the following valves:

___ RCP CONT BLEED-OFF HDR TO VCT ISOL VLV, CHA-HS-506.

___ RCP CONT BLEED-OFF HDR TO VCT ISOL VLV, CHB-HS-505.

___ RCP CONT BLEED-OFF HDR RELIEF VLV ISOL, CHA-HS-507.

___ Place all of the charging pump handswitches in PULL TO LOCK:

___ CHARGING PUMP 1, CHA-HS-216.

___ CHARGING PUMP 3, CHA-HS-218A.

___ CHARGING PUMP 3, CHB-HS-218.

___ CHARGING PUMP 2, CHB-HS-217.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

3.27 *SO is aligning instrument air to the containment.*

___3.28 IF all of the following conditions exist:

___ The CRS has directed.

___ Instrument air is aligned to the containment.

___ Nuclear cooling water is in service.

___ Pressurizer level is greater than 33% [40%].

THEN open the letdown containment isolation valves.

A. Ensure that LETDOWN BACKPRESSURE CONTROL, CHN-PIC-201, is in manual with 100% output.

B. Ensure that LEVEL SETPOINT CONTROL, RCN-LIC-110 is in manual with 0% output.

C. Ensure that the selected letdown control valve is closed, as indicated by green lights above LETDOWN CONTROL VALVE LV-110P/110Q SELECTOR, CHN-HS-110-1.

D. Override and open all of the following valves:

___ LETDOWN TO REGEN HX ISOL VLV, CHB-HS-515.

___ LETDOWN TO REGEN HX ISOL VLV, CHA-HS-516.

___ REGEN HX OUTLET ISOLATION VLV, CHB-HS-523.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___3.29 IF the CRS has directed,
AND the letdown containment isolation valves have been opened,
THEN restore letdown flow.

A. Calculate the time 22 minutes after letdown was isolated.

Time of SIAS _____

+ 22 min

= _____time.

B. IF letdown has been isolated longer than 22 minutes,
THEN perform both of the following:

___ a. Open LETDOWN CONTROL VALVES BYPASS, CHN-HS-526, to allow a 4 minute warmup.

___ b. Close LETDOWN CONTROL VALVES BYPASS, CHN-HS-526.

C. Raise the output on RCN-LIC-110 to place the letdown control valves in the intermediate position to establish flow.

D. Lower the output on CHN-PIC-201 to establish 450 psig backpressure.

E. Place CHN-PIC-201 in AUTO.

F. Adjust the output on RCN-LIC-110 to establish the desired flow.

G. Balance and place RCN-LIC-110 in LOCAL/AUTO.

FOR INFORMATION ONLY

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

3.30 Steps 3.30 through 3.35 - SO is identifying and isolating the affected steam generator.

NOTE

Equipment that has been overridden will require manual restoration should conditions degrade to the point where automatic actuation should take place.

___ 3.36 IF the CRS has directed,
THEN check that containment pressure is less than 8.5 psig.

Check that the pressure is less than 8.5 psig, on all of the available CONTAINMENT PRESSURE indicators listed below:

___ HCA-PI-351A.

___ HCB-PI-351B.

___ HCC-PI-351C.

___ HCD-PI-351D.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___ 3.37 IF all of the following conditions exist:

___ The CRS has directed.

___ A CSAS has actuated.

___ Containment pressure is less than 7.0 psig.

THEN stop containment spray.

A. Perform both of the following to stop A train CS:

___ Override and close CNTMT SPRAY A DSCH TO SPRAY HDR 1 VLV, SIA-HS-672.

___ Override and stop CONTAINMENT SPRAY PMP A, SIA-HS-5.

B. Perform both of the following to stop B train CS:

___ Override and close CNTMT SPRAY B DSCH TO SPRAY HDR 2 VLV, SIB-HS-671.

___ Override and stop CONTAINMENT SPRAY PMP B, SIB-HS-6.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___3.38 IF all of the following conditions exist:

___ The CRS has directed.

___ The CS pumps were placed in override.

___ Containment pressure is greater than or equal to 8.5 psig.

THEN re-initiate both trains of CS.

3.39 SO may be stopping all of the containment fans.

___3.40 WHEN the CRS has directed,
AND reactor power has decreased to 2 x 10^{-6}%,
THEN CONCURRENTLY PERFORM Boron Dilution Alarm Channel Check, **Attachment A-3** to this appendix.

Continue in this appendix.

3.41 CRS may be ensuring that the LCO action requirements are met.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___3.42 IF less than 4 RCPs are running,
THEN place the PRESSURE SPRAY CONTROL, RCN-PIK-100, in manual.

Perform all of the following to place PRESSURE SPRAY CONTROL, RCN-PIK-100, in manual:

___ Adjust the manual signal of PRESSURE SPRAY CONTROL, RCN-PIK-100, using the thumbwheel to match the automatic signal.

___ Select MANUAL on PRESSURE SPRAY CONTROL, RCN-PIK-100.

___ Reduce the setpoint of PRESSURE SPRAY CONTROL, RCN-PIK-100, to 0.

___ Inform the CRS and secondary operator that PRESSURE SPRAY CONTROL, RCN-PIK-100, is in manual control.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

3.0 EVENT CONTROL (cont.)

___3.43 IF, at any time during this procedure, any auxiliary spray valve will be opened,
OR any main spray valve will be opened with any RCP stopped,
THEN CONCURRENTLY PERFORM Spray Valve Actuation Data Sheet, **Attachment A-4** to this appendix.

3.44 Step 3.44 - SO may be aligning blowdown for the faulted steam generator.

3.45 CRS may be informing Radiation Protection and the RMS technician of the steam release.

3.46 CRS may be directing an operator to restore offsite power.

___3.47 Check that all Section 3.0 steps have been addressed.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

4.0 PLANT STATUS POINT

___ 4.1 Inform the CRS of plant parameters as requested.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

5.0 PLANT STABILIZATION

___5.1 Begin a normal response to new alarms.

5.2 SO may be controlling the steam generator level.

5.3 Steps 5.3 through 5.9 - SO may be restoring AFW to the steam generator.

5.10 Steps 5.10 through 5.12 - SO is ensuring that the main feedwater pumps are tripped.

5.13 SO may be controlling the steam generator level.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

5.0 PLANT STABILIZATION (cont.)

___5.14 WHEN the CRS has directed,
THEN place the hydrogen analyzers in service.

Perform all of the actions in both columns of the table below:

Analyzer A	Analyzer B
___Override and open CONTROL SYSTEM A SPLY ISOL VLV, HPA-HS-1.	___Override and open CONTROL SYSTEM B SPLY ISOL VLV, HPB-HS-2.
___Open CONTROL SYSTEM A ANAL ISOL VLVS, HPA-HS-7.	___Open CONTROL SYSTEM B ANAL ISOL VLVS, HPB-HS-8.
___Select the ANALYZE position with 1J-HPA-HS9A.	___Select the ANALYZE position with 1J-HPB-HS10A.
___Direct an auxiliary operator to reset the common trouble alarm.	___Direct an auxiliary operator to reset the common trouble alarm.

Continue in this procedure.

___5.15 Record the time the analyzers were placed in service. Time _____.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

5.0 PLANT STABILIZATION (cont.)

___ 5.16 IF all of the following conditions exist:

___ The CRS has directed.

___ CSAS has occurred.

___ Seal injection is being supplied to the RCPs.

THEN ensure that RCP seal bleedoff flow is isolated to prevent over-pressurizing the RDT.

IF power is available to the SEAL BLEEDOFF FROM RCP VLVs,
THEN close all the following valves:

___ RCN-HS-430.

___ RCN-HS-431.

___ RCN-HS-432.

___ RCN-HS-433.

IF NOT, THEN, perform both of the following:

A. Ensure that OUTSIDE CNTMT ISOL VLV, IAA-HS-2, is open.

B. Close all of the following valves:

___ RCP CONT BLEED-OFF HDR TO VCT ISOL VLV, CHA-HS-506.

___ RCP CONT BLEED-OFF HDR TO VCT ISOL VLV, CHB-HS-505.

___ RCP CONT BLEED-OFF HDR RELIEF VLV ISOL, CHA-HS-507.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

5.0 PLANT STABILIZATION (cont.)

___5.17 WHEN the CRS has directed,
THEN maintain pressurizer level between 10 and 70% [25 - 74%] and trending to between 33 and 53% [40 - 50%].

Continue in this appendix

5.18 SO is stopping the heater drain pumps.

5.19 Steps 5.19 through 5.22 - SO may be restoring normal containment ACUs and a normal chiller.

5.23 Steps 5.23 and 5.25 - SO is aligning auxiliary steam to supply gland seal.

5.26 SO is performing Secondary Equipment Shutdown Checklist.

___5.27 IF the CRS has directed,
THEN CONCURRENTLY PERFORM **Emergency Operations**, 41EP-1EO01, **Appendix F**, Water Inventory Record, beginning with Step 1.1.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

5.0 PLANT STABILIZATION (cont.)

CAUTION

Following an RCS cooldown, an overpressurization of the RCS may result in a pressurized thermal shock.

___ 5.28 WHEN the CRS has directed,
THEN maintain pressurizer pressure within the acceptable region by use of any of the following:

___ Pressurizer heaters and spray.

___ Charging and letdown.

___ Throttling of the HPSI valves.

Continue in this appendix

CONCURRENTLY PERFORM Spray Valve Actuation Data Sheet, **Attachment A-4** to this appendix.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

5.0 PLANT STABILIZATION (cont.)

___5.29 Ensure that the containment pressure is being controlled.

A. Evaluate the containment pressure on all of the following:

___ HCA-PI-351A.

___ HCB-PI-351B.

___ HCC-PI-351C.

___ HCD-PI-351D.

B. IF the CRS has directed,
THEN perform the operator actions in the table below, after evaluating the highest valid containment pressure:

Indicated Containment Pressure	Operator Actions
Above 3 psig	___ Ensure that a SIAS and a CIAS have actuated.
Between 3 and 8.5 psig	___ Ensure that one of the following conditions exists: ___ 1. At least 2 containment air handling units and at least 1 CEDM fan are in service. ___ 2. At least 1 CS header is delivering at least 3525 gpm.
Above 8.5 psig	___ Ensure that a CSAS has actuated with all of the following conditions met: ___ 1. At least 1 CS header is delivering at least 3525 gpm. ___ 2. The hydrogen analyzers are operating. ___ 3. All RCPs are stopped.

___5.30 Check that all Section 5.0 steps have been addressed.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

6.0 PLANT STATUS POINT

___6.1 Inform the CRS of plant parameters as requested.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

7.0 SYSTEM ENHANCEMENT

7.1 *CRS is directing an operator to check all locked in alarms.*

7.2 *CRS may be directing an operator to restore offsite power.*

___ 7.3 IF at least 2 RCPs are running,
THEN GO TO Step 7.12 in this appendix.

PRIMARY OPERATOR ACTIONS | PRIMARY OPERATOR DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

CAUTION

Major seal failure may occur if the RCPs are restarted after either of the following conditions:
1. Seal injection and cooling water were lost for longer than 20 minutes.
2. Seal bleedoff was not stopped within 1 minute of the loss of cooling water and seal injection.

RCPs should not be started if either of these conditions has occurred, except to prevent core damage.

___ 7.4 IF the RCP seal operating limits have NOT been exceeded, OR it is necessary to run an RCP to prevent core damage, THEN continue in this procedure.

___ IF NOT, THEN GO TO Step 7.12 in this appendix.

Check that both of the following conditions exist:

___ Seal injection and nuclear cooling water have been interrupted to the RCP seals for less than 20 minutes.

___ Seal bleedoff was stopped within 1 minute of the start of the event.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

CAUTION

Operating RCP combinations of pumps 1A and 2B, or pumps 1B and 2A may cause RCP bearing damage.

NOTE

1 RCP operating in each loop is the optimal pump configuration to be used during emergency or recovery operations. If 2 RCPs are to be started, the preferred combinations are pumps 1A and 2A, or pumps 1B and 2B.

___ 7.5 Check that the plant conditions and equipment will support RCP operation.

Check that all of the following conditions exist:

___ CSAS has not actuated.

___ RCS subcooling is acceptable.

___ Pressurizer pressure is above the NPSH limits.

___ At least 1 steam generator is maintaining RCS heat removal and has a level maintained above 2% [13%] WR.

___ Power is available from NAN-S01 or NAN-S02.

___ Nuclear cooling water low flow alarms are clear.

Check that at least 1 of the following conditions exists:

___ RVLMS indicates that the RVUH level is 100% and pressurizer level is being maintained at or above 33% [40%].

___ RVLMS indicates that the RVUH level is 67% and pressurizer level is being maintained at or above 66% [81%].

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

___ 7.6 IF plant conditions and equipment will NOT support RCP operation,
THEN GO TO Step 7.12 in this appendix.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

___ 7.7 IF plant conditions and equipment will support RCP operation, THEN establish all of the following prerequisites for each RCP to be started:

___ Seal injection is in service.

___ Seal bleedoff is in service.

Ensure that the seal bleedoff flow is between 1 and 3 gpm.

___ The oil lift pump has been running for 7 minutes.

Start the oil lift pump(s) and allow them to run for 7 minutes before starting the RCP(s) to be started.

___ TURB & GEN AUX TRIP & LO RELAY, G5/186R-1 and G3/186R-2, on MAN-C01, are reset.

Cabinet 1-E-MAN-C01 is located in the back panel area of the control room.

___ The RCP handswitch on B04 is in the normal AFTER STOP, green flagged, position.

___ RCP Speed Switch Trip Relay 214 SLOW SPEED AL is reset.

___ RCP Breaker 286 L/O Relay is reset.

Direct an operator to CONCURRENTLY PERFORM **Relay Resetting**, 40DP-0OP02, beginning with Step 1.1, to reset the actuated devices.

___ Electrical support panels are energized.

One of the following conditions is met:

___ E-NNN-D15 alarm window 1C12B (NNYS1) is clear, or local breakers 52-D1525 for RCP 1A and 52-D1526 for RCP 1B are checked closed. E-NNN-D15 is located in the south corridor of the turbine building, 100 ft elevation.

___ E-NNN-D16 alarm window 1C12B (NNYS2) is clear, or local breakers 52-D1625 for RCP 2A and 52-D1626 for RCP 2B are checked closed. E-NNN-D16 is located in the north corridor of the auxiliary building, 120 ft elevation.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

___7.8 Evaluate any RCP annunciator window that is in alarm.

Refer to the alarm response procedure indicated in the table below to evaluate any alarming RCP annunciator window:

Annunciator window	Alarm response procedure
___RCP SEAL SYS TRBL (3A11A)	Panel B03A Alarm Responses
___RCP SEAL INJ FLOW HI-HI OR LO (3A11B)	Panel B03A Alarm Responses
___RCP SEAL INJ TEMP HI-HI OR LO-LO (3A12A)	Panel B03A Alarm Responses
___RCP CONT BLEED-OFF PRESS HI-HI (3A12B)	Panel B03A Alarm Responses
___RCP TRBL (4A02A, 4A03A, 4A04A, 4A05A)	Panel B04A Alarm Responses
___RCP LO NCW FLOW (4D01A, 4D01B, 4D02A, 4D02B)	Panel B04D Alarm Responses
___RCP LO NCW FLOW (4E01A, 4E01B, 4E02A, 4E02B)	Panel B04E Alarm Responses

FOR INFORMATION ONLY

___7.9 IF the prerequisites for starting RCPs can NOT be established, THEN GO TO Step 7.12 in this appendix.

PRIMARY OPERATOR ACTIONS | PRIMARY OPERATOR DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

CAUTION

When starting RCPs, a pressurizer level drop due to RCS void collapse and contraction may occur. A loss of pressurizer level control may result in a loss of RCP NPSH and RCS subcooling. RCP and fuel damage may occur if the RCPs and the RCS operate in this condition.

NOTE

1 RCP operating in each loop is the optimal pump configuration to be used during emergency or recovery operations. If 2 RCPs are to be started, the preferred combinations are pumps 1A and 2A, or pumps 1B and 2B.

___ 7.10 IF the CRS has directed 1 RCP to be started,
THEN perform all of the following:

___ 1. Place CHARGING LINE TO RC LOOP 2A DP CONTROL, CHN-PDIC-240, in MANUAL.

___ 2. Start all of the available charging pumps.

___ 3. Place CHN-PDIC-240 in AUTO.

___ 4. Start 1 RCP.

___ 5. Ensure proper RCP operation.

Ensure that both of the following conditions exist:

___ Motor amperage stabilizes between 360 and 500 amps.

___ NPSH is acceptable for RCP operation.
See RCP NPSH Curve, on the control board.

PRIMARY OPERATOR ACTIONS | PRIMARY OPERATOR DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

NOTE

1 RCP operating in each loop is the optimal pump configuration to be used during emergency or recovery operations. If 2 RCPs are to be started, the preferred combinations are pumps 1A and 2A, or pumps 1B and 2B.

___7.11 IF the CRS has directed a second RCP to be started,
THEN perform both of the following:

___ 1. Start a second RCP, preferably 1 in the opposite loop.

___ 2. Ensure proper RCP operation.

Ensure that both of the following conditions exist:

___ Motor amperage stabilizes between 360 and 500 amps.

___ NPSH is acceptable for RCP operation.
See RCP NPSH Curve, on the control board.

___7.12 Ensure that pressurizer level is between 10 and 70% [25 - 74%] and is trending to between 33 and 53% [40 - 50%].

7.13 Steps 7.13 and 7.14 - SO may be checking natural circulation conditions.

___7.15 IF the CRS has directed,
THEN CONCURRENTLY PERFORM the referenced appendix for a verification that the equipment responded correctly for any actuated safety signals.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

7.16 *Steps 7.16 through 7.18 - CRS may be checking the safety signal reset criteria.*

___ 7.19 IF the CRS has directed,
AND the safety signal reset criteria are met,
THEN CONCURRENTLY PERFORM the referenced appendix for any actuated safety signals and restore equipment to standby.

___ 7.20 IF a CSAS has actuated,
THEN continue in this appendix.

___ IF NOT, THEN GO TO Step 7.24 in this appendix.

___ 7.21 IF the CRS has directed,
AND the containment hydrogen is between 0.5 and 2.8%,
THEN place at least 1 hydrogen recombiner in service.

A. Ensure that at least 1 hydrogen recombiner is installed.

B. Direct an operator to PERFORM at least 1 of the following sections in **Containment Hydrogen Control And Hydrogen Purge Exhaust System**, 41OP-1HP02:

___ Begin with Step 4.1 for Train A Hydrogen Recombiner.

___ Begin with Step 8.1 for Train B Hydrogen Recombiner.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

7.0 SYSTEM ENHANCEMENT (cont.)

___7.22 IF the CRS has directed,
AND the containment hydrogen increases to 2.8% or greater,
THEN place the hydrogen purge unit in service.

