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REGION 1

'04 JAN -6 A10 :45

January 5, 2004

Mr. John Caruso
USNRC Chief Examiner
USNRC Region 1
475 Allendale Road
King of Prussia, PA 19406-1415

Susquehanna Learning Center
Follow-up Post- Examination Comments
PLA 005710 File A14-13D

Dear Mr. Caruso:

In our Post-Examination Materials letter to you, dated December 18, 2003, (PLA 005708; File A14-13D), we requested a modification to the Written Examination Answer Key for Questions number 5 and 9, and supplied supporting documentation for this request. After additional reviews of these questions, we are changing our original request.

As requested in our original letter, Question #5 answer key should be changed to "C", and a revised, more detailed justification is attached to support this request.

Leave question #9 answer key as "D" as it was originally designed. After additional review of this question, we now believe there is sufficient information in the stem of the question to support this as the only correct answer to the question.

Enhancements and modifications to these questions, prior to reuse, will be evaluated and tracked by the Corrective Action Program.

If you have any questions, or require more information, please contact Bob Boesch at 570-542-3057 or Rich Brooks at 570-542-1891.

K. M. Roush
Manager – Nuclear Training

RB/KMR/mjm

rb followup post exam comments

Response: No

Enclosures

cc: Ops Letter File
Nuc Records - NUCPT

Question # 5

Comment:

The stem of the question poses a situation where a control room evacuation is required and a transfer switch malfunction occurs at the Unit 1 Remote Shutdown Panel (RSP) preventing control of the "B" RHR pump. ("B" RHR pump is the only RHR pump with controls at the Unit 1 RSP). The question then asks "What direction will be given to start an RHR pump when using the MANUAL method for suppression pool cooling?"

The answer key answer was "B" "At 1A20102 RHR PUMP 1A breaker, pull the lateral control switch to HANDLE OUT position and place the lateral control switch to CLOSE for RHR pump 1A". This answer was based on directions provided in Unit 1 procedure OP-149-005 step 2.7.6.a (attached), which is intended to provide direction to manually place RHR in service if the entire "B" loop of RHR is unavailable. However, the "B" Loop of RHR is still available by starting the "1D" RHR pump locally at the pump breaker. The candidates were not provided any references to answer this question.

The stem of the question makes no mention of the status of Unit 2. However, if the control room is evacuated, **both control rooms would be evacuated concurrently since the control rooms share a common area**. Unit 1 control room personnel would be dispatched to the Unit 1 RSP and follow the direction of ON-100-009, U-1 Control Room Evacuation. Unit 2 control room personnel would be dispatched to the Unit 2 RSP and follow the direction of ON-200-009, U-2 Control Room Evacuation.

Answer choice "C" is the correct answer based on procedural compliance and is also the most logical and practical approach to reaching the desired outcome for the following reasons:

- The design of the U-1 RSP is to control Div II RHR from the RSP. Div II RHR consists of the "B" & "D" RHR pumps and all the associated valves to operate the Loop in the various modes of RHR operation. All necessary valves, controls, and indications for the U-1 Div II RHR loop to operate in the Suppression Pool Cooling mode, Shutdown Cooling mode, and LPCI mode are at the U-1 RSP including the control switch for the "1B" RHR pump. To operate the Div II RHR loop in Suppression Pool Cooling using the "1D" RHR pump would require starting the pump using the lateral control switch at the pump breaker. All other required valves and controls are present at the U-1 RSP, since the "1D" RHR pump is part of the Div II RHR Loop.

  The design of the U-2 RSP is to control Div I RHR from the RSP. Div I RHR consists of the "A" & "C" RHR pumps and all the associated valves to operate the Loop in the various modes of RHR operation. All necessary valves, controls, and indications for the U-2 Div I RHR loop to operate in the Suppression Pool Cooling mode, Shutdown Cooling mode, and LPCI mode are at the U-2 RSP including the control switch for the "2A" RHR pump.. At the Unit 2 RSP the "2A" RHR pump would be placed in service to provide either suppression pool cooling or other RHR functions, as addressed IAW Unit 2 procedures. With Unit 2 using its' "2A" RHR pump, it is not possible for Unit 1 to energize its' "1A" RHR pump due to an electrical interlock.

- Procedurally the operators at Unit 1 RSP would use OP-149-005 "RHR Suppression Pool Cooling" section 2.5 to place RHR "B" loop in SPC. The following note is in the procedure:

• NOTE: **IF** RHR loop B unavailable for suppression pool cooling, section 2.7 provides the necessary instructions for placing the A loop in service. Placing the A loop in service will require manual valve and breaker operation and utilization of local flow indicator FI-15105A (27-683').

The loss of "1B" RHR pump does not constitute a loss of RHR loop B because the "1D" RHR pump is still available.

At step 2.5.11 when the operator attempts to start the "1B" RHR pump and discovers the pump fails to start, the Unit Supervisor would than send an operator to the ESS switchgear room and start the "1D" RHR pump from the breaker using the lateral control switch. Although not specifically addressed in the OP-149-005, "1D" RHR is part of the RHR B loop and would therefore be the logical choice to place the "B" Loop in Suppression Pool Cooling, since all valves and the associated controls for the remainder of the "B" Loop of RHR are functional at the U-1 RSP. Placing the 1D RHR pump in service meets the intent of the EOPs to use available SPC.

The candidates have no way of knowing if the question is challenging knowledge of procedural requirements OR plant design function. The question simply asks "What direction will be given to start a RHR pump..." Since no interlocks would prevent using the 1D RHR pump, the answer to this question is therefore "C" "At 1A20402 RHR PUMP 1D breaker, pull the lateral control switch to HANDLE OUT position and place the lateral control switch to CLOSE for RHR pump 1D. This allows all RHR valve manipulations and system monitoring to be accomplished at the U-1 RSP. This is the only possible physical alignment to restore RHR concurrently with Unit 2 utilizing their "A" loop of RHR. This makes good operating sense, in that this would be the most efficient method to restore RHR while maintaining control of the "B" loop of RHR at the RSP.

Answer choice "B" is incorrect based on procedural compliance and is <u>not</u> the most logical and practical approach to reaching the desired outcome for the following reasons:

- If the decision was made to start the Unit 1A RHR pump locally to support operations from the Unit 1 RSP, all valve manipulations required to support placing RHR in Suppression Pool Cooling would also need to be performed manually in the field for U-1. Furthermore if U-1 used the 1A RHR pump to support suppression pool cooling, then U-2 would be prevented from using the 2A RHR pump (i.e. the preferred pump) due to a breaker interlock discussed below. This also would require manual field operations on U-2 to support placing RHR in service.

  The attached electrical drawings illustrate this interlock. The highlighted portions of electrical drawings E-153 sheets 1 and 2 demonstrate how Unit 1 A RHR pump is prevented from starting when the highlighted 52b contact from Unit 2 A RHR pump breaker is closed. The highlighted portion of drawing E-153 sheet 47 illustrates how Unit 2 A RHR pump generates this 52b contract for use in the Unit 1 A RHR pump starting circuit. The highlighted portions of electrical drawings E-153 sheets 7 and 8 demonstrate how Unit 1 D RHR pump is prevented form starting when the highlighted 52b contact from Unit 2 D RHR pump breaker is closed. Since Unit 2 is operating the 2A RHR pump, Unit 1 D RHR pump would be available to start. Additionally, the lesson plan explanation of these interlocks is attached to provide a further explanation of how these interlocks function.

- If the operator incorrectly chooses to implement step 2.7 of OP-149-005 as an alternate choice, the operator will be required to perform manual valve manipulations by opening their breakers and repositioning the valves. This would require 15 breakers to be opened and 15 valves to be checked and/or operated. Then an operator would be directed to start the 1A or 1C RHR pump locally by using the lateral control switch at the ESS switchgear.

  The operators at Unit 2 RSP would use OP-249-005 "RHR Suppression Pool Cooling" section 2.5 to place RHR "A" loop in SPC. At step 2.5.5 the operator would be directed to determine if the 1A RHR pump is running and trip it locally if it is. This again makes running the 1D RHR pump on U-1 the right choice procedurally, since the U-2 procedure directs removing the 1A RHR pump from service. This will allow U-2 to use the 2A RHR pump and all the RSP panel valve controls, as opposed to manual field operations.

- This interlock between each Unit's RHR pumps and the fact that Unit 2 would be running its "A" RHR pump makes both the "A" and "B" distractors of the question not physically possible and thus incorrect. The "D" distractor is also incorrect since the DC trip and control power knife switch is not opened for this type of evolution.

Conclusion:

Based on the above information choice "C" is the only correct answer and Choice "B" is clearly wrong.

Change the answer key answer to "C".

Based on this review the following changes are being evaluated:

- The stem of the question should have contained a Unit 2 status indicating the Unit 2 "A" RHR pump **was not** in service.
- Both procedures OP-149-005 and OP-249-005 are being evaluated by the operations procedure group for enhancements to alert the operators of these interlocks, and to provide direction to manually start the other pump in the same Division if ONLY the RSP pump is unavailable.

These interlocks are not a problem for both Units activating their respective RSPs, it would only be necessary if additional malfunctions arise (like the one posed in the question) that make it necessary to implement an alternate RHR alignment while at the RSP.

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ppl TM

December 18, 2003

Mr. John Caruso
USNRC Chief Examiner
USNRC Region 1
475 Allendale Road
King of Prussia, PA 19406-1415

Susquehanna Learning Center
Post-Examination Materials
PLA 005708 File A14-13D

Dear Mr. Caruso:

In accordance with the guidance provided in NUREG 1021, "Operating Licensing Examination Standards for Power Reactors" (Draft Revision 9) ES-501 "Initial Post-Examination Activities", the following materials are submitted in support of the Susquehanna Initial Licensing Examination that concluded on December 15, 2003.

1. The graded, ORIGINAL, written examinations
2. Two clean copies of each Applicant's answer sheet
3. The MASTER examination and answer key
4. All questions asked by the Applicants during the administration of the examination and the Proctor's responses to those questions
5. The written examination seating chart
6. Form ES-403-1 "Written Examination Grading Quality Checklist"
7. Requested modifications to the Written Examination answer key (Questions #5 and #9), with supporting documentation

After the written examination was completed, an exam analysis was performed, and the Applicants participated in a review session to determine if enhancements to the questions were necessary. Results of this analysis/review indicate one question (Question #3) should be enhanced prior to reuse. No generic weaknesses were identified. Enhancement of this question and the two requested modifications to the answer key, prior to reuse, will be tracked by the Corrective Action Program.

All individuals signed on to Form ES-201-3, " Examination Security Agreement", have not yet completed the post-examination signature. When Form ES-201-3, " Examination Security Agreement", has been completed, it will be forwarded to you, thus completing the necessary documentation for this Susquehanna Initial Licensing Examination.

If you have any questions, or require more information, please contact me at 570-542-3326 or Rich Brooks at 570-542-1891.

Robert Boesch for KMR Robert Boesch 570-542-3057

K. M. Roush
Manager - Nuclear Training

Response: No

Enclosures

cc: Ops Letter File
Nuc Records - NUCPT

rb post-exam memo

RB/KMR/vah

Question #5

NOTE: LICENSEE'S ORIGINAL COMMENT SUBMITTED BY LETTER DATED DECEMBER 18, 2003. SEE LICENSEE LETTER dated JANUARY 5, 2004 FOR REVISED COMMENT.

Comment:

The stem of the question poses a situation where a control room evacuation is required and a transfer switch malfunction occurs at the Unit 1 Remote Shutdown Panel (RSP) preventing control of the "B" RHR pump. ("B" RHR pump is the only RHR pump with controls at the Unit 1 RSP) . The question then asks "What direction will be given to start an RHR pump when using the MANUAL method for suppression pool cooling?" The answer key answer was "B" "At 1A20102 RHR PUMP 1A breaker, pull the lateral control switch to HANDLE OUT position and place the lateral control switch to CLOSE for RHR pump 1A". This answer was based on directions provided in Unit 1 procedure OP-149-005 step 2.7.6.a (attached), which is intended to provide direction to manually place RHR in service if the entire "B" loop of RHR is unavailable. The candidates were not provided any references to answer this question.

However, the stem of the question makes no mention of the status of Unit 2, and if the control room is being evacuated, Unit 2 control room personnel would be dispatched to the Unit 2 RSP. At the Unit 2 RSP the "A" RHR pump would be placed in service to provide either suppression pool cooling or RHR functions, as addressed IAW Unit 2 procedure OP-249-005 step 2.5.11 (attached). With Unit 2 using its' RSP "A" RHR pump, it is not possible for Unit 1 to energize its' "A" RHR pump due to an electrical interlock.

The attached electrical drawings illustrate this interlock. The highlighted portions of electrical drawings E-153 sheets 1 and 2 demonstrate how Unit 1 1A RHR pump is prevented from starting when the highlighted 52b contact from Unit 2 2A RHR pump breaker is closed. The highlighted portion of drawing E-153 sheet 47 illustrates how Unit 2 2A RHR pump generates this 52b contact for use in the Unit 1 1A RHR pump starting circuit. The highlighted portions of electrical drawings E-153 sheets 7 and 8 demonstrate how Unit 1 1D RHR pump is prevented from starting when the highlighted 52b contact from Unit 2 2D RHR pump breaker is closed. Since Unit 2 is operating the 2A RHR pump, Unit 1 1D RHR pump would be available to start.
Additionally, the lesson plan explanation of these interlocks is attached to provide a further explanation of how these interlocks function.

This interlock between each Units RHR pumps and the fact that Unit 2 would be running its' "A" RHR pump makes both the "A" and "B" distractor of the question not physically possible and incorrect. The "D" distractor is also incorrect since the DC trip and control power is not opened for this type of evolution.

This leaves the "C" distractor "At 1A20402 RHR PUMP 1D breaker, pull the lateral control switch to HANDLE OUT position and place the lateral control switch to CLOSE for RHR pump 1D" as the only physically possible correct answer for the conditions stated in the stem of the question since no interlocks would prevent using the 1D RHR pump. This also makes good operating sense, in that this would be the quickest method to restore RHR and retains control of the "B" loop of RHR at the RSP.

There is however, no procedural guidance that addresses using the 1D RHR pump. But the stem of the question does not specifically ask about what procedurally addressed actions would be necessary to restore RHR. The candidates have no way of knowing if the question is after the procedural requirements OR the plant design function. The question simply asks "What direction will be given to start an RHR pump..." The answer to this question is therefore "C" "At 1A20402 RHR PUMP 1D

breaker, pull the lateral control switch to HANDLE OUT position and place the lateral control switch to CLOSE for RHR pump 1D" since this is the only possible physical alignment to restore RHR with Unit 2 utilizing their "A" loop of RHR.

CONCLUSION:

Change the answer key answer to "C".

