

Final Submittal

(Blue Paper)

OCONEE NUCLEAR STATION

05000269/2006301, 05000270/2006301, AND 05000287/2006301

JUNE 19 - 28, 2006

JUNE 30, 2006 (WRITTEN)

Final SRO Written Examination References

OCCONEE 2006-301

SRO EXAM

REFERENCE PACKAGE

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 High Pressure Injection (HPI)

LCO 3.5.2 The HPI System shall be OPERABLE with:

- a. Two HPI trains OPERABLE;
- b. An additional HPI pump OPERABLE;
- c. Two LPI-HPI flow paths OPERABLE;
- d. Two HPI discharge crossover valves OPERABLE;
- e. HPI suction headers cross-connected; and
- f. HPI discharge headers separated.

APPLICABILITY: MODES 1 and 2,
MODE 3 with Reactor Coolant System (RCS) temperature
> 350°F.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One HPI pump inoperable.	A.1 Restore HPI pump to OPERABLE status.	72 hours
<u>OR</u>	<u>AND</u>	
One or more HPI discharge crossover valve(s) inoperable.	A.2 Restore HPI discharge crossover valve(s) to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. Required Action and associated Completion Time of Condition A not met.</p>	<p><u>B.1</u> <u>Reduce THERMAL POWER to ≤ 75% RTP.</u></p>	<p><u>12 hours</u></p>
	<p><u>AND</u></p>	
	<p><u>B.2</u> <u>Verify by administrative means that the ADV flow path for each steam generator is OPERABLE.</u></p>	<p><u>12 hours</u></p>
	<p><u>AND</u></p>	
	<p><u>B.3</u> <u>Restore HPI pump to OPERABLE status.</u></p>	<p><u>30 days from initial entry into Condition A</u></p>
<p><u>AND</u></p>		
<p><u>B.4</u> <u>Restore HPI discharge crossover valve(s) to OPERABLE status.</u></p>	<p><u>30 days from initial entry into Condition A</u></p>	

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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p><u>C. One HPI train inoperable.</u></p>	<p><u>C.1</u> -----NOTE----- <u>Only required when inoperable HPI train is incapable of automatic actuation and incapable of actuation through remote manual alignment.</u></p> <p>----- <u>Reduce THERMAL POWER to ≤ 75% RTP.</u></p> <p><u>AND</u></p> <p><u>C.2</u> -----NOTE----- <u>Only required when THERMAL POWER ≤ 75% RTP.</u></p> <p>----- <u>Verify by administrative means that the ADV flow path for each steam generator is OPERABLE.</u></p> <p><u>AND</u></p> <p><u>C.3</u> <u>Restore HPI train to OPERABLE status.</u></p>	<p><u>3 hours</u></p> <p><u>3 hours</u></p> <p><u>72 hours</u></p>
<p><u>D. HPI suction headers not cross-connected.</u></p>	<p><u>D.1</u> <u>Cross-connect HPI suction headers.</u></p>	<p><u>72 hours</u></p>
<p><u>E. HPI discharge headers cross-connected.</u></p>	<p><u>E.1</u> <u>Hydraulically separate HPI discharge headers.</u></p>	<p><u>72 hours</u></p>

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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. <u>One LPI-HPI flow path inoperable.</u>	F.1 <u>Restore LPI-HPI flow path to OPERABLE status.</u>	<u>72 hours</u>
G. Required Action and associated Completion Time of Condition B, C, D, E, or F not met.	G.1 <u>Be in MODE 3.</u> <u>AND</u> G.2 <u>Reduce RCS temperature to ≤ 350°F.</u>	12 hours 60 hours
H. <u>Two HPI trains inoperable.</u> <u>OR</u> <u>Two LPI-HPI flow paths inoperable.</u>	H.1 <u>Enter LCO 3.0.3.</u>	<u>Immediately</u>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.5.2.1 <u>Verify each HPI manual and non-automatic power operated valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.</u>	31 days
SR 3.5.2.2 <u>NOTE</u> <u>Not applicable to operating HPI pump(s).</u> <u>Vent each HPI pump casing.</u>	31 days

(continued)