A. Ensure that the hydrogen purge unit is installed.

B. Direct an operator to PERFORM at least 1 of the following sections in **Containment Hydrogen Control And Hydrogen Purge Exhaust System**, 41OP-1HP02:

___ Begin with Step 6.1 for Train A Hydrogen Purge Exhaust.

___ Begin with Step 10.1 for Train B Hydrogen Purge Exhaust.

___7.23 IF all of the following conditions exist:

___ The CRS has directed.

___ Containment hydrogen removal is in progress.

___ Containment hydrogen decreases to less than 0.5%.

___ The TSC concurs that containment hydrogen will not increase to greater than 0.5%.

THEN remove both of the following from service:

___ Hydrogen recombiners.

___ Hydrogen purge system.

Direct an operator to PERFORM the following sections in **Containment Hydrogen Control And Hydrogen Purge Exhaust System**, 41OP-1HP02:

___ Begin with Step 5.1 for Train A Hydrogen Recombiner.

___ Begin with Step 9.1 for Train B Hydrogen Recombiner.

___ Begin with Step 7.1 for Train A Hydrogen Purge Exhaust.

___ Begin with Step 11.1 for Train B Hydrogen Purge Exhaust.

___7.24 Check that all Section 7.0 steps have been addressed.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

8.0 PLANT STATUS POINT

___8.1 Inform the CRS of plant parameters as requested.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN

9.1 CRS may be directing an operator to unload and shut down the diesel generators.

9.2 Steps 9.2 and 9.3 - The CRS is determining the credited RCS boron concentration and the target RCS boron concentration for the cooldown to 350°F [338°F].

___ 9.4 IF all of the following conditions exist:

___ The CRS has directed.

___ The the credited RCS boron concentration is less than the target RCS boron concentration.

___ The STA has determined that adequate boration will NOT occur during the cooldown.

THEN borate the RCS by the amount specified as the Required Boration on the Boration During Cooldown Worksheet.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

___ 9.5 WHEN any of the following conditions are met:

___ The credited RCS boron concentration is greater than the target RCS boron concentration.

___ The STA has determined that adequate boration will occur during the cooldown.

___ The required boration is complete.

___ Pressurizer level approaches 80% [74%] and letdown is isolated.

THEN continue in this appendix.

9.6 SO is performing RCS and Pressurizer Cooldown Log.

9.7 Steps 9.7 through 9.11 - SO may be opening the MSIVs.

9.12 SO may be resetting the automatic Pressurizer Pressure - Low setpoint.

PRIMARY OPERATOR ACTIONS | PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

The CRS also performs the decision table in step 9.13

___9.13 Evaluate the method of RCS depressurization.

Evaluate the method of RCS depressurization by performing the following decision table and GO TO the applicable step in this appendix:

Main Spray	Auxiliary Spray		
• RCP 1A • RCP 1B	• PRESSURIZER AUX SPRAY VLV, CHA-HV-205 • PRESSURIZER AUX SPRAY VLV, CHB-HV-203		
	2 or more charging pumps running	No charging pumps running	1 charging pump running
GO TO Step 9.14 in this appendix.	GO TO Step 9.15 in this appendix.	GO TO Step 9.16 in this appendix.	GO TO Step 9.17 in this appendix.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

___ 9.14 IF all of the following conditions exist:

___ The CRS has directed.

___ Pressurizer pressure is above 395 psia [330 psia].

___ RCP 1A or 1B is running.

THEN perform all of the following:

___ 1. Maintain minimum acceptable RCS subcooling.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ 2. Maintain acceptable RCP NPSH.

See RCP NPSH Curve, on the control board.

___ 3. Begin a depressurization of the RCS to between 350 and 395 psia [280 and 330 psia], using main spray.

CONCURRENTLY PERFORM Spray Valve Actuation Data Sheet, **Attachment A-4** to this appendix.

___ 4. GO TO Step 9.25 in this appendix.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

___ 9.15 IF all of the following conditions exist:

___ The CRS has directed.

___ Pressurizer pressure is above 395 psia [330 psia].

___ At least 2 charging pumps are running.

THEN perform all of the following:

___ 1. Maintain minimum acceptable RCS subcooling.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ 2. Begin a depressurization of the RCS to between 350 and 395 psia [280 and 330 psia], using auxiliary spray.

A. CONCURRENTLY PERFORM Spray Valve Actuation Data Sheet, **Attachment A-4** to this appendix.

B. Open at least 1 of the following valves:

___ PRESSURIZER AUX SPRAY VLV, CHA-HS-205.

___ PRESSURIZER AUX SPRAY VLV, CHB-HS-203.

___ 3. GO TO Step 9.25 in this appendix.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

___ 9.16 IF all of the following conditions exist:

___ The CRS has directed.

___ Pressurizer pressure is above 395 psia [330 psia].

___ No charging pumps are running.

THEN perform both of the following:

___ 1. Isolate the RCP seal injection flowpath.

Close one of the following valves to isolate the RCP seal injection flow path:

___ RCP SEAL INJ SPLY HDR ISOL VLV, CHB-HS-255.

___ SEAL INJECTION HX INLET VLV, CHN-HS-231P.

___ 2. Start at least 1 charging pump.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

___ 9.17 IF all of the following conditions exist:

___ The CRS has directed.

___ Pressurizer pressure is above 395 psia [330 psia].

___ Only 1 charging pump is running.

___ Additional charging pumps are available.

THEN perform all of the following:

___ 1. Start a second charging pump.

A. Place CHN-PDIC-240 in MANUAL.

B. Start a second charging pump.

C. Place CHN-PDIC-240 in AUTO.

___ 2. Maintain minimum acceptable RCS subcooling.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ 3. Begin a depressurization of the RCS to between 350 and 395 psia [280 and 330 psia], using auxiliary spray.

A. CONCURRENTLY PERFORM Spray Valve Actuation Data Sheet, **Attachment A-4** to this appendix.

B. Open at least 1 of the following valves:

___ PRESSURIZER AUX SPRAY VLV, CHA-HS-205.

___ PRESSURIZER AUX SPRAY VLV, CHB-HS-203.

___ 4. GO TO Step 9.25 in this appendix.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

Actuation of auxiliary spray with 1 charging pump running will cause a reduction or loss of seal injection flow.

___ 9.18 IF the additional charging pumps could NOT be started,
AND only 1 charging pump is running,
THEN perform all of the following:

___ 1. Isolate RCP bleedoff flow.

Close all of the following RCP bleedoff valves:

___ RCP CONT BLEED-OFF HDR TO VCT ISOL VLV, CHB-HS-505.

___ RCP CONT BLEED-OFF HDR TO VCT ISOL VLV, CHA-HS-506.

___ RCP CONT BLEED-OFF HDR RELIEF VLV ISOL, CHA-HS-507.

___ 2. Maintain acceptable RCS subcooling.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ 3. Depressurize the RCS to between 350 and 395 psia [280 and 330 psia], using auxiliary spray.

A. CONCURRENTLY PERFORM Spray Valve Actuation Data Sheet, **Attachment A-4** to this appendix.

B. Open at least 1 of the following valves:

___ PRESSURIZER AUX SPRAY VLV, CHA-HS-205.

___ PRESSURIZER AUX SPRAY VLV, CHB-HS-203.

FOR INFORMATION ONLY

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

Steps 9.19 through 9.21 establish seal injection with all of the seal injection flow controllers energized, after using auxiliary spray.

___ 9.19 IF the RCP seal injection flow path is isolated, AND all of the seal injection flow controllers are energized, THEN close the seal injection control valves from the control room to prepare for establishing seal injection.

___ IF NOT, THEN GO TO Step 9.22 in this appendix.

A. Check that at least 1 of the following valves is closed:

___ RCP SEAL INJ SPLY HDR ISOL VLV, CHB-HS-255.

___ SEAL INJECTION HX INLET VLV, CHN-HS-231P.

B. Close all of the RCP SEAL INJECTION FLOW CONTROL valves by setting them to maximum output in the MAN position:

___ CHN-FIC-241.

___ CHN-FIC-242.

___ CHN-FIC-243.

___ CHN-FIC-244.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

Steps 9.19 through 9.21 establish seal injection with all of the seal injection flow controllers energized, after using auxiliary spray.

NOTE

The RCP seal outlet cooldown rate limit is 50°F/min.

___ 9.20 IF all of the RCP seal injection flow control valves are closed, THEN perform all of the following to establish seal injection flow to all of the RCPs:

___ 1. Ensure that RCP SEAL INJ SPLY HDR ISOL VLV, CHB-HS-255, is open.

___ 2. Ensure that SEAL INJECTION HX INLET VLV, CHN-HS-231P, is open.

___ 3. Lower the output on CHARGING LINE TO RC LOOP 2A DP CONTROL, CHN-PDIC-240, until 120 psid is indicated on CHN-PDIC-240, or until a leakage of 0.2 gpm is indicated on each flow indicator.

Monitor all of the following RCP SEAL INJECTION FLOW CONTROL indicators:

___ CHN-FIC-241.

___ CHN-FIC-242.

___ CHN-FIC-243.

___ CHN-FIC-244.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

Steps 9.19 through 9.21 establish seal injection with all of the seal injection flow controllers energized, after using auxiliary spray.

___ 9.21 IF RCP seal injection flow was established,
AND the seal outlet temperatures have stabilized,
THEN perform all of the following:

___ 1. Throttle open each RCP seal injection flow control valve to establish greater than 6.6 gpm seal flow to each RCP.

Check the seal outlet temperatures using all of the following B04 indicators:

___ 1A SEAL 1 OUTLET, TT-157.

___ 1B SEAL 1 OUTLET, TT-167.

___ 2A SEAL 1 OUTLET, TT-177.

___ 2B SEAL 1 OUTLET, TT-187.

___ 2. Select the controllers to AUTO.

Balance and place all of the RCP SEAL INJECTION FLOW CONTROL valves in AUTO:

___ CHN-FIC-241.

___ CHN-FIC-242.

___ CHN-FIC-243.

___ CHN-FIC-244.

___ 3. GO TO Step 9.25 in this appendix.

PRIMARY OPERATOR ACTIONS	PRIMARY OPERATOR DETAILS
9.0 PLANT COOLDOWN (cont.)	
NOTE Steps 9.22 through 9.24 establish seal injection with 1 or more seal injection flow controllers de-energized, after using auxiliary spray.	
___9.22 IF the RCP seal injection flow path is isolated, AND all of the seal injection flow controllers are NOT energized, THEN perform all of the following:	Check that at least 1 of the following valves is closed: ___ RCP SEAL INJ SPLY HDR ISOL VLV, CHB-HS-255. ___ SEAL INJECTION HX INLET VLV, CHN-HS-231P.
___1. Ensure that instrument air is aligned to the containment.	Ensure that OUTSIDE CNTMT ISOL VLV, IAA-HS-2, is open.
___2. Direct an auxiliary operator to close SEAL INJ. HX OUT., CHN-V836.	CHN-V836 is located in the auxiliary building 110 ft valve gallery.
___3. Ensure that all energized seal injection flow control valves are fully open.	Open the energized RCP SEAL INJECTION FLOW CONTROL valves by setting them to minimum output in the MAN position: ___ CHN-FIC-241. ___ CHN-FIC-242. ___ CHN-FIC-243. ___ CHN-FIC-244.

PRIMARY OPERATOR ACTIONS | PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

Steps 9.22 through 9.24 establish seal injection with 1 or more seal injection flow controllers de-energized, after using auxiliary spray.

___ 9.23 IF all of the RCP seal injection flow control valves are NOT energized,
AND RCP seal injection is needed,
THEN align seal injection by performing all of the following:

___ 1. Open RCP SEAL INJ SPLY HDR ISOL VLV, CHB-HS-255.

___ 2. Open SEAL INJECTION HX INLET VLV, CHN-HS-231P.

___ 3. Lower the output on CHARGING LINE TO RC LOOP 2A DP CONTROL, CHN-PDIC-240, until 120 psid is indicated on CHN-PDIC-240.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

Steps 9.22 through 9.24 establish seal injection with 1 or more seal injection flow controllers de-energized, after using auxiliary spray.

NOTE

The RCP seal outlet cooldown rate limit is 50°F/min.

___ 9.24 IF all of the RCP seal injection flow control valves are NOT energized,
AND RCP seal injection has been aligned,
THEN direct an auxiliary operator to throttle open SEAL INJ. HX OUT., CHN-V836.

CHN-V836 is located in the auxiliary building 110 ft valve gallery.

A. Check the RCP seal outlet temperatures using all of the following B04 indicators:

___ 1A SEAL 1 OUTLET, TI-157.

___ 1B SEAL 1 OUTLET, TI-167.

___ 2A SEAL 1 OUTLET, TI-177.

___ 2B SEAL 1 OUTLET, TI-187.

B. WHEN a temperature decrease is noted on the RCP seal outlet temperatures,
THEN direct the auxiliary operator to stop opening CHN-V836.

C. WHEN the RCP seal outlet temperatures have stabilized,
THEN direct the auxiliary operator to fully open CHN-V836.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

RCP cooling water can be supplied either from nuclear cooling water or essential cooling water.

___ 9.25 IF RCP seal injection is established,
AND cooling water is supplied to the RCPs,
THEN establish seal bleedoff flow from all of the RCPs.

Open all of the following valves:

___ RCP CONT BLEED-OFF HDR TO VCT ISOL VLV, CHB-HS-505.

___ RCP CONT BLEED-OFF HDR TO VCT ISOL VLV, CHA-HS-506.

___ RCP CONT BLEED-OFF HDR RELIEF VLV ISOL, CHA-HS-507.

Open all of the following SEAL BLEEDOFF FROM RCP VLVs:

___ RCN-HS-430.

___ RCN-HS-431.

___ RCN-HS-432.

___ RCN-HS-433.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

9.26 CRS is ensuring that the cooldown rate does not exceed 100°F/hr.

NOTE

Step 9.27 provides the action that the operator should take if the RCS becomes oversubcooled during the cooldown that follows Step 9.30.

___9.27 IF the RCS becomes oversubcooled, during the cooldown that follows Step 9.30,
THEN depressurize the RCS to restore pressurizer pressure to within the acceptable region.

A. CONCURRENTLY PERFORM spray Valve Actuation Data Sheet, **Attachment A-4** to the Primary Operator Actions.

B. See Normal Containment RCS P/T Limits [Harsh Containment RCS Limits], on the control board.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

9.28 Steps 9.28 through 9.30 - SO is starting a plant cooldown to below 350°F [338°F].

9.31 CRS may be informing Radiation Protection and the RMS technician of the steam release.

___9.32 Maintain pressurizer level between 10 and 70% [25 - 74%] and trending to between 33 and 53% [40 - 50%].

___9.33 Maintain pressurizer pressure within the acceptable region throughout the cooldown.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

CONCURRENTLY PERFORM Spray Valve Actuation Data Sheet, **Attachment A-4** to the Primary Operator Actions.

9.34 SO is maintaining the steam generator levels.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

___ 9.35 WHEN pressurizer pressure is less than 1000 psia [1000 psia], AND letdown is in service, THEN align the standby letdown control valve.

Continue in this appendix.

A. Direct an auxiliary operator to open one of the following LETDOWN CONTROL VALVE INLET VALVEs:

___ CHN-V341 for CHN-LV-110P. CHN-V341 is located in the letdown control valve gallery, on the 110 ft elevation.

___ CHN-V343 for CHN-LV-110Q. CHN-V343 is located outside the letdown heat exchanger room, on the 100 ft elevation.

B. Select BOTH with the LETDOWN CONTROL VALVE LV-110P/110Q SELECTOR, CHN-HS-110-1, on B03.

C. Direct an auxiliary operator to open one of the following LETDOWN CONTROL VALVE OUTLET VALVEs:

___ CHN-V342 for CHN-LV-110P. CHN-V342 is located in the letdown control valve gallery, on the 110 ft elevation.

___ CHN-V340 for CHN-LV-110Q. CHN-V340 is located outside the letdown heat exchanger room, on the 100 ft elevation.

FOR INFORMATION ONLY

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

___ 9.36 WHEN pressurizer pressure is less than 1000 psia [1000 psia], AND letdown is in service, THEN align the standby backpressure control valve.

Continue in this appendix.

A. Direct an auxiliary operator to open one of the following BACKPRESSURE CONTROL VALVE INLET VALVEs:

___ CHN-V347 for CHN-PV-201Q. CHN-V347 is located outside the letdown heat exchanger room, on the 100 ft elevation.

___ CHN-V348 for CHN-PV-201P. CHN-V348 is located in the letdown control valve gallery, on the 110 ft elevation.

B. Select BOTH with the LETDOWN BACK-PRESS VLV PV-201P/201Q SELECTOR, CHN-HS-201, on B03.

C. Direct an auxiliary operator to open one of the following BACKPRESSURE CONTROL VALVE OUTLET VALVEs:

___ CHN-V349 for CHN-PV-201Q. CHN-V349 is located outside the letdown heat exchanger room, on the 100 ft elevation.

___ CHN-V350 for CHN-PV-201P. CHN-V350 is located in the letdown control valve gallery, on the 110 ft elevation.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

___9.37 WHEN the CRS has directed,
AND pressurizer pressure is less than 750 psia [860 psia],
THEN depressurize the SITs to between 300 and 310 psig.

Continue in this appendix.

A. Energize one of following SIT VENT VALVE POWER SUPPLY Switches:

Train B	Train A
___SIB-HS-18A	___SIA-HS-17A

B. Depressurize all of the SITs in the table below to between 300 and 310 psig, using the SAFETY INJECTION TANK VENT VALVEs in the energized train:

SIT	Train B	Train A
___1A	___SIB-HS-633A	___SIA-HS-607A
___1B	___SIB-HS-643A	___SIA-HS-608A
___2A	___SIB-HS-613A	___SIA-HS-605A
___2B	___SIB-HS-623A	___SIA-HS-606A

C. De-energize the energized SIT VENT VALVE POWER SUPPLY:

Train B	Train A
___SIB-HS-18A	___SIA-HS-17A

FOR INFORMATION ONLY

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

___ 9.38 WHEN all of the following conditions exist:

___ The CRS has directed.

___ Pressurizer pressure is less than 410 psia [390 psia].

___ RCS T_h is less than 350°F [338°F].

THEN perform both of the following to isolate the SITs:

___ 1. Direct an auxiliary operator to unlock and close the supply breakers to all of the SIT isolation valves.

Direct an auxiliary operator to PERFORM SIT Isolation Valve Power Alignment, **Attachment A-5** to this appendix.

___ 2. Close all of the SIT isolation valves.

Close all of the SIT isolation valves:

___ SIT 1A OUTLET TO RC LOOP 1A VLV, SIA-HS-634.

___ SIT 1B OUTLET TO RC LOOP 1B VLV, SIA-HS-644.

___ SIT 2A OUTLET TO RC LOOP 2A VLV, SIB-HS-614.

___ SIT 2B OUTLET TO RC LOOP 2B VLV, SIB-HS-624.

Continue in this appendix.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

___ 9.38 WHEN all of the following conditions exist:

___ The CRS has directed.

___ Pressurizer pressure is less than 410 psia [390 psia].

___ RCS T_h is less than 350°F [338°F].

THEN perform both of the following to isolate the SITs:

___ 1. Direct an auxiliary operator to unlock and close the supply breakers to all of the SIT isolation valves.

Direct an auxiliary operator to PERFORM SIT Isolation Valve Power Alignment, **Attachment A-5** to this appendix.

___ 2. Close all of the SIT isolation valves.

Close all of the SIT isolation valves:

___ SIT 1A OUTLET TO RC LOOP 1A VLV, SIA-HS-634.

___ SIT 1B OUTLET TO RC LOOP 1B VLV, SIA-HS-644.

___ SIT 2A OUTLET TO RC LOOP 2A VLV, SIB-HS-614.

___ SIT 2B OUTLET TO RC LOOP 2B VLV, SIB-HS-624.

Continue in this appendix.

