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Docket Number 50-346

License Number NPF-3

Serial Number 1-1226

October 13, 2000

Mr. H. Peterson
Operator License Examiner – Region III
United States Nuclear Regulatory Commission
801 Warrenville Road
Lisle, IL 60532-4351

Subject: Operator License Post Examination Documentation Submittal

Dear Mr. Peterson:

Enclosed is the post examination documentation for the written operator initial license examination administered at the Davis-Besse Nuclear Power Station (DBNPS) on October 6, 2000. The written examination administered at the DBNPS, revised in accordance with Nuclear Regulatory Commission (NRC) comments, was submitted to the NRC on September 27, 2000 (DBNPS Serial Number 1-1225).

The following examination documentation is being submitted to the NRC for review and approval:

- The Examination Security Agreement
- The master written operator license examination and answer key
- Each candidate's original examination cover sheet, examination and examination answer sheet
- A clean copy of each candidate's answer sheet
- The written examination seating chart
- The Written Examination Grading Quality Checklist

- Documentation of questions asked and answers given to candidates during the written examination

- Documentation of post-examination comments by the candidates

- Post-Examination Analysis

If you require additional information, please contact Mr. David H. Lockwood, Manager – Regulatory Affairs, at (419) 321-8450.

Sincerely yours,

for Guy Campbell 10-13-00

DLM/dlc

Enclosures

cc: S. P. Sands, DB-1 NRC/NRR Project Manager w/o
K. S. Zellers, DB-1 Senior Resident Inspector w/o
USNRC Document Control Desk w/o
Utility Radiological Safety Board w/o

COMMITMENT LIST

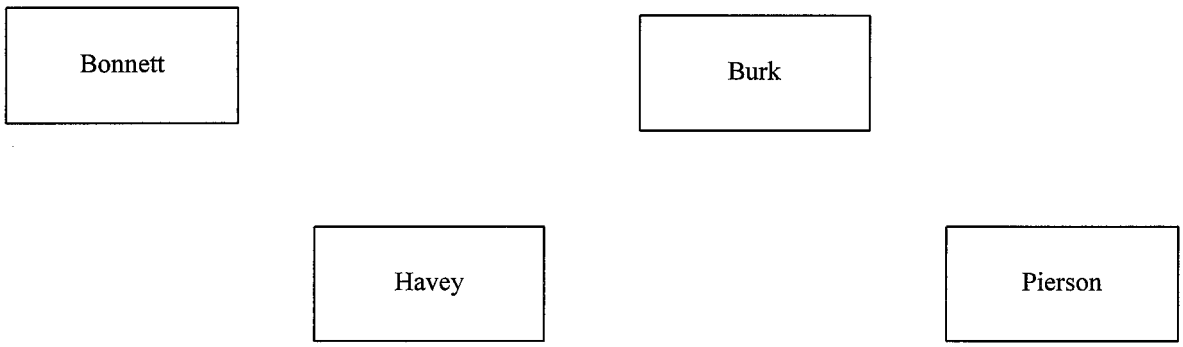
The following list identifies those actions committed to by the Davis-Besse Nuclear Power Station in this document. Any other actions discussed in the submittal represent intended or planned actions by Davis-Besse. They are described only as information and are not regulatory commitments. Please notify the Manager – Regulatory Affairs (419-321-8450) at Davis-Besse of any questions regarding this document or associated regulatory commitments.

COMMITMENTS	DUE DATE
None	N/A

DAVIS-BESSE NUCLEAR POWER STATION
2000 USRO LICENSING EXAM

SEATING CHART

FRONT



DAVIS-BESSE NUCLEAR POWER STATION
2000 USRO LICENSING EXAM

Question and Responses During the USRO Licensing Exam

1. Randy Burk asked if question 8 was stating that the NI was not decreasing and whether the control rods were at 100% at the same time?

   The response was that no more clarification could be provided based on his question.

2. Bill Bonnett asked on question 20 if the Reactor Coolant Pumps were still running?

   The response was that no more clarification could be provided for the question.

3. Randy Burk asked on question 51, what temperature is he to use if only pressure is listed in the choices?

   The response was to use the temperatures listed in the stem.

4. Rich Havey asked on question 20, He did not have the Main Steam Safety valve (MSSV) numbers memorized and was he to assume it was Steam Generator 2.

   The response was he should be able to determine which Steam Generator the MSSV is on from the valve designation.

5. Bill Bonnett pointed out a typo on question 51, choice a. has the word 'let' when it should be the word 'leg.'

6. Randy Burk asked if a loss of CCW to Auxiliary Building meant just CC 1495 closed or a loss of essential and non-essential CCW to the Auxiliary Building.

   The response was that no more clarification could be provided for the question.

7. Bill Bonnett asked if a loss of CCW to Auxiliary Building meant just CC 1495 closed or a loss of essential and non-essential CCW to the Auxiliary Building.

   The response was that no more clarification could be provided for the question.

NRC SRO Exam
10-06-2000

The questions that were missed by two or more of the candidates are listed below. The table also indicates the distracter(s) that were chosen, the objective number, the subject of that lesson plan, a brief summary of the enabling objective, and the references for that question.

Q#	Misses	Comments	Objective	Subject/Enabling Objective	Reference
3	4 of 4 (100%)	All chose "c"	OPS-GOP-116-03k	CRD Malfunctions – Supplementary actions to be performed iaw DB-OP-02516	005-GEN 2.1.07 10CFR55.43 DB-OP-02516.03, C-2
7	2 of 4 (50%)	Both chose "a"	OPS-GOP-304-03k	Lack of Subcooling Margin – how are various pumps affected by lack of subcooling margin	BW/E09-EA1.03 DB-OP-06903.5, C-2 step 7.3 DB-OP-02000.05 C-1 step 11.11.3 10CFR55.41
11	2 of 4 (50%)	Both chose "a"	OPS-GOP-306-06a	Overcooling – evaluate plant conditions to determine cause & summarize actions to be taken for conditions	040-BW/E05-EK2.02 DB-OP-02000.05 C-1 step 7.32 10CFR55.43
20	2 of 4 (50%)	Both chose "a"	OPS-GOP-307-05k	Steam Generator Tube Rupture – reasons for actions performed during a SG tube rupture	069-AK3.01 DB-OP-02000.05 C-1 step 8.14.8 10CFR55.43
22	3 of 4 (100%)	Three chose "a"	OPS-GOP-304-05k	Lack of Subcooling Margin – basis for actions in DB-OP-02000	BW/E03-EA2.01 DB-OP-02000.05 C-1 step 4.5.5 & 5.10
30	3 of 4 (75%)	Two chose "d"	OPS-GOP-206-02k	Plant shutdown and cooldown – arrange equipment into shutdown order as they are taken out of service	BW/E08-GEN-2.4.09 DB-OP-06903.04 C-2 10CFR55.41
31	2 of 4 (50%)	Both chose "b"	OPS-GOP-115-01k	RCP and Motor Abnormal Operation Procedure – recognize entry conditions	015/17-AK2.10 DB-OP-02515.01 C-4 step 4.3.1 10CFR55.41
32	2 of 4 (50%)	Both chose "b"	OPS-GOP-127-02k	Loss of DHR – supplementary actions to be performed iaw DB-OP-02527	025-AA2.02 DB-OP-02527.02 C-1 10CFR55.41
35	3 of 4 (75%)	Three chose "a"	OPS-GOP-131-11k	Steam Generator Tube Leak – explain cause or reason for note in DB-OP-02531	037-AK3.05 DB-OP-02531.02 C-1 10CFR55.41