<p>LOSS OF ALL OFFSITE POWER TO ESSENTIAL BUSES FOR GREATER THAN 15 MINUTES (BD 47)</p> <p>OPERATING MODE: All</p> <p>1. Loss of all offsite AC power to both the Red and Yellow Busses for > 15 minutes</p> <p>AND</p> <p>2. Unit auxiliaries are being supplied from Keowee or CTS</p>	<p>LOSS OF ALL OFFSITE AC POWER AND LOSS OF ALL ONSITE AC POWER TO ESSENTIAL BUSES (BD 49)</p> <p>OPERATING MODE: 5, 6 Detected</p> <p>A.1 MFB 1 and 2 de-energized</p> <p>AND</p> <p>A.2 Failure to restore power to at least one MFB within 15 minutes from the time of loss of both offsite and onsite AC power</p>	<p>LOSS OF ALL OFFSITE AC POWER AND LOSS OF ALL ONSITE AC POWER TO ESSENTIAL BUSES (BD 51)</p> <p>OPERATING MODE: 1, 2, 3, 4</p> <p>A.1 MFB 1 and 2 de-energized</p> <p>AND</p> <p>A.2 Failure to restore power to at least one MFB within 15 minutes from the time of loss of both offsite and onsite AC power</p>	<p>LOSS OF ALL OFFSITE AC POWER AND LOSS OF ALL ONSITE AC POWER TO ESSENTIAL BUSES (BD 54)</p> <p>OPERATING MODE: 1, 2, 3, 4</p> <p>A.1 MFB 1 and 2 de-energized</p> <p>AND</p> <p>A.2 SSF fails to maintain Hot Shutdown</p> <p>AND</p> <p>A.3 At least one of the following conditions exist:</p> <p>A.3.1 Restoration of power to at least one MFB within 4 hours is NOT likely</p> <p>OR</p> <p>A.3.2 Indications of continuing degradation of core cooling based on Fusion Product Barrier monitoring</p> <p>(END)</p>	<p>INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY</p> <p>NOTIFY 1, 2, 3, 4</p>
<p>UNPLANNED LOSS OF REQUIRED DC POWER FOR GREATER THAN 15 MINUTES (BD 48)</p> <p>OPERATING MODE: 5, 6</p> <p>A.1 Unplanned loss of vital DC power to required DC busses as indicated by bus voltage less than 110 VDC</p> <p>AND</p> <p>A.2 Failure to restore power to at least one required DC bus within 15 minutes from the time of loss</p> <p>(END)</p>	<p>AC POWER CAPABILITY TO ESSENTIAL BUSES REDUCED TO A SINGLE SOURCE FOR GREATER THAN 15 MINUTES (BD 50)</p> <p>OPERATING MODE: 1, 2, 3, 4</p> <p>A. AC power capability has been degraded to a single power source for > 15 minutes due to the loss of all but one of:</p> <p>Unit Normal Transformer Unit SU Transformer Another Unit SU Transformer CT4 CTS</p> <p>(END)</p>	<p>LOSS OF ALL VITAL DC POWER (BD 52)</p> <p>OPERATING MODE: 1, 2, 3, 4</p> <p>A.1 Unplanned loss of vital DC power to required DC busses as indicated by bus voltage less than 110 VDC</p> <p>AND</p> <p>A.2 Failure to restore power to at least one required DC bus within 15 minutes from the time of loss</p> <p>(END)</p>	<p>LOSS OF ALL OFFSITE AC POWER AND LOSS OF ALL ONSITE AC POWER TO ESSENTIAL BUSES (BD 52)</p> <p>OPERATING MODE: 1, 2, 3, 4</p> <p>A.1 Unplanned loss of vital DC power to required DC busses as indicated by bus voltage less than 110 VDC</p> <p>AND</p> <p>A.2 Failure to restore power to at least one required DC bus within 15 minutes from the time of loss</p> <p>(END)</p>	<p>INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY</p> <p>NOTIFY 1, 2, 3, 4</p>
<p>LOSS OF ALL OFFSITE AC POWER AND LOSS OF ALL ONSITE AC POWER TO ESSENTIAL BUSES (BD 52)</p> <p>OPERATING MODE: 1, 2, 3, 4</p> <p>A.1 Unplanned loss of vital DC power to required DC busses as indicated by bus voltage less than 110 VDC</p> <p>AND</p> <p>A.2 Failure to restore power to at least one required DC bus within 15 minutes from the time of loss</p> <p>(END)</p>	<p>LOSS OF ALL VITAL DC POWER (BD 52)</p> <p>OPERATING MODE: 1, 2, 3, 4</p> <p>A.1 Unplanned loss of vital DC power to required DC busses as indicated by bus voltage less than 110 VDC</p> <p>AND</p> <p>A.2 Failure to restore power to at least one required DC bus within 15 minutes from the time of loss</p> <p>(END)</p>	<p>LOSS OF ALL OFFSITE AC POWER AND LOSS OF ALL ONSITE AC POWER TO ESSENTIAL BUSES (BD 51)</p> <p>OPERATING MODE: 1, 2, 3, 4</p> <p>A.1 MFB 1 and 2 de-energized</p> <p>AND</p> <p>A.2 Failure to restore power to at least one MFB within 15 minutes from the time of loss of both offsite and onsite AC power</p>	<p>LOSS OF ALL OFFSITE AC POWER AND LOSS OF ALL ONSITE AC POWER TO ESSENTIAL BUSES (BD 54)</p> <p>OPERATING MODE: 1, 2, 3, 4</p> <p>A.1 MFB 1 and 2 de-energized</p> <p>AND</p> <p>A.2 SSF fails to maintain Hot Shutdown</p> <p>AND</p> <p>A.3 At least one of the following conditions exist:</p> <p>A.3.1 Restoration of power to at least one MFB within 4 hours is NOT likely</p> <p>OR</p> <p>A.3.2 Indications of continuing degradation of core cooling based on Fusion Product Barrier monitoring</p> <p>(END)</p>	<p>INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY</p> <p>NOTIFY 1, 2, 3, 4</p>