PRIMARY OPERATOR ACTIONS | PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

NOTE

Voiding in the RCS may be indicated by any of the following indications, parameter changes, or trends:

1. Letdown flow is greater than the charging flow.
2. Pressurizer level is increasing significantly more than expected while operating pressurizer spray.
3. Pressurizer level is decreasing significantly more than expected while operating pressurizer heaters.
4. The RVLMS indicates less than 100% RVUH level.
5. HJTC unheated thermocouple temperature indicates saturated conditions in the RVUH.
6. The RCS cannot be depressurized.

___9.39 IF RCS voiding prevents RCS depressurization,
THEN PERFORM **Emergency Operations**, 41EP-1EO01, **Appendix A**, RCS Void Determination and Control, beginning with Step 1.1.

RETURN TO Step 9.40 in this appendix.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

9.0 PLANT COOLDOWN (cont.)

___ 9.40 Ensure that all of the following SDC system entry conditions exist:

___ Pressurizer level is being maintained greater than 33% [40%].

___ RCS subcooling is acceptable.

See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ Pressurizer pressure is less than 395 psia [330 psia].

___ RCS T_h is less than 350°F [338°F].

___ 9.41 Check that all Section 9.0 steps have been addressed.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

10.0 PLANT STATUS POINT

___ 10.1 Inform the CRS of plant parameters as requested.

PRIMARY OPERATOR ACTIONS

PRIMARY OPERATOR DETAILS

11.0 PROCEDURE EXIT

11.1 Steps 11.1 through 11.4 - CRS is ensuring that all administrative requirements are met.

___11.5 IF Spray Valve Actuation Data Sheet, **Attachment A-4** to this appendix, was used,
THEN ensure that the data in the attachment is being transferred into **RCS and Pressurizer Heatup and Cooldown Rates**, 40ST-9RC01.

___11.6 GO TO the procedure selected by the CRS.

END OF PROCEDURE

ACTIONS

DETAILS

ATTACHMENT A-1 Charging Pump Suction from the RWT

Page 1 of 1

___ A-1.1	Open RWT TO CHARGING PUMPS SUCTION, CHB-V327.	CHB-V327 is located in the east mechanical piping penetration room, 70 ft elevation southwest corner.
___ A-1.2	Open CHARGING PUMP A ALTERNATE SUCTION, CHA-V755.	CHA-V755 is located in the A charging pump ante room.
___ A-1.3	Close CHARGING PUMP A SUCTION, CHA-V316.	CHA-V316 is located in the A charging pump ante room.
___ A-1.4	Open CHARGING PUMP B ALTERNATE SUCTION, CHB-V756.	CHB-V756 is located in the B charging pump ante room.
___ A-1.5	Close CHARGING PUMP B SUCTION, CHB-V319.	CHB-V319 is located in the B charging pump ante room.
___ A-1.6	Open CHARGING PUMP E ALTERNATE SUCTION, CHE-V757.	CHE-V757 is located in the E charging pump ante room.
___ A-1.7	Close CHARGING PUMP E SUCTION, CHE-V322.	CHE-V322 is located in the E charging pump ante room.
___ A-1.8	Inform the control room that this attachment is complete.	

END OF ATTACHMENT

FOR INFORMATION ONLY

ACTIONS

DETAILS

ATTACHMENT A-2 Charging Pump Suction from the SFP

Page 1 of 1

___A-2.1 Align RWT TO BAM PUMPS SUCT VLV, CHE-HV-532, for normal operation.

A. Unlock the CHE-HV-532 handwheel in accordance with **Locked Valve, Breaker, And Component Control**, 40AC-0ZZ06. CHE-HV-532 is located in the BAMP room.

B. Turn the CHE-HV-532 handwheel clockwise/close until the pointer indicates neutral.

C. Unlock and open INSTRUMENT AIR TO CHE-HV-532, IAN-V252, in accordance with **Locked Valve, Breaker, And Component Control**, 40AC-0ZZ06. IAN-V252 is located on the west wall in the BAMP room.

___A-2.2 Open both of the following valves:

___ SFP TO BAMP ISOLATION VALVE, CHN-V144. CHN-V144 is located in the BAMP room.

___ SFP TO BAMP ISOLATION VALVE, PCN-V215. PCN-V215 is located in the fuel building, 115 ft elevation, on the north wall of the heat exchanger area.

___A-2.3 Record IAN-V252 and CHE-HV-532 handwheel pointer positions in **Locked Valve, Breaker, And Component Control**, 40AC-0ZZ06

___A-2.4 Inform the control room that this attachment is complete.

END OF ATTACHMENT

FOR INFORMATION ONLY

ACTIONS DETAILS

ATTACHMENT A-3 Boron Dilution Alarm Channel Check

NOTE

This attachment satisfies surveillance requirements 4.1.2.7.a.2.a and 4.1.2.7.a.2.b for their initial performance.

___ A-3.1 Place the startup channel instruments in service.

A. Select the S-U CHAN position with both Channels 1 and 2 CONTROL/STARTUP CHANNEL SELECTOR switches, SEN-HS-5A and SEN-HS-6A, on B04.

B. Ensure that the METER SELECT pushbutton is in the START UP position on both of the NUCLEAR INSTRUMENTATION START-UP AND CONTROL DRAWERs.

C. Press the HV PERMIT/HV ON button on both of the NUCLEAR INSTRUMENTATION START-UP AND CONTROL DRAWERs.

ACTIONS DETAILS

ATTACHMENT A-3 Boron Dilution Alarm Channel Check (cont.) Page 2 of 4

NOTE

If only 1 channel is available a deviation comparison is not possible. For this case a qualitative assessment of channel behavior is performed on the remaining channel.

___A-3.2 Perform a channel check on the startup channels. Perform the columns below for each channel:

Startup Channel 1	Startup Channel 2
___ Record Channel 1 count rate: _____ cps.	___ Record Channel 2 count rate: _____ cps.
___ Calculate the instrument voltage corresponding to Channel 1 count rate:	___ Calculate the instrument voltage corresponding to Channel 2 count rate:
V_1 = 2 Log (channel 1 reading in cps) = _____ Vdc.	V_2 = 2 Log (channel 2 reading in cps) = _____ Vdc.

Highest Vdc reading _____ Vdc – Lowest Vdc reading _____ Vdc = ΔVdc _____ Vdc

Acceptance Criteria: ΔVdc is less than or equal to 0.8 Vdc

___A-3.3 IF ΔVdc is greater than 0.8,
THEN inform the CRS that the acceptance criteria has not been met, which indicates an inoperable startup channel.

FOR INFORMATION ONLY

ACTIONS DETAILS

ATTACHMENT A-3 Boron Dilution Alarm Channel Check (cont.) Page 3 of 4

NOTE

If only 1 channel is available a deviation comparison is not possible. For this case a qualitative assessment of channel behavior is performed on the remaining channel.

___A-3.4 Perform a channel check on the boron dilution alarms.

Perform the columns below for each channel at the miscellaneous equipment cabinet 1-J-ZJN-C06:

Channel 1JSEN-NI-005	Channel 1JSEN-NI-006
___ Press the RESET pushbutton to reset the alarm.	___ Press the RESET pushbutton to reset the alarm.
___ Ensure that the FLUX/SET POINT pushbutton is selected to FLUX.	___ Ensure that the FLUX/SET POINT pushbutton is selected to FLUX.
___ Ensure that the digital display is not flashing. (**Acceptance Criteria** is the display not flashing.)	___ Ensure that the digital display is not flashing. (**Acceptance Criteria** is the display not flashing.)
___ Ensure that the decimal point is flashing. (**Acceptance Criteria** is the decimal indicator flashing at about 1 flash per second.)	___ Ensure that the decimal point is flashing. (**Acceptance Criteria** is the decimal indicator flashing at about 1 flash per second.)
___ Record flux reading: _____ Vdc	___ Record flux reading: _____ Vdc

Highest flux reading _____ Vdc – Lowest flux reading _____ Vdc = ΔVdc _____ Vdc

Acceptance Criteria: ΔVdc is less than or equal to 0.8 Vdc

___A-3.5 IF ΔVdc is greater than 0.8,
THEN inform the CRS that the acceptance criteria has not been met, which indicates an inoperable boron dilution alarm.

FOR INFORMATION ONLY

ACTIONS DETAILS

ATTACHMENT A-3 Boron Dilution Alarm Channel Check (cont.) Page 4 of 4

___A-3.6 Record the surveillance test information below:

Are the **Acceptance Criteria** met ? Circle one (yes/ no) _____(*initial*)

Performed by: _____ *Signature* _____ *Initials* _____ *Date* _____ *Time*

Acceptance reviewer: _____ *Signature* _____ *Date* _____ *Time*

Asst./Shift Supervisor: _____ *Signature* _____ *Date* _____ *Time*

END OF ATTACHMENT

ATTACHMENT A-4 Spray Valve Actuation Data Sheet

Pressurizer Main Spray Cycle Log

Cycle Number	Time	SPRAY LOOP 1A TE-103 RCN-TI-103*	SPRAY LOOP 1B TE-104 RCN-TI-103*	Pressurizer TEMPERATURE TE-101 RCN-TI-101	Initial
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

* For operations in the manual mode with less than 4 pumps running, log spray line temperature before the spray valves are opened.

Pressurizer Auxiliary Spray Cycle Log

Cycle Number	Time	REGENERATIVE HX OUTLET TEMPERATURE CHN-TI-229*	Pressurizer TEMPERATURE TE-101 RCN-TI-101	Initial
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

* Log spray line temperature before spray valves are opened.

FOR INFORMATION ONLY

ACTIONS | DETAILS

ATTACHMENT A-5 SIT Isolation Valve Power Alignment

___A-5.1 Energize the SIT isolation valves.

Unlock and select ON with all of the SIT isolation valve supply breakers listed in the table below, in accordance with **Locked Valve, Breaker, And Component Control**, 40AC-0ZZ06:

Breaker	Location
___SAFETY INJECTION TANK 3 ISOL VLV J-SIA-UV-634, 1-E-PHA-M3316	Electrical Penetration Room A, Auxiliary Building, 120 ft level
___BACK-UP BREAKER FOR M3316, #1-E-PHA-M3316A	
___SAFETY INJECTION TANK 4 ISOL VLV J-SIA-UV-644, 1-E-PHA-M3318	Electrical Penetration Room A, Auxiliary Building, 120 ft level
___BACK-UP BREAKER FOR M3318, #1-E-PHA-M3334	
___SAFETY INJECTION TANK 1 ISOL VLV J-SIB-UV-614, #1-E-PHB-M3619	Electrical Penetration Room B, Auxiliary Building, 100 ft level
___BACK-UP BREAKER FOR M3619, 1-E-PHB-M3641A	
___SAFETY INJECTION TANK 2 ISOL VLV J-SIB-UV-624, #1-E-PHB-M3618	Electrical Penetration Room B, Auxiliary Building, 100 ft level
___BACK-UP BREAKER FOR M3618, 1-E-PHB-M3641	

FOR INFORMATION ONLY

END OF ATTACHMENT

SECONDARY OPERATOR ACTIONS

OBJECTIVE

This appendix provides the secondary operator actions which must be accomplished after an excess steam demand. The actions in this procedure are necessary to ensure that the plant is placed in a safe, stable condition. The goal of this procedure is to establish SDC entry conditions.

1.0 ENTRY CONDITIONS

NOTE

Entry Conditions are performed by the CRS.

2.0 EMERGENCY NOTIFICATION AND SUPPORT

NOTE

Emergency Notification and Support is performed by the CRS.

3.0 EVENT CONTROL

___3.1 Ensure that an MSIS has actuated. Check that the MSIS alarm has actuated on B05.

___3.2 Align both of the steam generators for hot leg sampling. Override and open all of the following valves on B07:

Steam Generator 1	Steam Generator 2
___SG 1 HOT LEG BLODN UPSTR VLV, SGA-HS-204	___SG 2 HOT LEG BLODN UPSTR VLV, SGB-HS-224
___SG 1 HOT LEG BLODN DNSTR VLV, SGB-HS-219	___SG 2 HOT LEG BLODN DNSTR VLV, SGA-HS-225

3.3 CRS may inform Chemistry to use alternate sample cooling methods.

3.4 PO may be ensuring that SIAS has actuated.

3.5 Steps 3.5 through 3.10 - PO may be stopping and throttling HPSI and LPSI.

3.11 Steps 3.11 through 3.13 - PO is checking the safety injection pumps.

3.14 PO may be energizing the non-vital electrical panels.

3.0 EVENT CONTROL (cont.)

___3.15 IF all of the following conditions exist:

___ Steam generator level is below 2% [13%] WR.

___ Steam generator pressure is decreasing.

___ T_C is approaching T_H.

THEN inform the CRS that a steam generator is approaching dryout conditions.

___3.16 Stabilize T_C in the loop with the highest pressure steam generator using ADVs.

___3.17 Align at least 1 ADV from the steam generator with the highest pressure for operation.

Perform the actions in the table below to align at least 1 ADV from the steam generator with the highest pressure for operation:

ACTION	SG 1 LINE 1 ISOL VLV, SGA-HV-184	SG 1 LINE 2 ISOL VLV, SGB-HV-178	SG 2 LINE 1 ISOL VLV, SGB-HV-185	SG 2 LINE 2 ISOL VLV, SGA-HV-179
A. Lower ADV VALVE CONTROL outputs to minimum.	___SGA-HIC-184A	___SGB-HIC-178A	___SGB-HIC-185A	___SGA-HIC-179A
B. Select OPEN PERM on both ADV permissives.	___SGA-HS-184A ___SGC-HS-184B	___SGB-HS-178A ___SGD-HS-178B	___SGB-HS-185A ___SGD-HS-185B	___SGA-HS-179A ___SGC-HS-179B

3.0 EVENT CONTROL (cont.)

___3.18 Open at least 1 ADV from the intact steam generator to stabilize T_c.

A. Set the demand for each selected ADV to at least 30%, with the thumbwheel on the ADV VALVE CONTROL.

B. Check that the selected ADV is moving toward open.

C. WHEN the position approaches 20% open, THEN adjust the demand to maintain T_c.

3.19 PO is maintaining pressurizer pressure less than 2300 psia.

3.20 Steps 3.20 and 3.21 - PO may be stopping the operating RCPs.

3.22 CRS is evaluating the RWT level and charging pump suction alignment.

3.0 EVENT CONTROL (cont.)

3.23 PO may be transferring the charging pump suction to the RWT.

3.24 PO may be transferring charging pump suction to the bottom of the RWT, through CHB-V327.

3.25 PO may be transferring charging pump suction to the SFP.

3.26 PO may be placing the charging pumps in PULL TO LOCK.

___3.27 IF the CRS has directed,
THEN align instrument air to the containment.

Ensure that OUTSIDE CNTMT ISOL VLV, IAA-HS-2, is open.

3.28 Steps 3.28 and 3.29 - PO may be restoring letdown.

3.0 EVENT CONTROL (cont.)

NOTE

An excess steam demand may affect both steam generators. When both steam generators are affected, the least affected is considered intact. The most affected steam generator is considered to be faulted. The faulted steam generator will have lower pressure and level than the intact steam generator.

NOTE

Before the faulted steam generator dries out, its RCS loop T_c will be the lowest. After the faulted steam generator dries out, its RCS loop T_c will be the highest.

___3.30 Identify the steam generator that is faulted.

Evaluate all of the parameters in the table below for each steam generator to identify the faulted steam generator:

Parameter	Steam Generator 1	Steam Generator 2
Lowest steam generator pressure		
Lowest RCS loop T_c (before steam generator dryout)		
Highest RCS loop T_c (following steam generator dryout)		
Lowest steam generator level		

Record the faulted steam generator _____.

3.0 EVENT CONTROL (cont.)

NOTE

An excess steam demand may affect both steam generators. When both steam generators are affected, the least affected is considered intact. The most affected steam generator is considered to be faulted. The faulted steam generator will have lower pressure and level than the intact steam generator.

___3.31 WHEN the CRS has directed,
THEN isolate the faulted steam generator.

Ensure that all of the following valves in the table below for the faulted steam generator are closed:

Steam Generator 1	Steam Generator 2
___SG 1 Line 1 ADV, SGA-HV-184	___SG 2 Line 1 ADV, SGB-HV-185
___SG 1 Line 2 ADV, SGB-HV-178	___SG 2 Line 2 ADV, SGA-HV-179
___AFW TO SG 1 DOWNSTREAM VLV, AFC-HS-36A	___AFW TO SG 2 DOWNSTREAM VLV, AFA-HS-37A
___AUX FW TO SG 1 DOWNSTREAM VLV, AFB-HS-34A	___AUX FW TO SG 2 DOWNSTREAM VLV, AFB-HS-35A
___SG 1 STM SPLY TO PMP, SGA-HS-134A	___SG 2 STM SPLY TO PMP, SGA-HS-138A
___SG 1 COLD LEG ISOL VLV, SGN-HS-41 (Blowdown Isolation)	___SG 2 COLD LEG ISOL VLV, SGN-HS-44 (Blowdown Isolation)
___SG 1 HOT LEG ISOL VLV, SGN-HS-43 (Blowdown Isolation)	___SG 2 HOT LEG ISOL VLV, SGN-HS-42 (Blowdown Isolation)

3.0 EVENT CONTROL (cont.)

NOTE

An excess steam demand may affect both steam generators. When both steam generators are affected, the least affected is considered intact. The most affected steam generator is considered to be faulted. The faulted steam generator will have lower pressure and level than the intact steam generator.

___3.32 Ensure that the isolated steam generator is the faulted steam generator.

Evaluate the parameters in the table below for the intact steam generator to ensure that the faulted steam generator is isolated:

Parameter	Steam Generator 1	Steam Generator 2
Pressure is stabilized or recovering in the intact steam generator		
Level is stabilized or recovering in the intact steam generator		
T_C is stabilized or recovering in the intact RCS loop		

3.0 EVENT CONTROL (cont.)

___3.33 IF the diagnosis was correct and the faulted steam generator has been isolated,
THEN GO TO Step 3.36 in this appendix.

___3.34 IF the faulted steam generator has NOT been isolated,
THEN restore the steam generator that was incorrectly isolated.