Q#	Misses	Comments	Objective	System Area/Enabling Objective	Reference
36	2 of 4 (50%)	Both chose "b"	OPS-GOP-307-05k	Steam Generator Tube Rupture – reasons for actions performed during a SG tube rupture	038-EK2.02 DB-OP-02000.05 C-1 10CFR55.41
37	2 of 4 (50%)	One chose "c" One chose "b"	OPS-GOP-305-05k	Lack of Heat Transfer – explain cautions in section 6, lack of heat transfer	054-GEN-2.4.18 DB-OP-02000.05 C-1 10CFR55.41
40	3 of 4 (75%)	Two chose "a"	OPS-GOP-128-08k	Loss of Instrument Air – predict the effects of loss of instrument air	065-AA1.03 DB-OP-02528.03 10CFR55.41
41	3 of 4 (100%)	Three chose "c"	OPS-GOP-113-05k	Pressurizer System Abnormal Operation – status of plant systems during implementation of DB-OP-02513	028-AK2.02 DB-OP-06003.03 Step 2.2.9 10CFR55.41
74	3 of 4 (75%)	Three chose "a"	OPS-SYS-508-04k	Process and Area Rad Monitoring – determine how various systems are affected by high radiation being sensed	055-K4.02 Dwg. 05-015 10CFR55.41
80	2 of 4 (50%)	Both chose "c"	OPS-GOP-431-01k	T.S. Reactivity Control System – parameters that are entry level conditions	005-K5.09 T.S. 3.1.1.2 10CFR55.43
85	2 of 4 (50%)	Both chose "d"	OPS-GOP-439-03k	T.S. Section 3.9 – basis for T.S.	GEN-2.1.12 T.S. 3.9.2 DB-OP-00030.00 C-2 step 6.3
95	4 of 4 (100%)	Three chose "b"	OPS-GOP-521-06k	Radwaste Management – sequence steps in order to perform a gaseous radioactive release	GEN-2.3.08 DB-OP-03012.02 C-5 step 4.6.25 10CFR55.41

No major trends based on the objective numbers or KA numbers were identified. However, the following indicators were identified:

- 6 of the 18 questions (33.33%) missed by at least two of the candidates had a reference of DB-OP-02000.05, C-1. These have been highlighted in bold type for ease of identifying.
- Two questions with identical lesson plan numbers were missed by several of the candidates. The number was OPS-GOP-304 – Lack of Subcooling Margin.
- One set of questions with identical objective numbers was missed by several of the candidates. This objective was:
  OPS-GOP-307-05k – (Steam Generator Tube Rupture) summarize the bases/reasons for each one of the following actions performed during a SG tube rupture:
  - Reactor trip at 100 inches in the PZR
  - Performing rapid shutdown with the SG/Rx demand station
  - Piggyback operation
  - Cooldown with and without RCPs
  - Emergency cooldown at 235F/hour

DAVIS-BESSE NUCLEAR POWER STATION
2000 USRO LICENSING EXAM

Justification for Post Examination Changes

Question 22

The stem of the question fails to state that a loss of off-site power has occurred which is required to qualify choice 'c' as the correct answer. Without assuming a loss of off-site power then, C1 bus is still available which would make the correct answer choice 'b' according to DB-OP-02000. The routing through DB-OP-02000 is to perform section 4 until step 4.11 is reach, which routes to section 5 if a lack of Subcooling Margin exists. In section 5, steps are performed until step 5.15 is reached which routes to section 11, RCS Saturated Steam Generator Removing Heat. Section 11 then directs an RCS cooldown at step 11.11, according to DB-OP-06903, Plant Shutdown and Cooldown. DB-OP-06903 will direct a cooldown at 100°F per hour to Mode 5.The original answer of choice 'c' would only be correct if there was a loss of offsite power. (See attached sections 4, 5 and 11 of DB-OP-02000.)

Question: 22

The following plant conditions exist:

- Reactor is tripped
- Subcooling margin meters indicate 0°F
- EDG1 has tripped on overspeed and cannot be reset.
- D1 bus has experienced a lockout
- SBODG has failed to start

Which one of the following is the correct response to this event?

a. Maintain plant conditions and continue effort to restore C1 bus.

b. Begin a cooldown at < 100°F/hr. to Mode 5.

c. Fully open both Atmospheric Vent Valves.

d. Open the PORV until the Core Flood Tanks start to discharge.

Answer:

c.

DETAILS

4.0 SUPPLEMENTARY ACTIONS

4.1 CHECK FOR CONTROL RODS INSERTED

4.1.1 All Control Rods are inserted when ALL Group 1 through 7 Rods have inserted.

4.1.2 RCS may be borated by either of the following methods. Transferring between the methods may be used to prevent overfilling the MU tank:

a. Lock MU Pump suctions MU 3971 and MU 6405 in the BWST position.

1. Adjust Makeup and Letdown flow as necessary to maintain a minimum of 95 gpm injection flow.

b. Boric acid additions to the MU Tank using DB-OP-06001, Boron Concentration Control.

1. Maintain a minimum of 25 gpm.

If only one rod failed to insert, adequate shutdown margin should exist.

If more than one rod failed to insert, RCS boration is initiated to increase Shutdown Margin. Boration should continue until sufficient boron has been added to establish adequate Shutdown Margin. This boron value is provided in DB-NE-06201, Reactor Operators Curve Book or in Reactor Operating Guidance for Full Power Operation periodically provided by Nuclear Engineering.

Ensure MU 6405 and MU 3971 fully position to the BWST. If the valves are in the midposition, the BWST could be depleted through the MU Tank and MU Tank relief.

DETAILS

4.2 CHECK FOR TURBINE TRIP

4.2.1 The Turbine is tripped when either the Turbine Stop or Control Valves are closed.

Zero percent valve position indicated on EHC Panel 2 for the following valves:

MSV-1	CV-1
MSV-2	CV-2
MSV-3	CV-3
MSV-4	CV-4

Center console mimic green lights LIT also indicate MSVs closed.

4.2.2 HIS 6403, AFP 1 TO SG 1 & ISO SG 1

HIS 6404, AFP 2 TO SG 2 & ISO SG 2

DETAILS

4.3 CHECK FOR NNI POWER AVAILABLE

4.3.1 NNI power is available when NNI power source indicating lights are LIT for all four power sources:

NNI POWER	
Y	X
AC and DC	AC and DC

4.3.2 For loss of NNI X AC or DC:

a. HIS 6403, AFP 1 TO SG 1 & ISO SG 1.