The stem of the question should have contained a Unit 2 status that would not have the Unit 2 "A" RHR pump in service. Additionally, both procedures OP-149-005 and OP-249-005 are being enhanced to alert the operators to these interlocks, and to provide direction to manually start the other pump in the same Division if ONLY the RSP pump is unavailable.
These interlocks are not a problem for both Units activating their respective RSPs, it would only be necessary if additional malfunctions arise (like the one posed in the question) that make it necessary to implement an alternate RHR mechanism while at the RSP.

SSES SRO NRC Re-Exam

5 A control room evacuation was required. A transfer switch malfunction caused loss of RHR pump control at Unit 1 Remote Shutdown Panel 1C201.

As Unit Supervisor what direction will be given to start an RHR pump when using the MANUAL method for suppression pool cooling?

A. At 1A20102 RHR PUMP 1A breaker, transfer DC Trip and Control power to alternate, pull the lateral control switch to HANDLE OUT position and place the lateral control switch to CLOSE for RHR pump 1A.

B. At 1A20102 RHR PUMP 1A breaker, pull the lateral control switch to HANDLE OUT position and place the lateral control switch to CLOSE for RHR pump 1A.

C. At 1A20402 RHR PUMP 1D breaker, pull the lateral control switch to HANDLE OUT position and place the lateral control switch to CLOSE for RHR pump 1D.

D. At 1A20202 RHR PUMP 1B breaker, OPEN the DC Trip and Control knife switch and place the lateral control switch to CLOSE for RHR pump 1B.

Question Data

B At 1A20102 RHR PUMP 1A breaker, pull the lateral control switch to HANDLE OUT position and place the lateral control switch to CLOSE for RHR pump 1A.

Explanation/Justification:

A. DC trip and control power is not transferred to alternate for this evolution.

B. is correct. The B loop of RHR is controlled from the Remote Shutdown Panel, the manual backup method uses the RHR loop A. In addition to manual valve alignment required to use RHR loop A, pump operation is accomplished by pulling the lateral control switch to the out position thereby transferring control locally at the breaker. Placing the control switch to CLOSE will start the RHR pump A providing 125 VDC control power is available. SRO responsible to implement an off normal situation

C. 1D RHR pump is not the manual method for Unit 1.

D. DC trip and control power is not opened for this evolution.

Sys #	System	Category	KA Statement
295016	**Control Room Abandonment**	**Conduct of Operations**	**Ability to locate and operate components, including local controls.**

K/A# **295016.2.1.30** K/A Importance **3.4** Exam Level **SRO**

References provided to Candidate **None** Technical References: **OP-149-005**

Question Source: **New** **Susquehanna, 12/15/2003** Level Of Difficulty: (1-5) **3**

Question Cognitive Level: **Fundamental** 10 CFR Part 55 Content: **55.43**

Training Objective: **1489** **List the RPV Instrumentation functions and components that can be operated from the Remote Shutdown Panel.**

Training Task: **00ON025** **Implement Plant Shutdown From Outside Control Room**

Question #9

NOTE: LICENSEE'S ORIGINAL COMMENT SUBMITTED BY LETTER DATED DECEMBER 18, 2003. LATER RETRACTED BY LETTER DATED JANUARY 5, 2004.

Comment:

The stem of the question sets up initial conditions where a Main Steam Line isolation from 100% power has occurred. The plant response to a MSIV isolation will cause SRVs to open for control of the initial pressure rise and auto start of HPCI and RCIC due to shrink caused by pressure increasing and rapid reduction in power. The scram resulting from the MSIVs closing, and the low level due to collapsed voids cause entry into EO-100-102 RPV Level as stated in the stem. The candidates were not provided any references to answer this question.

The stem shows that the suppression pool bulk volume was initially heated up due to three factors; HPCI and RCIC in service with an initial surge of steam from open SRVs. The stem provides temperature indications of suppression pool temperatures which indicate bulk pool temperatures (MAT 37) are higher than normal (90°F), and the SPOTMOS Div I & II indications being influenced by the current HPCI exhaust discharge are 101°F and 103°F respectively. The question then asks "Assess these Suppression Pool water temperature indications and determine what actions are required.

The answer key answer was "D" HPCI exhaust steam is heating a local area of the Suppression Pool. Direct 'B' Loop of RHR Suppression Pool Cooling to be placed in service. This answer was based on following a note in OP-152-001 (attached) which addresses using Loop "B" of RHR as the preferred loop when HPCI is in service.

However, the stem of the question also has the bulk fluid temperature of the suppression pool at 90°F, as indicated by MAT 37 and the SPOTMOS Div I & II indications at 101°F and 103°F. These temperature indications meet the entry conditions for EO-100-103 "PC CONTROL" (attached). The instructions of this higher tier procedure do not contain the directions to place "B" loop of suppression pool cooling into service, RATHER this procedure instructs the operating crew to Maximize suppression pool cooling by placing all available loops into service. This would require BOTH loops of suppression pool cooling into service. NONE of the choices in the question address placing both loops into service, therefore there is no correct answer to the question.

CONCLUSION:

Delete question #9 from the exam, there is no correct answer.

The question was constructed to purposely have several energy depositions into the suppression pool that were short term and then allow HPCI to continue discharging. The intent was to have the candidate discriminate between localize heating and bulk heating and then as SROs determine the appropriate method in dealing with the localized heating. In setting the stage to meet this intent the question inadvertently raised bulk fluid temperature to the EOP entry point, which changes how an SRO would deal with the elevated suppression pool temperature.

SSES SRO NRC Re-Exam

9 Unit 1 has scrammed from 100% power when MSIVs closed and the following conditions exist:

- EO-100-102 has been entered.
- HPCI and RCIC injected for level control
- HPCI now in service CST to CST for pressure control.
- RCIC shutdown
- Suppression Pool Cooling has not been placed in service.
- Suppression Pool bulk water temperature, point MAT37 on the PICSY format, CONTAINMENT ATMOSPHERIC CONTROL, indicates Red at 90 deg F.
- Alarms on 1C601, SUPP POOL DIV 1 AVERAGE TEMP HI (AR-111-F04) and SUPP POOL DIV 2 AVERAGE TEMP HI (AR-112-F04) have been received.
- SPOTMOS Div I & II are in alarm indicating 101 deg F and 103 deg F respectively.

Assess these Suppression Pool water temperature indications and determine what actions are required.

A. The SRV used for pressure control should have caused the MAT 37 point to indicate the same as SPOTMOS, contact I&C to investigate failed temperature input. Direct RHR Suppression Pool Cooling to be placed in service.

B. The MAT 37 point on the PICSY format has failed, contact I&C to investigate failed temperature input. Direct RHR Suppression Pool Cooling to be placed in service.

C. HPCI exhaust steam has heated the bulk of the Suppression Pool. Direct 'A' Loop of RHR Suppression Pool Cooling to be placed in service.

D. HPCI exhaust steam is heating a local area of the Suppression Pool. Direct 'B' Loop of RHR Suppression Pool Cooling to be placed in service.

Question Data

D HPCI exhaust steam is heating a local area of the Suppression Pool. Direct 'B' Loop of RHR Suppression Pool Cooling to be placed in service.

Explanation/Justification:

A. Use of one SRV for pressure control could cause local high temperatures. The temperature elements used for MAT 37 do not indict in the local area of the HPCI exhaust into the Suppression Pool. MAT 37 uses 6 temp elements at the pool surface plus 4 temp elements located at the bottom of the pool. The 4 temps at the bottom of the pool will be much cooler than the 6 surface elements used for SPOTMOS. Since MAT 37 uses the 4 lower temp elements with the 6 upper elements and SPOTMOS uses only the 6 upper elements it is expected that SPOTMOS will indicate higher than the mat 37 POINT. With no RHR Suppression Pool Cooling in service there is no mixing of the bulk sup pool water allowing a local area and the surface of the pool water to indicate high temperature which will be seen by the averaging circuit.

B. The temperature elements used for MAT 37 do not indicate in the local area of the HPCI exhaust into the Suppression Pool. MAT 37 uses 6 temp elements at the pool surface plus 4 temp elements located at the bottom of the pool. The 4 temps at the bottom of the pool will be much cooler than the 6 surface elements used for SPOTMOS. Since MAT 37 uses the 4 lower temp elements with the 6 upper elements and SPOTMOS uses only the 6 upper elements it is expected that SPOTMOS will indicate higher than the mat 37 POINT. With no RHR Suppression Pool Cooling in service there is no mixing of the bulk sup pool water allowing a local area and the surface of the pool water to indicate high temperature which will be seen by the averaging circuit.

C. indications provided are a result of local heating of the suppression pool not an over all heatup of the water.

D. Correct answer, With HPCI in service and no Suppression Pool mixing, a local area of the Suppression Pool will heat up and the procedure directs that 'B' loop of RHR be placed in Suppression Pool Cooling. 'B' Loop is the preferred loop due to the location of the RHR suction and discharge in relation to the HPCI exhaust. SRO responsible to determine if preferred loop is the appropriate loop to place in service based on overall conditions.

Sys #	System	Category	KA Statement

SSES SRO NRC Re-Exam

295013	High Suppression Pool Temperature	Ability to determine and/or interpret the following as they apply to HIGH SUPPRESSION POOL TEMPERATURE:	Localized heating/stratification

K/A# 295013.AA2.02 K/A Importance 3.5 Exam Level SRO

References provided to Candidate None Technical References: AR-112-001

Question Source: New Susquehanna, 10/2/2003 Level Of Difficulty: (1-5) 3

Question Cognitive Level: Analysis 10 CFR Part 55 Content: 55.43

Training Objective: 337 Determine if SPOTMOS readings are appropriate for stated Suppression Pool level.

Training Task: 59ON006 Implement Containment Isolation

☐ 2.2.11 **Perform** SO-159-010 Suppression Chamber Average Water Temperature Verification.

NOTE:	RHR Loop B preferred for Suppression Pool Cooling as HPCI exhausts near RHR Loop B suction.

☐ 2.2.12 **Place** Suppression Pool Cooling in operation in accordance with OP-149-005.

☐ 2.2.13 **Observe** HPCI BARO CDSR COND PP 1P215 **AUTOMATICALLY STARTS** to control Vacuum Tank level.

2.2.14 IF Condensate Storage Tank level < 7.5%, **Ensure**:

☐ a. HPCI PUMP SUCT FROM SUPP POOL HV-155-F042 **OPENS**.

☐ b. HPCI PUMP SUCT VLV FROM CST HV-155-F004 **CLOSES WHEN** HPCI PUMP SUCT FROM SUPP POOL HV-155-F042 reaches Fully Open position.

☐ c. HPCI TEST LINE TO CST ISO HV-155-F008 **CLOSES** if Open.

☐ d. HPCI TEST LINE TO CST ISO HV-155-F011 **CLOSES** if Open.

3. PROCEDURE

PC-1 MONITOR AND CONTROL SP/T SP/L PC/P PC/G AND DW/T CONCURRENTLY

All flowpaths are executed concurrently, irrespective of entry condition because the primary containment functions as a closed thermodynamic system and the transient responses of all primary containment parameters are directly interrelated. Plant conditions will dictate priority of performing one flowpath over another. As a minimum, periodic monitoring of other primary containment parameters is required, while following instructions in one flowpath.

(Reference: SSES-EPG Monitor and Control Concurrently, SP/T, SP/L, PC/P, PC/G and DW/T)

SP/T - Suppression Pool Temperature Control

This flowpath contains guidance to control suppression pool temperature during emergencies.

SP/T-1 MAINTAIN SUPP POOL TEMP < **90°F**
USING AVAILABLE SUPP POOL COOLING

CAUTION

VL OPERATION OF RHR
OR CORE SPRAY WITH SUCTION FROM SUPP POOL
AND PUMP FLOW BELOW VL
MAY RESULT IN EQUIPMENT DAMAGE.

The initial action to control suppression pool temperature uses the same method used during normal plant operations: monitoring its status and placing available suppression pool cooling in operation. If possible, pool heat up is minimized by stopping the heat addition. This includes attempting closure of any stuck open relief valve in accordance with ON-183-001(ON-283-001).

The most accurate method of determining Suppression Pool temperature is by using the bulk Suppression Pool temperature as calculated by the plant process computer point MAT37 or MAT38.

With suppression pool level above 20.5 ft., SPOTMOS Div 1 and Div 2 upper average provides accurate suppression pool temperature indication with a range from 30°F to 230°F.

SUPP POOL DIV 2 AVERAGE TEMP HI (F04)	SETPOINT:	88°F (105°F, 110°F, 120°F, ERROR)
	ORIGIN:	Computer Point MAT38 (TX-15752)

1. PROBABLE CAUSE:

1.1 Average Suppression Pool temperature above setpoint due to heat addition from normal or abnormal sources.

NOTE: With HPCI in operation, the suppression pool may stratify so that plant computer reads 88°F when SPOTMOS reads 105°F.

1.2 Loss of power to SPOTMOS.

2. OPERATOR ACTION:

2.1 OBSERVE alarm and readout on remote SPOTMOS indicator on Panel 1C601 and at computer point MAT38.

NOTE: If error light can not be reset enter into TRO 3.6.3.

2.2 CHECK for temperature element malfunction using SPOTMOS in accordance with OP-159-002 Suppression Pool Temperature Monitoring System.

2.3 If high temperature condition exists, PERFORM following:
- 2.3.1 INITIATE Suppression Pool Cooling in accordance with OP-149-005 RHR Operation in Suppression Pool Cooling Mode.
- 2.3.2 CHECK for heat addition from HPCI, RCIC or SRV's.

2.4 COMPLY with following as applicable:
- 2.4.1 TS 3.6.2.1
- 2.4.2 TS 3.3.3.1, TR 3.6.3

2.5 PERFORM SO-159-010 Suppression Chamber Average Water Temperature Verification, if required.

2.6 If loss of power to level instrumentation indicated, PERFORM following as applicable:
- 2.6.1 ENSURE following CLOSED:
  - a. SPOTMOS Div 2 Normal Supply 1Y12502.
  - b. Post Accident Mon/SPOTMOS 1C690B (Alternate Supply) 1Y22626.
- 2.6.2 PERFORM ON-117-001 Loss of Instrument Bus.
- 2.6.3 If SPOTMOS Div 1 is not available, COMPLY with TS 3.3.3.2.

2.7 If "No Data" displayed, START-UP Div. 2 SPOTMOS per OP-159-002.

3. AUTOMATIC ACTION:

None

4. REFERENCE:

4.1 E-324 Sh 16
4.2 M-157
4.3 J-457

system provides lubrication for the motor bearings and is cooled by the Emergency Service Water system (ESW) using an internal heat exchanger. The motors are 2,000 hp and each motor is powered from a separate Engineered Safeguard Bus.

