



SOUTHERN CALIFORNIA  
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A. Edward Scherer  
Manager of  
Nuclear Regulatory Affairs

July 15, 2005

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

**Subject: San Onofre Nuclear Generating Station Units 2 and 3  
Docket Nos. 50-361 and 50-362  
NRC Bulletin 2003-01  
Response To Second NRC Request For Additional Information**

**Reference:** Letter from A. E. Scherer (SCE) to the Document Control Desk (NRC) dated August 1, 2003; Subject: San Onofre Nuclear Generating Station Units 2 and 3, Docket Nos. 50-361 and 50-362, 60-Day Response to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors"

Dear Sir or Madam:

By the referenced letter, Southern California Edison (SCE) submitted a 60-day response to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors."

The NRC staff has requested additional information regarding our submittal in order for the staff to continue its review of the submittal.

The information request was discussed during a telephone call on May 23, 2005, wherein SCE agreed to provide a written response. Enclosed is the SCE response to the request for additional information.

If you have any questions or require any additional information, please contact Mr. Jack Rainsberry at (949) 368-7420.

Sincerely,

Enclosure

cc: B. S. Mallett, NRC Region IV, Regional Administrator  
B. M. Pham, NRC Project Manager, San Onofre Units 2 and 3  
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 and 3

P.O. Box 128  
San Clemente, CA 92672  
949-368-7501  
Fax 949-368-7575

A103

## **ENCLOSURE**

### **SCE RESPONSE TO SECOND REQUEST FOR ADDITIONAL INFORMATION**

### **SAN ONOFRE NUCLEAR GENERATING STATION (SONGS), UNITS 2 AND 3**

### **SOUTHERN CALIFORNIA EDISON COMPANY**

### **NRC BULLETIN 2003-01**

### **DOCKET NOS. 50-361 AND 50-362**

- 1. Please provide a copy of the LOCA Emergency Operating Procedure to allow assessment of the relocation of Step 12B "Containment Spray Termination Criteria" in relation to where it appears in relation to the initiation of sump recirculation.**

Response to question number 1:

The following Emergency Operating Instructions are attached:

Attachment A: SO23-12-3, Revision 19; Loss of Coolant Accident

Attachment B: SO23-12-11, Revision 3; Floating Step FS-14, TERMINATE Containment Spray Operation (page 36 of 274)

The particular step for addressing CEN-152 LOCA step 12B "Containment Spray Termination Criteria" at SONGS is "FS-14, TERMINATE Containment Spray Operation." As stated in our response dated October 13, 2004 (Reference 3), no action is required to be taken regarding the relocation of step 12B "Containment Spray Termination Criteria".

- 2. What is SONGS position on WOG Candidate Operator Action #4 Terminate 1 LPSI prior to sump recirculation?**

Response to question number 2:

The WCAP-16204 (Reference 2) evaluation of Candidate Operator Action 4, "Secure One (out of 2) LPSI Pump Before Transfer To Recirculation," resulted in the following recommendation (Appendix A): Preliminary indications show stopping one LPSI pump before recirculation may result in core damage and therefore is not risk beneficial.

SONGS has reviewed our plant specific design features and concurs with the generic WOG recommendation.

## **REFERENCES**

1. Letter from A. E. Scherer (SCE) to the Document Control Desk (NRC) dated August 1, 2003; Subject: San Onofre Nuclear Generating Station Units 2 and 3, Docket Nos. 50-361 and 50-362, 60-Day Response to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors"
2. WCAP-16204, Revision 1; "Evaluation of Potential ERG and EPG Changes to Address NRC Bulletin 2003-1 Recommendations (PA-SEE-0085);" March 2004
3. Letter from A. E. Scherer (SCE) to the Document Control Desk (NRC) dated October 13, 2004; Subject: San Onofre Nuclear Generating Station Units 2 and 3, Docket Nos. 50-361 and 50-362, NRC Bulletin 2003-01, Response to NRC Request for Additional Information

**ATTACHMENT A**  
**SO23-12-3, REVISION 19**  
**LOSS OF COOLANT ACCIDENT**

LOSS OF COOLANT ACCIDENT

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## LOSS OF COOLANT ACCIDENT

### PURPOSE

To specify actions required to mitigate the effects of a LOCA to isolate the primary system break  
OR establish long term core cooling.

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### ENTRY CONDITIONS

- 1 The SRO Operations Supervisor has diagnosed LOCA with the aid of:
    - a. *SO23-12-1, STANDARD POST TRIP ACTIONS*, Attachment 1, RECOVERY DIAGNOSTIC.OR
    - b. Break Identification Chart from another optimal Emergency Operating Instruction.AND
    - c. *SO23-12-1, STANDARD POST TRIP ACTIONS*, steps 1 through 10 have been completed (Modes 1 and 2)OR
  - 2 The event initiated from a lower Mode when Shutdown Cooling is **NOT** initially in service.
- 

### EXIT CONDITIONS

- 1 The diagnosis of LOCA is **NOT** confirmed.
- OR
- 2 **ANY** of the Safety Function Status Check acceptance criteria are **NOT** satisfied.
- OR
- 3 This procedure has accomplished **ALL** of the following:
    - ALL of the Safety Function Status Check acceptance criteria are being satisfied.
    - Shutdown Cooling entry conditions are metOR  
RCS break is isolated.
- OR
- 
- RCS is in long term core cooling
- The Shift Manager/Operations Leader has designated an alternate procedure.