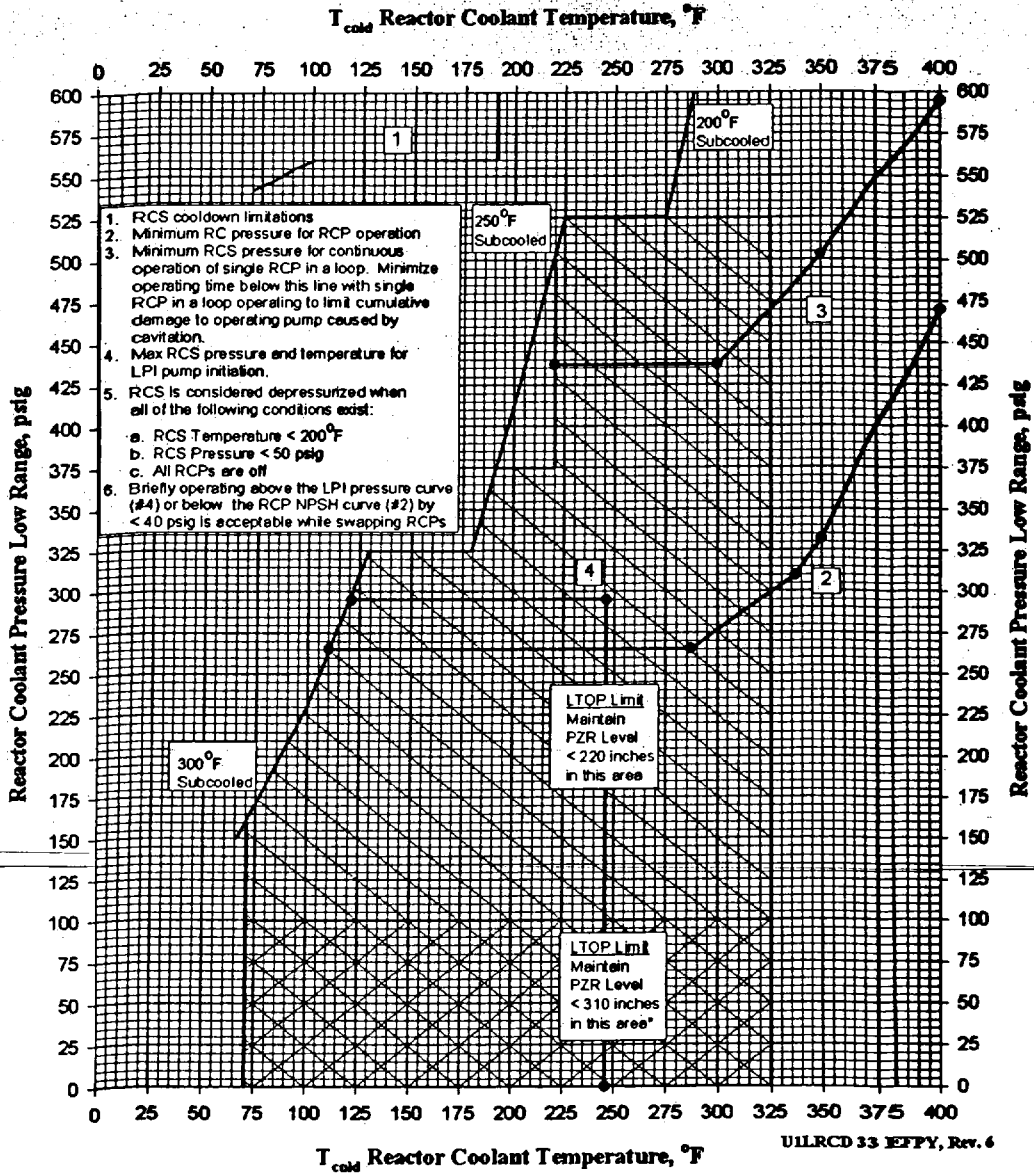
Encls. 4.1
Fission Product Barrier Matrix