Pump	Power Supply	Pump Location
1P202A	1A201	RB El. 645, Area 29, Rm. I-014
1P202B	1A202	RB El. 645, Area 28, Rm. I-013
1P202C	1A203	RB El. 645, Area 29, Rm. I-014
1P202D	1A204	RB El. 645, Area 28, Rm. I-013

The pumps can be started and stopped from the associated 1C601 panel (STOP-AUTO-START) control switch (RHR PUMP 1P202A-D) with (amber-open/red-closed) pump breaker position indication. The RHR pumps are interlocked between units in such a manner that only one letter pump may be running at any given time, for example; 1P202A or 2P202A but not both. This interlock prevents Unit 1 A pump breaker from being closed automatically or manually if the Unit 2 A pump breaker is closed (52 contact). This breaker interlock prevents overloading of the ESS bus, offsite transformers or the Emergency Diesel Generators. Each pump receive automatic start signal from both of two division initiation logics (RHR Loop A/B) to ensure that all four RHR pumps are started during and accident even if one division logic fails. Pump starts under this logic are sequenced to prevent overloading the ESS bus, offsite transformers or the Emergency Diesel Generators.

The pumps receive automatic start signals from the RHR Loop A/B initiation logics on any of the following signals:

Parameter	**Setpoint**
RPV Level Low (L1)	< -129 inches
Drywell Pressure High with RPV Pressure Low Permissive	DW >1.72 psig <u>and</u> RPV pressure <427 psig
Manual Initiation Div 1 or 2	PB Armed and Depressed

The low RPV level and high drywell pressure signals provide indication of a Loss of Coolant Accident (LOCA) and necessity for vessel inventory makeup. The low vessel pressure signal (with the high Drywell pressure

See section 2.5.2 note & section 2.7, 2.7.6a

PROCEDURE COVER SHEET

PPL SUSQUEHANNA, LLC	NUCLEAR DEPARTMENT PROCEDURE	
RHR SUPPRESSION POOL COOLING ADHERENCE LEVEL: STEP-BY-STEP (BY SECTION)		5-16-03 OP-149-005 Revision 21 Page 1 of 47

QUALITY CLASSIFICATION:	APPROVAL CLASSIFICATION:
(X) QA Program ( ) Non-QA Program	(X) Plant ( ) Non-Plant ( ) Instruction

EFFECTIVE DATE: _____

PERIODIC REVIEW FREQUENCY: N/A

PERIODIC REVIEW DUE DATE: N/A

RECOMMENDED REVIEWS:

Procedure Owner: Shift Technical Advisor-B Shift

Responsible Supervisor: Shift Manager-B Shift

Responsible FUM: Manager-Nuclear Operations

Responsible Approver: Manager-Nuclear Operations

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2.5 RHR SUPP POOL COOLING OPERATIONS FROM REMOTE SHUTDOWN PANEL

2.5.1 Prerequisites

☐ a. Control Room Evacuated.

☐ b. Plant being controlled from Remote Shutdown Panel.

☐ c. RHR Service Water System available for use in accordance with OP-116-001 RHR Service Water.

☐ d. ESW System available in accordance with OP-054-001, Emergency Service Water System.

2.5.2 Precautions

a. RHR min flow HV-151-F007B will not auto open or close when controlled from Remote Shutdown Panel.

b. RHR Pump B will not auto start on LPCI injection signal when controlled from Remote Shutdown Panel.

c. RHR loop B will not auto align for LPCI injection when controlled from Remote Shutdown Panel.

d. Loop A(B) suppression pool cooling may not be operated simultaneously with any other RHR loop A(B) mode of operation.

NOTE:	**IF** RHR loop B unavailable for suppression pool cooling, section 2.7 provides the necessary instructions for placing the A loop in service. Placing the A loop in service will require manual valve and breaker operation and utilization of local flow indicator FI-15105A (27-683').

☐ 2.5.3 **Ensure** ESW Loop B in operation in accordance with OP-054-001, Emergency Service Water System.

☐ 2.5.4 **Place** RHRSW in operation in accordance with OP-116-001, RHR Service Water System.

2.5.5 **IF** RHR Pump 2B is running, as determined locally, **Stop** RHR Pump 2B locally at RHR Pump 2P202B breaker 2A20202: (2)

☐ a. **Pull Out** Lateral Control Switch.

☐ b. **Place** Lateral Control Switch to **OFF**.

☐ 2.5.6 **Ensure** HX B SHELL SIDE BYPS HV-151-F048B **OPEN**

☐ 2.5.7 **Open** SUPP CHMBR SPRY TEST SHUTOFF HV-151-F028B

☐ 2.5.8 **Ensure** RHR PP B/D MIN FLOW HV-151-F007B **OPEN**

2.5.9 **IF** RHR discharge pressure < 50 psig locally on PI 15187 located at Area 25 683', **Fill AND Pressurize** RHR Loop B as follows: (6)

☐ a. **Fully Open** TEST LINE CTL HV-151-F024B.

☐ b. **Close** RHR HX B SHELL SIDE INLET HV-151-F047B

☐ c. **Close** RHR HX B SHELL SIDE BYPS HV-151-F048B (Throttle Valve)

☐ d. **Start** RHR PP 1P202B

☐ e. **Throttle Open** HX B SHELL SIDE BYPS HV-151-F048B to establish a system flow between 3,000 gpm and 3,500 gpm as indicated on RHR SYSTEM FLOW INDICATOR FI-15105.

NOTE (1):	The next step will completely fill the RHR LPCI INJECTION LINE as flow rises from 3,500 gpm to 6,000 gpm.
NOTE (2):	Slowly Throttling in one to two second bumps corresponds to approximately 500 gpm.

☐ f. **Open** the HX B SHELL SIDE BYPS HV-151-F048B in 500 gpm increments followed by a 20 second pause to establish a system flow rate of 6,000 gpm as indicated on RHR SYSTEM FLOW INDICATOR FI-15105.

☐ g. **Throttle Open** HX B SHELL SIDE BYPS HV-151-F048B to establish RHR loop flow between 11,000 gpm and 12,000 gpm as indicated on RHR SYSTEM FLOW INDICATOR FI-15105.

NOTE:	The next step will completely fill the DRYWELL SPRAY LINE. This will occur at a TEST LINE CTL HV-151-F024B position of 30-40% OPEN.

☐ h. **Throttle Closed** TEST LINE CTL HV-151-F024B to maintain ≤ 10,000 gpm as indicated on RHR SYSTEM FLOW INDICATOR FI-15105.

☐ i. **Full Open** HX B SHELL SIDE BYPS HV-151-F048B.

☐ j. **Open** RHR HX B SHELL SIDE INLET HV-151-F047B

☐ k. **Go To** step 2.5.13

☐ 2.5.10 **Ensure** RHR System filled and vented in accordance with OP-149-001.

☐ 2.5.11 **Start** RHR PUMP B 1P202B.

☐ 2.5.12 **Throttle Open** TEST LINE CTL HV-151-F024B.

☐ 2.5.13 **AFTER** 3000 gpm flow reached, **Close** RHR PUMP B/D MIN FLOW HV-151-F007B.

☐ 2.5.14 **Adjust** flow to ≤ 10,000 gpm using TEST LINE CTL HV-151-F024B.

☐ 2.5.15 **Close** HX B SHELL SIDE BYPS HV-151-F048B. (Throttle Valve)

NOTE:	RHR Room Cooler 1V202B normally auto starts when RHR Pump 1B starts. The Room Cooler will auto start at 128°F and auto stops at 70°F during a Control Room fire which damages HVAC Panel 1C681.

☐ 2.5.16 As time and personnel become available, **Ensure** RHR Room Cooler 1V202B **STARTED**.

2.5.17 **Shut Down** RHR Suppression Pool Cooling as follows:

☐ a. **BEFORE** flow is decreased to < 3000 gpm, **Open** RHR PUMP B/D MIN FLOW HV-151-F007B.

☐ b. **Close** TEST LINE CTL HV-151-F024B.

☐ c. **Stop** RHR PUMP 1P202B.

☐ d. **Close** SUPP CHMBR SPRY TEST SHUTOFF HV-151-F028B.

☐ e. **Open** HX B SHELL SIDE BYPS HV-151-F048B. (Throttle Valve)

2.6 RHR PIPING FLUSH USING SUPPRESSION POOL COOLING

2.6.1 Prerequisites

☐ a. RHR System in Normal Standby Alignment for Automatic Response in accordance with OP-149-001.

☐ b. If flush is for ALARA purposes, Health Physics has personnel available to perform surveys to notify Operations when to terminate flush.

☐ c. Health Physics has controlled access to the affected RHR Pump Room (645' elevation) and the affected portion of the RHR Equipment Space (683' elevation) as deemed necessary by Health Physics.

☐ d. Emergency Service Water System available in accordance with OP-054-001. (see 2.6.3.a for exception)

☐ e. No Unit 1 low pressure ECCS system operating in full flow test during routine power operation.

2.6.2 Precautions

a. During routine power operation, only one loop of RHR may be placed in Suppression Pool Cooling at a time on either unit unless it is necessary to keep Suppression Pool temperature < 90°F. [3]

b. Minimize operation of Suppression Pool Cooling while an LCO exists on RHR or Core Spray Systems.

c. Loop A(B) suppression pool cooling may not be operated simultaneously with any other RHR loop A(B) mode of operation.

2.6.3 **Initiate** RHR Suppression Pool Cooling for flushing as follows:

NOTE:	ESW Loop A supplies RHR Pumps A and D, ESW Loop B supplies RHR Pumps B and C.

☐ a. **Place** Emergency Service Water System in operation in accordance with OP-054-001 supplying RHR Room Cooler and RHR Pump to be placed in service.

IF ESW is not available, the RHR Pumps may be run without ESW cooling water flow to the Motor Oil Cooler and RHR Room Cooler for short durations (e.g., to perform ALARA flushing, etc.) provided the following parameters are not exceeded:

Upper Thrust Bearing - Max Temperature Limit 200°F
Upper Sleeve Bearing - Max Temperature Limit 200°F

The above temperatures can be monitored by the following computer points:

RHR PUMP	UPPER THR BRG	UPPER SLV BRG
1P202A	NHT13	NHT17
1P202B	NHT14	NHT18
1P202C	NHT15	NHT19
1P202D	NHT16	NHT20

Note that the Computer Alarm Limit for these points is 185°F.

☐ b. **Place** RHR LOOP A(B) MOV OL BYPS HS-E11-1S62A(B) keyswitch to **TEST**.

☐ (1) **Confirm** expected Annunciator RHR LOOP A(B) OUT OF SERVICE AR 109(113) B9 **ALARMS**.

☐ c. **Open** SUPP CHMBR SPR TEST SHUTOFF HV-151-F028A(B).

☐ d. **Check** RHR System filled and vented in accordance with OP-149-001.

☐ e. **Check Open** HX A(B) SHELL SIDE BYPS HV-151-F048A(B).

☐ f. **Close** RHR HX A(B) SHELL SIDE INLET HV-151-F047A(B).

☐ g. **Start** RHR PUMP 1P202A(B)(C)(D) as applicable.

☐ h. **Throttle Open** TEST LINE CTL HV-151-F024A(B) to achieve a flowrate of approximately 12,000 gpm.

☐ i. **Check** RHR PP A/C(B/D) MIN FLOW HV-151-F007A(B) **CLOSES** at ~ 3000 gpm RHR flow.

☐ j. **Log** Suppression Pool Cooling Operation on Attachment C RHR Suppression Pool Cooling/Full Flow Test Hours Log.

☐ k. **Check** RHR Pump Room Cooler 1V210A(B)(C)(D) **STARTED**.

☐ l. **Flush** for approximately 15 minutes.

☐ m. **Perform** following if other pump in same loop needs to be run for flushing. Otherwise, **Go To** step 2.6.3.n.

☐ (1) **Start** other RHR PUMP 1P202A(B)(C)(D) in same loop as applicable.

☐ (2) **Throttle Open** TEST LINE CTL HV-151-F024A(B) to achieve a flowrate of approximately 23,000 gpm.

☐ (3) **Check** RHR Pump Room Cooler 1V210A(B)(C)(D) **STARTED**.

☐ (4) **Flush** for approximately 5 minutes.

☐ (5) **Throttle Closed** TEST LINE CTL HV-151-F024A(B) to achieve a flowrate of approximately 10,000 gpm.

☐ (6) **Stop** one RHR PUMP 1P202A(B)(C)(D) in same loop as applicable.

☐ (7) **Check** RHR Pump Room Cooler 1V210A(B)(C)(D) **STOPPED**.

☐ n. **Open** RHR HX A(B) SHELL SIDE INLET HV-151-F047A(B).

☐ o. **Throttle Closed** TEST LINE CTL HV-151-F024A(B) to achieve a flowrate of 9,500 to 10,000 gpm.

☐ p. **Close** HX A(B) SHELL SIDE BYPS HV-151-F048A(B).

CAUTION

RHR Heat Exchanger Structural Integrity Is Adversely Affected At Flowrates Above 10,000 Gpm.

☐ q. **Ensure** TEST LINE CTL HV-151-F024A(B) **THROTTLED** to achieve a flowrate of 9,500 to 10,000 gpm.

☐ r. **Flush** for approximately 5 minutes.

☐ s. **Open** HX A(B) SHELL SIDE BYPS HV-151-F048A(B).

2.6.4 **Shut Down** RHR Suppression Pool Cooling Flush as follows:

☐ a. **Close** TEST LINE CTL HV-151-F024A(B) by holding control switch in **CLOSE** position until at least 10 seconds after Amber Closed indication **ILLUMINATES**.

☐ b. **Observe** RHR PP A/C(B/D) MIN FLOW HV-151-F007A(B) **OPENS** ~ 30 seconds after 3000 gpm flow reached.

☐ c. **Stop** RHR PUMP 1P202A(B)(C)(D) as applicable.

☐ d. **Close** SUPP CHMBR SPR TEST **SHUTOFF** HV-151-F028A(B).

☐ e. **Check** RHR Pump Room Cooler 1V210A(B)(C)(D) **STOPPED**.

☐ f. **Log** Suppression Pool Cooling Shutdown on Attachment C RHR Suppression Pool Cooling/Full Flow Test Hours Log.

☐ g. IF desired, **Remove** Emergency Service Water from service in accordance with OP-054-001.

☐ h. **Return** RHR System to Normal Standby alignment for Automatic Response in accordance with OP-149-001.

☐ i. **Ensure** RHR System Checked, Filled & Vented in accordance with OP-149-001.

☐ j. **AFTER** 2 minutes, **Place** RHR LOOP A(B) MOV OL BYPS HS-E11-1S62A(B) keyswitch to **NORMAL**.

☐ (1) **Confirm** annunciator RHR LOOP A(B) OUT OF SERVICE **EXTINGUISHES**.