Restore all of the following valves in the table below for the steam generator that was incorrectly isolated to the required position for plant conditions:

Steam Generator 1	Steam Generator 2
___SG 1 Line 1 ADV, SGA-HV-184	___SG 2 Line 1 ADV, SGB-HV-185
___SG 1 Line 2 ADV, SGB-HV-178	___SG 2 Line 2 ADV, SGA-HS-179
___AFW TO SG 1 DOWNSTREAM VLV, AFC-HS-36A	___AFW TO SG 2 DOWNSTREAM VLV, AFA-HS-37A
___AUX FW TO SG 1 DOWNSTREAM VLV, AFB-HS-34A	___AUX FW TO SG 2 DOWNSTREAM VLV, AFB-HS-35A
___SG 1 STM SPLY TO PMP, SGA-HS-134A	___SG 2 STM SPLY TO PMP, SGA-HS-138A
___SG 1 COLD LEG ISOL VLV, SGN-HS-41 (Blowdown Isolation)	___SG 2 COLD LEG ISOL VLV, SGN-HS-44 (Blowdown Isolation)
___SG 1 HOT LEG ISOL VLV, SGN-HS-43 (Blowdown Isolation)	___SG 2 HOT LEG ISOL VLV, SGN-HS-42 (Blowdown Isolation)

3.0 EVENT CONTROL (cont.)

___3.35 Isolate the steam generator that was incorrectly diagnosed as being intact.

Ensure that all of the following valves in the table below for the faulted steam generator are closed:

Steam Generator 1	Steam Generator 2
___SG 1 Line 1 ADV), SGA-HV-184	___SG 2 Line 1 ADV, SGB-HV-185
___SG 1 Line 2 ADV, SGB-HV-178	___SG 2 Line 2 ADV, SGA-HV-179
___AFW TO SG 1 DOWNSTREAM VLV, AFC-HS-36A	___AFW TO SG 2 DOWNSTREAM VLV, AFA-HS-37A
___AUX FW TO SG 1 DOWNSTREAM VLV, AFB-HS-34A	___AUX FW TO SG 2 DOWNSTREAM VLV, AFB-HS-35A
___SG 1 STM SPLY TO PMP, SGA-HS-134A	___SG 2 STM SPLY TO PMP, SGA-HS-138A
___SG 1 COLD LEG ISOL VLV, SGN-HS-41 (Blowdown Isolation)	___SG 2 COLD LEG ISOL VLV, SGN-HS-44 (Blowdown Isolation)
___SG 1 HOT LEG ISOL VLV, SGN-HS-43 (Blowdown Isolation)	___SG 2 HOT LEG ISOL VLV, SGN-HS-42 (Blowdown Isolation)

FOR INFORMATION ONLY

3.36 Steps 3.36 through 3.38 - PO may be stopping CS.

3.0 EVENT CONTROL (cont.)

___ 3.39 IF the CRS has directed,
AND a CSAS has actuated,
THEN ensure that all of the containment fans are stopped.

A. Select STOP with all of the following fan switches:

___ PRZR NORMAL CLG FAN A, HCN-HS-354.

___ PRZR NORMAL CLG FAN B, HCN-HS-355.

___ REAC CAVITY CLG FAN A, HCN-HS-58.

___ REAC CAVITY CLG FAN C, HCN-HS-60.

___ REAC CAVITY CLG FAN B, HCN-HS-59.

___ REAC CAVITY CLG FAN D, HCN-HS-61.

B. Place all of the following fan switches in PULL TO LOCK:

___ CNTMT NORMAL ACU FAN A, HCA-HS-11.

___ CNTMT NORMAL ACU FAN C, HCA-HS-13.

___ CNTMT NORMAL ACU FAN B, HCB-HS-12.

___ CNTMT NORMAL ACU FAN D, HCB-HS-14.

___ CEDM ACU FANS A/C, HCA-HS-49.

___ CEDM ACU FANS B/D, HCB-HS-50.

3.0 EVENT CONTROL (cont.)

3.40 PO is performing Boron Dilution Alarm Channel Check.

3.41 CRS may be ensuring that the LCO action requirements are met.

3.42 Steps 3.42 and 3.43 - PO may be controlling the pressurizer spray valves.

3.0 EVENT CONTROL (cont.)

___3.44 IF the CRS has directed,
THEN align the faulted steam generator for high rate blowdown to the condenser.

A. PERFORM the appropriate attachment to reduce the inventory in the faulted steam generator:

___ Steam Generator 1 Level Reduction Checklist, **Attachment B-1** to this appendix.

___ Steam Generator 2 Level Reduction Checklist, **Attachment B-2** to this appendix.

B. Return to Step 3.47.

3.45 CRS may be informing Radiation Protection and the RMS technician of the steam release.

3.46 CRS may be directing an operator to restore offsite power.

___3.47 Check that all Section 3.0 steps have been addressed.

4.0 PLANT STATUS POINT

___4.1 Inform the CRS of plant parameters as requested.

5.0 PLANT STABILIZATION

___5.1 Begin a normal response to new alarms.

CAUTION

Overriding an AFAS and throttling flow when the steam generator level is below 2% [13%] WR may result in a loss of heat removal.

NOTE

AFW valves that are in override will not auto actuate. Operator action will be required to maintain the steam generator levels.

___5.2 IF an AFAS has actuated,
AND at least 1 steam generator level is above 2% [13%] WR,
THEN perform all of the following:

___ 1. Override and adjust the AFW valves to establish the intact steam generator level between 72 and 80% [78 - 84%] WR.

Override and adjust all of the valves to the intact steam generator in the table below:

Essential Steam Driven Auxiliary Feedwater Pump	Essential Electric Driven Auxiliary Feedwater Pump
___AFW TO SG 1 UPSTREAM VLV, AFA-HS-32A	___AUX FW TO SG 1 UPSTREAM VLV, AFB-HS-30A
___AFW TO SG 2 UPSTREAM VLV, AFC-HS-33A	___AUX FW TO SG 2 UPSTREAM VLV, AFB-HS-31A
___AFW TO SG 1 DOWNSTREAM VLV, AFC-HS-36A	___AUX FW TO SG 1 DOWNSTREAM VLV, AFB-HS-34A
___AFW TO SG 2 DOWNSTREAM VLV, AFA-HS-37A	___AUX FW TO SG 2 DOWNSTREAM VLV, AFB-HS-35A

___ 2. Ensure that the intact steam generator level is being maintained.

___ 3. GO TO Step 5.10 in this appendix.

5.0 PLANT STABILIZATION (cont.)

NOTE

The CRS also performs the decision table below. The CRS will direct which AFW pump to place in service.

___5.3 WHEN the CRS has directed,
AND an AFAS has NOT actuated,
THEN ensure that an auxiliary feed pump is placed in service.

Evaluate the table below and GO TO the appropriate step to ensure that an auxiliary feed pump is placed in service:

Start-up Auxiliary Feedwater Pump, AFN-P01	Essential Electric Driven Auxiliary Feedwater Pump, AFB-P01	Essential Steam Driven Auxiliary Feedwater Pump, AFA-P01
WHEN the CRS has directed, THEN GO TO Step 5.7 in this appendix to start AFN-P01.	WHEN the CRS has directed, THEN GO TO Step 5.4 in this appendix to start AFB-P01.	WHEN the CRS has directed, THEN GO TO Step 5.5 in this appendix to start AFA-P01.

5.0 PLANT STABILIZATION (cont.)

NOTE

The essential electric driven and start-up AFW pumps discharge pressure alarms are expected to alarm at full auxiliary feed flow.

___ 5.4 IF the CRS has directed to place Essential Electric Driven Auxiliary Feedwater Pump, AFB-P01, in service to the intact steam generator,
THEN perform all of the following:

Record the intact steam generator_____.

___ 1. Start ESS ELECTRIC AUX FEED PUMP, AFB-HS-10.

___ 2. Open the AFW downstream valve to the intact steam generator.

Open the valve to the intact steam generator:

___ AUX FW TO SG 1 DOWNSTREAM VLV, AFB-HS-34A.

___ AUX FW TO SG 2 DOWNSTREAM VLV, AFB-HS-35A.

___ 3. Jog open the AFW upstream valve to the intact steam generator to establish a feedwater flow rate of at least 500 gpm.

A. Jog open the valve to the intact steam generator:

___ AUX FW TO SG 1 UPSTREAM VLV, AFB-HS-30A.

___ AUX FW TO SG 2 UPSTREAM VLV, AFB-HS-31A.

B. Ensure that feed flow is established to the intact steam generator.

C. Establish a steam generator level between 72 and 80% [78 - 84%] WR.

D. Limit the pump amps to 151 amps.

___ 4. GO TO Step 5.10 in this appendix.

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5.0 PLANT STABILIZATION (cont.)

___ 5.5 IF directed by the CRS to place Essential Steam Driven Auxiliary Feedwater Pump, AFA-P01, in service to the intact steam generator,
THEN perform all of the following:

Record the intact steam generator_____.

___ 1. Start the pump.

Open the steam supply from the intact steam generator:

___ SG 1 STM SPLY TO PMP, SGA-HS-134A.

___ SG 2 STM SPLY TO PMP, SGA-HS-138A.

___ 2. Open the AFW downstream valve to the intact steam generator.

Open the valve to the intact steam generator:

___ AFW TO SG 1 DOWNSTREAM VLV, AFC-HS-36A.

___ AFW TO SG 2 DOWNSTREAM VLV, AFA-HS-37A.

___ 3. Jog open the AFW upstream valve to the intact steam generator to establish a feedwater flow rate of at least 500 gpm.

A. Jog open the valve to the intact steam generator:

___ AFW TO SG 1 UPSTREAM VLV, AFA-HS-32A.

___ AFW TO SG 2 UPSTREAM VLV, AFC-HS-33A.

B. Ensure that feed flow is established to the intact steam generator.

C. Establish a steam generator level between 72 and 80% [78 - 84%] WR.

___ 4. GO TO Step 5.10 in this appendix.

FOR INFORMATION ONLY

5.0 PLANT STABILIZATION (cont.)

5.6 CRS may be informing Radiation Protection and the RMS technician of the steam release.

NOTE

The essential electric driven and start-up AFW pumps discharge pressure alarms are expected to alarm at full auxiliary feed flow.

___5.7 IF directed by the CRS to start Start-up Auxiliary Feedwater Pump, AFN-P01,
THEN perform both of the following:

Record the intact steam generator_____.

___ 1. Open the suction valves.

Open both of the following valves:

___ PMP SUCT FROM CST VLV, CTA-HS-1.

___ PMP SUCT FROM CST VLV, CTA-HS-4.

___ 2. Ensure that the downcomer isolation valves are open to the intact steam generator.

Ensure that both of the following DOWNCOMER ISOL VLVs are open to the intact steam generator:

Steam Generator 1	Steam Generator 2
___SGA-HS-172	___SGA-HS-175
___SGB-HS-130	___SGB-HS-135

FOR INFORMATION ONLY

5.0 PLANT STABILIZATION (cont.)

___ 5.8 IF Start-up Auxiliary Feedwater Pump, AFN-P01, is being placed in service,
THEN perform all of the following:

___ 1. Jog open the feedwater isolation bypass valve to 10% open to the intact steam generator.

Jog open one of the following valves to the intact steam generator to 10% open:

___ SG 1 FW ISOL BYPASS VLV, SGN-HS-1143.

___ SG 2 FW ISOL BYPASS VLV, SGN-HS-1145.

___ 2. Close the downcomer feedwater regulating block valves.

Close both of the following valves:

___ SG 1 FW ISOL BLOCK VLV, SGN-HS-1142.

___ SG 2 FW ISOL BLOCK VLV, SGN-HS-1144.

___ 3. Start S/U Aux Feed Pump, AFA-HS-11.

5.0 PLANT STABILIZATION (cont.)

___ 5.9 Transfer feed from the main feed pumps to Start-up Auxiliary Feedwater Pump, AFN-P01:

___ 1. Lower the speed of the running main feed pumps to below 1000 rpm.

A. Select MANUAL with both of the following:

___ FWPT A MANUAL/AUTO SELECT, FTN-HS-99.

___ FWPT B MANUAL/AUTO SELECT, FTN-HS-100.

B. Lower each turbine speed to below 1000 rpm by turning each of the following manual speed control pots counterclockwise:

___ FEEDWATER PUMP TURB A MANUAL SPEED CONTROL, FTN-HS-53.

___ FEEDWATER PUMP TURB B MANUAL SPEED CONTROL, FTN-HS-54.

___ 2. Adjust the feedwater isolation bypass valve to establish an AFW flow of at least 0.28 x 10^6 lb/hr to the intact steam generator.

A. Adjust the valve to the intact SG:

___ SG 1 FW ISOL BYPASS VLV, SGN-HS-1143.

___ SG 2 FW ISOL BYPASS VLV, SGN-HS-1145.

B. Ensure that feed flow is established to the intact steam generator.

C. Establish a steam generator level between 72 and 80% [78 - 84%] WR.

D. Limit the pump amps to 122 amps.

___ 3. GO TO Step 5.11 in this appendix.

5.0 PLANT STABILIZATION (cont.)

___ 5.10 WHEN directed by the CRS to remove the main feed pumps from service,
AND AFW flow is established,
THEN ensure that the running main feed pump speeds are below 1000 rpm.

Continue in this appendix.

A. Select MANUAL with both of the following:

___ FWPT A MANUAL/AUTO SELECT, FTN-HS-99.

___ FWPT B MANUAL/AUTO SELECT, FTN-HS-100.

B. Lower each turbine speed to below 1000 rpm by turning each of the following manual speed control pots counterclockwise:

___ FEEDWATER PUMP TURB A MANUAL SPEED CONTROL, FTN-HS-53.

___ FEEDWATER PUMP TURB B MANUAL SPEED CONTROL, FTN-HS-54.

5.0 PLANT STABILIZATION (cont.)

___ 5.11 WHEN the running main feed pump speeds are below 1000 rpm,
THEN remove the main feed pumps from service.

___ 1. Ensure that the AFW pump is maintaining the steam generator level.

Ensure that both of the following conditions exist:

___ The intact steam generator level is constant or increasing.

___ AFW flow is established.

___ 2. Trip the main feed pumps.

Press both of the following buttons:

___ FEEDWATER PUMP TURB A MANUAL TRIP, FTN-HS-51.

___ FEEDWATER PUMP TURB B MANUAL TRIP, FTN-HS-52.

Continue in this appendix.

5.0 PLANT STABILIZATION (cont.)

___5.12 Place the main feed pump steam line drains in service.

Open all of the main feed pump steam line drains listed in the table below:

FWPT A	FWPT B
___FWPT A LP STEAM LEAD DRAIN VLV, FTN-HS-9	___FWPT B LP STEAM LEAD DRAIN VLV, FTN-HS-10
___FWPT A LP STOP VALVE ABOVE SEAT DRN, FTN-HS-7	___FWPT B LP STOP VALVE ABOVE SEAT DRN, FTN-HS-8
___FWPT A HP STOP VALVE BELOW SEAT DRN, FTN-HS-5	___FWPT B HP STOP VALVE BELOW SEAT DRN, FTN-HS-6
___FWPT A LP STOP VALVE BELOW SEAT DRN, FTN-HS-13	___FWPT B LP STOP VALVE BELOW SEAT DRN, FTN-HS-14
___FWPT A 1ST STAGE DRAIN VLV, FTN-HS-11	___FWPT B 1ST STAGE DRAIN VLV, FTN-HS-12

5.0 PLANT STABILIZATION (cont.)

CAUTION

Overriding an AFAS and throttling flow when the steam generator level is below 2% [13%] WR may result in a loss of heat removal.

NOTE

AFW valves that are in override will not auto actuate. Operator action will be required to maintain the steam generator levels.

___5.13 WHEN the CRS has directed,
AND AFW has been restored to the intact steam generator,
THEN maintain the intact steam generator level between 72 and 80% [78 - 84%] WR.

Continue in this procedure.

Establish the required feedwater flow to the intact steam generator as listed in the table below:

SG WR Level	Flow Required
Above 72% [78%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR
Between 2 and 72% [13 - 78%] WR	At least 500 gpm or 0.28 x 10^6 lb/hr feedwater flow
Below 2% [13%] WR	• AFAS actuated and not throttled • Between 500 and 1500 gpm or between 0.28 and 0.83 x 10^6 lb/hr

5.0 PLANT STABILIZATION (cont.)

5.14 Steps 5.14 and 5.15 - PO is placing the hydrogen analyzers in service.

5.16 PO may be ensuring that RCP seal bleedoff flow is isolated.

5.17 PO may be controlling pressurizer level.

___5.18 WHEN the CRS has directed,
THEN stop the heater drain pumps.

Continue in this appendix.

A. Stop both of the heater drain pumps:

___ HEATER DRAIN PUMP A, EDN-HS-505.

___ HEATER DRAIN PUMP B, EDN-HS-506.

5.0 PLANT STABILIZATION (cont.)

___ 5.19 IF all of the following conditions exist:

___ The CRS has directed.

___ Plant cooling water is available.

___ Nuclear cooling water is available.

___ At least 1 normal chiller is available.

___ Containment spray is NOT spraying.

___ Containment pressure is below 7.0 psig.

THEN open the chill water containment isolation valves and the NC water containment isolation valves.

Override and open all of the following valves :

___ CHW RETURN HDR OUTSIDE CNTMT ISOL VLV, WCA-HS-62.

___ CHW RETURN HDR INSIDE CNTMT ISOL VLV, WCB-HS-61.

___ CHW SUPPLY HDR OUTSIDE CNTMT ISOL VLV, WCB-HS-63.

Override and open all of the following valves:

___ NCW CNTMT UPSTREAM SPLY ISOL VLV, NCB-HS-401.

___ NCW CNTMT DOWNSTREAM RETURN ISOL VLV, NCA-HS-402.

___ NCW CNTMT UPSTREAM RETURN ISOL VLV, NCB-HS-403.

5.0 PLANT STABILIZATION (cont.)

___5.20 WHEN the CRS has directed,
AND the NC water containment isolation valves are open,
THEN ensure that at least 1 CEDM ACU is started.

Continue in this appendix.

Override and start one of the following:

___ CEDM ACU FANS A/C, HCA-HS-49.

___ CEDM ACU FANS B/D, HCB-HS-50.

___5.21 IF the chill water containment isolation valves have been opened,
THEN ensure that 2 containment ACU fans are running in the same train.

Override and start 2 fans from the same train in the table below:

Train A	Train B
___CNTMT NORMAL ACU FAN A, HCA-HS-11	___CNTMT NORMAL ACU FAN B, HCB-HS-12
___CNTMT NORMAL ACU FAN C, HCA-HS-13	___CNTMT NORMAL ACU FAN D, HCB-HS-14

5.0 PLANT STABILIZATION (cont.)

___ 5.22 IF the CRS has directed,
AND no chillers are operating after ventilation was restored,
THEN perform all of the following:

___ 1. Check that at least 1 plant cooling water pump is operating.

___ 2. Check that at least 1 nuclear cooling water pump is operating.

___ 3. Start a normal chiller.

A. Start 2 of the following chillers by placing the control switch to STOP and then to START:

___ NORM CHLR B/CIRC PMP B, WCN-HS-2A.

___ NORM CHLR C/CIRC PMP C, WCN-HS-3A.

___ NORM CHW PMP & CHLR-E02 CONT, WCN-HS-4A.

___ NORM CHLR A/CIRC PMP A, WCN-HS-1A

5.0 PLANT STABILIZATION (cont.)

___5.23 WHEN the CRS has directed,
THEN ensure that auxiliary steam is being supplied.

A. Direct an auxiliary operator to perform one of the columns in the table below to align the selected auxiliary steam supply:

Main Steam Supply	Cross-tie Header Supply
___Close CROSS-TIE HEADER ISOLATION VALVE, ASN-V015.	___Open CROSS-TIE HEADER ISOLATION VALVE, ASN-V015.
___Close CROSS-TIE HEADER BYPASS VALVE, ASN-V014.	___Close REDUCER INLET VALVE, SGN-V093.
	___Close REDUCER INLET VALVE, SGN-V094.
	___Close REDUCER INLET VALVE, SGN-V095.

Continue in this appendix.

B. Inform the other units of the current cross-tie header alignment.

5.0 PLANT STABILIZATION (cont.)

___5.24 IF the CRS has directed,
AND auxiliary steam is being supplied from the cross-tie header,
THEN shift gland seal from main steam to auxiliary steam.