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

**1 RECORD EOI entry time:**

- a. RECORD time of EOI entry \_\_\_\_\_.

**2 VERIFY LOCA Diagnosis:**

- a. INITIATE *SO23-12-10, SAFETY  
FUNCTION STATUS CHECKS.*

- b. INITIATE FOLDOUT PAGE.

- c. VERIFY LOCA diagnosis, using Figure 1,  
BREAK IDENTIFICATION CHART.

- c. 1) RE-EVALUATE event per *SO23-12-1,  
STANDARD POST TRIP ACTIONS,*  
Attachment 1, RECOVERY DIAGNOSTIC

- 2) IF re-evaluation identifies another event,  
NOT Loss of Coolant Accident,  
  
THEN GO TO identified EOI.

- 3) IF re-evaluation identifies:

- a) Loss of Coolant Accident

OR

- b) More than one event,

THEN GO TO *SO23-12-9, FUNCTIONAL  
RECOVERY.*

- d. INITIATE sampling of both Steam  
Generators for radioactivity and boron.

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### **3 INITIATE Administrative Actions:**

- a. NOTIFY Shift Manager/Operations  
Leader of *SO23-12-3, LOSS OF  
COOLANT ACCIDENT*, initiation.
- b. ENSURE Emergency Plan is initiated.
- c. IMPLEMENT PLACEKEEPER.

#### **4 VERIFY ESF Actuation:**

- a. VERIFY SIAS actuation required:
  - 1) PZR pressure
    - less than SIAS Setpoint
  - OR
  - 2) Containment pressure
    - greater than 3.4 PSIG.
- a. GO TO step 7.
- b. ENSURE the following – actuated:
  - SIAS
  - CCAS
  - CRIS.
- c. RECORD time of SIAS \_\_\_\_\_.
- d. STOP unloaded Diesel Generators.
- e. INITIATE SO23-12-11, Attachment 22,  
NON-QUALIFIED LOAD RESTORATION.



## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### 5 ESTABLISH Optimum SI Alignment:

a. ESTABLISH two train operation:

- 1) All available Charging Pumps  
– operating.
- 2) One HPSI and one LPSI per train  
– operating.
- 3) All Cold Leg flow paths – aligned.
- 4) VERIFY SI flow required:

SI flow – indicated

OR

RCS pressure  
– greater than 1250 PSIA.

OR

b. VERIFY FS-7, VERIFY SI Throttle/Stop  
Criteria – satisfied.

#### 6 VERIFY PZR pressure:

- a. VERIFY RCP NPSH requirements of  
SO23-12-11, Attachment 29,  
POST-ACCIDENT PRESSURE /  
TEMPERATURE LIMITS  
– satisfied.

- a. REQUEST Shift Manager/Operations Leader  
to direct plant resources to establish the  
following support systems for non-operating/  
unavailable equipment:

- 1) Electrical power to pumps and valves.
- 2) Proper system alignment.
- 3) CCW flow.
- 4) HVAC.

- a. STOP all RCPs.

AND

INITIATE FS-3, MONITOR Natural Circulation  
Established

#### 7 IMPLEMENT Floating Steps:

- a. INITIATE applicable actions of  
SO23-12-11, Attachment 2, FLOATING  
STEPS.

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### 8 INITIATE Leak Isolation:

a. VERIFY Letdown – isolated.

a. EVALUATE need for Letdown isolation.

b. VERIFY:

b. ENSURE SIAS – actuated

1) Outside Containment Radiation alarms

AND

– NOT alarming or trending to alarm.

REQUEST Shift Manager/Operations Leader:

2) Outside Containment Sump levels  
– NOT abnormally rising.

1) EVALUATE possible LOCA outside Containment

2) INITIATE FS-20, MONITOR RWST Level

3) EVALUATE CIAS actuation.

c. ENSURE all RCS Sample valves  
– closed.

d. ENSURE PZR and Reactor Vessel Head Vents – closed.

e. VERIFY:

e. 1) ENSURE all RCPs – stopped.

1) CCW radiation alarm  
– NOT alarming.

2) CLOSE RCP CCW Seal Heat Exchanger Return valves:

2) CCW Surge Tank level  
– NOT rising.

TV-9144

TV-9154

TV-9164

TV-9174.

3) ENSURE CCW NCL Supply and Return Isolation valves – closed.

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### **8 INITIATE Leak Isolation: (Continued)**

f. VERIFY PZR Safety valves – closed.

f. 1) REQUEST Shift Manager/Operations Leader evaluate lowering PZR pressure to aid in resetting the Safety valves.