2.7 MANUAL OPERATION OF RHR SYSTEM LOOP A IN SUPPRESSION POOL COOLING WHEN PLANT CONTROL IS FROM REMOTE SHUTDOWN PANEL. (4) (5)

2.7.1 Prerequisites

☐ a. Control Room Evacuated.

☐ b. Plant being controlled from the Remote Shutdown Panel.

☐ c. B RHR and/or B RHRSW Loops not available or aligned for Shutdown Cooling from the remote shutdown panel.

☐ d. A RHR loop is not in operation .

2.7.2 Precautions

a. All valve operations are manual. Valve operations should be performed slowly to prevent damage to drained and/or depressurized systems.

b. All interlocks associated with the A RHR/RHRSW LOOPS are disabled due to breakers being open in the performance of this procedure.

c. RHR loop A will not auto align for LPCI injection when this procedure is being performed.

d. Unit 1A(C) RHR PUMP will be unavailable if Unit 2A(C) RHR PUMP is In service

e. RHR System Loop A and RHR Service Water Loop A cannot be controlled from remote shutdown panel. All actions are perform locally or as indicated. This is not a normal routine evolution and would only be performed if the loops controlled from the remote shutdown panel were not available for Suppression Pool Cooling.

f. This procedure assumes that normal keepfill pressure is not available and that a slow controlled fill of the RHR Loop will be required.

g. Loop A(B) suppression pool cooling may not be operated simultaneously with any other RHR loop A(B) mode of operation.

☐ 2.7.3 **Ensure** ESW LOOP B in operation in accordance with OP-054-001, Emergency Service Water System.

2.7.4 **Place** RHRSW in operation as follows:

☐ a. **Open** breakers for the following valves:

☐ (1) 1B237011 RHR HX A RHRSW INLET VLV HV11210A (27-670').

☐ (2) 1B237012 RHR HX A RHRSW OUTLET VLV HV11215A (27-670').

☐ b. **Manually Throttle Open** Unit 1 RHRSW HX A INLET HV11210A (29-645', I-14, R652') to 10% open ~ 8 turns open.

☐ c. **Manually Fully Open** RHR HX A RHRSW OUTLET HV11215A (29-645', I-14, R652').

☐ d. At 1A20308(29-749') RHRSW PUMP 1A BREAKER, **Place** the lateral control switch to the **HANDLE OUT** position.

☐ e. **Start** RHRSW pump 1A by placing the lateral control switch to the **CLOSE** position.

☐ f. **Manually Throttle Open** Unit 1 RHRSW HX A INLET HV11210A (29-645', I-14, R652') TO 30% open ~ 24 turns open which corresponds to ~ 9000 gpm flow.

☐ 2.7.5 **Manually Align** A loop RHR for Suppression Pool Cooling.

CAUTION

In The Event That The HV151F047A Valve Was Closed Prior To Control Room Evacuation, It May Be Susceptible To Pressure Locking. Do Not Attempt To Open The Valve Until After The "A" Loop Of RHR Has Been Filled And Pressurized Per Step 2.7.6.

a. **Open** the breakers for the following valves:

☐ (1) 1B236022 SUPP CHAMBER SPRAY CTL VLV HV151F027A (29-719').

☐ (2) 1B216032 RHR PUMP A SUCT VLV FROM SUPP POOL HV151F004A (27-683').

☐ (3) 1B216033 RHR PP A SHUTDOWN CLG SUCT VLV HV151F006A (27-683').

☐ (4) 1B216044 SUPP CHMBR SPR TEST SHUTOFF HV151F028A (27-683').

☐ (5) 1B216052 RHR HX A SHELL SIDE INLET VLV HV151F047A (27-683').

☐ (6) 1B216053 RHR HX A SHELL SIDE OUTLET VLV HV151F003A (27-683').

☐ (7) 1B219011 RHR LOOP A OB INJ ISO VLV HV151F015A (27-670').

☐ (8) 1B219031 RHR PUMP A&C MIN FLOW VLV HV151F007A (27-670').

☐ (9) 1B237024 RHR LOOP A TEST LINE CTL VLV HV151F024A (27-670')

☐ (10) 1B237032 RHR PP C SHUTDOWN CLG SUCT VLV HV151F006C (27-670')

☐ (11) 1B27033 RHR PUMP C SUCT VLV FROM SUPP POOL HV151F004C (27-670')

☐ (12) 1B237034 RHR HX A SHELL SIDE BYPASS VLV HV151F048A (27-670').

☐ (13) 1B217032 DRWL SPRAY OB VLV HV151F016A (29-749').

☐ b. **Check Closed <u>OR</u> Manually Close** DRWL SPRAY OB VLV HV151F016A (29-749', I-506, R752').

☐ c. **Check Open <u>OR</u> Manually Open** SUPP CHMBR SPR TEST SHUTOFF HV151F028A (27-683', I-204, G705', R708').

☐ d. **Check Closed <u>OR</u> Manually Close** SUPP CHAMBER SPRAY CTL VLV HV151F027A (27-683', I-204, G687', R690')

☐ e. **Check Closed <u>OR</u> Manually Close** RHR LOOP A TEST LINE CTL VLV HV151F024A (27- 683', I-204, G687', R690')

☐ f. **Check Closed OR Manually Close** RHR LOOP A OB INJ ISO VLV HV151F015A (29-683', I-204, G705', R712').

☐ g. **Check Open OR Manually Open** RHR HX A SHELL SIDE BYPASS VLV HV151F048A (29-683', I-204, G688', R693').

☐ h. **Check Closed OR Manually Close** RHR PP A SHUTDOWN CLG SUCT VLV HV151F006A (29-645', I-14, G668', R669').

☐ i. **Check Closed OR Manually Close** RHR PP C SHUTDOWN CLG SUCT VLV HV151F006C (29-645', I-14, G668', R669').

☐ j. **Check Open OR Manually Open** RHR PUMP A SUCT VLV FROM SUPP POOL HV151F004A(29-645', I-14, G658', R664').

☐ k. **Check Open OR Manually Open** RHR PUMP C SUCT VLV FROM SUPP POOL HV151F004C (29-645', I-14, G658', R664').

☐ l. **Check Open OR Manually Open** RHR PUMP A&C MIN FLOW VLV HV151F007A (29-645', I-14, G658', R664').

☐ m. **Check Open OR Manually Open** RHR HX A SHELL SIDE OUTLET VLV HV151F003A (29-645', I-14, G668', R672').

☐ n. **Close** 151F034A(C) RHR PUMP A(C) DISCHARGE ISO VLV(29-645', I-14, G668', R674').

2.7.6 **Place** A loop RHR in service as follows:

NOTE:	The following steps will start a RHR Pump and slowly fill the system, minimum flow for the pump is still provided by the min flow line.

☐ a. At 1A20102 (29-749') RHR PUMP 1A BREAKER, **Place** the lateral control switch to the **HANDLE OUT** position.

OR

☐ b. At 1A20302 (29-719') RHR PUMP 1C BREAKER, **Place** the lateral control switch to the **HANDLE OUT** position.

☐ c. **Start** RHR 1A pump by placing the lateral control switch to the **CLOSE** position.

OR

☐ d. **Start** RHR 1C pump by placing the lateral control switch to the **CLOSE** position.

☐ e. **Ensure** RHR Pump A(C) Room Cooler 1V 210A(C) **STARTED**.

☐ f. **Slowly Throttle Open** 151F034A(C) (29-645', I-14, G668,R672') to pressurize A loop RHR.

CAUTION

In The Event That The HV151F047A Valve Was Closed Prior To Control Room Evacuation, It May Be Susceptible To Pressure Locking. If Closed, The Valve Must Be Checked Opened With The System Pressurized And Prior To Establishing System Flow.

☐ g. Once the "A" Loop of RHR has been pressurized, **Check Open OR Manually Open** RHR HX A SHELL SIDE INLET VLV HV151F047A (29-645', I-14, G668', R676').

☐ h. **Station** an operator at RHR LOOP A TEST CTL VLV HV151F024A (27-683', I-204, G687', R690').

☐ i. **Manually Slowly Throttle Open** RHR LOOP A TEST CTL VLV HV151F024A (27-683', I-204, G687', R690').

NOTE: Due to system alignment (breakers open) HV151F007A will remain open for the duration of this procedure to ensure minimum system flow.

☐ j. **Slowly Increase** RHR injection flow to ~ 10000 gpm as read on RHR HX A OUTLET FLOW IND FI15105A (27-683').

☐ k. **Manually Close** RHR HX A SHELL SIDE BYPS HV151F048A (29-683', I-204, G688', R693').

☐ 2.7.7 **WHEN** need for manual operation of A loop RHR no longer required and control available from the Control Room. **Restore** A loop RHR as follows:

☐ a. **Depress** following push buttons on Panel 1C601:

☐ (1) RHR LOOP A SHUTDOWN CLG RESET HSE111S32A

☐ (2) RHR LOOP B SHUTDOWN CLG RESET HSE111S32B

☐ b. **Observe** white light above following **EXTINGUISH**:

☐ (1) HSE111S32A.

☐ (2) HSE111S32B.

c. At 1C601 **Ensure** the following handswitches are aligned to match the valve positions locally or are in the neutral position:

☐ (1) DRWL SPRAY OB VLV HV151F016A (29-749,' I-506, R752').

☐ (2) SUPP CHMBR SPR TEST SHUTOFF HV151F028A (27-683', I-204, G-705', R708').

☐ (3) SUPP CHAMBER SPRAY CTL VLV HV151F027A (27-683', I-204, G687', R690').

☐ (4) RHR LOOP A TEST LINE CTL VLV HV151F024A(27-683', I-204, G687', R690')

☐ (5) RHR LOOP A OB INJ ISO VLV HV151F015A (29-683', I-204, G705', R712').

☐ (6) RHR HX A SHELL SIDE BYPASS VLV HV151F048A (29-683', I-204, G688', R693').

☐ (7) RHR PP A SHUTDOWN CLG SUCT VLV HV151F006A (29-645', I-14, G668', R669').

☐ (8) RHR PP C SHUTDOWN CLG SUCT VLV HV151F006C (29-645', I-14, G668', R669').

☐ (9) RHR PUMP A SUCT VLV FROM SUPP POOL HV151F004A (29-645', I-14, G658', R664').

☐ (10) RHR PUMP C SUCT VLV FROM SUPP POOL HV151F004C (29-645', I-14, G658', R664').

☐ (11) RHR PUMP A&C MIN FLOW VLV HV151F007A (29-645', I-14, G658', R664').

☐ (12) RHR HX A SHELL SIDE INLET VLV HV151F047A (29-645', I-14, G668', R676').

☐ (13) RHR HX A SHELL SIDE OUTLET VLV HV151F003A (29-645', I-14, G668', R672').

d. **Close** the breakers for the following valves:

☐ (1) 1B236022 SUPP CHAMBER SPRAY CTL VLV HV151F027A (29-719').

☐ (2) 1B216032 RHR PUMP A SUCT VLV FROM SUPP POOL HV151F004A (27-683').

☐ (3) 1B216033 RHR PP A SHUTDOWN CLG SUCT VLV HV151F006A (27-683').

☐ (4) 1B216044 SUPP CHMBR SPR TEST SHUTOFF HV151F028A (27-683').

☐ (5) 1B216052 RHR HX A SHELL SIDE INLET VLV HV151F047A (27-683').

☐ (6) 1B216053 RHR HX A SHELL SIDE OUTLET VLV HV151F003A (27-683').

☐ (7) 1B219011 RHR LOOP A OB INJ ISO VLV HV151F015A (27-670').

☐ (8) 1B219031 RHR PUMP A&C MIN FLOW VLV HV151F007A (27-670').

☐ (9) 1B237024 RHR LOOP A TEST LINE CTL VLV HV151F024A (27-670')

☐ (10) 1B237032 RHR PP C SHUTDOWN CLG SUCT VLV HV151F006C (27-670')

☐ (11) 1B237033 RHR PUMP C SUCT VLV FROM SUPP POOL HV151F004C (27-670')

☐ (12) 1B237034 RHR HX A SHELL SIDE BYPASS VLV HV151F048A (27-670').

☐ (13) 1B217032 DRWL SPRAY OB VLV HV151F016A (29-749').

☐ e. At 1A20102 (29-749') RHR PUMP 1A BREAKER, **Place** the lateral control switch to the **HANDLE IN** position.

OR

☐ f. At 1A20302 (29-719') RHR PUMP 1C BREAKER, **Place** the lateral control switch to the **HANDLE IN** position.

2.7.8 **WHEN** need for manual operation of A loop RHRSW no longer required and control available from the Control Room. **Restore** A loop RHRSW as follows:

☐ a. **Close** breakers for the following valves:

☐ (1) 1B237011 RHR HX A RHRSW INLET VLV HV11210A (27-670').

☐ (2) 1B237012 RHR HX A RHRSW OUTLET VLV HV11215A (27-670').

☐ b. At 1A20308 (29-749') RHRSW PUMP 1A BREAKER, **Place** the lateral control switch to the **HANDLE IN** position.

3. REFERENCES

3.1 Electrical Schematic E-153

3.2 Electrical Schematic E-171

3.3 Electrical Schematic E-185

3.4 Elementary Diagram M1-E11-66

3.5 IOM 46 RHR Pump Motors

3.6 IOM 155 RHR Pump Motors

(1) 3.7 Memo, PLI-58111, "SBO Rule Completion of Coping Duration Calculation"

(3) 3.8 Memo, PLI-49559, M.B. Detamore to H.J. Palmer, "Operating Recommendations for RHR," March 24, 1987

See 2.5.5, Pg 25

PROCEDURE COVER SHEET

PPL SUSQUEHANNA, LLC	NUCLEAR DEPARTMENT PROCEDURE	
RHR SUPPRESSION POOL COOLING ADHERENCE LEVEL: STEP-BY-STEP (BY SECTION)		5-13-03 OP-249-005 Revision 24 Page 1 of 49
QUALITY CLASSIFICATION: (X) QA Program ( ) Non-QA Program	APPROVAL CLASSIFICATION: (X) Plant ( ) Non-Plant ( ) Instruction	

EFFECTIVE DATE: _____

PERIODIC REVIEW FREQUENCY: N/A

PERIODIC REVIEW DUE DATE: N/A

RECOMMENDED REVIEWS:

Procedure Owner: Shift Technical Advisor-B Shift

Responsible Supervisor: Shift Manager-B Shift

Responsible FUM: Manager-Nuclear Operations

Responsible Approver: Manager-Nuclear Operations

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2.5 RHR SUPP POOL COOLING OPERATIONS FROM REMOTE SHUTDOWN PANEL

2.5.1 Prerequisites

☐ a. Control Room Evacuated.

☐ b. Plant being controlled from Remote Shutdown Panel.

☐ c. RHR Service Water System available for use in accordance with OP-216-001 RHR Service Water.

