

SOUTH CAROLINA ELECTRIC AND GAS COMPANY

VIRGIL C. SUMMER NUCLEAR STATION

NUCLEAR OPERATIONS

NON-CONTROLLED  
COPY

ZERO POWER TESTING

CORE COOLING WITH A SIMULATED LOSS OF ONSITE  
AND OFFSITE AC POWER

ZPT-9.2

REVISION 0

JUNE 6, 1982

SAFETY RELATED (X)

Reviewed by:

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6/16/82  
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ATTACHMENTS

ATTACHMENT I

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ATTACHMENTS

ATTACHMENT I - PROCESS COMPUTER TREND BLOCKS A AND B

1.0 PURPOSE

- 1.1 To demonstrate plant performance capabilities in removing decay heat utilizing manual control of the Turbine Driven Emergency Feedwater Pump and simulated loss of all onsite and offsite AC power.

## 2.0 REFERENCES

- 2.1 V. C. Summer Nuclear Station FSAR, Chapter 14, Table 14.1-65.
- 2.2 Precautions, Limitations, and Setpoints Document for Westinghouse NSSS.
- 2.3 SAP-420, Power Ascension Test Program,

### 3.0 PREREQUISITES

INITIAL/ DATE

- 3.1 Tave is approximately 557°F. The Steam Dump is operating (or available) to maintain Tave in the Steam Pressure Mode.

\_\_\_\_/\_\_\_\_

- 3.2 Pressurizer pressure is being maintained at approximately 2235 psig by automatic operation of the Pressurizer Pressure Control System.

\_\_\_\_/\_\_\_\_

- 3.3 Pressurizer level is being maintained at approximately 25% by automatic operation of the Pressurizer Level Control System.

\_\_\_\_/\_\_\_\_

- 3.4 The S/Gs are being maintained at approximately 24%. The Main Feedwater or EFW System is operating (or available) to maintain S/G levels.

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- 3.5 All three RCP's are running.

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- 3.6 The CVCS is in a normal at-power lineup.

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- 3.7 Excess Letdown is available for operation.

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- 3.8 The reactor is shutdown with all rods inserted. There is sufficient shutdown margin for a 100% cooldown.

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- 3.9 The Computer Trend Printer is set up to monitor at one minute intervals the parameters specified in Attachment I of this procedure.

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- 3.10 S/G Chemistry is in a condition such that blowdown may be isolated for the duration of this test.

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INITIAL/ DATE

3.11 Communications have been established between the Control Room, the Emergency Feedwater valve gallery mezzanine, I.B. 424' and the TDEFP operator.

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3.12 Direct contact thermocouples have been mounted on the TDEFP pump inboard and outboard bearings and the TDEFP turbine inboard and outboard bearings with remote reading to a four pen brush recorder located outside the TDEFP room. The recorder scale is to be 0°F to 300°F.

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3.13 The Shift Supervisor/Shift Foreman have been notified of the impending performance of this test.

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4.0 SPECIAL TEST EQUIPMENT

INITIAL/ DATE

4.1 Four direct contact thermocouples.

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4.2 Gould Model 2400 Brush Recorder or equivalent.

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5.0 LIMITS AND PRECUATIONS

- 5.1 During the conduct of this test the Test Supervisor will make determinations relating to the amount of data being recorded (i.e. speed of recorders, collecting of data, etc.).  
\_\_\_\_\_ / \_\_\_\_\_
- 5.2 Avoid rapid or sudden changes in steam pressure or feedwater flow.  
\_\_\_\_\_ / \_\_\_\_\_
- 5.3 Maintain less than 97 psid pressure between any two steam lines and greater than 675 psig in each Steam Generator.  
\_\_\_\_\_ / \_\_\_\_\_
- 5.4 During the conduct of this test the Shift Supervisor will make determinations relating to the safety of the plant and terminate the test when plant safety or equipment is jepordized.  
\_\_\_\_\_ / \_\_\_\_\_

6.0 TEST METHOD

6.1 Verify that Source Range Channels 31 and 32 are selected on NR-45. \_\_\_\_\_/\_\_\_\_\_

6.2 Place Pressurizer spray valves PCV-444C and PCV-444D in MANUAL and close the valves. \_\_\_\_\_/\_\_\_\_\_

6.3 Verify RCP seal injection is between 6 and 12 gpm per pump and total flow is less than 33 gpm. \_\_\_\_\_/\_\_\_\_\_

6.4 Place Pressurizer Level Control in MANUAL and match the charging plus seal injection flows to the letdown and seal return flows. \_\_\_\_\_/\_\_\_\_\_

NOTE: Pressurizer level will now vary with the RCS heatup/cooldown.

6.5 To simulate the loss of onsite and offsite AC power perform the following:

6.5.1 Turn the two steam dump interlock switches to the OFF RESET position and release. \_\_\_\_\_/\_\_\_\_\_

6.5.2 Place the three SD/PWR relief switches to the PWR RLF position. \_\_\_\_\_/\_\_\_\_\_

6.5.3 Place the three PWR RELIEF SETPT controls in MANUAL and adjust the setpoints to maintain a steam pressure of approximately 1092 psig. \_\_\_\_\_/\_\_\_\_\_

- 6.5.4 Place the steam dump CNTRL in MANUAL and reduce the signal output to zero. \_\_\_\_\_/\_\_\_\_\_

NOTE: Control of steam pressure is now via the PORVs.