A. Ensure that AUX STEAM TO GLAND SEAL RGLTR VLV, GSN-HS-14 is open.

B. Ensure that MAIN STEAM TO GLAND SEAL RGLTR VLV, GSN-HS-5 is closed.

C. Check that steam pressure is 3 to 5 psig, on GLAND STEAM SEAL SUPPLY PRESSURE, GSN-PI-3.

___5.25 WHEN the CRS has directed,
THEN align gland seal to the main turbine.

Continue in this appendix.

___5.26 IF the CRS has directed,
THEN CONCURRENTLY ~~PERFORM~~ **Emergency Operations**, 41EP-1EO01, **Appendix E**, Secondary Equipment Shutdown Checklist, beginning with Step 1.1.

5.27 PO may be performing Water Inventory Record.

5.28 PO may be controlling pressurizer pressure.

5.29 PO is checking the containment pressure.

___5.30 Check that all Section 5.0 steps have been addressed.

6.0 PLANT STATUS POINT

___6.1 Inform the CRS of plant parameters as requested.

7.0 SYSTEM ENHANCEMENT

7.1 CRS is directing an operator to check all locked in alarms.

7.2 CRS may be directing an operator to restore offsite power.

7.3 PO and CRS may be going to Step 7.12 in their procedures.

7.4 CRS may be checking the RCP seals.

7.5 Steps 7.5 through 7.11 - PO may be starting the RCPs.

7.12 PO is checking pressurizer level.

7.0 SYSTEM ENHANCEMENT (cont.)

NOTE

Safety injection flow into the hot and cold legs will cause RCS T_h and T_c to read lower temperatures than actually exist.

___ 7.13 IF no RCPs are running,
THEN check that all of the following conditions for natural circulation exist in at least 1 RCS loop with the intact steam generator.

Check that all of the following conditions exist:

___ RCS loop ΔT is less than 57°F [74°F].

T_h _____°F

$- T_c$ _____°F

= RCS loop ΔT _____°F

___ T_h and T_c are constant or decreasing.

___ RCS subcooling is acceptable.
See Normal Containment RCS P/T Limits [Harsh Containment RCS P/T Limits], on the control board.

___ The ΔT between RCS loop T_h and REP CET temperature is less than 10°F [15°F].

RCS loop T_h _____°F

– REP CET temperature _____°F

= ΔT _____°F

FOR INFORMATION ONLY

7.0 SYSTEM ENHANCEMENT (cont.)

___7.14 IF no RCPs are running,
AND natural circulation conditions do NOT exist,
THEN inform the CRS.

___7.15 IF the CRS has directed,
THEN CONCURRENTLY PERFORM the referenced appendix for a verification that the equipment responded correctly for any actuated safety signals.

7.16 Steps 7.16 through 7.18 - CRS may be checking the safety signal reset criteria.

___7.19 IF the CRS has directed,
AND the safety signal reset criteria are met,
THEN CONCURRENTLY PERFORM the referenced appendix for any actuated safety signals and restore equipment to standby.

7.20 CRS may be going to Step 7.24 of his procedure.

7.21 Steps 7.21 through 7.23 - PO may be controlling the containment hydrogen concentration.

___7.24 Check that all Section 7.0 steps have been addressed.

8.0 PLANT STATUS POINT

___8.1 Inform the CRS of plant parameters as requested.

9.0 PLANT COOLDOWN

9.1 CRS may be directing an operator to unload and shut down the diesel generators.

9.2 Steps 9.2 and 9.3 - The CRS is determining the credited RCS boron concentration and the target RCS boron concentration for the cooldown to 350°F [338°F].

9.4 PO may be borating the RCS to the required boron concentration.

___ 9.5 WHEN any of the following conditions are met:

___ The credited RCS boron concentration is greater than the target RCS boron concentration.

___ The STA has determined that adequate boration will occur during the cooldown.

___ The required boration is complete.

___ Pressurizer level approaches 80% [74%] and letdown is isolated.

THEN continue in this appendix.

9.0 PLANT COOLDOWN (cont.)

NOTE

The maximum allowed RCS cooldown rate is 100°F/hr, in accordance with **Tech Spec 3.4.8.1.** The maximum allowed pressurizer cooldown rate is 200°F/hr, in accordance with **Tech Spec 3.4.8.2.**

___9.6 Record the RCS and pressurizer cooldown rates.

CONCURRENTLY PERFORM RCS and Pressurizer Cooldown Log, **Attachment B-3** to this appendix.

___9.7 IF the MSIVs on the intact steam generator can NOT be opened, THEN GO TO Step 9.12 in this appendix.

9.0 PLANT COOLDOWN (cont.)

___ 9.8 IF directed by the CRS to open the MSIVs,
THEN perform both of the following to align the valves to equalize the pressure around the MSIVs on the intact steam generator:

___ 1. Close the MSIV bypass manual isolation valve on the intact steam generator.

Direct an auxiliary operator to close the MSIV BYPASS MANUAL ISOLATION VALVE for the intact steam generator. Access these valves from the 120 ft level of the MSSS.

Steam Generator 1	Steam Generator 2
___SGE-V048	___SGE-V084

___ 2. Close the main steam line drain valves.

Close all of the following valves:

___ UPSTR MN STM DRN VLVS, SGN-HS-30.

___ DNSTR MN STM DRN VLVS, SGN-HS-45.

___ TURB SV BEFORE SEAT DRN VLVS, MTN-HS-242.

FOR INFORMATION ONLY

9.0 PLANT COOLDOWN (cont.)

___ 9.9 IF directed by the CRS to open the MSIVs,
THEN perform both of the following to equalize the pressure around the MSIVs on the intact steam generator:

___ 1. Override and open the MSIV bypass valve on the intact steam generator.

Open the MSIV BYPASS ISOL VLV solenoids in the table below, on the intact steam generator:

Steam Generator 1	Steam Generator 2
___SGA-UY-169A	___SGB-UY-183B
___SGB-UY-169B	___SGA-UY-183A

___ 2. Equalize the pressure across the MSIVs.

Direct an auxiliary operator to throttle open the MSIV BYPASS MANUAL ISOLATION VALVE that was closed in Step 9.8 above.

9.0 PLANT COOLDOWN (cont.)

___ 9.10 IF the MSIVs are bypassed on steam generator 1, AND the pressure has equalized around the MSIVs, THEN override and open the steam generator 1 MSIVs.

IF steam generator 1 is the intact steam generator, THEN perform both of the following to SLOW OPEN the MSIVs:

___ Place at least 1 of the following switches to SLOW OPEN:

___ LINE 1 MSIV, SGA-HS-170A.

___ LINE 1 MSIV, SGB-HS-170B.

___ Place at least 1 of the following switches to SLOW OPEN:

___ LINE 2 MSIV, SGA-HS-180A.

___ LINE 2 MSIV, SGB-HS-180B.

9.0 PLANT COOLDOWN (cont.)

___ 9.11 IF the MSIVs are bypassed on steam generator 2,
AND the pressure has equalized around the MSIVs,
THEN override and open the steam generator 2 MSIVs.

IF steam generator 2 is the intact steam generator,
THEN perform both of the following to SLOW OPEN the MSIVs:

___ Place at least 1 of the following switches to SLOW OPEN:

___ LINE 1 MSIV, SGA-HS-171A.

___ LINE 1 MSIV, SGB-HS-171B.

___ Place at least 1 of the following switches to SLOW OPEN:

___ LINE 2 MSIV, SGA-HS-181A.

___ LINE 2 MSIV, SGB-HS-181B.

___ 9.12 IF the CRS has directed,
AND the pressure reduction is due to deliberate actions,
THEN maintain the automatic Pressurizer Pressure - Low setpoint below pressurizer pressure.

A. Press the LO PZR PRESS SETPOINT RESET for all 4 channels on B05 to lower the automatic Pressurizer Pressure - Low setpoint.

B. Ensure that the pretrip alarm, LO PZR PRESS CH PRE-TRIP, is clear.

9.0 PLANT COOLDOWN (cont.)

9.13 Steps 9.13 through 9.18 - PO may be depressurizing the RCS.

9.19 Steps 9.19 through 9.25 - PO may be restoring seal injection and seal bleedoff.

NOTE

The maximum allowed RCS cooldown rate is 100°F/hr, in accordance with **Tech Spec 3.4.8.1.** The maximum allowed pressurizer cooldown rate is 200°F/hr, in accordance with **Tech Spec 3.4.8.2.**

NOTE

Step 9.26 provides the action that the operator should take if the cooldown rate is exceeded during the cooldown that follows Step 9.30.

___ 9.26 IF the RCS cooldown rate exceeds 100°F/hr, during the cooldown that follows Step 9.30,
THEN reduce the cooldown rate to less than 100°F/hr, while maintaining the RCS P/T limits.

See Normal Containment RCS P/T Limits,[Harsh Containment RCS P/T Limits] on the control board.

9.27 CRS is ensuring that the RCS is not oversubcooled.

9.0 PLANT COOLDOWN (cont.)

NOTE

The maximum allowed RCS cooldown rate is 100°F/hr, in accordance with **Tech Spec 3.4.8.1.** The maximum allowed pressurizer cooldown rate is 200°F/hr, in accordance with **Tech Spec 3.4.8.2.**

NOTE

If any RCPs are operating, use RCS T_h to determine the cooldown endpoint.If no RCPs are operating, use REP CET to determine the cooldown endpoint.

9.28 IF the CRS has directed,
AND the SBCS is available,
THEN use the SBCS to begin a controlled plant cooldown to an RCS T_h of below 350°F [338°F].

Continue in this procedure.

9.0 PLANT COOLDOWN (cont.)

NOTE

The maximum allowed RCS cooldown rate is 100°F/hr, in accordance with **Tech Spec 3.4.8.1**. The maximum allowed pressurizer cooldown rate is 200°F/hr, in accordance with **Tech Spec 3.4.8.2**.

NOTE

If any RCPs are operating, use RCS T_h to determine the cooldown endpoint. If no RCPs are operating, use REP CET to determine the cooldown endpoint.

___9.29 IF the CRS has directed,
AND the SBCS is NOT available,
THEN align at least 1 ADV from the intact steam generator for operation.

Perform the actions in the table below to align at least 1 ADV from the intact steam generator for operation:

ACTION	SG 1 LINE 1 ISOL VLV, SGA-HV-184	SG 1 LINE 2 ISOL VLV, SGB-HV-178	SG 2 LINE 1 ISOL VLV, SGB-HV-185	SG 2 LINE 2 ISOL VLV, SGA-HV-179
A. Lower ADV VALVE CONTROL outputs to minimum.	___SGA-HIC-184A	___SGB-HIC-178A	___SGB-HIC-185A	___SGA-HIC-179A
B. Select OPEN PERM on both ADV permissives.	___SGA-HS-184A ___SGC-HS-184B	___SGB-HS-178A ___SGD-HS-178B	___SGB-HS-185A ___SGD-HS-185B	___SGA-HS-179A ___SGC-HS-179B

9.0 PLANT COOLDOWN (cont.)

NOTE

The maximum allowed RCS cooldown rate is 100°F/hr, in accordance with **Tech Spec 3.4.8.1.** The maximum allowed pressurizer cooldown rate is 200°F/hr, in accordance with **Tech Spec 3.4.8.2.**

___9.30 IF the CRS has directed,
THEN open the selected ADVs to cool down to an RCS T_h of below 350°F [338°F].

A. Set the demand for each selected ADV to at least 30%, with the thumbwheel on the ADV VALVE CONTROL.

B. Check that each selected ADV is moving toward open.

C. WHEN the position approaches 20% open,
THEN adjust the demand with the thumbwheel to control the RCS cooldown.

9.31 CRS may be informing Radiation Protection and the RMS technician of the steam release.

9.32 Steps 9.32 and 9.33 - PO is controlling pressurizer level and pressure.

FOR INFORMATION ONLY

9.0 PLANT COOLDOWN (cont.)

___9.34 Maintain the steam generator levels between 50 and 70% NR throughout the cooldown.

9.35 Steps 9.35 and 9.36 - PO is aligning the standby letdown and backpressure control valves.

9.37 Steps 9.37 and 9.38 - PO is depressurizing and isolating the SITs.

9.39 PO may be performing RCS Void Determination and Control.

9.40 PO is checking the SDC system entry conditions.

___9.41 Check that all Section 9.0 steps have been addressed.

10.0 PLANT STATUS POINT

___ 10.1 Inform the CRS of plant parameters as requested.

11.0 PROCEDURE EXIT

11.1 Steps 11.1 through 11.4 - CRS is ensuring that all administrative requirements are met.

___11.5 IF RCS and Pressurizer Cooldown Log, **Attachment B-3** to this appendix, was used,
THEN ensure that the data in the attachment is being transferred into **RCS and Pressurizer Heatup and Cooldown Rates**, 40ST-9RC01.

___11.6 GO TO the procedure selected by the CRS.

END OF PROCEDURE

ACTIONS DETAILS

ATTACHMENT B-1 Steam Generator 1 Level Reduction Checklist Page 1 of 4

NOTE

This attachment uses HIGH RATE blowdown to the main condenser for level reduction.

___B-1.1 Override and open both of the following valves:

___ SG 1 COMMON UPSTR ISOL VLV, SGA-HS-500P.

___ SG 1 COMMON DNSTR ISOL VLV, SGB-HS-500Q.

NOTE

The steam generator blowdown containment isolation valves may not open due to excessive ΔP across the valves.

___B-1.2 IF steam generator blowdown can NOT be unisolated, THEN perform both of the following:

___ Ensure the steam generator blowdown containment isolation valves are closed.

___ GO TO step 3.47

Ensure that both of the following valves are closed:

___ SG 1 COMMON UPSTR ISOL VLV, SGA-HS-500P

___ SG 1 COMMON DNSTR ISOL VLV, SGB-HS-500Q

ACTIONS DETAILS

ATTACHMENT B-1 Steam Generator 1 Level Reduction Checklist (cont.) Page 2 of 4

___B-1.3 Direct an auxiliary operator to ensure that both of the following valves are open, to send water to the condenser:

___ SG 1 HIGH RATE BLOWDOWN TO CONDENSER, SC-HV-18C, OUTLET, SCN-V088.

___ SG 1 ABNORMAL BLOWDOWN TO CONDENSER, SC-HV-18B, OUTLET, SCN-V071.

___B-1.4 Select OFF with the SG 1 PATH SELECTOR VALVES, SCN-HS-1.

___B-1.5 Ensure that at least 1 of the following valves are open:

___ SG 1 COLD LEG ISOL VLV, SGN-HS-41.

___ SG 1 HOT LEG ISOL VLV, SGN-HS-43.

ACTIONS DETAILS

ATTACHMENT B-1 Steam Generator 1 Level Reduction Checklist (cont.) Page 3 of 4

___B-1.6 Select HIGH RATE on SG 1 RATE SELECTOR VALVES, SCN-HS-18.

___B-1.7 Select COND with the SG 1 PATH SELECTOR VALVES, SCN-HS-1.

___B-1.8 IF all of the following conditions are met:

___ Steam generator level is below 2% [13%] WR.

___ Steam generator pressure is decreasing.

___ T_c is approaching T_h.

THEN inform the CRS that steam generator 1 is approaching dryout conditions.

___B-1.9 IF the CRS has directed, THEN stabilize T_c with steam generator 2.

ACTIONS DETAILS

ATTACHMENT B-1 Steam Generator 1 Level Reduction Checklist (cont.) Page 4 of 4

___B-1.10 WHEN steam generator 1 pressure has decreased to less than 200 psig,
THEN select OFF with the SG 1 PATH SELECTOR VALVES, SCN-HS-1.

___B-1.11 Direct an auxiliary operator to close both of the following valves:

___ SG 1 HIGH RATE BLOWDOWN TO CONDENSER, SC-HV-18C, OUTLET, SCN-V088.

___ SG 1 ABNORMAL BLOWDOWN TO CONDENSER, SC-HV-18B, OUTLET, SCN-V071.

___B-1.12 Close SG 1 COMMON UPSTR ISOL VLV, SGA-HS-500P.

___B-1.13 Close SG 1 COMMON DNSTR ISOL VLV, SGB-HS-500Q.

END OF ATTACHMENT

ACTIONS DETAILS

ATTACHMENT B-2 Steam Generator 2 Level Reduction Checklist Page 1 of 4

NOTE

This attachment uses HIGH RATE blowdown to the main condenser for level reduction.

___ B-2.1 Override and open both of the following valves:

___ SG 2 COMMON UPSTR ISOL VLV, SGB-HS-500R.

___ SG 2 COMMON DNSTR ISOL VLV, SGA-HS-500S.

NOTE

The steam generator blowdown containment isolation valves may not open due to excessive ΔP across the valves.

___ B-1.2 IF steam generator blowdown can NOT be unisolated, THEN perform both of the following:

___ Ensure the steam generator blowdown containment isolation valves are closed.

___ GO TO step 3.47

Ensure that both of the following valves are closed:

___ SG 2 COMMON UPSTR ISOL VLV, SGB-HS-500R

___ SG 2 COMMON DNSTR ISOL VLV, SGA-HS-500S

FOR INFORMATION ONLY

ACTIONS DETAILS

ATTACHMENT B-2 Steam Generator 2 Level Reduction Checklist (cont.) Page 2 of 4

___B-2.3 Direct an auxiliary operator to ensure that both of the following valves are open, to send water to the condenser:

___ SG 2 HIGH RATE BLOWDOWN TO CONDENSER, SC-HV-19C, OUTLET, SCN-V103.

___ SG 2 ABNORMAL BLOWDOWN TO CONDENSER, SC-HV-19B, OUTLET, SCN-V073.

___B-2.4 Select OFF with the SG 2 PATH SELECTOR VALVES, SCN-HS-2.

___B-2.5 Ensure that at least 1 of the following valves are open:

___ SG 2 COLD LEG ISOL VLV, SGN-HS-44.

___ SG 2 HOT LEG ISOL VLV, SGN-HS-42.

ACTIONS DETAILS

ATTACHMENT B-2 Steam Generator 2 Level Reduction Checklist (cont.) Page 3 of 4

___B-2.6 Select HIGH RATE on SG 2 RATE SELECTOR VALVES, SCN-HS-19.

___B-2.7 Select COND with the SG 2 PATH SELECTOR VALVES, SCN-HS-2.

___B-2.8 IF all of the following conditions are met:

___ Steam generator level is below 2% [13%] WR.

___ Steam generator pressure is decreasing.

___ T_C is approaching T_h.

THEN inform the CRS that steam generator 2 is approaching dryout conditions.

___B-2.9 IF the CRS has directed,
THEN stabilize T_C with steam generator 1.

ACTIONS DETAILS

ATTACHMENT B-2 Steam Generator 2 Level Reduction Checklist (cont.) Page 4 of 4

___B-2.10 WHEN steam generator 2 pressure has decreased to less than 200 psig,
THEN select OFF with the SG 2 PATH SELECTOR VALVES, SCN-HS-2.