RP/0/B/1C 001
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TERMINE THE APPROPRIATE CLASSIFICATION USING THE TABLE BELOW. CIRCLE EALS CHOSEN. ADD POINTS TO CLASSIFY. (SEE NOTE BELOW)

Potential Loss (4 Points)	Loss (5 Points)	Potential Loss (4 Points)	Loss (5 Points)	Potential Loss (1 Point)	Loss (3 Points)
RCS Leak rate > available makeup capacity as indicated by a loss of subcooling	Average of the 5 highest CETC $\geq 700^\circ\text{F}$	Average of the 5 highest CETC $\geq 1200^\circ\text{F}$	Average of the 5 highest CBTC $\geq 1200^\circ\text{F}$	CETC $\geq 1200^\circ\text{F}$ ≥ 15 minutes OR CETC $\geq 700^\circ\text{F}$ ≥ 15 minutes with a valid RVLS reading 0"	Rapid unexplained containment pressure decrease after increase level not consistent with LOCA
IRIA 57/58 reading ≥ 1.0 R/hr	Valid RVLS reading of 0"	Valid RVLS reading of 0"	Coolant activity ≥ 300 $\mu\text{C}/\text{ml}$ DBI	RB pressure ≥ 59 psig OR RB pressure ≥ 10 psig and no RBCU or RBS	Failure of secondary side of SG results in a direct opening to the environment with P/S leakage ≥ 10 gpm in the same SG
2 RIA 57 reading ≥ 1.6 R/hr 2 RIA 58 reading ≥ 1.0 R/hr	NOTE: RVLS is NOT valid if one or more RCPs are running OR if LPI pump(s) are running.	Hours Since SD RIA57/58 R/hr 0 - < 0.5 0.5 - < 2.0 2.0 - 8.0	Hours Since SD RIA57/58 R/hr $\geq 300/150$ $\geq 80/40$ $\geq 32/16$	Hours Since SD RIA57/58 - R/hr 0 - < 0.5 0.5 - < 2.0 2.0 - 8.0	Failure of secondary side of SG results in a direct opening to the environment with P/S leakage ≥ 10 gpm in the other SG AND Feeding SG with secondary side failure from the affected unit
3 RIA 57/58 reading ≥ 1.0 R/hr					
RCS pressure spike ≥ 2750 psig				Hydrogen concentration $\geq 9\%$	Containment isolation is incomplete and a release path to the environment exists
Emergency Coordinator/EOF Director judgment	Emergency Coordinator/EOF Director judgment	Emergency Coordinator/EOF Director judgment	Emergency Coordinator/EOF Director judgment	Emergency Coordinator/EOF Director judgment	Emergency Coordinator/EOF Director judgment
OPERATING MODE: 1, 2, 3, 4					
Any potential loss of Containment	Any potential loss or loss of the Fuel Clad	Any potential loss or loss of the Fuel Clad	Loss of any two barriers	Loss of one barrier and potential loss of either RCS or Fuel Clad Barriers	Loss of any two barriers and potential loss of the third barrier
Any loss of containment	Any potential loss or loss of the RCS	Potential loss of both the RCS and Fuel Clad Barriers	Potential loss of both the RCS and Fuel Clad Barriers		Loss of all three barriers
OPERATING MODE: 1, 2, 3, 4					
INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY NOTIFY 1.2.3.4	INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY NOTIFY 1.2.3.4	INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY NOTIFY 1.2.3.4	INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY NOTIFY 1.2.3.4	INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY NOTIFY 1.2.3.4	INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY NOTIFY 1.2.3.4
<p>NOTE: An event with multiple events could occur which would result in the conclusion that exceeding the loss or potential loss threshold is IMMINENT (i.e., within 1-3 hours). In this IMMINENT LOSS situation, use judgment and classify as if the thresholds are exceeded.</p>					

Unit 1 Low Range Cooldown Curve



* PZR level restricted to ≤ 380 inches when RCS temperature is ≤ 160°F, and NO HPIPs operating.

RCS TEMPERATURE	MAX COOLDOWN RATE
T > 280°F	≤ 45°F in any 1/2 hour period
150°F < T ≤ 280°F	≤ 20°F in any 1/2 hour period
T ≤ 150°F	≤ 9°F in any 1 hour period
RCS depressurized (note 5)	≤ 45°F in any 1 hour period