- 6.5.5 Place all pressurizer heater groups in OFF. \_\_\_\_\_/\_\_\_\_\_

- 6.5.6 Start the TDEFW pump as per SOP-211. \_\_\_\_\_/\_\_\_\_\_

- 6.5.7 Verify S/G Blowdown is secure. \_\_\_\_\_/\_\_\_\_\_

- 6.5.8 Place the two MDEFW switches in the pull-to-lock position. \_\_\_\_\_/\_\_\_\_\_

- 6.5.9 At the HVAC panel stop XFN-83A-VL and XFN-83B-VL by placing switches EFP CLG FAN A and EFP CLG FAN B to OFF. \_\_\_\_\_/\_\_\_\_\_

- 6.5.10 Monitor the Turbine Driven Emergency Feedwater Pump for increasing temperature and vibration throughout the duration of this test with no HVAC available. \_\_\_\_\_/\_\_\_\_\_

- 6.5.11 Place the TDEFW to S/G A, B, C switches in MANUAL and fully open TDEFW to S/G A, B, C controllers IFV-3536, IFV-3546, IFV-3556. \_\_\_\_\_/\_\_\_\_\_

6.5.12 Using the FCV-3536, FCV-3546 and FCV-3556 handwheels throttle emergency feed flow to maintain generator levels first on orders from the Control Room and secondly by monitoring local wide range steam generator level indicators ILT-477A, ILT-487A and ILT-497A.

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6.5.13 Continue to control steam pressure with the steam line PORVs from the Control Room.

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6.6 When directed by the Test Supervisor (after approximately 30 minutes of steady state conditions), perform the following:

6.6.1 At the HVAC panel start XFN-83A-VL and XFN-83B-VL by placing switches EFP CLG FAN A and EFP CLG FAN B to AUTO.

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6.6.2 Throttle TDEFP to S/G A, B, C controllers IFV-3536, IFV-3546 and IFV-3556 until the controllers override the handwheel limits.

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6.6.3 Turn FCV-3536, FCV-3546 and FCV-3556 handwheels to the full open position.

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6.6.4 Per SOP-211 start the Motor Driven Emergency Feedwater Pumps and shut down the Turbine Driven Emergency Feedwater Pump.

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6.6.5 Place all pressurizer heater groups in AUTOMATIC.

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6.6.6 Establish S/G Blowdown.

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6.6.7 Place the Steam Dump CNTRL to AUTO and adjust the setpoint to maintain a steam pressure of 1092 psig.

6.6.8 Place the three SD/PWR Relief Switches to the AUTO position.

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6.6.9 Place the pressurizer level control in AUTO.

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6.6.10 Place PZR SPRAY PCV-444C and PCV-444D in AUTO.

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6.7 Stop the Computer Trend Blocks of Attachment I and collect the data.

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6.8 Stop the brush recorder monitoring TDEFP temperature and collect the data.

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6.9 Notify the Shift Supervisor that the test is completed.

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## 7.0 DATA REQUIREMENTS

7.1 All Computer Trend Blocks are collected and attached.

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## 8.0 ACCEPTANCE CRITERIA

### LEVEL I

NONE

### LEVEL II

- 8.1 Core Cooling can be maintained while maintaining S/G levels with the Turbine Driven Emergency Feedwater Pump (simulated loss of on-site and off-site power).
- \_\_\_\_\_ / \_\_\_\_\_

### LEVEL III

NONE

PROCESS COMPUTER TREND BLOCK A

<u>COLUMN</u>	<u>ADDRESS</u>	<u>PARAMETER</u>	<u>UNITS</u>
1	T0406A	RCL A TCOLD	*F
2	T0426A	RCL B TCOLD	*F
3	T0446A	RCL C TCOLD	*F
4	T0419A	RCL A THOT	*F
5	T0439A	RCL B THOT	*F
6	T0459A	RCL C THOT	*F
7	CONTROL	TAVG LOOP B	*F
8	T0126A	CHARGING TEMPERATURE	%
9	T0127A	LETDOWN TEMPERATURE	%
10	N0031A	SOURCE RANGE COUNTS	CPS
11	N0032A	SOURCE RANGE COUNTS	CPS
12	F0128A	CHARGING FLOW	GFM
13	F0134A	LETDOWN FLOW	GPM
14	L0480A	PRESSURIZER LEVEL	%
15	L0112A	VCT LEVEL	%



PROCESS COMPUTER TREND BLOCK B

<u>COLUMN</u>	<u>ADDRESS</u>	<u>PARAMETER</u>	<u>UNITS</u>
1	L0400A	S/G A LEVEL	%
2	L0420A	S/G B LEVEL	%
3	L0440A	S/G C LEVEL	%
4	P0400A	S/G A PRESS	PSIG
5	P0420A	S/G B PRESS	PSIG
6	P0440A	S/G C PRESS	PSIG
7	P0483A	PRESSURIZER PRESS	PSIG
8	P0499A	RC SYSTEM PRESS	PSIG
9	P0142A	CHARGING PRESS	PSIG
10	U0482	AVG PZR PRESS	PSIG
11	U0483	AVG PZR LEVEL	%
12	U1170	AVG T/C TEMP	°F
13	AS REQUIRED	HOTTEST T/C (QUADRANT 1)	°F
14	AS REQUIRED	HOTTEST T/C (QUADRANT 2)	°F
15	AS REQUIRED	HOTTEST T/C (QUADRANT 3)	°F
16	AS REQUIRED	HOTTEST T/C (QUADRANT 4)	°F