___B-2.11 Direct an auxiliary operator to close both of the following valves:

___ SG 2 HIGH RATE BLOWDOWN TO CONDENSER, SC-HV-19C, OUTLET, SCN-V103.

___ SG 2 ABNORMAL BLOWDOWN TO CONDENSER, SC-HV-19B, OUTLET, SCN-V073.

___B-2.12 Close SG 2 COMMON UPSTR ISOL VLV, SGB-HS-500R.

___B-2.13 Close SG 2 COMMON DNSTR ISOL VLV, SGA-HS-500S.

END OF ATTACHMENT

ATTACHMENT B-3 RCS and Pressurizer Cooldown Log

Instructions

NOTE

The PMS demand typer may be used to obtain the RCS and PZR temperatures at the required 15 minute intervals.

1. Use the colder of RCA-TI-115 or RCB-TI-125 during forced circulation.
2. Use the REP CET temperature from QSPDS, page 211, during natural circulation.
3. Place a check mark next to the instrument selected, in the space provided. Use the same instrument for all readings.
4. The PMS points, RCT115 and RCT125, may be used to make a PMS operator log.
5. Record the present time in the first blank box under the time column in Row a.
6. Record the RCS temperature for the present time in the first blank box under the **RCS Temperature** column in Row a.

NOTE

The instructions are continued on the next page.

	RCS Cooldown Data			Pressurizer Cooldown Data	
	Time	RCS Temperature	Cooldown Rate	Pressurizer TEMPERATURE	Cooldown Rate
		___RCA-TI-115 ___RCB-TI-125 ___REP CET	RCS ΔT*	TE-101 RCN-TI-101	PZR ΔT**
Row (a)					
(b)					
(c)					
(d)					
(e)					
(f)					
(g)					
(h)					
(i)					
(j)					
(k)					
(l)					

* Do not exceed an RCS ΔT of 25°F. ** Do not exceed a PZR ΔT of 50°F.

FOR INFORMATION ONLY

ATTACHMENT B-3 RCS and Pressurizer Cooldown Log (cont.)

Instructions

7. Record the PZR temperature for the present time in the first blank box under the **Pressurizer Temperature** column in Row a.

8. WHEN 15 minutes has elapsed since Step 1 above, THEN repeat Steps 5 - 7 for Row b.

---NOTE---

An RCS ΔT of >25°F or a PZR ΔT of >50°F for 4 consecutive 15 minute intervals will exceed the limits of **Tech Specs 3.4.8.1** and **3.4.8.2**.

---NOTE---

Be sure to preserve the sign of the number. A positive number indicates cooldown and a negative number indicates heatup.

9. Subtract Row b from Row a for the **RCS Temperature** column. Record the difference under the RCS ΔT column.

---NOTE---

The instructions are continued on the next page.

	RCS Cooldown Data			Pressurizer Cooldown Data	
	Time	RCS Temperature	Cooldown Rate	Pressurizer TEMPERATURE	Cooldown Rate
		___ RCA-TI-115 ___ RCB-TI-125 ___ REP CET	RCS ΔT*	TE-101 RCN-TI-101	PZR ΔT**
Row (m)					
(n)					
(o)					
(p)					
(q)					
(r)					
(s)					
(t)					
(u)					
(v)					
(w)					
(x)					

* Do not exceed an RCS ΔT of 25°F. ** Do not exceed a PZR ΔT of 50°F.

FOR INFORMATION ONLY

ATTACHMENT B-3 RCS and Pressurizer Cooldown Log (cont.)

FOR INFORMATION ONLY

Instructions

NOTE

Be sure to preserve the sign of the number. A positive number indicates cooldown and a negative number indicates heatup.

10. Subtract Row b from Row a for the **Pressurizer Temperature** column. Record the difference under the PZR ΔT column.

11. Continue to record the RCS and pressurizer temperatures at 15 minute intervals. For each set of temperatures, record the respective differences in the proper ΔT columns.

NOTE

An RCS ΔT of >25°F or a PZR ΔT of >50°F for 4 consecutive 15 minute intervals will exceed the limits **Tech Specs 3.4.8.1 and 3.4.8.2.**

12. Inform the CRS anytime that the RCS and pressurizer temperature 15 minute ΔT calculation exceeds the RCS ΔT of >25°F or the pressurizer ΔT of >50°F.

	RCS Cooldown Data			Pressurizer Cooldown Data	
	Time	RCS Temperature	Cooldown Rate	Pressurizer TEMPERATURE	Cooldown Rate
		___ RCA-TI-115 ___ RCB-TI-125 ___ REP CET	RCS ΔT*	TE-101 RCN-TI-101	PZR ΔT**
Row (y)					
(z)					
(aa)					
(bb)					
(cc)					
(dd)					
(ee)					
(ff)					
(gg)					
(hh)					
(ii)					
(jj)					

* Do not exceed an RCS ΔT of 25°F. ** Do not exceed a PZR ΔT of 50°F.

Section 1 Entry Conditions

Section 2 Emergency notifications and support

Section 3 Stabilize the plant as much as possible during the excess steam demand event.

- MSIS actuation and verification.
- SIAS actuation and verification.
- HPSI, LPSI, & CS stop and throttle criteria.
- RCP trip criteria.
- Swap charging pump suctions.
- Letdown restoration.
- Faulted SG isolation.
- LOOP actions

Section 4 Safety function status checks.

Section 5 Stabilize the plant.

- SG level control.
- Maintain pressurizer pressure.
- Aux. steam to gland seal system.
- Depressurize RCS.
- Containment pressure control.

Section 6 Safety function status checks.

Section 7 Stabilize the plant.

- Restore offsite power if available.
- Restart of RCPs if possible.
- Reset and verify safety signals that have actuated.
- Hydrogen control.

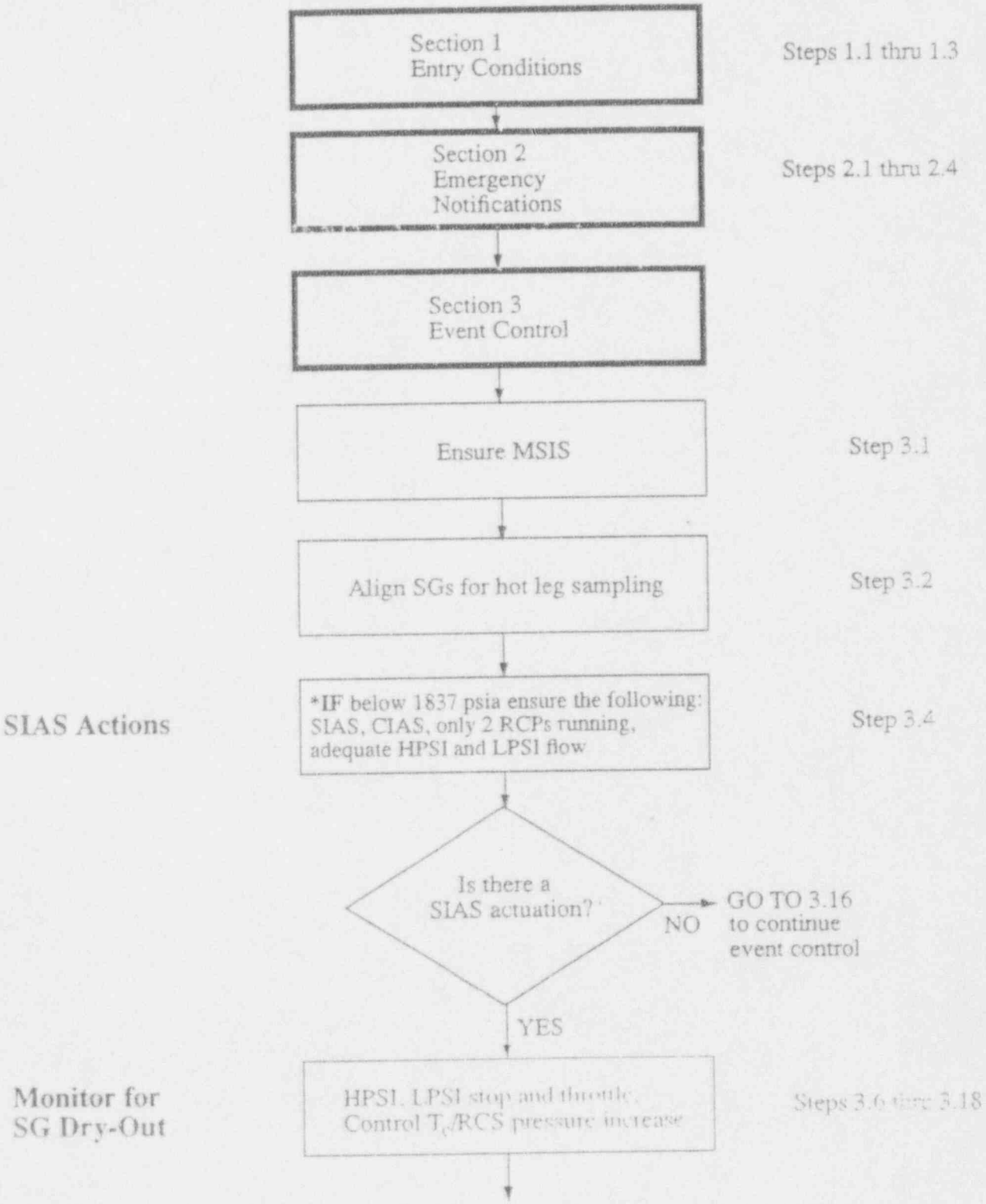
Section 8 Safety function status checks.

Section 9 Plant cooldown.

- Transfers vital busses from DG(s) to offsite power if possible.
- Open MSIVs on intact SG.
- Plant cooldown.
- Establish shutdown cooling

Section 10 Safety function status checks.

Section 11 Procedure Exit and Administrative Requirements



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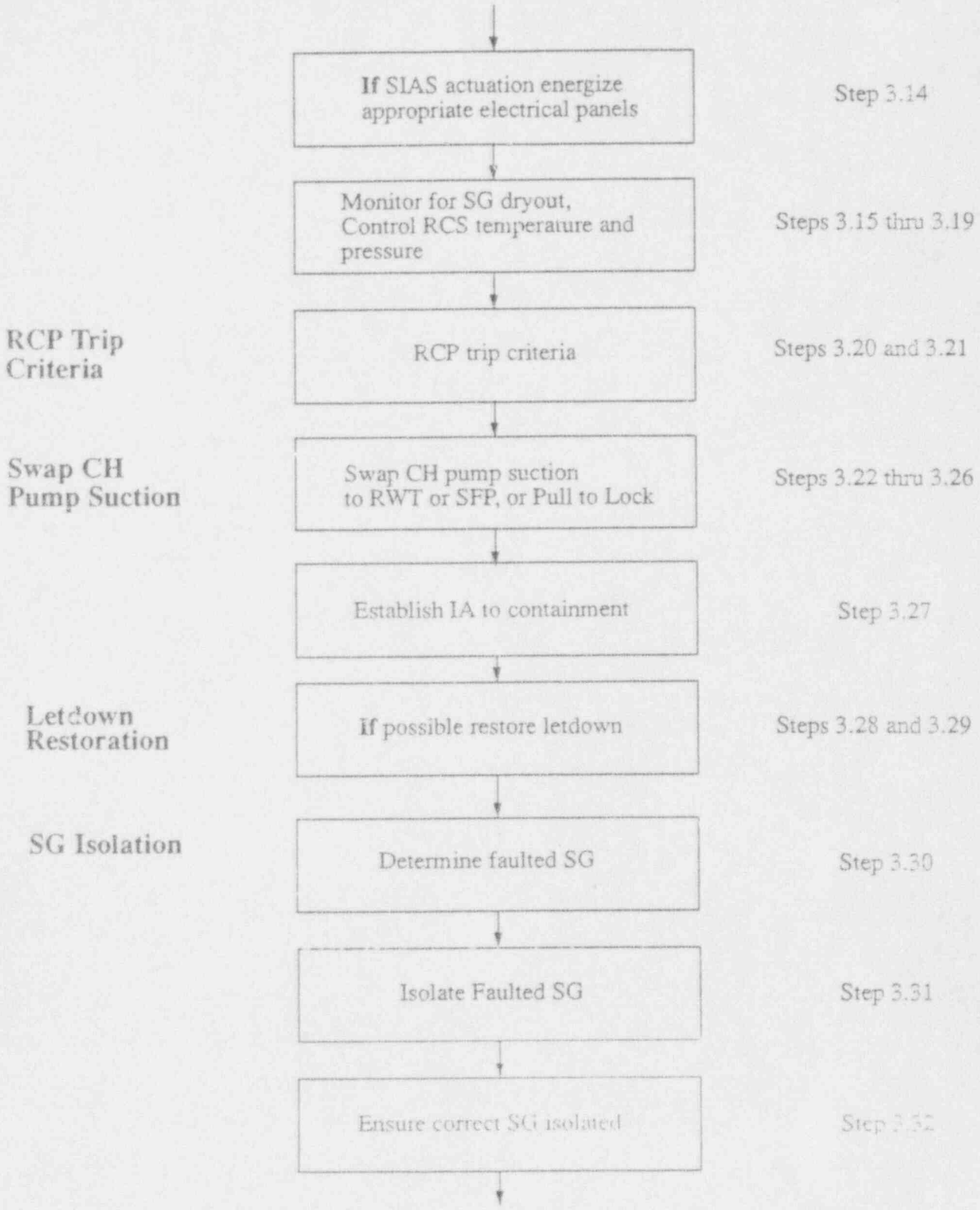

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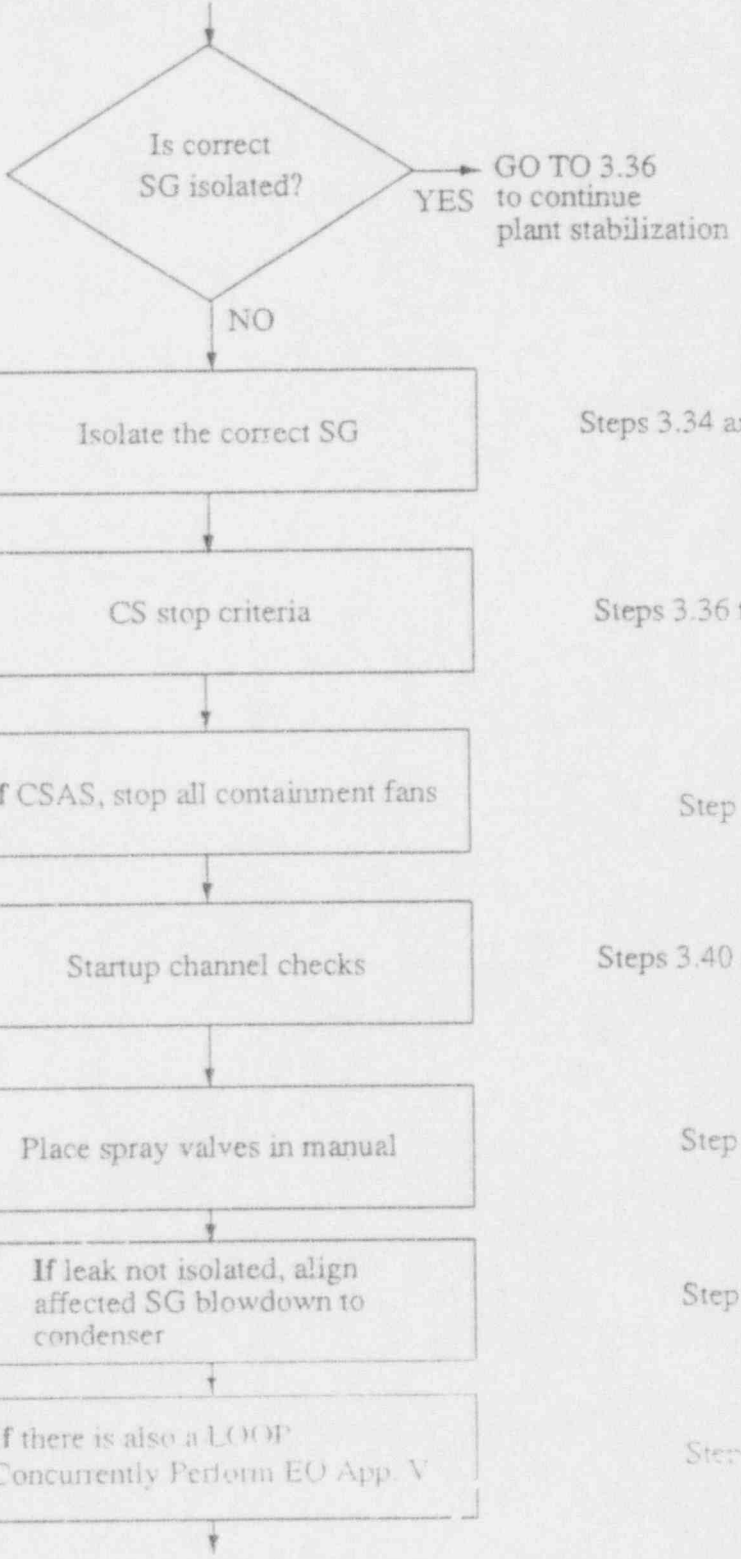

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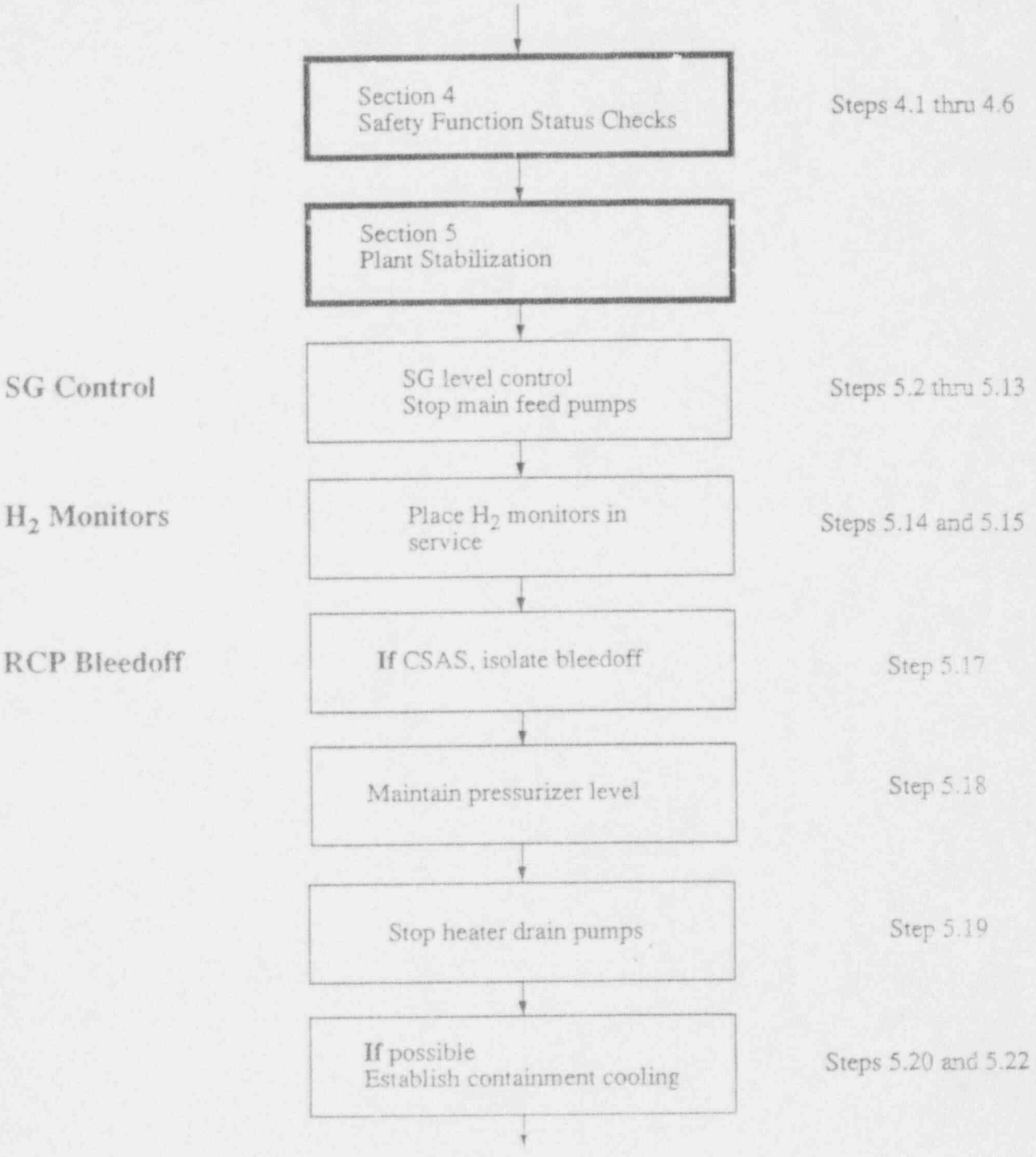