HIS 6404, AFP 2 TO SG 2 & ISO SG 2.

b. PAM panel (except T_C) and NNI Y dependent indicators.

c. With initial switch lineup on NNI X indicators, loss of NNI X AC OR DC will cause loss of the PZR Low Level Heater Interlock. If the power loss is to NNI X AC only, the PZR Interlocks may be regained by transferring PZR Level AND PZR Temperature Selector Switches to NNI Y. PZR level and MU Tank level recorders will not have power. Placing MU 32 in manual should restore pressurizer level control.

d. On a power loss to NNI X DC, manual control of PZR heaters and the PZR Spray Valve will be required. The SCR heaters will not function.

Operation of heaters below an uncompensated level of 60 inches may result in operation with the heaters uncovered.

DETAILS

4.3.3 For loss of NNI Y AC OR DC:

a. PAM panel (except T_c) and NNI X dependent indicators.

b. NNI X powered signals to the ICS for TBV/AVV pressure control HIS SP12B and HIS SP12A should be selected by SASS if available.

4.3.4 If both NNI X and Y are lost, all interlocks associated with the MU Pump suction valves will not function. The Makeup Pump suction valves are locked on the BWST to prevent inadvertent loss of Makeup Pump suction.

With MU Pump suctions locked on the BWST, Makeup Tank level and pressure will rise. When the Makeup Tank relief lifts, a flowpath to the Clean Waste Receiver Tank will exist. DB-OP-02512, Loss of RCS Makeup, provides a method to transfer Makeup Pump minimum recirc flow to the BWST.

Ensure MU 6405 and MU 3971 fully position to the BWST. If the valves are in mid position, the BWST could be depleted through the MU Tank and MU Tank relief.

DETAILS

4.4 CHECK FOR ICS POWER AVAILABLE

4.4.1 ICS power is NOT available when one or more of the following conditions exist:

- Annunciator ICS 24 VDC BUS TRIP (14-1-C) is lit

  OR

- Annunciator ICS/NNI 118 VAC PWR TRBL (14-2-D), is lit and NNI AC power indicating lights remain ON.

  OR

- ICS H/A station indicating lights are off.

4.4.2 When ICS power is lost, both MFW Block Valves receive a close signal.

HIS 6403, AFP 1 TO SG1 & ISO SG1

HIS 6404, AFP 2 TO SG2 & ISO SG2

DETAILS

4.5 CHECK FOR C1 AND D1 BUSES ENERGIZED WITH NO EDGs RUNNING

4.5.1 C1 and D1 are energized when C1 and D1 buses have voltage.

4.5.2 CCW and SW Auto Start sequence:

- Previously running CCW Pump will restart when bus is reenergized.
- Standby CCW Pump starts about 40 seconds after EDG Output Breaker closes.
- SW Pump(s) start about 40 seconds after EDG Output Breaker(s) closes.
- SFAS sequencer will control pump start on an SFAS with a loss of offsite power.

4.5.3 If EDG Output Breaker will NOT close due to a Bus C1 (D1) lockout, overheating damage will occur to the engine if left running without cooling water. If the EDG is running in response to an undervoltage condition, the Control Room EDG stop pushbutton is bypassed. The local emergency shutdown pushbutton on C3621 or C3622 must be used.

DETAILS

4.5.4 (Continued)

2. The CCW Pump should start immediately if previously running or an SFAS signal is present, otherwise 40 seconds after the EDG output breaker closes.

3. The SW Pump should start 40 seconds after the EDG output breaker closes or as sequenced by the SFAS sequencer.

DETAILS

4.5.5 A description of each symptom is provided in the Supplemental Actions Steps 4.11, 4.12, 4.13, and 4.14. The intent is to monitor for symptoms while continuing efforts to re-energize C1 or D1 Bus.

It is recognized that without AC power, it will not be possible to complete all specified actions in these sections. The goals should be to:

a. Provide core cooling

b. Minimize dose to the public

c. Preserve RCS inventory.

DETAILS

4.6 CHECK FOR INSTRUMENT AIR AVAILABLE

4.6.1 Instrument Air is available when:

Instrument Air Header pressure is >75 psig as indicated in the CTRM on PI 810.

AND

An Air Compressor is running.

On a loss of power to E3, the SAC 1 indicating light may indicate the compressor is running, however without power the compressor will not be running.

4.6.2 If no Air Compressor is running, loss of Instrument Air has occurred and SFRCS is actuated to provide SG heat transfer control without use of air operated valves and to isolate air operated valves that could upset the heat transfer process.

HIS 6403, AFP 1 TO SG1 & ISO SG1

HIS 6404, AFP 2 TO SG2 & ISO SG2

4.6.3 The standby CCW Pump is started to ensure cooling is available to the running MU Pump in the event CC 1460 closes due to a loss of Instrument Air.

DETAILS

4.7 CHECK FOR SECONDARY SYSTEMS RESPONSE AS FOLLOWS:

4.7.1 Condensate System flow is reduced to prevent Deaerator high level trip. Maximum flow for one Condensate Pump is approximately 3.5 MPPH.

4.7.2 SFRCS isolation is caused by any SFRCS trip action except SG low level or loss of all RCPs.

4.7.3 RFR control is normal when:

- Both MFW Control Valves close.
- Both SUFW Control Valves automatically go to a target demand (10-20 percent).
- MFPTs are at target speed (4600 rpm).

Low Level Limit control is normal when:

- Both SG levels are being controlled at approximately 40 inches

a. With two Main Feedpumps in service, it is preferred that MFP 1 be reduced to minimum speed to balance steam loads. However, if a SG Tube rupture exists, with two MFPTs in operation, the MFPT on the side of the tube rupture should be reduced to minimum speed.

4.7.4 HIS 6403, AFP 1 TO SG 1 & ISO SG 1

HIS 6404, AFP 2 TO SG 2 & ISO SG 2

DETAILS

4.8 CHECK FOR MAKEUP SYSTEM OPERATION AS FOLLOWS:

4.8.1 Isolate Letdown by closing MU 2B, LETDOWN ISO Valve. If MU 2B cannot be closed, close MU 3, LETDOWN CLRS OUTLET.

It is not necessary to wait until 40 inches to isolate Letdown if in the judgment of the operator, based on plant conditions, Pressurizer level will decrease below 40 inches.

Any heaters that are manually ON will not respond to the Pressurizer low level heater interlock. If Pressurizer level goes below 40 inches verify all Pressurizer Heaters are OFF.

4.8.3 Makeup Flow

a. MU Pump suctions are transferred to the BWST using HIS 3971 and HIS 6405 to ensure NPSH. Ensure MU 6405 and MU 3971 fully position to the BWST. If the valves are in the midposition, the BWST could be depleted through the MU Tank and MU Tank relief. OFF is pressed to allow the high MU Tank level interlock to function.

Normal post trip MU flow is through a single injection line. If PZR level drops to 10 inches, and both MU Pumps are running with suction locked on the BWST, additional MU flow may be injected using the alternate injection line, MU 6421 and MU 6419, to recover PZR level.