2) IF SIAS NOT actuated,

THEN MAINTAIN PZR pressure  
– greater than SIAS setpoint.

3) MAINTAIN Core Exit Saturation Margin  
– greater than or equal to 20°F.

#### **9 CONFIRM Leak Isolation:**

a. VERIFY rate of RCS inventory and pressure loss  
– less than available Charging Pump capacity.

a. GO TO step 15.

#### **10 ESTABLISH RCS Inventory and Pressure Control:**

a. INITIATE indicated actions for available control methods of SO23-12-11, Attachment 5, CORE EXIT SATURATION MARGIN CONTROL.

b. VERIFY RCS pressure

b. GO TO step 15.

– stable or rising

AND

– controlled.

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### **11 ESTABLISH RCS Heat Removal Control:**

a. VERIFY SBCS available:

- 1) Condenser Backpressure  
– less than SBCS Interlock Setpoint.

AND

- 2) MSIVs – open.

b. VERIFY MFW available:

- 1) MAINTAIN S/G levels  
– between 40% NR and 80% NR.

a. OVERRIDE (as required) and OPERATE ADVs.

b. OPERATE AFW to establish at least one S/G level – between 40% NR and 80% NR.

#### **12 ESTABLISH Optimal Containment Atmosphere Conditions:**

a. INITIATE FS-12, MONITOR Containment Pressure.

b. INITIATE FS-14, TERMINATE Containment Spray Operation.

c. VERIFY Containment Area Radiation Monitors  
– NOT alarming or trending to alarm.

c. 1) ENSURE SIAS – actuated.

2) REQUEST Shift Manager/Operations Leader to evaluate CIAS Actuation.

3) GO TO step 15.

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### 13 VERIFY Impacted Safety Function status:

- a. VERIFY RCS Inventory Control:                      o GO TO step 15.

- 1) PZR level
  - between 10% and 70%.
- 2) Charging and Letdown or SI available to maintain PZR level.
- 3) Core Exit Saturation Margin
  - greater than or equal to 20°F:

QSPDS page 611  
CFMS page 311.

- 4) Reactor Vessel level
  - greater than or equal to 100% (Plenum):

QSPDS page 622  
CFMS page 312  
SO23-12-11, Attachment 4.

- b. VERIFY RCS Pressure Control:

- 1) Core Exit Saturation Margin
  - between 20°F and 160°F:

QSPDS page 611  
CFMS page 311.

- c. VERIFY Containment Isolation:

- 1) Containment pressure
  - less than 3.4 PSIG

OR

- 2) CIAS
  - actuated automatically or manually.

LOSS OF COOLANT ACCIDENT

**OPERATOR ACTIONS**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

**13 VERIFY Impacted Safety Function status:**  
(Continued)

d. VERIFY Containment Pressure and  
Temperature Control:

- 1) Containment average temperature  
– less than 205°F.
- 2) Containment pressure  
– less than 14 PSIG.
- 3) All containment spray flow  
– stopped.

- o GO TO step 15.

**14 VERIFY desired plant status:**

- a. OBTAIN approval from Shift Manager/  
Operations Leader to maintain  
Hot Standby conditions.

- a. *GO TO SO23-5-1.5, PLANT SHUTDOWN  
FROM HOT STANDBY TO COLD  
SHUTDOWN.*

- b. *GO TO SO23-5-1.3.1, PLANT STARTUP  
FROM HOT STANDBY TO MINIMUM  
LOAD.*

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### 15 INITIATE RCS Cooldown:

##### NOTE

Cooldown should be initiated as soon as possible to aid in:

- 1) Maintaining adequate subcooled margin reducing the potential for fuel clad failure and radioactive release to the environment,
- 2) Conserving condensate inventory, and
- 3) Providing plant conditions to support repair work for restoring optimal safety function success paths.

- a. REQUEST the Shift Manager/Operations Leader evaluate/approve further RCS cooldown/pressure reduction.
- b. INITIATE SO23-12-11, Attachment 3, COOLDOWN / DEPRESSURIZATION, as directed by the Shift Manager/Operations Leader.

#### 16 INITIATE S/G Blowdown:

##### NOTE

The inventory requirements of Condensate Storage Tanks T-120 and T-121 DO NOT take S/G blowdown into account.

- |   |  |
|---|--|
| <ol style="list-style-type: none"><li>a. VERIFY one or more Demineralized Water Storage Tank(s) – available:<br/><br/>T-266<br/>T-267<br/>T-268.</li><li>b. ESTABLISH S/G blowdown as required for Chemistry Control.</li></ol> | <ol style="list-style-type: none"><li>a. 1) ENSURE S/G blowdown – isolated.<br/><br/>2) INITIATE SO23-12-11, Attachment 16, DETERMINE TIME UNTIL SHUTDOWN COOLING REQUIRED.<br/><br/>3) GO TO step 17.</li></ol> |
|---|--|

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### 17 ESTABLISH Containment Combustible Gas Control:

- a. ENSURE at least one Containment Dome Air Circulating Fan – operating.
- b. INITIATE Hydrogen Monitor post accident calibration per SO23-3-2.28, *CONTAINMENT COMBUSTIBLE GAS CONTROL SYSTEM* section on Post Accident Hydrogen Monitoring.