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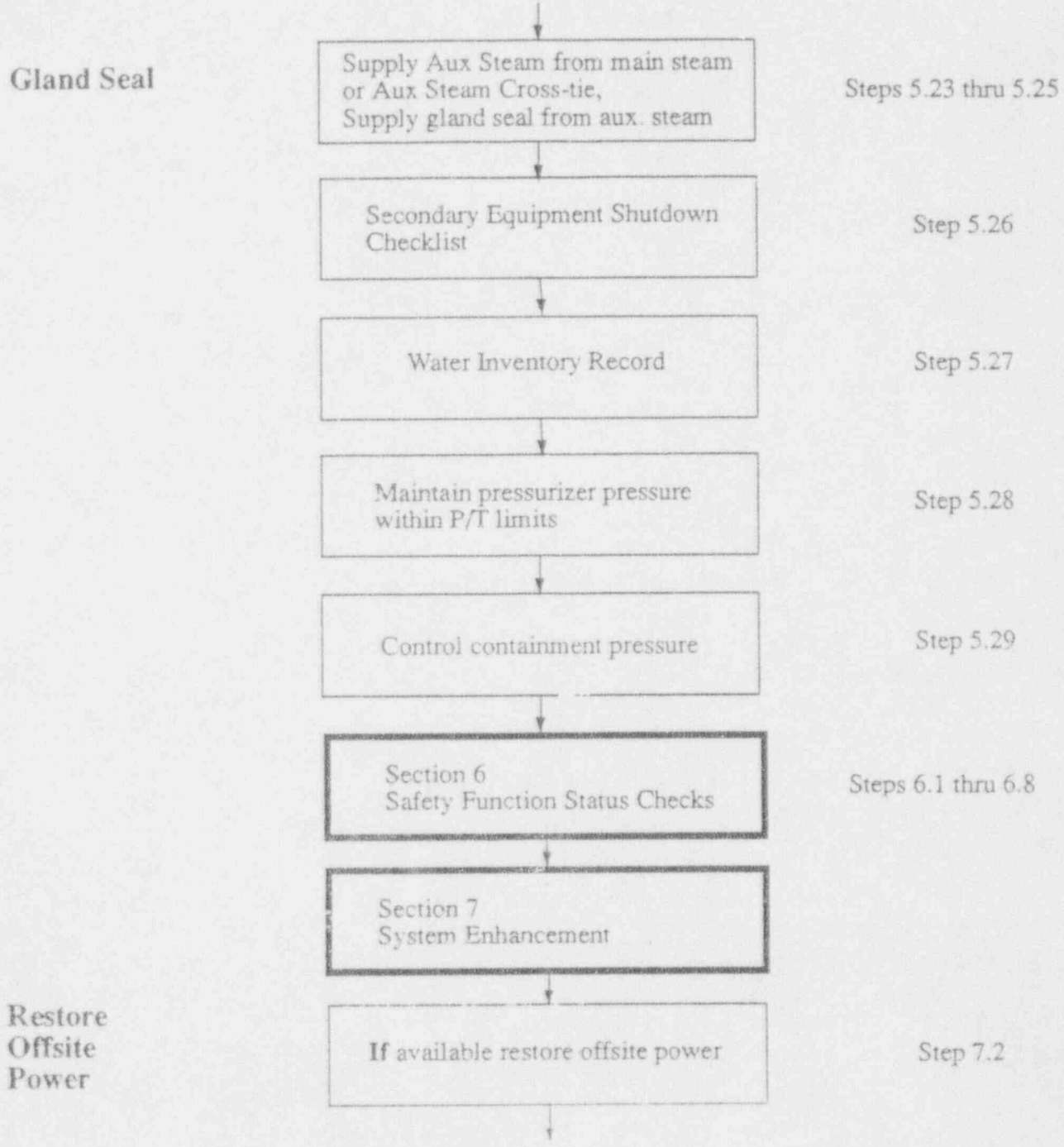

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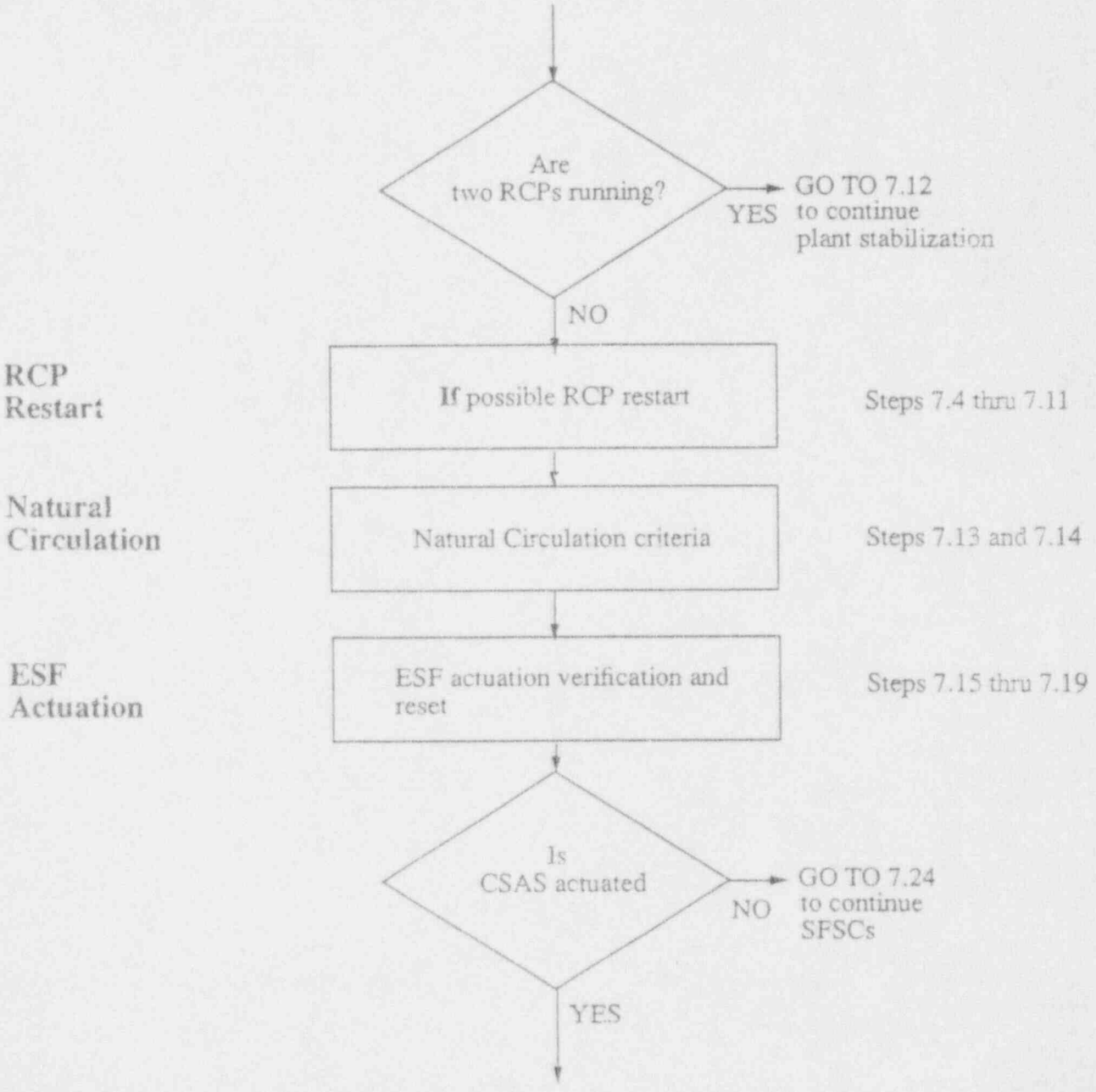

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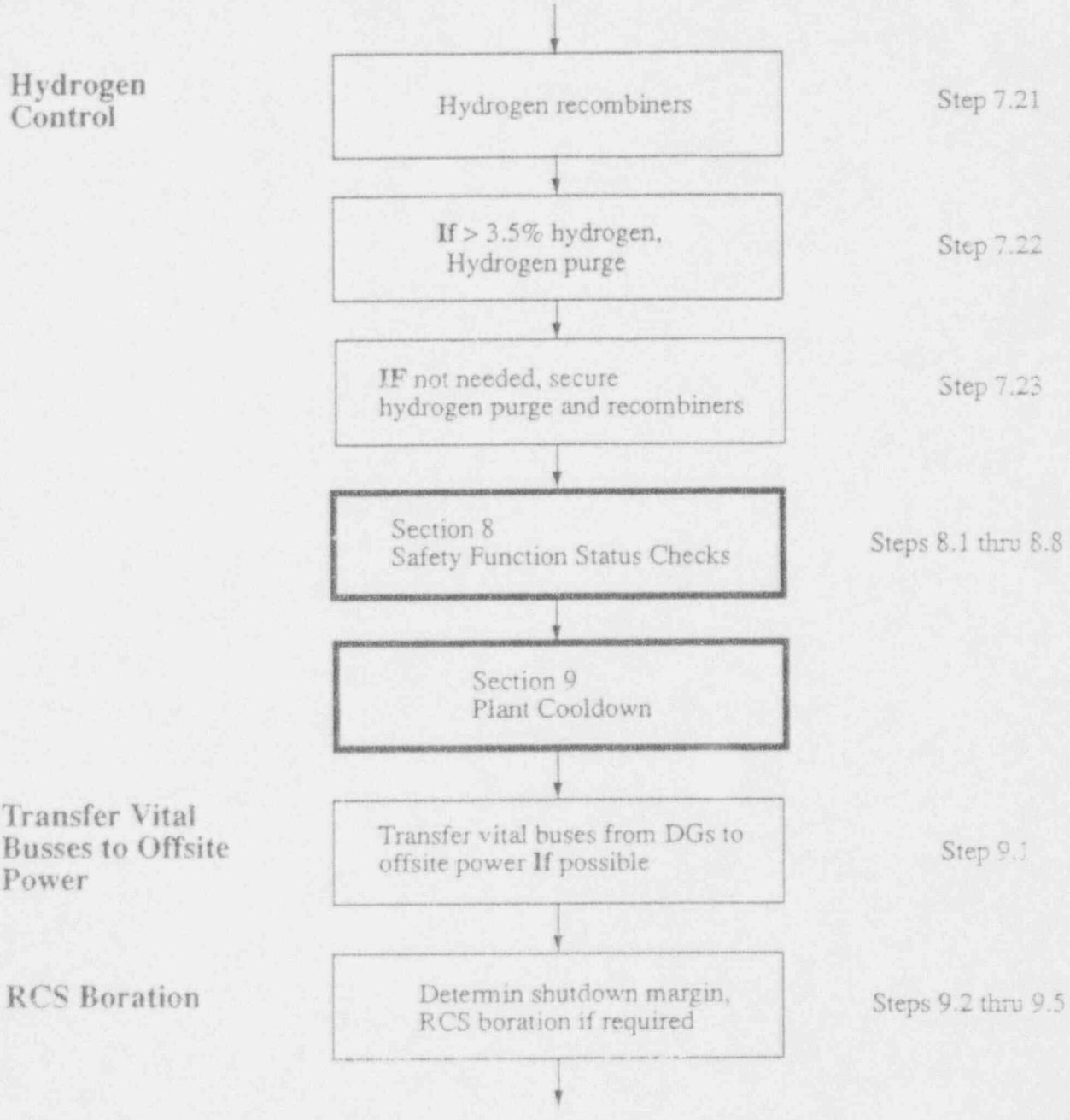

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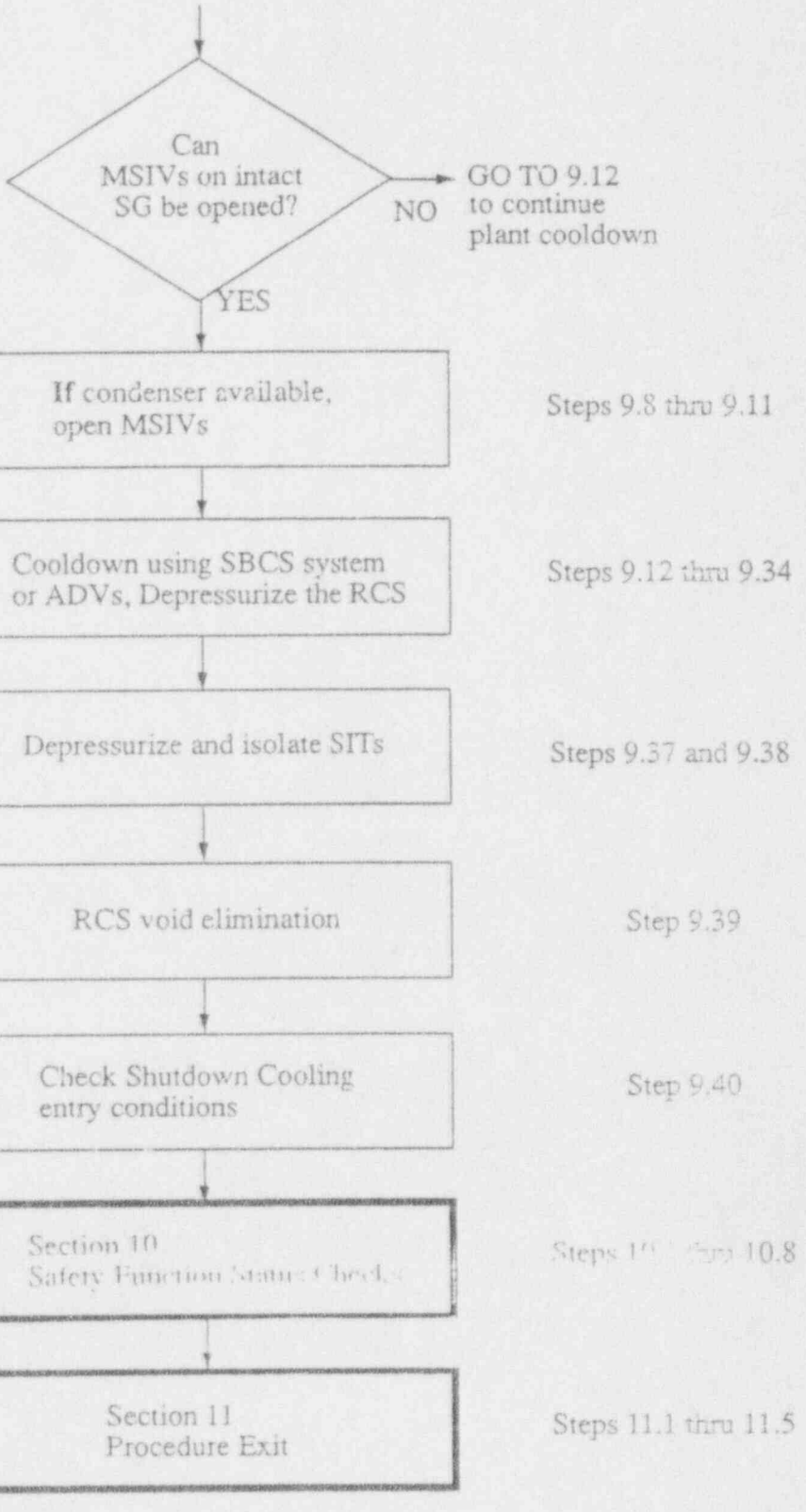
Section 9 continued from previous page



Safety Function Status Check Acceptance Criteria

Reactivity Control:

Check that the conditions from one of the columns below are met:

All CEAs are inserted	Boration rate is greater than 40 gpm.	• Reactor power is less than 10^{-4} %. • Adequate shutdown margin is established. • RCS boron concentration is greater than 2150 ppm.
Reactor power is decreasing	Reactor power is decreasing	• Reactor power is decreasing. • Reactor power is constant.

Maintenance of Vital Auxiliaries:

Check that <u>all</u> of the following criteria are met:

____ Main turbine is tripped.

____ Generator output breakers are open.

____ <u>All</u> of the buses in at least one train from the table below are energized.

	<u>Train A</u>	<u>Train B</u>
4.16 kV BUS	____PBA-S03	____PBB-S04
120 Vac BUSES	____PNA-D25	____PNB-D26
	____PNC-D27	____PND-D28
125 Vdc BUSES	____PKA-M41	____PKB-M42
	____PKC-M43	____PKD-M44

RCS Pressure and Inventory Control:

Check that <u>all</u> of the following criteria are met for the existing pressurizer level condition:

Pressurizer level between 10 and 70% [25 - 74%]

____ RCS subcooling is acceptable. See Normal Containment RCS P/T Limits, on the control board [Hard Containment RCS P/T Limits, on the control board].

____ RVLMS indicates that the RVUH level is greater than 21%.

____ Charging and letdown, as available, are restoring pressurizer level.

Safety Function Status Check Acceptance Criteria

____ Ensure that HPSI meets one of the following:

____ HPSI flow is acceptable. See HPSI Delivery Curve, on the control board.

____ HPSI throttle criteria have been met.

Pressurizer level below 10% [25%]

____ RVLMS indicates that the RVUH level is greater than 21%.

____ HPSI flow is acceptable. See HPSI Delivery Curve, on the control board.

____ All available charging pumps are running.

Heat Removal:

A. Calculate RCS operating loop ΔT. Th _____°F

-Tc _____°F

= RCS operating loop ΔT _____°F

B. Check that all of the criteria are met for the existing RCP condition listed in the table below:

At least 1 RCP running:	No RCPs running:
____RCS loop ΔT is less than 10°F [17°F].	____RCS loop ΔT is less than 57°F [74°F].
____RCS T_c is less than 570°F [558°F].	____REP CET temperature is less than 600°F [608°F].
____RCS T_c is stable or decreasing.	____REP CET temperature is stable or decreasing.