☐ d. ESW System available in accordance with OP-054-001, Emergency Service Water System.

2.5.2 Precautions

a. RHR min flow HV-251-F007A will not auto open or close when controlled from Remote Shutdown Panel.

b. RHR Pump A will not auto start on LPCI injection signal when controlled from Remote Shutdown Panel.

c. RHR loop A will not auto align for LPCI injection when controlled from Remote Shutdown Panel.

d. Loop A(B) suppression pool cooling may not be operated simultaneously with any other RHR loop A(B) mode of operation.

NOTE:	If RHR loop A unavailable for suppression pool cooling, section 2.7 provides the necessary instructions for placing the B loop in service. Placing the B loop in service will require manual valve and breaker operation and utilization of local flow indicator FI-25105B (34-683').

☐ 2.5.3 **Ensure** ESW in operation in accordance with OP-054-001, Emergency Service Water System.

☐ 2.5.4 **Place** RHRSW in operation in accordance with OP-216-001, RHR Service Water System.

2.5.5 **IF** RHR Pump 1A is running, as determined locally or RHR Pump 2A will not start, **Stop** RHR Pump 1A locally at RHR Pump 1P202A breaker 1A20102: [2]

☐ a. **Pull Out** Lateral Control Switch.

☐ b. **Place** Lateral Control Switch to **OFF**.

☐ 2.5.6 **Ensure** HX A SHELL SIDE BYPS HV-251-F048A **OPEN**

☐ 2.5.7 **Open** SUPP CHMBR SPRY TEST SHUTOFF HV-251-F028A

☐ 2.5.8 **Ensure** RHR PP A/C MIN FLOW HV-251-F007A **OPEN**

2.5.9 **IF** RHR discharge pressure < 50 psig locally on PI-25187 located at Area 30 - 683', **Fill** and **Pressurize** RHR Loop A as follows:[7]

☐ a. **Fully Open** TEST LINE CTL HV-251-F024A.

☐ b. **Close** RHR HX A SHELL SIDE INLET HV-251-F047A

☐ c. **Close** RHR HX A SHELL SIDE BYPS HV-251-F048A (Throttle Valve)

☐ d. **Start** RHR PP 2P202A

☐ e. **Throttle Open** HX A SHELL SIDE BYPS HV-251-F048A to establish a system flow between 3,000 gpm and 3,500 gpm as indicated on RHR SYSTEM FLOW INDICATOR FI-25105.

NOTE (1):	The next step will completely fill the RHR LPCI INJECTION LINE and RHR HEAD SPRAY LINE (A Loop only) as flow rises from 3,500 gpm to 6,000 gpm.
NOTE (2):	Slowly throttling in one to two second bumps corresponds to approximately 500 gpm.

☐ f. **Open** the HX (A) SHELL SIDE BYPS HV-251-F048A in 500 gpm increments followed by a 20 second pause to establish a system flow rate of 6,000 gpm as indicated on RHR SYSTEM FLOW INDICATOR FI-25105.

☐ g. **Throttle Open** HX A SHELL SIDE BYPS HV-251-F048A to establish RHR loop flow between 11,000 gpm and 12,000 gpm as indicated on RHR SYSTEM FLOW INDICATOR FI-25105.

NOTE:	The next step will completely fill the DRYWELL SPRAY LINE. This will occur at a TEST LINE CTL HV-251-F024A position of 30-40% open.

☐ h. **Throttle Closed** TEST LINE CTL HV-251-F024A to maintain ≤ 10,000 gpm as indicated on RHR SYSTEM FLOW INDICATOR FI-25105.

☐ i. **Full Open** HX A SHELL SIDE BYPS HV-251-F048A.

☐ j. **Open** RHR HX A SHELL SIDE INLET HV-251-F047A

☐ k. **Go To** step 2.5.13

2.5.10 **Ensure** RHR System filled and vented as follows:

☐ a. **Open** 251821 RHR Div 1 Drywell Spray Vent Valve.

☐ b. **WHEN** venting complete, **Close** 251821 RHR Div 1 Drywell Spray Vent Valve.

☐ 2.5.11 **Start** RHR PUMP A 2P202A.

☐ 2.5.12 **Throttle Open** TEST LINE CTL HV-251-F024A.

☐ 2.5.13 **AFTER** 3000 gpm flow reached, **Close** RHR PUMP A/C MIN FLOW HV-251-F007A.

☐ 2.5.14 **Adjust** flow to ≤ 10,000 gpm using TEST LINE CTL HV-251-F024A.

☐ 2.5.15 **Close** HX B SHELL SIDE BYPS HV-251-F048A.

NOTE:	RHR Room Cooler 2V202A normally auto starts when RHR Pump 2A starts. The Room Cooler will auto start at 128°F and auto stops at 70°F during a Control Room fire which damages HVAC Panel 2C681.

☐ 2.5.16 As time and personnel become available, **Ensure** RHR Room Cooler 2V202A **STARTED**.

2.5.17 **Shut Down** RHR Suppression Pool Cooling as follows:

☐ a. **BEFORE** flow is decreased to < 3000 gpm, **Open** RHR PP A/C MIN FLOW HV-251-F007A.

☐ b. **Close** TEST LINE CTL HV-251-F024A.

☐ c. **Stop** RHR PUMP 2P202A.

☐ d. **Close** SUPP CHMBR SPRY TEST SHUTOFF HV-251-F028A.

☐ e. **Open** HX A SHELL SIDE BYPS HV-251-F048A (Throttle Valve).

PROCEDURE COVER SHEET

Pages 26 & 27 address transfer Switch "U" opposite valve 24A and the "1B" RHR pump.

PPL SUSQUEHANNA, LLC	NUCLEAR DEPARTMENT PROCEDURE	
CONTROL ROOM EVACUATION ADHERENCE LEVEL: STEP-BY-STEP CONDITIONAL		04/21/03 ON-100-009 Revision 8 Page 1 of 32

QUALITY CLASSIFICATION:	APPROVAL CLASSIFICATION:
(X) QA Program ( ) Non-QA Program	(X) Plant ( ) Non-Plant ( ) Instruction

EFFECTIVE DATE: _____

PERIODIC REVIEW FREQUENCY: N/A

PERIODIC REVIEW DUE DATE: N/A

RECOMMENDED REVIEWS:

Procedure Owner: Shift Technical Advisor-B Shift

Responsible Supervisor: Shift Manager-B Shift

Responsible FUM: Manager-Nuclear Operations

Responsible Approver: Manager-Nuclear Operations

1. SYMPTOMS AND OBSERVATIONS

Conditions exist which require Control Room EVACUATION:

1.1 Dense SMOKE

1.2 Extreme HEAT

1.3 Hazardous GAS which induces difficulty in breathing

1.4 Direction from Shift Supervision

2. AUTOMATIC ACTIONS

None

3. IMMEDIATE OPERATOR ACTIONS

3.1 **Record** date and time of event.

_____ Shift Supervision ____/____ Date Time

NOTE:	If Control Room evacuation is anticipated, **Notify** Security to provide access to BOTH Units' Remote Shutdown Panels.

3.2 As time permits, **Perform** following prior to Control Room evacuation:

☐ 3.2.1 **Announce** twice over Plant PA System "Control Room evacuation in progress." (HC)

☐ 3.2.2 **Place** MODE SWITCH HS-C72A-1S01 to **SHUTDOWN**.[5] (HC)

☐ 3.2.3 **Ensure** all Control Rods **INSERTED**. (HC)

☐ 3.2.4 **Insert** SRM's and IRM's. (HC)

☐ 3.2.5 **Close** HV-141-F022A,B,C,& D, HV-141-F028A,B,C & D, HV-141-F016 and HV-141-F019 MSIV's and MSL drains. [5] (HC)

☐ 3.2.6 **Close** HV-10603A, B & C RFP A, B & C DSCH ISO.[5] (HC)

☐ 3.2.7 **Trip** RFPT A, B & C, RFPT A, B & C TRIP RESET HS-12745A, B & C.[5] (HC)

☐ 3.2.8 **Place** FW LOW LOAD DEMAND LIC-C32-1R602 in **AUTO**. (HC)

☐ 3.2.9 **Open** HV-155-F011HPCI TEST LINE TO CST ISO. (HC)

☐ 3.2.10 **Take** two (2) sets of security keys from Shift Supervisor key cabinet to gain entrance into Reactor Building. (Unit Supervisor only) (HC)

☐ 3.2.11 **Take** PICSY laptop computer from under the Shift Supervisor's desk. (Unit Supervisor only) (HC)

☐ 3.3 **Evacuate** Main Control Room. (HC)

4. SUBSEQUENT OPERATOR ACTIONS

NOTE:	All indications and controls are from 1C201 unless otherwise indicated.

☐ 4.1 **IF** required to establish communication between Remote Shutdown Panel and locations in the plant, **Refer** to Attachment C for sound powered phone location.

NOTE:	Unit Two Remote Shutdown Panel Room phone extension is 3823.

4.2 **IF** Control Room evacuated prior to completing immediate operator actions, **Perform** locally:

4.2.1 **Open** the following breakers to Scram Reactor and isolate Inboard and Outboard MSIV's and Main Steam Line Drains:[5]

NOTE:	A screwdriver has been stored in JP1203 Sound Powered Phone Headset Storage Box (by A RPS Panel) if needed to open RPS panels.

☐ a. 1Y201A Bkr CB2A in RPS power distribution panel (Area 27/749')

☐ b. 1Y201B Bkr CB8B in RPS power distribution panel (Area 27/749')

4.2.2 Manually **Close** following valves (Area 11/729'):

☐ a. HV-10603A RFP A Dsch Iso

☐ b. HV-10603B RFP B Dsch Iso

☐ c. HV-10603C RFP C Dsch Iso

4.3 Upon arrival at Remote Shutdown Panel, **Perform** following to determine plant status and gain control of critical systems:

NOTE:	Attachment D contains lists of all functions performed by placing transfer switches to **EMERG** position.

☐ 4.3.1 As time and manpower allows, **Connect** the PICSY laptop per Attachment E.

NOTE:	Since the laptop is for monitoring purposes only, this should not impact completing the following steps to gain control of the plant.

4.3.2 **Transfer** control to Remote Shutdown Panel as follows, **Observe** Green Light **ILLUMINATES** for each transfer switch when placed in **EMERG** position:

☐ a. **Place** HSS-14901A INSTR TRANSFER SWITCH A INSTR SET 1, 2 in **EMERG** position (located near the top center of the panel).

☐ b. **Place** HSS-15110A INSTR TRANSFER SWITCH B INSTR SET 3, 4 in **EMERG** position (located near the top right of the panel).

c. **Transfer** HSS-14902A CONTROL TRANSFER SWITCH A as follows:

☐ (1) **Ensure** 1P-220 BAROMETRIC CDSR COND PUMP aligned to **AUTO**.

☐ (2) **Place** HSS-14902A CONTROL TRANSFER SWITCH A in **EMERG** position.

d. **Transfer** HSS-14902B CONTROL TRANSFER SWITCH M as follows:

☐ (1) **Ensure** HV-149-F059 TURB EXH TO SUPP POOL aligned to **OPEN**.

☐ (2) **Ensure** 1P-219 BAROMETRIC VACUUM PUMP aligned to **STOP**.

☐ (3) **Place** HSS-14902B CONTROL TRANSFER SWITCH M in **EMERG** position.

e. **Transfer** HSS-14903A CONTROL TRANSFER SWITCH B as follows:

☐ (1) **Ensure** HV-149-F060 VAC PP DSCH TO SUPP POOL aligned to **OPEN**.

☐ (2) **Place** HSS-14903A CONTROL TRANSFER SWITCH B in **EMERG** position.

☐ f. **Place** HSS-14903B CONTROL TRANSFER SWITCH N in **EMERG** position.

☐ g. **Place** HSS-14904A CONTROL TRANSFER SWITCH C in **EMERG** position.

☐ h. **Place** HSS-14905A CONTROL TRANSFER SWITCH D in **EMERG** position.

i. **Transfer** HSS-15111B CONTROL TRANSFER SWITCH R as follows:

☐ (1) **Ensure** SV-12651 INSTR GAS TO CONTN ISO aligned to **OPEN**.

☐ (2) **Place** HSS-15111B CONTROL TRANSFER SWITCH R in **EMERG** position.

☐ j. **Place** HSS-15112A CONTROL TRANSFER SWITCH F in **EMERG** position.

☐ k. **Place** HSS-15112B CONTROL TRANSFER SWITCH S in **EMERG** position.

☐ l. **Place** HSS-15113A CONTROL TRANSFER SWITCH G in **EMERG** position.

m. **Transfer** HSS-15113B CONTROL TRANSFER SWITCH T as follows:

☐ (1) **Ensure** HV-151-F006B SHUTDOWN CLG SUCT aligned to **CLOSE**.

☐ (2) **Ensure** HV-151-F010B RHR LOOP B CROSSTIE aligned to **CLOSE**.

☐ (3) **Place** HSS-15113B CONTROL TRANSFER SWITCH T in **EMERG** position.

NOTE:	Indication for HV-151-F010B RHR LOOP B CROSSTIE will not illuminate due to supply breaker being open.

n. **Transfer** HSS-15114A CONTROL TRANSFER SWITCH H as follows:

☐ (1) **Ensure** HV-151-F004B RHR PUMP B SUCT aligned to **OPEN**.

☐ (2) **Place** HSS-15114A CONTROL TRANSFER SWITCH H in **EMERG** position.

o. **Transfer** HSS-15114B CONTROL TRANSFER SWITCH U as follows:

☐ (1) **Ensure** SV-12605 INSTR GAS CMP OB SUCT ISO aligned to **OPEN.**

☐ (2) **Place** HSS-15114B CONTROL TRANSFER SWITCH U in **EMERG** position.

☐ p. **Place** HSS-15115A CONTROL TRANSFER SWITCH J in **EMERG** position.

q. **Transfer** HSS-15115B CONTROL TRANSFER SWITCH V as follows:

☐ (1) **Ensure** HV-151-F047B HX B SHELL SIDE INLET aligned to **OPEN**.

☐ (2) **Place** HSS-15115B CONTROL TRANSFER SWITCH V in **EMERG** position.

r. **Transfer** HSS-15116A CONTROL TRANSFER SWITCH K as follows:

☐ (1) **Ensure** HV-151-F003B HX B SHELL SIDE OUTLET aligned to **OPEN**.

☐ (2) **Place** HSS-15116A CONTROL TRANSFER SWITCH K in **EMERG** position.

☐ s. **Place** HSS-15116B CONTROL TRANSFER SWITCH W in **EMERG** position.

☐ t. **Place** HSS-15117A CONTROL TRANSFER SWITCH L in **EMERG** position.

☐ u. **Place** HSS-15117B CONTROL TRANSFER SWITCH X in **EMERG** position.