When using both injection lines, limit MU flow to less than 250 gpm per line except when LPI is piggybacked from the BWST.

If necessary, MU 32 H/A Station may be placed in HAND, and flow raised manually.

If MU 32 fails, isolate MU 32 using MU 6422 and control flow using alternate injection line, MU 6421 and MU 6419.

DETAILS

4.8.4 Actions If No MU Pump Is Running

a. MU 19 will be inoperable on loss of NNI X AC or DC, or when Instrument Air pressure is less than 20 PSIG. MU 19 air supply source is the Penetration Room Air Header, which does NOT have a low pressure cut-off valve.

b. MU Pump suctions are transferred to the BWST using HIS 3971 and HIS 6405 to ensure NPSH. Ensure MU 6405 and MU 3971 fully position to the BWST. If the valves are in the midposition, the BWST could be depleted through the MU Tank and MU Tank relief. OFF is pressed to allow the high MU Tank Level Interlock to function.

(Continued)

DETAILS

4.8.4 (Continued)

h. Normal post trip MU flow is through a single injection line. Thermal cycles should be limited on the alternate injection line. IF PZR level drops to 10 inches AND BOTH MU Pumps are running with suction from the BWST, additional MU flow may be injected using the alternate injection line, MU 6421 and MU 6419, to recover PZR level.

When using BOTH injection lines limit MU flow to less than 250 gpm per line except when LPI is piggybacked from the BWST.

If necessary, MU 32 H/A Station may be placed in HAND, and flow raised manually.

If MU 32 fails, isolate MU 32 using MU 6422 and control flow using alternate injection line by opening MU 6421 and throttling MU 6419.

4.8.6 Control RCS pressure using PZR heaters and spray.

DETAILS

4.9 CHECK FOR SFAS ACTUATION

SFAS is actuated when at least one of the following annunciator alarms is LIT AND indications of a full SFAS trip of Actuation Channel 1 OR 2, OR BOTH Actuation Channels on any Incident Level(s) except SFAS CTMT RAD CH TRIP of Incident Level 1 confirm an SFAS actuation:

- SFAS CTMT PRES > 18.4 PSIA CH TRIP (5-1-B)
- SFAS RC PRESS < 1650 PSIG CH TRIP (5-1-C)
- SFAS RC PRESS < 450 PSIG CH TRIP (5-1-D)
- SFAS CTMT PRES > 38.4 PSIA CH TRIP (5-2-B)

4.9.3 SFAS RC PRESS < 1650 PSIG CH TRIP (5-1-C)

a. Adequate SCM exists when both TSAT meters indicate 20°F or greater.

If neither TSAT meter is available, then adequate SCM is verified by ensuring RCS temperature and pressure are above and to the left of the SCM line of the P/T display (or manual plot).

T_H is the normal input to the TSAT meters. T_H RTDs are more accurate than individual incore thermocouples, provided there is flow past the sensor.

If SCM is adequate, and either natural circ or forced RCS flow is present, then T_H shall be used to monitor SCM. Otherwise incore thermocouples shall be used.

b. SFAS response should be verified using Table 2, SFAS Activated Equipment.

(Continued)

DETAILS

4.9.3 (Continued)

f. Refer to the SAD to assist in getting the HPI system operating.

4.9.4 SFAS RC PRESS < 450 PSIG CH TRIP (5-1-D)

b. SFAS response should be verified using Table 2, SFAS Activated Equipment.

c. This is a large LOCA. Seal Injection and Seal Return are isolated by SFAS. MU Pumps are not needed and should be stopped.

d. Refer to the SAD to assist in getting the LPI system operating.

e. LPI flow is an indication of a large LOCA. Section 10 provides instructions for long term core cooling following a large LOCA.

4.9.5 SFAS CTMT PRESS > 18.4 PSIA CH TRIP (5-1-B)

a. SFAS response should be verified using Table 2, SFAS Activated Equipment.

4.9.6 SFAS CTMT PRESS > 38.4 PSIA CH TRIP (5-2-B)

a. SFAS response should be verified using Table 2, SFAS Activated Equipment.

DETAILS

4.10 CHECK FOR SFRCS ACTUATION

4.10.1 SFRCS actuation is indicated by the following annunciators being LIT:

- (8-6-A) SFRCS ACTUATED
- (12-1-C) SG 1 LO PRESS TRIP
- (12-1-D) SG 2 LO PRESS TRIP
- (12-2-C) CH 1 HI LVL OR HI DP TRIP
- (12-2-D) CH 2 HI LVL OR HI DP TRIP
- (12-3-C) CH 1 LO LVL OR NO RCPS TRIP
- (12-3-D) CH 2 LO LVL OR NO RCPS TRIP

4.10.2 Verify proper actuation using Table 1.

4.10.3 AFW flow may not be present for a SG if that SG has an SFRCS Low Pressure trip.

b. Recirculation is shifted to minimize CST water loss.

3. AF 59 is a locked valve.

DETAILS

4.10.4 The MDFP may be used to supply either or both of the Steam Generators if the AFW system has failed. Both Steam Generators should be fed if possible.

1. Both discharge valves are enabled to allow control of flow to either Steam Generator. The discharge valves fail open when they are not ENABLED.

6. Recirculation is shifted to minimize CST water loss.

c) AF 59 is locked valve.

DETAILS

4.10.6 Attachment 1 includes directions for feeding a dry Steam Generator via the MFW header.

DETAILS

4.11 CHECK FOR ADEQUATE SUBCOOLING MARGIN

4.11.1 Adequate SCM exists when both TSAT meters indicate 20°F or greater.

If neither TSAT meter is available, then adequate SCM is verified by ensuring RCS temperature and pressure are above and to the left of the SCM line of the P/T display (or manual plot).

T_H is the normal input to the TSAT meters. T_H RTDs are more accurate than individual incore thermocouples, provided there is flow past the sensor.

If SCM is adequate, and either natural circ or forced RCS flow is present, then T_H shall be used to monitor SCM. Otherwise incore thermocouples shall be used.

DETAILS

4.12 CHECK FOR LACK OF HEAT TRANSFER

4.12.1 Lack of heat transfer exists when RCS temperature is increasing with SG pressure constant or decreasing.

Lack of heat transfer does NOT exist when a display or plot of RCS temperature and pressure and SG pressure shows the following trends:

Plant is stable or approaching the post trip target box, AND RCS T_c is coupled with SG pressure. Coupling exists when T_c and T_{SAT} SG are about the same value.

DETAILS

4.13 CHECK FOR OVERCOOLING

4.13.1 Overcooling exists when an RCS cooldown causes SG pressure to lower below 960 PSIG, due to either of the following:

- Secondary steam demand exceeds primary heat production

OR

- A secondary side malfunction exists.

Overcooling does NOT exist when a display or plot of RCS temperature and pressure and SG pressure shows the following trends:

- Plant is stable or approaching the post trip target box,

AND

- SG pressure is above 960 PSIG.