C. Check that the intact steam generator meets all of the criteria for the existing level condition listed in the table below

SG WR Level	2 Steam Generators Available	1 Steam Generator Available
Above 72% [78%]WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR	Enough flow to maintain the steam generator level between 72 and 80% [78 - 84%] WR
Between 2 and 72% [13-78%]WR	At least 250 gpm or 0.14×10^6 lb/hr feed water flow	At least 500 gpm or 0.28×10^6 lb/hr feed water flow
Below 2%[13%]WR	Between 250 and 1500 gpm or between 0.14×10^6 lb/hr and 0.83×10^6 lb/hr	Between 500 and 1500 gpm or between 0.28×10^6 lb/hr and 0.83×10^6 lb/hr

Safety Function Status Check Acceptance Criteria

Containment Integrity:

Check that all of the following criteria are met:

____ At least one of the following pressure criteria is met:

____ Containment pressure is less than 3.0 psig.

____ CIAS has actuated.

____ None of the following containment radiation monitors are in ALERT or HIGH alarm:

____ RU-1 or alternate

____ RU-16

____ RU-17

____ RU-148

____ RU-149

____ None of the following steam plant radiation monitors are in ALERT or HIGH alarm:

____ RU-139

____ RU-140

____ RU-141

____ One of the following conditions is met:

____ No ALERT or HIGH alarm on RU-4 or RU-5.

____ Chemistry samples indicate no increased steam generator tube leakage.

Containment Atmospheric Control:

Check that at least 1 of the following containment pressure criteria is met:

____ Containment pressure is less than 8.5 psig.

____ At least 1 containment spray header is delivering at least 3525 gpm.

FOR INFORMATION ONLY
PROCEDURE ACTION COVER SHEET

PROCEDURE NO:	REV #	DDC-PV Contact for Decimal Revision No. TIME (if applicable) (EXT 6633)
41EP-1RO04	00.07	Diane

PROCEDURE TITLE: Excess Steam Demand

DESCRIPTION OF ACTION:

CRS (page 11) PO (page 8) step 3.13 - Changed step to include opening both LPSI injection valves for any running LPSI Pump.

CRS (page 23) step 3.44 - Reworded the step so the condition relies on SG level.

PO, page 13, step 3.23 - Added step to stop any operating BAMPs if charging pump suction is to be through CH-536.

TYPE OF PROCEDURE ACTION

- DECIMAL REVISION [X]
- REVISION [ ]
- TEMPORARILY APPROVED PROCEDURE ACTION [ ]
- NEW PROCEDURE [ ]
- CANCELLATION [ ]

PREPARED BY:	EXT:	STA:	UNITS AFFECTED:	INTENT CHANGE:
Rick Timmons	5861	7665	One	[ ] YES [X] NO

TEMPORARY APPROVAL SIGNATURES (Refer to Section 3.4)

Place a copy of the temporarily approved procedure action in the assigned pickup box immediately upon completion.

(PRINT)	MEMBER PLANT SUPERVISORY STAFF (Step 3.4.2.8)	SIGNATURE	DATE
(PRINT)	ASSISTANT/SHIFT SUPERVISOR (SRO) (Step 3.4.2.9)	SIGNATURE	DATE

Total Number of Pages for the Temporarily Approved Procedure Action: _____

1. A CATS DATABASE SEARCH IS REQUIRED FOR ALL PROCEDURE ACTIONS IN ACCORDANCE WITH 90GB-0CQ01, COMMITMENT ACTION TRACKING SYSTEM - CATS. (CATS search is not required for clerical or administrative actions)
2. IF THIS IS AN INTENT CHANGE PROCEDURE ACTION, THEN PERFORM A 10CFR50.59 SCREENING AND EVALUATION PER 93AC-0NS01.

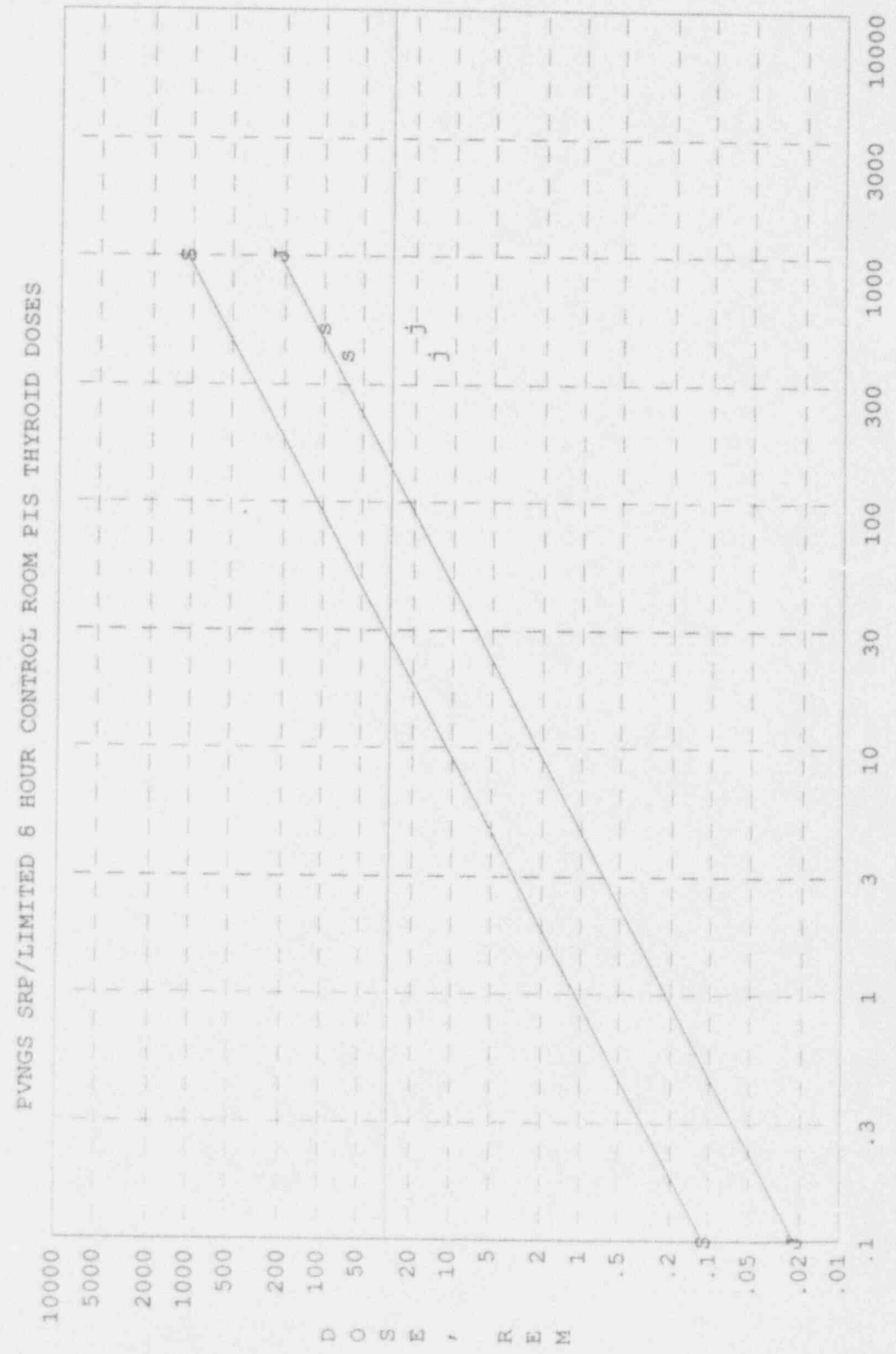
Procedure Action Package Documents (Refer to Section 3.2.1.3) NOPC (1), CATS search (15), V&V Requirements Checklist (1), Comment Forms (0), Procedure Pages 1, 1a, 11, 11a, 23, 23a, App A Page 8, 8a, 13, 13a.

Total Pages Turned Over to DDC (include PAC) (Technical Reviewer Only) 27

PRINT		SIGNATURE	DATE	
Lou Florence	TECHNICAL REVIEWER	Louis G. Florence	6/16/93	(Refer to Section 3.2.8.5)
N/A	QA CONCURRENCE (PR and AC only)			(Refer to Section 3.2.9)
John Dennis	LEAD MANAGER	John W. Dennis	6/16/93	(Refer to Section 3.2.10)
John Dennis	DOCUMENT APPROVER	John W. Dennis	6/16/93	(Refer to Section 3.2.11) 6-25-93 Effective Date, if requested

ENCLOSURE 3

This Figure replaces 2.1.5-1



ENCLOSURE 4

Table 2.1.6-2
Sequence of Events for a Main Steam Line Break With 3 Induced Double Ended Guillotine Tube Failures

Time (sec)	Event
10	3 U-Tubes fail (double ended guillotine breaks)
20	SIAS, HPSI injection
27	Pressurizer empties
28	AFAS on SG#2 (locked out)
1810	Operator initiates auxiliary feedwater (one pump) to intact steam generator
1920	Operator throttles HPSI ~50% to reduce pressure - all throttle criteria met
2410	Operator begins a controlled cooldown plant with the intact SG and opens pressurizer vent path. Steaming rate, venting and feed rate to the intact SG are periodically adjusted to maintain desired conditions.
4380	Shutdown cooling entry conditions reached
6430	Level recovered in faulted steam generator to 4.0 feet above tube sheet
18,850	Level recovered in faulted steam generator to above U-tubes, ft.
28,800	Transient Ended

Sequence of Events and Systems Operation

At 0.0 seconds, a MSLB occurs on SG#2. The reactor trip and MSIS occur approximately 3 seconds later due to low SG pressure and the MSIVs close, isolating 3 of the 4 main steam lines. At 10 seconds, 3 double ended guillotine tube ruptures are assumed to occur in SG#2. At ~20 seconds, a SIAS occurs. At ~28 seconds an AFAS occurs on the faulted generator, but auxiliary feedwater flow is locked out due to low pressure in the faulted generator. The faulted generator essentially boils dry at ~200 seconds, but the RCS continues to cool down due to boil off of the leakage. At ~1300 seconds, primary pressure rebounds to a maximum of 1156 psia, at which time HPSI flow essentially matches the leak rate and RCS makeup due to liquid contraction effects. Subcooling continues to increase due to the ongoing cooldown. At ~30 minutes, operators begin steaming and feeding the intact generator at a nominal rate of 650 gpm (only one auxiliary feedwater pump is assumed to be available). At 32 minutes, operators are assumed to throttle safety injection flow due to high pressurizer level and subcooling margin. At 40 minutes the operators open the pressurizer vent to aid depressurization (both auxiliary and main spray are assumed to be unavailable) and increase steaming from the intact generator to establish and maintain a controlled cooldown per the Technical Specification cooldown limits. At approximately 73 minutes, RCS temperature and pressure are within the shutdown cooling system entry conditions (350 ^{o}F, 400 psia). Nevertheless, for purposes of conservatively determining offsite dose, all cooling is assumed to continue via the steam generators for 8 hours.

This analysis assumes that the shutdown cooling (SDC) system will be placed in service within 2 hours of reaching entry conditions, and that the RCS will be at cold shutdown conditions 4 hours after the SDC is placed in service. Hence, this event would be over within 8 hours.

- 1 (i.e., no partitioning) for the flashed portion of the leak, and for bulk boiling when liquid levels are less than 4.0 feet above the tube sheet.
- 10 for bulk boiling when liquid levels are 4.0 feet above the tube sheet.
- 100 for bulk boiling when liquid levels are above the U-tubes.

6) The atmospheric dispersion factors are 3.1×10^{-4} sec/m^3 and 5.1×10^{-5} sec/m^3 for the Exclusion Area Boundary (EAB) and Low Population Zone (LPZ), respectively.

7) Doses due to the initial activity present in the faulted generator are included in the SRP dose calculations, but are negligible for evaluating realistic dose consequences, or SRP dose consequences with reduced primary activities.

The above assumptions account for all the activity in the faulted generator due to the initial dryout, and do not credit any partitioning effects until a steam/liquid interface is reestablished. No credit is taken for plateout effects in the faulted generator. It should be noted, however, that ~50% of the iodine released from the RCS is assumed to plateout inside containment in LOCA events. Given the surface area inside the generators, a similar plateout effect would be expected for this event, which would significantly reduce dose consequences. The dose consequences for the MSLB with induced leakage equivalent to 3 DEG tube breaks are given in Table 2.1.6-4

Table 2.1.6-4

Summary of Off-Site Dose Consequences Incorporating CEPAC Transient Results for a Main Steam Line Break With Induced Leakage Equivalent to 3 DEG Tube Breaks

Dose Consequences	GIS Cases, REM	PIS Cases, REM
Applicable Limits, 10CFR100	300	300
2 Hour EAB, SRP Assumptions	374	1360
2 Hour EAB, Realistic Assumptions[a]	23	28
2 Hour EAB, SRP Assumptions with realistic initial activities (0.6 and 12 µCi/gm)	225	272
8 Hour LPZ, SRP Assumptions	119	253
8 Hour LPZ, Realistic Assumptions[a]	5	4
8 Hour LPZ, SRP Assumptions with realistic initial activities (0.6 and 12 µCi/gm)	72	51

a. 0.6 and 12 µCi/gm for GIS and PIS initial activities. Realistic dcf and X/Q values.

The transient results noted above were also used to evaluate the control room 8 hour GIS and PIS doses by ratioing the dose consequences by the appropriate atmospheric dispersion factors and incorporating a protection factor of 95 for the control room essential air handling system.

Corresponding doses for a MSLB with 2 DEG tube failures were also determined. The resulting dose consequences are summarized on Table-2.1.6-5:

Table 2.1.6-5
Summary of Control Room Dose Consequences Based On CEPAC Transient Results for a Main Steam Line Break With Induced Leakage Equivalent to 2 and 3 DEG Tube Breaks

Dose Consequences	GIS Cases, REM		PIS Cases, REM	
Applicable Limits, 10CFR100	30		30	
Number of Tubes Assumed to Fail	2	3	2	3
8 Hour LPZ, SRP Assumptions	35	49	68	103
8 Hour LPZ, SRP Assumptions with realistic initial activities (0.6 and 12 μCi/gm)	21	29	14	21

For comparison purposes, the PIS doses for the MSLB with 2 and 3 DEG tube ruptures are depicted on Figure 2.1.5-1 (designated "s" and "j" on figure).

2.1.7 Dose Consequence Conclusions

Based on the dose consequences described above, the offsite doses for a MSLB with induced tube leakage greater than the analyzed value of 1.0 gpm can be limited to within the specified acceptance criteria (10CFR100 limits for off-site doses and 30 REM thyroid for control room doses) by administratively restricting the PVNGS primary activity to the limits shown on Table 2.1.7-1.

Table 2.1.7-1
Primary Activity Limits to Ensure Dose Consequences For a MSLB With Induced Tube Failures Remain Within 10CFR100 Limits

Parameters	Tech. Spec Limits	Administrative Limits
Primary Activity, Steady State, μCi/gm	1.0	0.6
Primary Activity, Spiked, μCi/gm	60	12

These administrative limits justify continued operation of PVNGS Units 1 and 3 until the scheduled refueling outages.

In addition, the results presented herein demonstrate that pressurizer power operated relief valves are not required to ensure acceptable dose consequences. The HPSI flows assumed in the analysis are PVNGS specific. Maximum safety injection rates were assumed in order to maximize leak rates, and hence dose.

ENCLOSURE 5

SAFETY ASSESSMENT OF THE OPERATION OF

UNITS 1 AND 3 WITH RESPECT TO THE UNIT 2 SGTR EVENT

Supplemental Information:

FOR MSLB+SGTR CASES AVG. 2 AND 8 HOUR LEAK RATES ARE:

	Average GPM for Intervals	
	2 Hours	8 Hours
MSLB + 1 DEG TUBE	352	--
MSLB + 2 DEG TUBES	635	393
MSLB + 3 DEG TUBES	821	507
MSLB + 4 DEG TUBES	988	--

1 and 4 DEG tube transients were run for 2 hour intervals only to evaluate 2 hour doses.

ENCLOSURE 6

Steam Generator Resin Intrusion

When resin was discovered on Unit 2 steam generators' (SG) can decks, an intensive data review was initiated to determine if there were any indications of when the intrusion(s) occurred. This review was conducted of all three units data and encompassed a time frame from approximately January 1987 through May of this year.

The review revealed no potential instances in Units 1 or 3. However, the review did confirm resin intrusions in Unit 2 on two separate occasions. Both involved condensate demineralizers. The first was revealed by maintenance records that show that the underdrain seal for condensate demineralizer vessel "B" needed repair in July of 1991. The other involved condensate demineralizer vessel "E". Resin intrusion from this event was discovered in January 1992 when sulfate was detected at levels greater than [illegible] ppb. The subsequent inspection at the time found failure of the resin retention screen in vessel "E". Chapter V.A.3 of the Unit 2 Steam Generator Tube Rupture Analysis Report submitted to the NRC on July 18, 1993, describes condensate demineralizer retention element problems discovered during the current Unit 2 outage.

As a consequence of these findings, all three units' SG hideout return data was reviewed for the years 1991 through 1993. Unit Two exhibited the highest average return of sulfate, averaging 84 grams (Unit One - 53 grams, Unit Three - 37 grams). Sulfate residual is consistent with resin intrusion as it is a by-product of cation resin decomposition.

Numerous indications were available to implicate resin intrusion in these two events, some evident and recognized at the time (such as the vessel"E" retention screen failure and others revealed as an "after the fact" review (such as in the case of the vessel"B" retention screen failure). The 1992 vessel"E" failure was evident by the following indications:

a. Elevated sulfate levels in Unit 2 SGs.
b. Decreased sample flow and pressure from vessel"E".
c. Sample line filters for vessel"E" plugged.
d. Sample line filter for condensate demineralizer influent contained resin.

The 1991 vessel"B" failure was evident, after the fact by the following indications:

a. Less gallons throughput using this vessel.
b. Higher effluent conductivity when this vessel was in service.
c. Difficulty achieving acceptable conductivity when performing pre-service rinses (prior to placing vessel in service).

d. Resin beads were discovered on corrosion product sample filters installed at the time on the SG blowdown sample.

Based on these indications there have been no resin intrusions in Unit One or Three.

It should be noted that at the time resin was discovered on corrosion product sample filters, Unit Two was the only unit with the capability as this was a pilot study performed at the unit to characterize and quantify the transport of corrosion products. Since then all units have had on-line corrosion product monitoring installed that continuously monitors SG blowdown, feedwater and condensate demineralizer influent and effluent. While it is not their designed intent, the monitors employ a filter that will reveal resin fines, as well as whole beads, thus providing greater monitoring capability in all units.

Additionally, resin traps are installed immediately downstream of the condensate demineralizer vessels and designed to catch any resin from a retention screen failure. These are equipped with differential pressure gauges that would reveal any catastrophic failure by remote alarm indication in the Control Room. It should be noted, however, that in neither of Unit Two's events was the intrusion apparently of great enough magnitude to initiate such an alarm.

On July 19, 1993, suspected resin fines were discovered in Unit 3's corrosion product sample filters (CRDR #330317). Initial indications implicate a resin charge that may have contained more resin "fines" than normal. Regardless, resin fine intrusion is expected to some degree. EPRI document NP-4521, Resin and Ionics Leakage from Condensate Polishers with and without Inert Resin, April 1986, estimates annual resin leakage range from 38 to 235 pounds. This leakage is primarily in the form of fines. While this is recognized by the industry, Palo Verde is currently developing a program to quantify resin intrusion and, where possible, mitigate it.