4.3.3 **Ensure** Main Steam Lines **ISOLATED** by **EITHER**:

☐ a. **Observing** IB MSIV's indicate **CLOSED**.

☐ b. LOCALLY **Observing** OB MSIV's **CLOSED**.

☐ 4.3.4 **Monitor** available parameters to determine plant status.

NOTE (1):	If PICSY computer available all information that was available in the control room via computer displays will be available at the Remote Shutdown Panel using the PICSY laptop computer.
NOTE (2):	If PICSY computer is not available, the following step is not necessary for control of the plant, but will make the control by the operators smoother.

☐ 4.3.5 **IF** PICSY is not available **Notify** I&C to install:

a. Temporary level indication in accordance with IC-180-004, LT-B21-1N027 Reactor Range Level Measurement at Rack 1C005.

b. Temporary reactor coolant temperature indication in accordance with IC-149-005, Installation and Removal of Temporary RTD Readers for Local Monitoring of RHR Heat Exchanger B Inlet (TE-E11-1N004B) and Outlet (TE-E11-1N027B)Temperatures.

☐ 4.3.6 If PICSY is not available and the Control Room was evacuated prior to scramming the reactor, ensure the reactor scrammed by locally observing the positions of the scram valves on a few HCUs. (The scram valve indication should be open (up) for both inlet and exhaust valves.

NOTE:	Transferring HSS-14454 CONTROL TRANSFER SWITCH Y to **EMERG** will cause RWCU OB ISO HV-144-F004 to close. Opening Breaker 18 in 1Y219 will de-energize SV-14433 closing HV-144F033.

4.4 **IF** there is indication of RWCU piping leak **OR** indication of flow being diverted to condenser or Radwaste through RWCU, **Perform** the following:[2, 4[82]]

☐ 4.4.1 **Place** HSS-14454 CONTROL TRANSFER SWITCH Y to **EMERG** (located near the top of the panel)
AND

☐ 4.4.2 **Observe** Green Light **ILLUMINATED**.

☐ 4.4.3 **Open** Breaker 1Y219-018 (Area 29/719').

4.5 **IF** Control Room evacuation was because of fire:

4.5.1 **Verify** that the following Control Structure HVAC Systems are operating:[1]

☐ a. Computer Room Floor Cooling System

☐ b. Control Room Floor Cooling System

☐ c. Control Structure H&V System

☐ d. Battery Room Exhaust System

☐ **IF** one or more of the above systems are found inoperable, **Enter** ON-030-001, Loss of Control Structure HVAC within 3 hours.

☐ 4.5.2 **Perform** DC-OP-001, Post Fire Recovery Actions within 8 hours.[1]

CAUTION

RHR Pump 1P202A may spuriously start preventing Unit 2 from running RHR Pump 2P202A when required.

4.5.3 **IF** RHR Pump 1P202A must be tripped, **Perform** the following at 1A20102:[1,4[68]]

☐ a. **Place** Lateral Control Switch to **HANDLE OUT** position.

☐ b. **Place** Lateral Control Switch to **OPEN**.

4.5.4 **IF** Suppression Pool Level drops below 22 feet, **WITHIN 10 HOURS**:

☐ a. **Ensure** no systems are in operation that could cause the decrease.

☐ b. **Ensure** no other condition(s) exist that could cause the decrease.

☐ c. Locally **Close** manual valve 157025 (Area 27/645').

4.5.5 **IF** the fire has caused hot shorts that have resulted in damage to MOVs required for the operation of RCIC, RHR Suppression Pool Cooling or RHR Shutdown Cooling from the Remote Shutdown Panel, **Depressurize** the RPV using the available SRVs and **Use** RHR/LPCI in the alternate shutdown cooling mode in accordance with ON-149-001.

CAUTION

Fires in the Control Room could cause an inadvertent and uncontrolled RPV injection from either Condensate, Core Spray, or the RHR Division not installed on the RSP. The SRV discharge piping has been analyzed for the loading conditions that will result from this condition. To minimize the loads on the SRV discharge piping, assure that an SRV is open as RPV pressure is being reduced and the RPV pressure approaches the shutoff head for each of these systems (Condensate approximately 600 psig; Core Spray and RHR approximately 300 psig). Should Condensate begin to inject, monitor RPV level to assure that the fire has not damaged the FW LO LOAD controller prior to closing the SRV.

4.6 To control reactor pressure **Perform** the following:

NOTE: Relief mode of SRV's A, B, and C will not auto initiate when applicable Control Transfer Switches are in EMERG position, however, safety function is always operable. Also when SRV Transfer Switches are in EMERG spurious auto actuation is prevented due to a Control Room fire.[1]

4.6.1 **Ensure** following valves **OPEN**:

☐ a. SV-12651 INSTR GAS TO CONTN ISO.

☐ b. SV-12605 INSTR GAS CMP OB SUCT ISO.

CAUTION

Level 1 (-129") or high drywell pressure (1.72 psig) LOCA Isolation Signal is defeated for CIG valves when controlled from the remote shutdown panel.

NOTE: Placing HSS-15114B Transfer Switch U in **EMERG** causes Instr Gas CMP OB suction to cycle possibly tripping CIG compressors on low suction pressure.

4.6.2 **IF** CIG Compressors tripped, **Reset** as follows at 1C239 (Area 25/719'):

☐ a. **Depress** Logic Reset push button.

☐ b. **Ensure** CIG Compressor **STARTS**.

4.6.3 **Operate** SRV's as follows:[1,4[70]]

CAUTION (1)

If RPV pressure drops below 650 psig, condensate pumps will inject when RPV level < +35 inches.

CAUTION (2)

Wide range level indication becomes less accurate as RPV pressure decreases.

☐ a. **Open** SRV's A, B, and C as needed.

NOTE: Keys to operate SRV's are located in sealed Pink sound powered phone storage box, labeled "JP1207, JP1402, JP2201," inside the Remote Shutdown Panel Room.

☐ b. **IF** pneumatic supply to SRV's A, B, and C not available, **Operate** SRV's G, J, K, L, M, or N (ADS valves) individually from upper (lower) relay room Panel 1C628 (1C631) using Keylock switches.

☐ c. **Refer** to Attachment A for RPV Pressure/Temperature Correlation.

☐ 4.6.4 **Plot** cooldown in accordance with Attachment A and B.

CAUTION

RCIC will not trip on high vessel level +54".

☐ a. **WHEN** desired to place Shutdown Cooling in service, **Raise** RPV level to 90 - 100 inches.

NOTE: A loss of condensate transfer will cause a loss of RHR keepfill and will prevent the ability to place shutdown cooling in service. ON-037-001 provides instructions on how to establish an alternate source of keepfill.

☐ b. **IF** condensate transfer is lost, **Enter** ON-037-001, Loss of Condensate Transfer System.

☐ c. **IF** shutdown cooling is lost, **Enter** ON-149-001, Loss of RHR Shutdown Cooling.[4[81]]

☐ d. **WHEN** reactor pressure < 98 psig, **Align** RHR System Loop A for Shutdown Cooling in accordance with OP-149-002, RHR operation in Shutdown Cooling Mode.

4.7 Diesel Generator Local Start

☐ 4.7.1 **IF** required, **Perform** ON-104-001 Unit 1 Response to Loss of All Offsite Power.

☐ 4.7.2 **IF** B Loop of ESW not available or cannot be placed in service, **Place** A Loop ESW in service from Unit 2 Remote Shutdown Panel 2C201 in accordance with OP-054-001, Emergency Service Water system (ESW).

☐ 4.7.3 **IF** required, **Start** Diesel Generators A(B)(C)(D)(E) locally at 0C521A(B)(C)(D)(E) in accordance with OP-024-001, Diesel Generators.

4.8 Re-energizing a 4.16KV ESS bus[1,4[33]]

4.8.1 **IF** the Diesel Generator breaker to the 4.16KV ESS Bus fails to close, **Perform** following at 1A20104 (1A20204) (1A20304)(1A20404) (Area 29/749', Area 28/749', Area 29/719', Area 28/719' respectively):

☐ a. **Ensure** breaker control power in breaker cubicle available by **CLOSING** DC Ctl Power Knife Switch in 1A20104 (1A20204)(1A20304)(1A20404).

☐ b. **Ensure** effects of breaker operation and associated interlocks have been evaluated.

☐ c. **Ensure** Closing Spring Charging Motor operates.

☐ d. **WHEN** Closing Spring is charged, **Operate** Breaker as desired, using Lateral Control Switch.

4.9 **Dispatch** Operators to **Ensure** the following:

☐ 4.9.1 Main Turbine **TRIPPED**.

☐ 4.9.2 Generator **TRIPPED** by observing Output Breakers **OPEN**.

☐ 4.9.3 At 13.8 KV Switchgear (Area 4/699') , Auxiliary Buses **TRANSFERRED** to Startup Bus 10 indicated by Breakers 1A10101 and 1A10201 **OPEN** and Breakers 1A10104 & 1A10204 **CLOSED** with voltage on bus.

☐ 4.9.4 Main Suction Pump and Turning Gear Oil Pump auto **START**.

☐ 4.9.5 Lift pumps auto **START**.

☐ 4.9.6 Turning Gear **ENGAGES** Main Turbine.

☐ 4.9.7 Reactor Feed Pump Turbines **TRIP**.

4.9.8 1P401A & 1P401B Reactor Recirculation Pumps remain at minimum speed at 1S137A(B) Servo Controller as follows:

NOTE:	Reactor Recirculation Pumps 1A & 1B should be at Limiter No. 1 (30%) due to low feedwater flow at this point.

☐ a. **Remove** top cover.

☐ b. **Place** Control Power Switch **OFF**.

4.10 IF 1P401A(B) Reactor Recirc Pump must be tripped and cannot be tripped from Control Room, MANUALLY **Trip** Recirc by **EITHER** a, b, c or d:[4[43]]

4.10.1 At 1S134A(B) M. G. Set A1(B1) Drive Motor cubicle 1A10110 (1A10210) (Area 4/699'):

☐ a. **Push UP** on the Plunger marked "Lift Plunger to Open."

☐ b. IF concern exists that Pump may restart automatically due to fire, **Open** Control and Trip DC Power Knife Switch.

4.10.2 IF accessible, at 1P401A Reactor Recirc Pump 1A 1A20501(1A20502) RPT Bkr (Area 29/749'):

☐ a. **Push UP** on the Plunger marked "Lift Plunger to Open."

☐ b. IF concern exists that Pump may restart automatically due to fire, **Open** Control and Trip DC Power Knife Switch.

4.10.3 IF accessible, at Reactor Recirc Pump 1B 1P401B (RPT) Bkr 1A20601(1A20602) (Area 28/749'):

☐ a. **Push UP** on the Plunger marked "Lift Plunger to Open."

☐ b. IF concern exists that Pump may restart automatically due to fire, **Open** Control and Trip DC Power Knife Switch.

4.10.4 At reactor Recirc Pp MG Set A(B) Exciter & Local Bkr Cubicle 1C062A(B) (Area 11/729'):

NOTE:	Generator Speed will increase to Motor Speed.

☐ a. **Open** MG Set A(B) Gen Local Ckt Bkr (Field Breaker) by **Depressing** Trip Push Button.

☐ b. **Observe** MG Set A(B) Gen Fld Current **DECREASE**.

c. IF desired, 1S134A(B) MG Set A1(B1) Drive Motor Cubicle 1A10110 (1A10210) can be opened (with no load on pump) by:

☐ (1) **Push UP** on the Plunger marked "Lift Plunger to Open."

☐ (2) **IF** desired, **Open** Control and Trip DC Power Knife Switch.

NOTE:	Fire induced cable faults may cause a loss of scram discharge volume isolation capability.

☐ 4.11 **IF** it is unlikely the control room will be manned within 6 hours at Area 28/719', **Close** 147002A and 147002B and **Open** 147007 to vent air header.[4[87]]

☐ 4.12 **WHEN** Control Room becomes available, **Proceed** to OP-100-001 to return control to Control Room from Remote Shutdown Panel.

4.13 **Forward** completed copy of this procedure to the following for review:

4.13.1 Shift Manager _____ / _____
Signature Date

4.13.2 Assistant Operations Manager - Shift Operations _____ / _____
Signature Date

4.14 **Forward** copy of this reviewed procedure to:

4.14.1 DCS

5. REFERENCES

5.1 FSAR 7.4.1.4

5.2 E-153 Sh 4, 9-18, 20, 24, 36-41, 44

5.3 E-185 Sh 5, 10-13

5.4 J-451 Sh 1-3

5.5 Susquehanna Fire Protection Review Report [1]

5.6 PLI-74583 App R HOT SHORTS Procedure Change Request [2]

5.7 E-690 Appendix R Safe Shutdown Manual Actions List [4]

5.8 PLA-4505 Appendix R Spurious Operations Criteria [3]

5.9 EC-013-0859, Appendix R Analysis for a Control Room Fire [5]

6. DISCUSSION

This procedure assumes EOP's are entered and providing directions for parameter control and is designed to shut down the plant from outside the Control Room by using the Remote Shutdown Panel and manual operations in the plant. Since the Control Room will be evacuated, Unit 2 will be implementing ON-200-009 at the same time. Transfer of control to the Remote Shutdown Panel bypasses Main Control Room devices and transfers component's control power to alternate supply.

The operation of systems and equipment needed for safe shutdown are those systems necessary to perform the following functions:

a. REACTIVITY CONTROL: RPS manual SCRAM from Control Room.

b. REACTOR COOLANT MAKEUP: RCIC and RHR injection.

c. REACTOR DEPRESSURIZATION and HEAT REMOVAL: Operating one of three specific SRV's from Remote Shutdown Panel or ADS SRV's locally in Relay Rooms. Shutdown Cooling and Suppression Pool Cooling are used for heat removal.

d. SUPPORT FUNCTIONS:

1. RHR Service Water which removes heat from the Suppression Pool in the Suppression Pool Cooling Mode or the Reactor Loop through the Heat Exchanger in Shutdown Cooling.

2. Emergency Service Water which provides cooling for equipment through the appropriate Room Coolers.

3. Control Structure HVAC which is utilized to cool the Control Structure. Control Structure HVAC may not be available (and is not required) during an Appendix R fire event provided the actions in ON-030-001 are completed when required.

4. Diesel Generators and batteries which supply power to the various components with the AC and DC distribution system.

Evacuation of the main Control Room should only occur after reasonable efforts have been utilized including use of respiratory equipment. Upon leaving the Control Room: the reactor is scrammed, the MSIV's and RFP discharge valves are closed, and the RFP's are tripped. If Control Room actions cannot be performed, all functions can be performed outside the Control Room. I&C is notified to install temporary remote level and temperature indication. Wide range level instrumentation is increasingly less accurate as pressure decreases. At approximately 200 psig, wide range level instrument indicates +60" when actual level is 0". Temperature indication is not available at the shutdown panel to monitor reactor coolant temperature. While the reactor is pressurized, coolant temperature is derived from RPV pressure using the saturation curve on Attachment A. Once the reactor is depressurized, coolant temperature is unavailable at the remote shutdown panel.