If the plant was initially in MODE 3 or 4, then an uncontrolled lowering of SG pressure or RCS temperature due to a secondary malfunction or a condition where secondary steam demand exceeds primary heat production is considered overcooling.

HPI cooling can cause RCS temperature to lower. SG pressure will follow this drop in RCS temperature (reverse heat transfer). This is NOT considered overcooling of the RCS even if SG press drops below 960 PSIG.

DETAILS

4.14 CHECK FOR SG TUBE RUPTURE

4.14.1 MS line radiation monitors will NOT respond in ANALYZE mode with the Reactor S/D. The monitors should be in the GROSS Mode (G).

4.14.2 SGTR is indicated by at least one of the following annunciators:

- VAC SYS DISCH RAD HI (9-4-A)
- MN STM LINE 1 RAD HI (12-1-A)
- MN STM LINE 2 RAD HI (12-1-B)

AND PZR level decreasing with Letdown isolated and maximum MU flow through a single injection line.

In the event of annunciator or radiation monitor failure, the following may be used as additional indicators of a SGTR:

- SG Sample results (Boron, Radiation levels)
- Radiation Survey results (Main Steam Line area)
- Feedwater System response
- Radiation Monitor trends

DETAILS

4.15.2 For Generator faults, the transfer will be immediate.

On a Turbine Trip, the transfer will be initiated by one of the following:

- Generator Reverse Power
- Generator Anti-Motoring

These conditions are indicated by Annunciator Alarm 16-6-C, GEN REV PWR/ANTI-MTR TRIP.

4.15.4 Power flowing on the Main Generator is indicated by a load reading other than zero with the turbine maintaining 1800 rpm.

4.15.6 Disconnect 34620 is opened to prevent Generator damage if Breaker 34560 or 34561 flash over. Opening 34620 also allows timely restoration of the ring bus.

DETAILS

4.15.15 Deenergizing E2 and F2 stops both SFP Cooling Pumps and most of the ventilation systems in the Auxiliary Building.

ACTIONS FOR TREATMENT OF LACK OF SUBCOOLING MARGIN

5.0 LACK OF ADEQUATE SUBCOOLING MARGIN

5.1 IF the loss of subcooling margin is the result of establishing MU/HPI cooling,
THEN GO TO Section 12, TRANSIENT TERMINATION FOLLOWING AN OCCURRENCE THAT LEAVES THE RCS BEING COOLED BY MU/HPI COOLING.

5.2 Trip all RCPs.

5.3 Actuate and control MU/HPI using Specific Rules 1 and 2.

5.4 Verify proper SFRCS actuation for the trip parameters present.

5.5 Verify proper SG level control by AFW using Specific Rules 1 and 3.

5.5.1 IF SFRCS trips on low SG pressure due to:

- MU/HPI Cooling

OR

- Raising SG level to 124 inches,

THEN re-establish AFW to the isolated SG
AND restore proper SG level per Specific Rule 3.

5.6 IF overcooling exists and is the apparent cause of the loss of subcooling margin,
THEN GO TO Section 7, Overcooling,

DETAILS

5.0 LACK OF ADEQUATE SUBCOOLING MARGIN

5.4 Verify proper actuation using Table 1, SFRCS Actuated Equipment.

5.6 Check for Overcooling

Overcooling exists when an RCS cooldown causes SG Pressure to lower below 960 PSIG due to either of the following:

- Secondary steam demand exceeds primary heat production

OR

- A secondary side malfunction exists.

Overcooling does NOT exist when a display or plot of RCS temperature and pressure and SG pressure shows the following trend:

- Plant is stable OR approaching the post trip target box

AND

- SG pressure is above 960 PSIG.

HPI cooling can cause an RCS temperature decrease. SG pressure will follow this drop in RCS temperature (reverse heat transfer). Even if SG pressure decreases below 960 psig, this is NOT considered overcooling of the RCS.

Filling the SG to 124 inches may cause SG Pressure to decrease below 960 psig. This is not considered an overcooling of the RCS.

ACTIONS FOR TREATMENT OF LACK OF SUBCOOLING MARGIN

5.7 Isolate Possible RCS Leaks as follows:

5.7.1 Verify RC 2A, PORV, control switch in AUTO.

5.7.2 Close RC 11, PORV BLOCK Valve.

5.7.3 Verify MU 2B, LETDOWN ISO is closed.

5.7.4 Verify RC 2, PZR SPRAY Valve is closed.

5.7.5 Close RC 10, PZR SPRAY BLOCK Valve.

5.7.6 Close Pressurizer Sample Isolations

- RC 239A
- RC 239B.

5.7.7 Verify Loop 1 High Point Vents are closed

- RC 4608A
- RC 4608B.

5.7.8 Verify Loop 2 High Point Vents are closed

- RC 4610A
- RC 4610B.

5.8 Verify proper SFAS response using Table 2, SFAS Activated Equipment.

DETAILS

5.7 Isolate Possible RCS Leaks

If the isolated component was not the source of the leak, return that component to service when practical.

ACTIONS FOR TREATMENT OF LACK OF SUBCOOLING MARGIN

5.9 IF at any time ICC exists (superheated using Incore T/Cs), THEN GO TO Section 9, INADEQUATE CORE COOLING,

5.10 IF there is NO makeup
OR HPI flow available
AND an RCS leak exists,
THEN perform the following:

5.10.1 Fully open the AVVs AND if available, the TBVs to cooldown the RCS at the maximum attainable rate.

5.10.2 Maintain proper SG level and AFW flowrate using Specific Rules 1 and 3.

DETAILS

5.9 Check for Inadequate Core Cooling

T_H is the normal input to the T_{SAT} meters. Due to instrument response time, rapid RCS pressure drops may result in superheated conditions being displayed on the T_{SAT} meters (NEG MARGIN light lit) when the RCS is actually saturated.

Superheated conditions should be confirmed prior to entry into Section 9, by selecting INCORE for the T_{SAT} meter input AND rotating the INCORE TEMPERATURE selector through all positions (for both channels) while monitoring the T_{SAT} meter.

If both channels are available, then a total of five or more working incore detectors displaying a NEG MARGIN confirms that ICC exists. If only one channel is available, then a total of three or more working incore detectors displaying a NEG MARGIN confirms that ICC exists.

Due to instrument error (±24.2°F for incore thermocouples) and rate of instrument response during rapid transients, it is possible that although the RCS P/T plot is slightly to the right of the saturation curve, the RCS is indeed only saturated. The fact that the RCS is saturated rather than superheated can be verified by noting that the incore thermocouple temperature moves parallel to the saturation curve. If ICC conditions actually exist the RCS P/T plot will continue to trend into the ICC region away from the saturation curve.

If any doubt remains as to the actual existence of ICC conditions then Section 9 should be implemented.

5.10.1 Maximizing the RCS cooldown rate will minimize loss of RCS inventory until CFTs or LPI can provide an injection source to the RCS.

5.10.2 SG levels may decrease during the RCS cooldown. SG levels should recover to setpoint as SG pressure decreases due to reduced steam flow at the lower SG pressure.