#### 18 VERIFY Containment Radiation Levels:

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>a. VERIFY Containment High Range Area Radiation Monitor readings<br/>– less than 40 R/HR.</li></ul> | <ul style="list-style-type: none"><li>a. 1) ENSURE SIAS – actuated.</li><li>2) REQUEST Shift Manager/Operations Leader to evaluate:<ul style="list-style-type: none"><li>a) CIAS actuation</li><li>b) CSAS actuation for iodine removal.</li></ul></li></ul> |
|---|--|

#### 19 VERIFY Hot/Cold Leg Injection Conditions:

#### **CAUTION**

IF Simultaneous Hot/Cold Leg Injection is required, THEN Simultaneous Hot/Cold Leg Injection must be initiated within 2 to 4 hours from SIAS actuation.

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>a. VERIFY SDC Operation<br/>– expected within 4 hours from SIAS actuation.</li></ul> | <ul style="list-style-type: none"><li>a. INITIATE SO23-12-11, Attachment 11, SIMULTANEOUS HOT / COLD LEG INJECTION.</li></ul> |
|--|---|



## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### 20 ESTABLISH SDC Entry Conditions:

- a. VERIFY Reactor Vessel level  
– greater than or equal to 82% (Plenum):

QSPDS page 622  
CFMS page 312  
SO23-12-11, Attachment 4.

- b. ESTABLISH RCS  $T_H$  – less than 375°F.

- c. STABILIZE lowest RCS  $T_c$   
– greater than 260°F.

- d. GO TO step f.

- e. ESTABLISH REP CET  
– less than 375°F

- f. ESTABLISH PZR pressure  
– less than 340 PSIA (LR).

- g. VERIFY Containment pressure  
– less than 3 PSIG.

- a. GO TO step e.

- b. IF only one ADV – available,  
THEN

ESTABLISH RCS  $T_H$   
– less than 385°F based on the average of  
at least two indications.

- c. REQUEST Shift Manager/Operations Leader  
to evaluate placing LTOP in service.

- e. IF only one ADV – available,  
THEN

ESTABLISH REP CET – less than 385°F.

- g. 1) CALCULATE Required PZR pressure:

$$\begin{array}{rcl} \text{SDC entry} & & 340 \text{ PSIA} \\ \text{Containment Pressure} & - & \text{PSIG} \\ \hline \text{Required PZR Pressure} & = & \text{PSIA} \end{array}$$

- 2) ESTABLISH PZR pressure (LR)  
– less than Required PZR pressure.

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### 21 RESET ESFAS:

- a. VERIFY MSIS – NOT actuated.
- b. VERIFY any EFAS – actuated.
- c. ENSURE S/G levels  
– greater than 26% NR.
- d. RESET EFAS per SO23-3-2.22, ESFAS  
OPERATION.
- e. ENSURE feedwater flow to available  
S/G(s).
- f. ENSURE DC powered AFW to S/G  
Isolation valves NOT required to maintain  
S/G levels – closed:  

E-088      E-089  
HV-4730    HV-4715.
- g. OPERATE AFW or MFW to maintain S/G  
levels – between 40% NR and 80% NR.
- h. INITIATE SO23-3-2.22, ESFAS  
OPERATION, to reset signals and realign  
plant systems.

- a. RESET MSIS per SO23-3-2.22, ESFAS  
OPERATION.
- b. GO TO step g.

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### 22 VERIFY SDC Entry Conditions:

#### NOTE

During a Natural Circulation Cooldown, voiding in the Reactor Vessel Head is expected to occur when depressurizing to go on SDC. The strategy is to collapse the void when plenum level is less than 100% and RAS is NOT in service.

a. VERIFY RAS – NOT actuated.

a. 1) IF Reactor Vessel level  
– greater than or equal to 61% (Plenum):

QSPDS page 622  
CFMS page 312  
SO23-12-11, Attachment 4.

THEN GO TO step 22e.

OR

2) IF Reactor Vessel level  
– less than 61% (Plenum):

QSPDS page 622  
CFMS page 312

THEN

REQUEST Shift Manager/Operations  
Leader evaluate for alternate procedure.

AND

GO TO step 20.

b. VERIFY Reactor Vessel level  
– greater than or equal to 100%  
(Plenum):

QSPDS page 622  
CFMS page 312  
SO23-12-11, Attachment 4.

b. 1) INITIATE FS-10, ELIMINATE Voids.  
2) REQUEST Shift Manager/Operations  
Leader evaluate for alternate procedure.  
3) GO TO step 20.