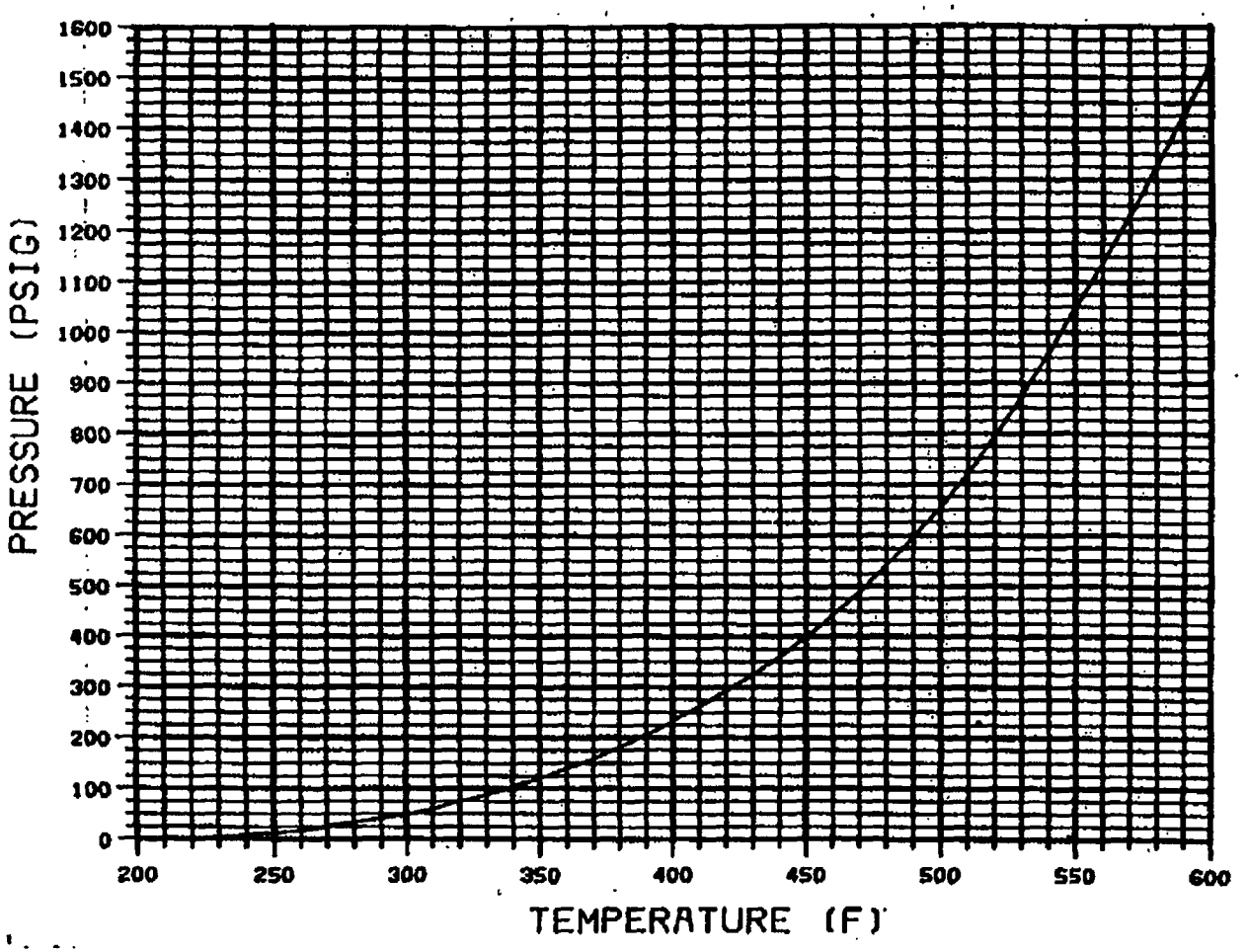
This procedure, and in conjunction with appropriate EOP's, ON's, OP's, etc., will:

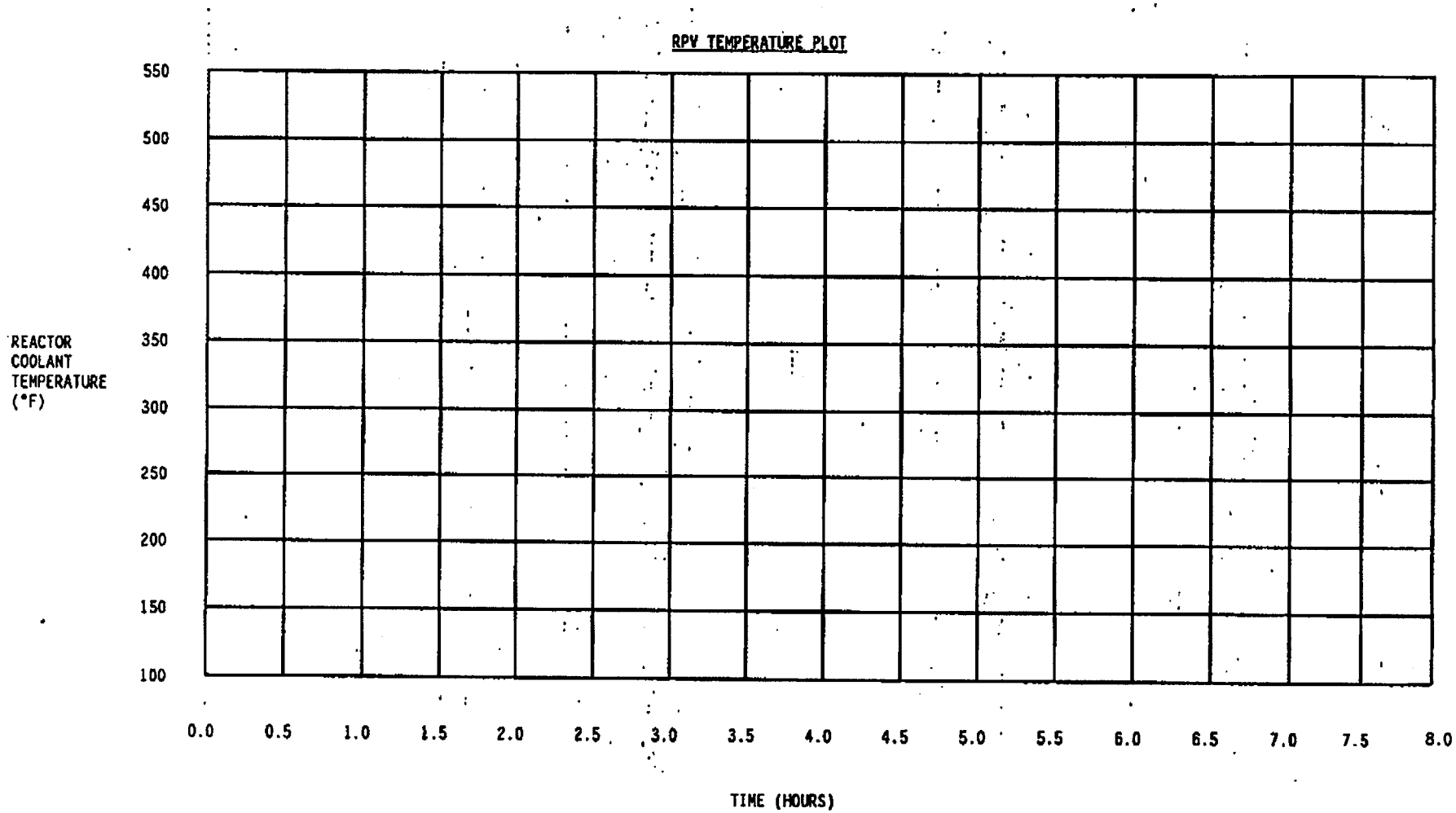
(a) Achieve and maintain subcritical reactivity conditions.
(b) Maintain Reactor coolant inventory.
(c) Achieve Hot Shutdown.
(d) Achieve and maintain Cold Shutdown.

Transfer switches are wired very differently in Unit 1 RSP as compared to Unit 2 RSP. This requires procedure steps to be implemented differently on each unit.

Fire in the Control Room could cause hot shorts with the potential to damage MOVs required to be operated at the Remote Shutdown Panel. As a minimum, those valves required for the operation of RHR/LPCI in the alternate shutdown cooling mode as outlined in Plant Procedure ON-149-001 have been modified to be protected from damage caused by hot shorts.

PRESSURE VS TEMPERATURE
FOR
SATURATED STEAM




RPV TEMPERATURE PLOT
REACTOR COOLANT TEMPERATURE (°F)
550
500
450
400
350
300
250
200
150
100
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
TIME (HOURS)

SOUND POWERED PHONE LOCATIONS

Jack Plate Identification	Location	(Area/Elevation)
Loop 2 Remote Shtdwn (JP1201)	1A201 4.16 KV Switchgear Room	(29/749)
Loop 2 Remote Shtdwn (JP1202)	1A202 4.16 KV Switchgear Room	(28/749)
Loop 2 Remote Shtdwn (JP1203)	RPS M/G Set	(30/762)
Loop 2 Remote Shtdwn (JP1204)	1A203 4.16 KV Switchgear Room	(29/719)
Loop 2 Remote Shtdwn (JP1205)	1A204 4.16 KV Switchgear Room	(28/719)
Loop 2 Remote Shtdwn (JP1206)	CS HVAC Local Panel	(21/783)
Loop 2 Remote Shtdwn (JP1207)	Unit 1 Remote Shutdown Panel Room	(25/670)
Loop 2 Remote Shtdwn (JP1208)	13.8 KV Switchgear 1A101/1A102	(8/699)
Loop 2 Remote Shtdwn (JP1209)	Lower Relay Room	(12/698)
Loop 2 Remote Shtdwn (JP1210)	A D/G Room	(44/677)
Loop 2 Remote Shtdwn (JP1211)	B D/G Room	(44/677)
Loop 2 Remote Shtdwn (JP1212)	C D/G Room	(43/677)
Loop 2 Remote Shtdwn (JP1213)	D D/G Room	(43/677)
Loop 2 Remote Shtdwn (JP1214)	E D/G Room	(43/677)
Loop 2 Remote Shtdwn (JP1215)	Unit 2 Remote Shutdown Panel Room	(32/670)
Loop 3 Remote Shtdwn (JP1216)	Upper Relay Room	(12/754)
Loop 2 Remote Shtdwn (JP2201)	Unit 1 Remote Shutdown Panel Room	(25/670)
Loop 2 Remote Shtdwn (JP2205)	Unit 2 Remote Shutdown Panel Room	(32/670)

General Notes:

(1) A maximum of 6 jack plates can be used at one time.

(2) Sound Powered Phone Headsets are located in a sealed box near the jack plate.

(3) Can establish communications between any 2 to 6 locations listed above.

(4) Jack Plates and Headsets storage boxes are color coded Pink.

(5) Communications between Unit 1 and Unit 2 Remote Shutdown Panel use either:

JP1207 to JP1215 OR JP2205 to JP2201

1. HSS-14901A INSTR TRANSFER SW A (INSTR SET 1, 2)
   a. TI-15751 SUPPRESSION POOL WATER TEMP
   b. PI-14262 REACTOR VESSEL PRESSURE
   c. LI-14262 REACTOR VESSEL LEVEL
   d. SI-15001B RCIC TURBINE SPEED
   e. FI-14903 RCIC PUMP INJECTION FLOW
   f. FIC-14903 RCIC TURBINE FLOW CONTROLLER
   g. HV-141-F022 MAIN STEAM LINE 1B ISO VLVS
2. HSS-15110A INSTR TRANSFER SW B (INSTR SET 3, 4)
   a. PI-15728B CONTAINMENT PRESSURE
   b. TI-15790B2 CONTAINMENT TEMPERATURE
   c. LI-15776B2 SUPPRESSION POOL LEVEL
   d. TI-15725B SUPPRESSION POOL AIR TEMP
   e. FI-11207B RHR SERV WATER SYSTEM FLOW
   f. FI-15105 RHR SYSTEM FLOW
   g. TI-15752 SUPPRESSION POOL WATER TEMP (in case at far right)
3. HSS-14902A CONTROL TRANSFER SWITCH A
   a. HV-149-F031 PUMP SUCT FROM SUPP POOL — E-154 SH 10
      (1) CONTROL AND INDICATION
      (2) DEFEAT AUTO OPEN ON LOW CST LEVEL
   b. 1P-220 BAROMETRIC CDSR COND PUMP — E-154 SH 2
      (1) CONTROL AND INDICATION
      (2) PUMP WILL AUTO CYCLE WITH LEVEL

c. TRANSFERS POWER SOURCE TO RCIC FROM EMG TURB SPEED CONTROL BOX — E-154 SH 39

d. HV-149-F046 RCIC BARO CONDENSER SPRAY — E-154 SH 9

(1) OPEN SIGNAL TO VALVE

4. HSS-14902B CONTROL TRANSFER SWITCH M

a. HV-149-F059 TURB EXH TO SUPP POOL — E-154 SH 14

(1) CONTROL AND INDICATION

(2) NO AUTO FUNCTIONS EXIST

b. HV-149-F010 PUMP SUCT FROM CST — E-154 SH 11

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON HV-149-F031 FULL OPEN

(3) DEFEAT AUTO OPEN ON INITIATION SIGNAL AND HV-149-F031 NOT FULL OPEN

c. 1P-219 BAROMETRIC VACUUM PUMP — E-154 SH 1

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO START ON INITIATION SIGNAL

d. TRANSFERS POWER SOURCE TO RCIC TURB TRIP SOLENOID, HOWEVER, TRIP SIGNAL RELAY K8 IS BYPASSED

5. HSS-14903A CONTROL TRANSFER SWITCH B

a. HV-15012 TURBINE TRIP AND THROTTLING — E-154 SH 8

(1) CONTROL AND INDICATION

(2) NO FUNCTIONS BYPASSED

b. FV-149-F019 MIN FLOW TO SUPP POOL — E-154 SH 12

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO OPEN ON HIGH PRESS AND LOW FLOW

(3) DEFEAT AUTO CLOSE ON HIGH FLOW, STOP VLV CLOSURE, OR STEAM ADMISSION VLV CLOSURE

c. HV-149-F060 VAC PP DSCH TO SUPP POOL E-154 SH 13

(1) CONTROL AND INDICATION

(2) NO AUTO FUNCTIONS EXIST

d. HV-149-F062 RCIC TURB EXH OB VAC BKR E-154 SH 17

(1) INDICATION

(2) SEE HSS-14904A FOR BALANCE OF LOGIC

6. HSS-14903B CONTROL TRANSFER SWITCH N

a. HV-149-F045 STEAM TO RCIC TURBINE E-154 SH 5

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO OPEN ON INITIATION SIGNAL

(3) DEFEAT AUTO CLOSE ON +54 INCH SHUTDOWN SIGNAL

b. HV-149-F012 RCIC PUMP DSCH E-154 SH 6

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO OPEN ON INITIATION SIGNAL

c. HV-149-F022 TEST LINE ISO TO CST E-154 SH 15

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON INITIATION SIGNAL

(3) DEFEAT AUTO CLOSE ON HV-249-F031 OPEN

(4) HV-149-F013, RCIC INJECTION, MUST BE CLOSED TO OPEN VLV ALSO WILL CLOSE F022 IF F013 LEAVES FULL CLOSED POSITION.