ACTIONS FOR TREATMENT OF LACK OF SUBCOOLING MARGIN

5.10.3 IF RCS pressure increases to 2450 PSIG,
THEN perform the following:

a. Verify RC 11, PORV BLOCK is open,

b. Lock open RC2A, PORV.

AND

Allow the PORV to remain open until Incore T/C temperature decreases to 40 to 60°F above the SG saturation temperature or RCS pressure reaches 1000 psig.

c. IF the PORV fails open,
THEN close RC 11, PORV BLOCK.

5.10.4 Verify CFT Isolation Valves are open.

- CF 1A
- CF 1B

5.10.5 Continue efforts to restore MU or HPI flow.

5.10.6 WHEN the SFRCS Low Main Steam Line Pressure and High SG Level Trip BLOCK PERMITS come in,
THEN block the SFRCS Low Main Steam Line Pressure and High SG Level Trip.

5.10.7 Continue to implement the above direction until one of the following conditions are met:

- IF ICC exists (superheated using Incore T/C),
THEN GO TO Section 9, Inadequate Core Cooling.
- IF LPI flow has been established,
THEN reduce the cooldown rate to less than the Tech Spec Maximum Cooldown rate if possible,
AND GO TO Section 10, Large LOCA.
- IF either train of MU
OR HPI is restored,
THEN reduce the cooldown rate to less than the Tech Spec maximum cooldown rate if possible,
AND continue with Step 5.11.

DETAILS

5.10.6 If SFRCS trips on low SG pressure prior to blocking, then re-establish AFW to the isolated SG.

ACTIONS FOR TREATMENT OF LACK OF SUBCOOLING MARGIN

NOTE 5.11

It is recommended to allow time for the recovery of SCM provided:

- ICC does NOT exist
- At least one SG has proper level per Specific Rule 3
- I/C Thermocouple temperature NOT rising
- CFT are NOT emptying.

5.11 IF adequate subcooling margin exists,
THEN GO TO Step 5.16,

5.12 IF the CFTs are emptying,
THEN GO TO Section 10, LARGE LOCA.

DETAILS

5.11 Check Subcooling Margin (SCM)

Adequate SCM exists when both T_{SAT} meters indicate 20°F or greater.

If neither T_{SAT} meter is available, then adequate SCM is verified by ensuring RCS temperature and pressure are above and to the left of the SCM line of the P/T display (or manual plot).

T_H is the normal input to the T_{SAT} meters. T_H RTDs are more accurate than the individual incore thermocouples, provided there is flow past the sensor.

If SCM is adequate, and either natural circ or forced RCS flow is present, then T_H shall be used to monitor SCM. Otherwise incore thermocouples shall be used.

If adequate SCM is lost, then average the INCORE readings to determine SCM. (P/T display provides an average INCORE value.)

It may be necessary to wait, while monitoring plant response, to make this determination.

5.12 CFTs emptying indicates a large LOCA. If a large LOCA exists, do NOT go to Section 6, LACK OF HEAT TRANSFER. Primary to secondary heat transfer will be lost and cannot be regained. Section 10 provides instructions for long term core cooling following a large LOCA.

ACTIONS FOR TREATMENT OF LACK OF SUBCOOLING MARGIN

5.13 IF primary to secondary heat transfer conditions DO NOT exist in ANY SG,
THEN GO TO Section 6, LACK OF HEAT TRANSFER.

5.14 IF a SG Tube Rupture exists,
THEN GO TO Section 8, SG Tube Rupture, Step 8.7.

5.15 IF conditions for primary to secondary heat transfer are available in ANY SG,
AND the RCS is saturated,
THEN GO TO Section 11, RCS SATURATED SG REMOVING HEAT.

DETAILS

5.13 Conditions for heat transfer are available when T_c and SG pressure are coupled. Coupled means that Tc and T_{SAT} SG are about the same value.

RCS temperature increasing with SG pressure remaining constant or decreasing indicates an inadequate heat transfer capability.

Steaming of the SG(s) may assist in determining if coupling exists between T_c and T_{SAT} SG (i.e., T_c follows the decrease in T_{SAT} SG as the SG Pressure is decreased).

HPI cooling can cause a reversal in the heat transfer process, but as long as coupling exists, heat transfer is available.

5.14 SGTR is indicated by at least one of the following annunciators:

- VAC SYS DISCH RAD HI (9-4-A)
- MN STM LINE 1 RAD HI (12-1-A)
- MN STM LINE 2 RAD HI (12-1-B)

AND PZR level decreasing with Letdown isolated and maximum MU flow through a single injection line.

MS line radiation monitors will NOT respond in ANALYZE mode with the Reactor S/D. The monitors should be in the GROSS Mode (G).

In the event of an annunciator or radiation monitor failure, the following may be used as indicators of a SGTR:

- SG Sample results (Boron, Radiation levels)
- Radiation Survey results (Main Steam Line area)
- Feedwater System Response
- Radiation Monitor Trends

5.15 Exiting to Section 11 assumes: the RCS is saturated; a small break is indicated; and that cooldown with the SG(s) may be performed with HPI maintaining RCS inventory.

ACTIONS FOR TREATMENT OF LACK OF SUBCOOLING MARGIN

ADEQUATE SUBCOOLING MARGIN HAS BEEN ESTABLISHED

5.16 Throttle MU and HPI as necessary to maintain adequate subcooling margin. REFER TO Specific Rule 4, PTS Requirements.

5.17 Restore RCS Forced Flow as follows:

5.17.1 IF RC 10, PZR SPRAY BLOCK VALVE is not an RCS leak path, THEN verify RC 10 is open.

5.17.2 IF Bus A OR B is energized
AND NNI X AC AND DC are energized,
THEN REFER TO Attachment 10, Reactor Coolant Pump Operation, to restart at least one RCP in each loop.

5.17.3 IF Bus A AND B are deenergized
OR NNI X AC OR DC are deenergized,
THEN begin steps to regain Bus A OR B bus AND NNI X AC AND DC in parallel with the following steps.

5.18 IF a lack of adequate primary to secondary heat transfer exists, THEN GO TO Section 6, LACK OF HEAT TRANSFER.

DETAILS

ADEQUATE SUBCOOLING MARGIN HAS BEEN ESTABLISHED

5.17 Restore RCS Forced Flow

5.17.2 Restart a minimum of one RC pump in each loop. Normal interlocks and NPSH limits apply. Attachment 10 provides information for restarting RCPs. RCP 2-2 is preferred but forced flow in any pump combination is desired at this point. Start as many RCPs as plant conditions allow.

Once the RCP is started, SCM may decrease due to voids being swept out of the loops. This may take several minutes. Once SCM has stabilized a second RCP should be started. If a sustained (more than 2 minutes) loss of SCM occurs when the RCPs are started, the RCPs must be stopped until SCM is regained.

5.17.3 Refer to DB-OP-02521, Loss of AC Bus Power Sources, for restoration of A or B Bus.

Refer to DB-OP-02532, Loss of NNI\ICS Power, and DB-OP-06407, NNI Operating Procedure, for restoration of NNI power.