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### 22 VERIFY SDC Entry Conditions: (Continued)

c. VERIFY RCS  $T_H$  – less than 375°F.

c. IF one ADV – available

THEN

ESTABLISH RCS  $T_H$

– less than 385°F based on the average of  
at least two indications.

d. GO TO step f.

e. VERIFY REP CET  
– less than 375°F

e. IF only one ADV – available,

THEN

VERIFY REP CET – less than 385°F.

f. VERIFY Containment pressure  
– less than 3 PSIG.

f. CALCULATE Required PZR pressure for  
SDC entry:

$$\begin{array}{rcl} \text{SDC entry} & = & 340 \text{ PSIA} \\ \text{Containment Pressure} & - & \text{PSIG} \\ \hline \text{Required PZR Pressure} & = & \text{PSIA} \end{array}$$

## LOSS OF COOLANT ACCIDENT

### OPERATOR ACTIONS

#### ACTION/EXPECTED RESPONSE

#### RESPONSE NOT OBTAINED

#### 22 VERIFY SDC Entry Conditions: (Continued)

g. VERIFY:

- 1) PZR pressure
  - less than 340 PSIA (low range).

OR

- less than Required PZR pressure from 22f. RNO.

- 2) Core Exit Saturation Margin
  - greater than or equal to 20°F:

QSPDS page 611

CFMS page 311.

- 3) Shift Manager/Operations Leader evaluated RCS activity
  - within appropriate limits.

- 4) SO23-12-11, Attachment 3, COOLDOWN/DEPRESSURIZATION steps – complete.

- g. 1) REQUEST Shift Manager/Operations Leader evaluate for alternate procedure.

- 2) GO TO step 20.

#### 23 INITIATE SDC OPERATION:

- a. ENSURE Hot Leg Injection valves
  - closed:

HV-9420

HV-9434.

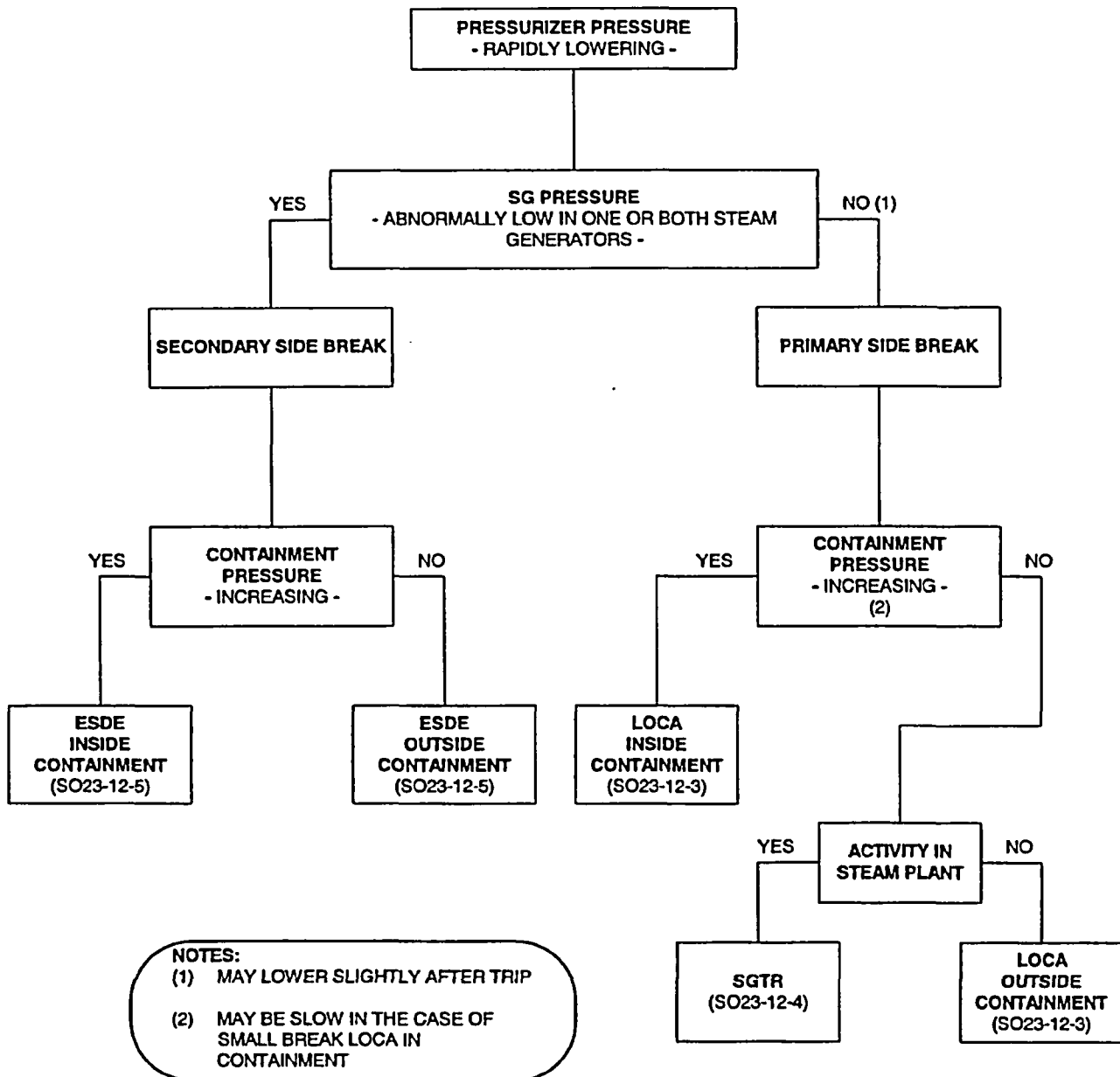
- b. INITIATE *SO23-3-2.22, ESFAS OPERATION* to reset signals and realign plant systems as desired.