7. HSS-14904A CONTROL TRANSFER SWITCH C

   a. HV-149-F008 STEAM SUPPLY OB ISO — E-154 SH 3

      (1) CONTROL AND INDICATION

      (2) DEFEAT AUTO CLOSE ON ISOLATION SIGNAL

   b. HV-149-F013 RCIC INJECTION — E-154 SH 7

      (1) CONTROL AND INDICATION

      (2) DEFEAT AUTO OPEN ON INITIATION SIGNAL

      (3) DEFEAT AUTO CLOSE ON +54 SHUTDOWN SIGNAL

   c. HV-149-F062 TURB EXH OB VAC BKR — E-154 SH 17

      (1) CONTROL AND INDICATION

      (2) DEFEAT AUTO CLOSE ON LOW VESSEL PRESS WITH HIGH CONTAINMENT PRESS

      (3) SEE HSS-14903A FOR BALANCE OF LOGIC

8. HSS-14905A CONTROL TRANSFER SWITCH D

   a. HV-149-F007 STEAM SUPPLY IB ISO — E-154 SH 4

      (1) CONTROL AND INDICATION

      (2) DEFEAT AUTO CLOSE ON ISOLATION SIGNAL

      (3) CAN BE OPENED WITH ISOLATION SIGNAL PRESENT

   b. HV-143-F023B RECIRC PUMP B SUCTION — E-151 SH 8

      (1) CONTROL AND INDICATION

      (2) NO AUTO FUNCTIONS EXIST

   c. HV-149-F084 TURB EXH IB VAC BKR — E-154 SH 16

      (1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON LOW VESSEL PRESSURE WITH HIGH CONTAINMENT PRESS

9. HSS-15111B CONTROL TRANSFER SWITCH R

a. SV-12651 INSTR GAS TO CONTN ISO — E-172 SH 17

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON CONTAINMENT ISOLATION

(3) VALVE WILL AUTO CLOSE DURING TRANSFER

b. PSV-141-F013A SAFETY RELIEF VALVE A — E-180 SH 1

(1) CONTROL (NO INDICATION ON RSP)

(2) DEFEAT RELIEF FUNCTION

10. HSS-15112A CONTROL TRANSFER SWITCH F

a. HV-12603 INSTR GAS CMP IB SUCT ISO — E-172 SH 2

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON ISOLATION SIGNAL

b. HV-151-F009 SHUTDOWN CLG SUCT IB ISO — E-153 SH 5

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON RHR NSSSS ISOLATION

(3) 98 PSIG VESSEL HIGH PRESSURE WILL ISOLATE VLV, 125V DC POWER, DOES NOT REQUIRE RESET

c. PSV-141-F013C SAFETY RELIEF VALVE C — E-180 SH 1

(1) CONTROL (NO INDICATION ON RSP)

(2) DEFEAT RELIEF FUNCTION

11. HSS-15112B CONTROL TRANSFER SWITCH S

a. HV-151-F040 RADWASTE IB ISO — E-153 SH 40

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON NSSSS ISOLATION SIGNAL

b. PSV-141-F013B SAFETY RELIEF VALVE B — E-180 SH 1

(1) CONTROL (NO INDICATION ON RSP)

(2) DEFEAT RELIEF FUNCTION

c. HV-151-F006A SHUTDOWN CLG SUCT — E-153 SH 20

(1) CLOSE SIGNAL TO VALVE

d. HV-151-F006C SHUTDOWN CLG SUCT — E-153 SH 20

(1) CLOSE SIGNAL TO VALVE

12. HSS-15113A CONTROL TRANSFER SWITCH G

a. HV-151-F008 SHUTDOWN CLG SUCT OB ISO — E-153 SH 15

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON RHR NSSSS ISOLATION

(3) 98 PSIG VESSEL HIGH PRESSURE WILL ISOLATE VLV, 125 V DC POWER, DOES NOT REQUIRE RESET

b. HV-112-F073B RHR SW CROSS TIE — E-150 SH 29

(1) CLOSE SIGNAL TO VALVE

13. HSS-15113B CONTROL TRANSFER SWITCH T

a. HV-151-F006B SHUTDOWN CLG SUCT — E-153 SH 36

(1) CONTROL AND INDICATION

(2) DEFEAT INTERLOCK THAT REQUIRES HV-151-F028A CLOSED TO OPEN VALVE

(3) STILL HAVE INTERLOCK THAT REQUIRES HV-141-F004A CLOSED TO OPEN VALVE

b. HV-151-F010B RHR LOOP B CROSS-TIE — E-153 SH 112

(1) CONTROL AND INDICATION

(2) NO AUTO FUNCTIONS EXIST

c. HV-151-F006D SHUTDOWN CLG SUCT — E-153 SH 20

(1) CLOSED SIGNAL TO VALVE

d. HV-151-F016B RHR DRYWELL SPRAY OB ISO — E-153 SH 114

(1) CLOSE SIGNAL TO VALVE

14. HSS-15114A CONTROL TRANSFER SWITCH H

a. HV-151-F004B RHR PUMP B SUCT — E-153 SH 10

(1) CONTROL AND INDICATION

(2) HV-151-F006B MUST BE CLOSED TO OPEN VALVE

b. HV-151-F017B RHR INJ FLOW CTL — E-153 SH 14

(1) CONTROL AND INDICATION

(2) DEFEAT INTERLOCK WITH HV-151-F015B

(3) DEFEAT AUTO OPEN ON LOCA SIGNAL

c. HV-151-F049 RADWASTE OB ISO — E-153 SH 39

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON OB CONTAINMENT ISO

(3) CAN BE OPENED WITH ISO SIGNAL PRESENT

15. HSS-15114B CONTROL TRANSFER SWITCH U

a. 1P-202B RHR PUMP B — E-153 SH 4

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO START ON LOCA SIGNAL

(3) DEFEAT AUTO TRIP WITH NO SUCTION PATH ALIGNED

(4) DEFEAT LOCA/FALSE LOCA TRIP

(5) START DELAYED 3 SECONDS IF DG SUPPLYING BUS

(6) 2B RHR PUMP MUST BE SHUTDOWN TO START

b. HV-151-F024B TEST LINE CTL throttle valve E-153 SH 13

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON LOCA SIGNAL

c. SV-12605 INSTR GAS CMP OB SUCT E-172 SH 5

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON CONTAINMENT ISOLATION

(3) VALVE WILL CYCLE CLOSED DURING TRANSFER TRIPPING CIG COMPRESSORS

16. HSS-15115A CONTROL TRANSFER SWITCH J

a. HV-151-F007B RHR PP B/D MIN FLOW Common to Both pumps E-153 SH 93

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO OPEN ON LOW FLOW

(3) DEFEAT AUTO CLOSE ON HIGH FLOW

b. HV-151-F028B SUPP CHMBR SPRY TEST SHUTOFF E-153 SH 12

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO CLOSE ON LOCA SIGNAL

17. HSS-15115B CONTROL TRANSFER SWITCH V

a. HV-151-F048B HX B SHELL SIDE BYPS E-153 SH 9

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO OPEN ON LOCA SIGNAL

b. HV-151-F047B HX B SHELL SIDE INLET — E-153 SH 107

(1) CONTROL AND INDICATION

(2) NO AUTO FUNCTIONS EXIST

c. HV-151-F103B HX B VENT — E-153 SH 94

(1) CONTROL AND INDICATION

(2) NO AUTO FUNCTIONS EXIST

d. HV-151-F027B SUPP CHMBR SPRAY CTL — E-153 SH 115

(1) CLOSE SIGNAL TO VALVE

18. HSS-15116A CONTROL TRANSFER SWITCH K

a. HV-151-F015B RHR INJ OB ISO — E-153 SH 16

(1) CONTROL AND INDICATION

(2) DEFEAT AUTO OPEN ON LOCA SIGNAL

(3) DEFEAT INTERLOCK WITH HV-151-F017A

(4) DEFEAT INTERLOCK WITH VESSEL HIGH PRESS

(5) DEFEAT AUTO CLOSE ON +13 INCH SDC ISOLATION

b. HV-151-F003B HX B SHELL SIDE OUTLET — E-153 SH 11

(1) CONTROL AND INDICATION

(2) NO AUTO FUNCTIONS EXIST

c. HV-151-F104B HX B VENT — E-153 SH 94

(1) CONTROL AND INDICATION

(2) NO AUTO FUNCTIONS EXIST

19. HSS-15116B CONTROL TRANSFER SWITCH W

    a. HV-11215B RHRSW HX B OUTLET — E-150 SH 12

        (1) CONTROL AND INDICATION

        (2) NO AUTO FUNCTIONS EXIST

    b. HV 01222B ESW POND LOOP B SPRAY BYPASS — E-150 SH 4

        (1) CONTROL AND INDICATION

        (2) VALVE WILL AUTO OPEN ON PUMP START OR ON LAST PUMP SHUTDOWN

    c. 1P506B 1B RHRSW PUMP — E-150 SH 13

        (1) CONTROL AND INDICATION (PARTIAL)

        (2) DEFEATS LOCA TRIP

        (3) SEE HSS-15117B TRANSFERS REMAINING CONTROL AND INDICATION

20. HSS-15117A CONTROL TRANSFER SWITCH L

    a. HV-11210B RHRSW HX B INLET — E-150 SH 11

        (1) CONTROL AND INDICATION

        (2) NO AUTO FUNCTIONS EXIST

    b. OP-504B ESW PUMP B — E-146 SH 3 & 4

        (1) CONTROL AND INDICATION

        (2) ENABLES INDICATION AT U2 RSP

        (3) PUMP WILL START WITH D/G

        (4) DEFEATS LOCA/LOOP RESET LOGIC

    c. HV-01224B1 ESW POND SPR IN B1 — E-150 SH 8

        (1) CONTROL AND INDICATION

(2) NO AUTO FUNCTIONS EXIST

21. HSS-15117B CONTROL TRANSFER SWITCH X

a. 1P-506B RHRSW PUMP B — E-150 SH 2

(1) CONTROL AND INDICATION (PARTIAL)

(2) SEE HSS-15116B TRANSFERS REMAINING CONTROL AND INDICATION

b. OP-504D ESW PUMP D — E-146 SH 7 & 8

(1) CONTROL AND INDICATION

(2) ENABLES INDICATION AT U2 RSP

(3) PUMP WILL START WITH D/G

(4) DEFEATS LOCA/LOOP RESET LOGIC

c. HV-01224B2 ESW POND SPR IN B2 — E-150 SH 8

(1) CONTROL AND INDICATION

(2) NO AUTO FUNCTIONS EXIST

22. HSS-14454 CONTROL TRANSFER SWITCH Y

a. HV-144-F004 RWCU OB ISO — E-165 SH 7

(1) CLOSE SIGNAL TO VALVE

(2) THERMAL OVERLOADS BYPASSED

INSTRUCTIONS FOR CONNECTING PICSY LAPTOP COMPUTER AT REMOTE SHUTDOWN PANEL

1. Equipment needed:

   1.1 PICSY laptop computer.

   1.2 Lancast 4318 box with power cord and thin wire (located in laptop case).

   1.3 Fiber Optic Cable (located in laptop case).

   1.4 20' extension cord with multioutlet end stored in cabinet at remote shutdown panel.

2. **Connect** Lancast 4318 box as follows:

☐ 2.1 **Connect** one end of purple marked fiber optic cable to PICSY LAN terminal box TB1654 port B (located behind Remote Shutdown Panel on north wall of room head high). DO NOT BEND THE CABLE END. A tooth on the inside of the plug MUST be aligned with a slot on the terminal box.

☐ 2.2 **Connect** unmarked fiber optic cable to PICSY LAN terminal box TB1654 port A.

☐ 2.3 **Connect** other end of purple marked fiber optic cable to Lancast 4318 port labeled TX.

☐ 2.4 **Connect** unmarked fiber optic cable to Lancast 4318 port labeled RX.

☐ 2.5 **Connect** Lancast plug in transformer to 110 vac source.

☐ 2.6 **Connect** power supply to Lancast 4318 box power connection.

☐ 2.7 **Connect** gray thinwire to Lancast 4318 port labeled COAX.

3. **Connect** Lancast 4318 box to PICSY laptop computer as follows:

☐ 3.1 **Connect** thinwire to bottom PCMCIA port with 3COM symbol facing up (PCMCIA port can be found on left side of laptop behind access cover labeled PCMCIA).

☐ 3.2 **Connect** gray thinware to PCMCIA connector.

4. **Connect** laptop as follows:

☐ 4.1 **Connect** laptop power cord to 110 vac power source.

☐ 4.2 **Connect** power cord to back of laptop.

☐ 4.3 **Turn on** powerstrip.

NOTE:	Trackball buttons are on top of surface of laptop behind trackball.

CONTROL ROOM EVACUATION IMMEDIATE ACTIONS
(Reference Section 3.2, 3.3)

- ☐ 1. **ANNOUNCE** twice over Plant PA System "Control Room Evacuation in progress."
- ☐ 2. **PLACE** MODE SWITCH HS-C72A-1S01 to **SHUTDOWN**.
- ☐ 3. **ENSURE** all Control Rods **INSERTED**.
- ☐ 4. **INSERT** SRM's and IRM's.
- ☐ 5. **CLOSE** MSIV's and MSL drains.
- ☐ 6. **CLOSE** HV-10603A, B, & C RFP A, B, & C DSCH ISO
- ☐ 7. **TRIP** RFPT A, B, C.
- ☐ 8. **PLACE** FW LOW LOAD LIC-C32-1R602 in **AUTO**.
- ☐ 9. **OPEN** HV-155-F011 HPCI TEST LINE TO CST ISO.
- ☐ 10. **TAKE** two (2) sets of security keys from Shift Manager key cabinet to gain entrance into Reactor Building. (Unit Supervisor only)
- ☐ 11. **TAKE** PICSY laptop computer from under the Shift Manager's desk. (Unit Supervisor only)
- ☐ 12. **EVACUATE** Main Control Room.