5.18 Check for Lack of Heat Transfer

Lack of heat transfer exists when RCS temperature is increasing with SG pressure constant or decreasing.

Lack of heat transfer does NOT exist when a display or plot of RCS temperature and pressure and SG pressure shows the following trend:

Plant is stable OR approaching the post trip target box

AND

RCS T_C is coupled with SG pressure. Coupling exists when T_C and T_{SAT} SG are about the same value.

ACTIONS FOR TREATMENT OF LACK OF SUBCOOLING MARGIN

5.19 IF overcooling exists,
THEN GO TO Section 7, OVERCOOLING.

5.20 IF a SG Tube Rupture exists,
THEN GO TO Section 8, SG TUBE RUPTURE, Step 8.7.

5.21 GO TO Section 13, SOLID COOLDOWN OR PRESSURIZER RECOVERY.

DETAILS

5.19 Check for Overcooling

Overcooling exists when an RCS cooldown causes SG Pressure to lower below 960 PSIG due to either of the following:

- Secondary steam demand exceeds primary heat production

OR

- A secondary side malfunction exists.

Overcooling does NOT exist when a display or plot of RCS temperature and pressure and SG pressure shows the following trend:

- Plant is stable OR approaching the post trip target box

AND

- SG pressure is above 960 PSIG.

HPI cooling can cause an RCS temperature decrease. SG pressure will follow this drop in RCS temperature (reverse heat transfer). Even though SG pressure decreases below 960 psig, this is NOT considered overcooling of the RCS.

5.20 SGTR is indicated by at least one of the following annunciators:

- VAC SYS DISCH RAD HI (9-4-A)
- MN STM LINE 1 RAD HI (12-1-A)
- MN STM LINE 2 RAD HI (12-1-B)

AND PZR level decreasing with Letdown isolated and maximum MU flow through a single injection line.

MS line radiation monitors will NOT respond in ANALYZE mode with the Reactor S/D. The monitors should be in the GROSS Mode (G).

In the event of an annunciator or radiation monitor failure, the following may be used as indicators of a SGTR:

- SG Sample results (Boron, Radiation levels)
- Radiation Survey results (Main Steam Line area)
- Feedwater System Response
- Radiation Monitor Trends

5.21 The RCS is subcooled. SGs are removing heat. There may or may not be a bubble in the PZR. Section 13 provides instructions for these conditions.

11.0 TRANSIENT TERMINATION FOLLOWING AN OCCURRENCE THAT LEAVES THE RCS SATURATED WITH SGs REMOVING HEAT

This section provides high level guidance to allow plant cooldown using existing procedures for details of system and equipment operation. End conditions may not coincide with entry conditions in existing procedures. The time span over which these actions are performed should be sufficient to allow consulting other procedures, drawings, and references for details of operation.

11.1 If this section was entered with only one SG removing heat, continue attempts to establish heat transfer in the other SG.

11.1.1 If a SG has been isolated by a SFRCS LOW MS LINE PRESSURE trip, due to RCS cooldown, AFW may be reestablished to aid in RCS control.

11.2 Check RA-EP-01500, Emergency Classification, to determine if Emergency Action Levels have been exceeded. Implement any appropriate procedures.

NOTE 11.3

- SFAS equipment may NOT be overridden except as addressed in Attachment 9, Miscellaneous Post Accident Actions.
- Review the potential for radioactive gaseous or liquid release from CTMT PRIOR to overriding additional equipment as approved by the Plant Manager (or designee) using Attachment 9, Step 2.7.

11.3 Verify proper SFAS response using Table 2.

11.4 Perform actions to close breakers for DH 7A, DH 7B, DH 9A, DH 9B and HP 31. REFER TO Attachment 7, Section 1, Actions to close breakers for DH 7A, DH 7B, DH 9A, DH 9B and HP 31.

11.5 Start Control Room EVS as follows:

11.5.1 Start both Control Room EVS Fans.

- Place HIS 5261, CONTROL ROOM EMER VENT FAN 1 in start
- Place HIS 5262, CONTROL ROOM EMER VENT FAN 2 in start.

11.5.2 For each Control Room EVS fan that has been started, perform the following:

a. Open the outside air Inlet damper(s):

- HA 5261A, FAN 1 OUTSIDE AIR INLET DAMPER
- HA 5262A, FAN 2 OUTSIDE AIR INLET DAMPER

b. Verify the process radiation monitor(s) in operation:

- RCM-5327, CTRM FLT FAN 1 DISCH
- RCM-5328, CTRM FLT FAN 2 DISCH

c. Place the Air Cooled Condensing Unit(s) in service following Emergency Start, REFER TO DB-OP-06505, Control Room Emergency Ventilation System.

11.6 Establish RCP seal injection and seal return. REFER TO Attachment 10, Reactor Coolant Pump Operation.

11.7 Verify maximum MU/HPI flow using Specific Rule 1.

11.8 Control SG levels per Specific Rule 3.

11.9 IF RCS pressure decreases to where LPI flow starts, THEN GO TO Section 10, Large LOCA.

11.10 Verify CFT Isolation Valves are open:

- CF 1A
- CF 1B.

NOTE 11.11

Plant conditions such as RCS leaks may prevent observing normal equipment limits such as cooldown rates. Equipment should be operated as near normal a manner as conditions permit.

11.11 Begin RCS cooldown using DB-OP-06903, Plant Shutdown and Cooldown, as much as possible, with the following additional guidance:

11.11.1 Borate the RCS as necessary to maintain adequate Shutdown Margin. REFER TO DB-NE-06202, Reactivity Balance Calculations.

CAUTION 11.11.2

The SGs should be steamed as necessary to prevent the SG from becoming a heat source even if the RCS cooldown rate due to HPI flow exceeds 100°F/HR.

11.11.2 IF an increase in the RCS Cooldown rate is desired, THEN increase SG steaming by MANUAL control of TBVs OR AVVs, depending on Condenser availability.

11.11.3 As cooldown proceeds, verify SGs continue to provide a heat sink for RCS by checking:

- Incore T/C temperatures decrease as SG pressure is lowered,

AND

- T_{sat} and T_c remain coupled.

11.11.4 Block SFRCS Low Main Steam Line Pressure AND High SG Level trips when the BLOCK PRMT alarm comes in.

11.11.5 IF the RCS does NOT cooldown as the SGs are depressurized (i.e. primary to secondary heat transfer is lost),
AND an RCP is running,
THEN GO TO Section 12, MU\HPI Cooling.
OTHERWISE GO TO Step 6.11.

11.11.6 IF heat transfer to the SGs is available, THEN continue saturated cooldown by decreasing SG pressure.

NOTE 11.12

The Control Room BWST Level indicators are PAM indicators. If any questions arise related to BWST Level, the SFAS Cabinet BWST Level indicators are also available.

11.12 WHEN BWST level decreases to 9 feet, THEN perform the following:

11.12.1 Determine if HPI can be stopped using Specific Rule 2.4.

11.12.2 IF HPI can be stopped, THEN stop both HPI Pumps.

11.12.3 IF HPI can NOT be stopped, THEN piggyback LPI to HPI Pump suction as follows:

a. Open DH 63

b. Open DH 64

c. Close HP 32

d. Close HP 31.