- c. GO TO *SO23-5-1.5, PLANT SHUTDOWN FROM HOT STANDBY TO COLD SHUTDOWN*, section on Establish SDC System Operation.

– END –

## LOSS OF COOLANT ACCIDENT

Figure 1, BREAK IDENTIFICATION CHART



## LOSS OF COOLANT ACCIDENT

**FOLDOUT PAGE****1. SI Throttle/Stop Criteria**

INITIATE FS-7, VERIFY SI Throttle/Stop Criteria.

**2. MONITOR RCP Status**

- a) IF PZR pressure is less than 1430 PSIA, THEN ENSURE one RCP in each loop stopped.
- b) IF PZR pressure is less than RCP NPSH requirements of SO23-12-11, Attachment 29, POST-ACCIDENT PRESSURE / TEMPERATURE LIMITS, THEN ENSURE all RCPs are stopped.
- c) IF all RCPs are stopped, THEN INITIATE FS-3, MONITOR Natural Circulation Established.

**3. Monitor Electrical Power**

- a) IF at least one 220kV switchyard section is **NOT** energized to the Unit via Reserve Auxiliary or Unit Auxiliary transformers, THEN INITIATE SO23-12-11, Attachment 8, RESTORATION OF OFFSITE POWER.
- b) IF any Non-1E Instrument Bus has become de-energized as evidenced by 2/3 B10 (Unit 2) or 3B09 (Unit 3) de-energized, THEN SELECT 2(3)VS612, 2(3)QO612 Instrument Bus #2 Transfer Switch, to EMERGENCY.
- c) IF there is a loss of offsite power, THEN INITIATE SO23-12-11, Attachment 19, NON-1E DC LOAD REDUCTION.
- d) IF 4kV bus A04 or A06 remain de-energized, THEN INITIATE SO23-12-11, Attachment 20, CLASS 1E BATTERY LOAD REDUCTION.

**4. Restore Non-Qualified Loads**

IF SIAS has initiated,  
THEN INITIATE SO23-12-11, Attachment 22, NON-QUALIFIED LOAD RESTORATION.

**5. Establish Secondary Plant Protection**

IF Non-1E 4kV bus A03 and A07 are de-energized,  
THEN INITIATE FS-18, ESTABLISH Secondary Plant Protection

## LOSS OF COOLANT ACCIDENT

### TIME DEPENDENT STEPS

UNIT \_\_\_\_\_ DATE \_\_\_\_\_

Time of entry into LOCA \_\_\_\_\_  
Time of SIAS initiation \_\_\_\_\_  
Time of LOOP \_\_\_\_\_

<u>TIME DEPENDENT STEPS</u>		<u>STEP INITIATED</u>	<u>STEP COMPLETED</u>
FS-23	<b>45 minutes from Loss of Offsite Power.</b> ..... D5 loads need to be reduced within 45 minutes. D6 loads need to be reduced as soon as possible if loss of power is expected to extend past 90 minutes. D7 load is reduced after the Main Generator shaft has come to rest if loss of power is expected to extend past 120 minutes.	<input type="checkbox"/>	<input type="checkbox"/>
FS-24	<b>1½ to 2 hours from SIAS initiation.</b> ..... Transfer Charging Pump suction.	<input type="checkbox"/>	<input type="checkbox"/>
FS-25	<b>2 to 4 hours from SIAS initiation.</b> ..... Hot/Cold Leg Injection Conditions.	<input type="checkbox"/>	<input type="checkbox"/>
FS-27	<b>8 hours from SIAS initiation.</b> ..... Dose analysis of Control Room.	<input type="checkbox"/>	<input type="checkbox"/>