11.12.4 Transfer the suction of the LPI and CS Pumps to the CTMT Emergency Sump. REFER TO Attachment 7, Section 2, Suction Transfer.

11.12.5 WHEN plant conditions of Attachment 12 permit, THEN establish a long term Boron dilution flowpath. REFER TO Attachment 12, Establishing Long Term Boron Dilution.

11.13 IF the EDGs are running unloaded, THEN get approval using Attachment 9, Step 2.7 to return both EDGs to standby using DB-OP-06316, EDG Operating Procedure.

11.14 Monitor and control CTMT conditions per Table 3.

11.15 IF Inadequate Core Cooling exists per Attachment 8, Determination of Core Outlet Temperature, THEN GO TO Section 9, Inadequate Core Cooling,

11.16 IF RCS remains saturated during cooldown, THEN GO TO Step 11.18.

11.17 IF adequate SCM is regained THEN proceed as follows:

11.17.1 IF an RCP is running OR can NOT be started, THEN GO TO Section 13, Solid Cooldown or PZR Recovery,

11.17.2 Raise PZR level to approximately 200 inches.

NOTE 11.17.3

Starting the Reactor Coolant Pump may result in a loss of Subcooling Margin due to collapsing of voids in the Reactor Coolant System. The loss of SCM should be temporary and RCP operation can be maintained. If the loss of SCM is sustained (more than 2 minutes), then the RCP will be shutdown to comply with Specific Rule 1.

11.17.3 IF an RCP can be started,
THEN start an RCP (Loop 2 is preferred for PZR spray). REFER TO Attachment 10, Reactor Coolant Pump Operation.

11.17.4 IF the RCP started in Step 11.17.3 had to be tripped due to loss of SCM,
THEN, once adequate SCM is regained, an additional pump restart is allowed in an attempt to establish forced RC flow.

11.17.5 IF adequate SCM still exists after the RCP start,
THEN GO TO Section 13, Solid Cooldown or PZR Recovery.

11.18 WHEN LPI SYSTEM flow is 1000 GPM/line or greater,
THEN perform the following:

- Close CF 1A, CFT isolation valve.
- Close CF 1B, CFT isolation valve.

11.19 Continue RCS cooldown and depressurization by decreasing SG pressure.

11.20 Verify the Spare CCW Heat Exchanger SW Discharge Isolation Valve is closed:

- SW 36 CCW HEAT EXCHANGER 1 DISCHARGE ISO VALVE

OR

- SW 37 CCW HEAT EXCHANGER 3 DISCHARGE ISO VALVE

OR

- SW 38 CCW HEAT EXCHANGER 2 DISCHARGE ISO VALVE

11.21 WHEN RCS pressure decreases to 250 PSIG, THEN perform the following:

11.21.1 Decrease cooldown rate by throttling TBVs or AVVs.

11.21.2 As decay heat level decreases, core cooling by HPI and SGs will restore adequate SCM.

11.21.3 When adequate SCM is regained, remain in this section and continue with Step 11.22.

11.22 While maintaining RCS pressure at 250 PSIG with HPI, continue the cooldown by decreasing SG pressure until the operating conditions of the DHR system are met (less than 250 PSIG and less than 280°F). When these conditions are met, proceed with Step 11.23.

11.23 Check Availability of DH Pumps

11.23.1 IF both DH Pumps are available, THEN GO TO Step 11.25,

11.24 IF only one DH Pump is available, THEN perform the following:

11.24.1 IF only DH Pump 1 is available, THEN piggyback DH Pump 1 to the suction of the HPI Pump(s):

a. Verify DH Pump 2 is off.

b. Close DH 2734, DH PUMP 2 LPI SUCT

c. Open DH 831, DECAY HEAT COOLER DISCH XOVER 1 TO 2

d. Open DH 63 and DH 64

e. Close HP 31 and HP 32

(Continued)

11.24.1 (Continued)

NOTE 11.24.1.e

Total flow through an LPI pump includes:

- 2 trains of LPI injection flow
- 2 trains of M/U flow
- 4 injection lines of HPI flow

e. Limit total flow through a single LPI Pump to 4000 gpm.

f. Continue to monitor and adjust total DH Pump 1 flow as necessary.

11.24.2 IF only DH Pump 2 is available,
THEN piggyback DH Pump 2 to the suction of the HPI Pump(s):

a. Verify DH Pump 1 is off.

b. Close DH 2733, DH PUMP 1 LPI SUCT

c. Open DH 830, DECAY HEAT COOLER DISCH XOVER 2 TO 1

d. Open DH 63 and DH 64.

e. Close HP 31 and HP 32.

(Continued)

11.24.2 (Continued)

NOTE 11.24.2.f

Total flow through an LPI pump includes:

- 2 trains of LPI injection flow
- 2 trains of M/U flow
- 4 injection lines of HPI flow

f. Limit total flow through a single LPI Pump to 4000 gpm.

g. Continue to monitor and adjust total DH Pump 2 flow as necessary.

11.24.3 Maintain RCS pressure at 250 PSIG by throttling HPI.

11.24.4 Maintain these conditions until the second DH Pump becomes available.

11.24.5 WHEN the second DH Pump becomes available, THEN start the second DH Pump in the DH Removal Mode REFER TO DB-OP-06012, DH and LPI Operating Procedure.

11.24.6 IF unable to establish DH Removal Mode, THEN remain in the LPI Injection Mode until further instructions are given by Station Management.

11.24.7 With decay heat flow greater than 1000 gpm, any RCPs running may be stopped.

11.24.8 As RCS temperature decreases, throttle HPI flow to reduce RCS pressure while maintaining adequate SCM.

11.24.9 IF HPI can be terminated using Specific Rule 2, THEN stop HPI Pumps AND close piggyback valves DH 63 and DH 64.

11.24.10 Maintain cooling with one DH Pump in the DH Removal Mode and one DH Pump in the LPI Mode with suction from the Emergency Sump until further instructions are given by Station Management.

11.25 Continued cooldown with both DH pumps available as follows:

11.25.1 Start one DH Pump in the DH Removal Mode through DH 11 and DH 12 using DB-OP-06012, DH and LPI Operating Procedure.

11.25.2 IF unable to establish DH Removal Mode, THEN remain in the LPI Injection Mode until further instructions are given by Station Management.

11.25.3 With decay heat flow greater than 1000 gpm, any RCPs running may be stopped.

11.25.4 As RCS temperature decreases, throttle HPI flow to reduce RCS pressure while maintaining adequate subcooling margin.

11.25.5 IF HPI can be terminated using Specific Rule 2, THEN stop HPI Pumps AND close piggyback valves DH 63 and DH 64.

11.25.6 Maintain cooling with one DH Pump in the DH Removal Mode and one DH Pump in the LPI Mode with suction from the Emergency Sump until further instructions are given by Station Management.