LOSS OF COOLANT ACCIDENT

PLACEKEEPER

<u>STEP</u>		<u>REFERENCE PAGE</u>
1	<b>Time of EOI entry is recorded .....</b>	Page 3
2	<b>LOCA Diagnosis confirmed .....</b> [ ] SO23-12-10, SFSC initiated [ ] FOLDOUT PAGE initiated [ ] Figure 1, BREAK IDENTIFICATION CHART verified [ ] S/G sampling for radioactivity initiated	Page 3
3	<b>Administrative Actions Initiated .....</b> [ ] SM/OL notified of LOCA [ ] Emergency Plan initiated	Page 4
4	<b>ESF Actuation verified .....</b> [ ] SIAS actuation criteria verified [ ] SIAS, CCAS and CRIS actuated as needed [ ] Stop unloaded Diesel Generators. [ ] SO23-12-11, Attachment 22, NON-QUALIFIED LOAD RESTORATION initiated	Page 4
5	<b>Optimum SI Alignment established .....</b> [ ] All available Charging Pumps operating, [ ] One HPSI and one LPSI per train operating, [ ] All Cold Leg flow paths aligned [ ] One of the following: [ ] SI flow OR [ ] RCS pressure greater than 1250 PSIA OR [ ] SI Throttle/Stop criteria verified per FS-7, VERIFY SI Throttle/Stop Criteria.	Page 5
6	<b>Pressurizer Pressure verified .....</b> [ ] VERIFY RCP NPSH per SO23-12-11, Attachment 29, POST-ACCIDENT PRESSURE / TEMPERATURE LIMITS met OR [ ] ALL RCPs are stopped.	Page 5
7	<b>Floating Steps .....</b> [ ] SO23-12-11, Attachment 2, FLOATING STEPS initiated	Page 5

## LOSS OF COOLANT ACCIDENT

### PLACEKEEPER

<u>STEP</u>		<u>REFERENCE PAGE</u>
8	<b>Leak Isolation initiated</b> .....	Page 6
	<input type="checkbox"/> Letdown isolated	
	<input type="checkbox"/> Outside Containment radiation monitors and sumps	
	<input type="checkbox"/> All RCS Sample valves closed	
	<input type="checkbox"/> PZR and Reactor Vessel Head Vents closed	
	<input type="checkbox"/> CCW radiation monitors and surge tank level	
	<input type="checkbox"/> PZR Safety valves closed	
9	<b>Leak Isolation confirmed (1)</b> .....	Page 7
	<input type="checkbox"/> Leakage less than available Charging Pump capacity	
10	<b>RCS Inventory and Pressure Control established (1)</b> .....	Page 7
	<input type="checkbox"/> SO23-12-11, Attachment 5, CORE EXIT SATURATION MARGIN CONTROL initiated	
	<input type="checkbox"/> RCS pressure (stable or rising) and (controlled)	
11	<b>RCS Heat Removal Control established</b> .....	Page 8
	<input type="checkbox"/> SBCS or ADVs available	
	<input type="checkbox"/> MFW or AFW available to maintain S/G level	
12	<b>Optimal Containment Atmosphere established (1)</b> .....	Page 8
	<input type="checkbox"/> FS-12, MONITOR Containment Pressure initiated	
	<input type="checkbox"/> FS-14, TERMINATE Containment Spray Operation initiated	
	<input type="checkbox"/> CONTAINMENT Area and Airborne Radiation Monitors	
13	<b>Impacted Safety Function status verified (1)</b> .....	Page 9
	<input type="checkbox"/> RCS Inventory Control	
	<input type="checkbox"/> RCS Pressure Control	
	<input type="checkbox"/> Containment Isolation	
	<input type="checkbox"/> Containment Pressure and Temperature Control	
14	<b>Desired plant status verified (LOCA condition isolated)</b> .....	Page 10
	<input type="checkbox"/> ESFAS reset initiated (SO23-3-2.22 ESFAS OPERATION)	
	<input type="checkbox"/> SM/OL approval to GO TO (check one):	
	<input type="checkbox"/> SO23-5-1.3.1 PLANT STARTUP FROM HSB TO MIN LOAD	
	<input type="checkbox"/> SO23-5-1.5 PLANT SHUTDOWN FROM HSB TO CSD	
15	<b>RCS Cooldown initiated (LOCA condition not isolated)</b> .....	Page 11
	<input type="checkbox"/> SM/OL approval for RCS cooldown	
	<input type="checkbox"/> SO23-12-11, Attachment 3, COOLDOWN / DEPRESSURIZATION initiated	
16	<b>S/G Blowdown initiated as needed</b> .....	Page 11

1 RNO includes GO TO Step 15. This bypasses subsequent steps up to Step 15.

PLACEKEEPER

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LOSS OF COOLANT ACCIDENT

PLACEKEEPER

<u>STEP</u>		<u>REFERENCE PAGE</u>
17	<b>Containment Combustible Gas Control established .....</b> [ ] At least one Containment Dome Air Circ fan operating [ ] Hydrogen Monitor post accident calibration initiated.	Page 12
18	<b>Containment Radiation Levels verified .....</b> [ ] CONTAINMENT High Range radiation levels less than 40R/HR [ ] SIAS if CONTAINMENT radiation levels greater than 40R/HR [ ] CIAS and CSAS if approved by SM/OL	Page 12
19	<b>Hot/Cold Leg Injection Conditions verified .....</b> [ ] SDC Operation expected within 4 hours from SIAS [ ] SO23-12-11, Attachment 11, SIMULTANEOUS HOT / COLD LEG INJECTION if SDC not expected prior to 4 hours from SIAS	Page 12
20	<b>SDC Entry Conditions established .....</b> [ ] Reactor Vessel level greater than or equal to 82% (Plenum) [ ] Temperature requirements established <input type="checkbox"/> $T_H$ less than 375°F <input type="checkbox"/> Lowest $T_C$ greater than 260°F OR <input type="checkbox"/> REP CET less than 375°F (if plenum level less than 82%) [ ] PZR pressure less than 340 PSIA (low range) [ ] Adjust PZR pressure for Containment pressure	Page 13
21	<b>ESFAS reset .....</b> [ ] MSIS reset (if actuated) [ ] EFAS reset	Page 14

LOSS OF COOLANT ACCIDENT

PLACEKEEPER

<u>STEP</u>		<u>REFERENCE PAGE</u>
22	<b>SDC Entry Conditions verified.....</b> [ ] Reactor Vessel level established <input type="checkbox"/> greater than or equal to 100% (Plenum) OR <input type="checkbox"/> greater than 61% if RAS in service. [ ] Temperature requirements established <input type="checkbox"/> T <sub>H</sub> less than 375°F <input type="checkbox"/> Lowest T <sub>c</sub> greater than 260°F OR <input type="checkbox"/> REP CET less than 375°F (if plenum level less than 82%) [ ] PZR pressure (adjusted for Containment pressure) less than 340 PSIA (LR) [ ] Core Exit Saturation Margin greater or equal to than 20°F [ ] RCS activity within appropriate limits [ ] SO23-12-11, Attachment 3, COOLDOWN / DEPRESSURIZATION complete.	Page 15
23	<b>SDC Operation Initiated.....</b> [ ] Hot Leg Injection valves closed [ ] ESFAS reset initiated ( <i>SO23-3-2.22 ESFAS OPERATION</i> ) [ ] GO TO <i>SO23-5-1.5 PLANT SHUTDOWN FROM HSB TO CSD</i>	Page 17

- END -

**ATTACHMENT B**  
**SO23-12-11, REVISION 3**  
**FLOATING STEP 14**  
**TERMINATE CONTAINMENT SPRAY OPERATION**  
**(PAGE 36 OF 274)**

EOI SUPPORTING ATTACHMENTS

FLOATING STEPS

<u>ACTION/EXPECTED RESPONSE</u>	<u>RESPONSE NOT OBTAINED</u>										
<b>FS-14 TERMINATE Containment Spray Operation</b> Applicability: <input type="checkbox"/> 12-3, <input type="checkbox"/> 12-5, <input type="checkbox"/> 12-9											
a. VERIFY Containment pressure <ul style="list-style-type: none"><li>– less than 14 PSIG</li></ul> AND <ul style="list-style-type: none"><li>– stable or lowering.</li></ul>	a. 1) ENSURE CSAS – actuated.  2) CLOSE CCW to/from Letdown Heat Exchanger valves:  <table><tr><td><u>Train A</u></td><td><u>Train B</u></td></tr><tr><td>HV-6293B/A</td><td>HV-6522B/A</td></tr></table> 3) GO TO next applicable floating step.	<u>Train A</u>	<u>Train B</u>	HV-6293B/A	HV-6522B/A						
<u>Train A</u>	<u>Train B</u>										
HV-6293B/A	HV-6522B/A										
b. VERIFY at least two Containment Emergency Cooling Units – operating.  <table><tr><td><u>Train A</u></td><td><u>Train B</u></td></tr><tr><td>E-399</td><td>E-400</td></tr><tr><td>E-401</td><td>E-402</td></tr></table>	<u>Train A</u>	<u>Train B</u>	E-399	E-400	E-401	E-402	b. 1) ENSURE CSAS – actuated.  2) CLOSE CCW to/from Letdown Heat Exchanger valves:  <table><tr><td><u>Train A</u></td><td><u>Train B</u></td></tr><tr><td>HV-6293B/A</td><td>HV-6522B/A</td></tr></table> 3) GO TO next applicable floating step.	<u>Train A</u>	<u>Train B</u>	HV-6293B/A	HV-6522B/A
<u>Train A</u>	<u>Train B</u>										
E-399	E-400										
E-401	E-402										
<u>Train A</u>	<u>Train B</u>										
HV-6293B/A	HV-6522B/A										
c. REQUEST Shift Manager / Operations Leader to evaluate Containment Spray – NOT required for:  1) Containment Iodine removal.  2) Decay heat removal post-RAS.	c. GO TO next applicable floating step.										
d. OVERRIDE and STOP Containment Spray Pumps, one train at a time.											
e. OVERRIDE and CLOSE Containment Spray Pump Discharge valves, one train at a time:  <table><tr><td><u>Train A</u></td><td><u>Train B</u></td></tr><tr><td>HV-9367</td><td>HV-9368</td></tr></table>	<u>Train A</u>	<u>Train B</u>	HV-9367	HV-9368							
<u>Train A</u>	<u>Train B</u>										
HV-9367	HV-9368										
f. RESET CSAS per SO23-3-2.22, ESFAS OPERATION.											