



PERFORMANCE TESTING PROCEDURE

PT-108

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DECAY HEAT REMOVAL AND REACTOR BUILDING SPRAY SYSTEM LEAK RATE TEST

REVIEWED BY: Plant Review Committee

*[Signature]*  
Date 11/1/79  
Meeting No. 79-43

APPROVED BY: Nuclear Plant Manager

*[Signature]*  
Date 11/6/79  
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## 1.0 PURPOSE

- 1.1 The purpose of this test is to determine the actual leak rate of the decay heat removal (DHR) and Reactor Building (RB) spray systems to assure compliance with the applicable Technical Specifications.

## 2.0 REFERENCES AND ENCLOSURES

### 2.1 REFERENCES

- 2.1.1 OP-404, Decay Heat Removal System
- 2.1.2 OP-405, Reactor Building Spray System
- 2.1.3 FPC Drawings
  - 2.1.3.1 IS-318-641, Decay Heat Removal
  - 2.1.3.2 IS-318-621, Spent Fuel Cooling
  - 2.1.3.3 IS-318-711, Reactor Building Spray
  - 2.1.3.4 IS-318-661, Makeup and Purification
  - 2.1.3.5 IS-318-651, Reactor Coolant
- 2.1.4 MP-137, System Hydrostatic Pressure Testing
- 2.1.5 Plant Technical Specifications

### 2.2 ENCLOSURES

Enclosure 1 Data Sheet I

## 3.0 TIME REQUIRED

- 3.1 Approximately 8 hrs. from start of test to completion, including:
- a. Assembly of Pressure Test Rig (PTR)
  - b. System Testing (two trains)

c. Calculations

d. Disassembly of PTR

4.0 MANPOWER

- 4.1 Plant Auxiliary Operator (1)
- 4.2 Level II Visual Inspectors (2)
- 4.3 Maintenance Mechanics (2)
- 4.4 Test Engineer (1)

5.0 SPECIAL TEST EQUIPMENT

- 5.1 Method of timing leak collection (stopwatch)
- 5.2 Containers suitable for leakage collection.
- 5.3 PTR similar to that described in MP-137, System Hydrostatic Pressure Testing, Figure 1.
- 5.4 Calibrated container suitable for measuring total collected leakage.

6.0 LIMITS AND PRECAUTIONS

- 6.1 Any leak found during the performance of this test must be measured for a period of no less than 1 hr.
- 6.2 The PTR water supply boron concentration must be maintained equal or greater than that required for cold shutdown.
- 6.3 One train of the DHR must be operable for low pressure injection (LPI) during Modes 1, 2, 3, and 4.

- 6.4 One train of the RB spray must be operable during Modes 1, 2, 3, and 4.
- 6.5 When the system is under pressure, the PTR must be manned at all times and pressure monitored.
- 6.6 All work will be performed under a Radiation Work Permit (RWP).
- 6.7 If at any time the leak rate exceeds 6 gph in the DHR or RB spray systems, refer to Technical Specification 3.5.1 or 3.6.1.
- 6.8 SYSTEM TEST PRESSURE
- 6.8.1 Technical Specifications require leak rate measurement pressures of above 190 psig. The combined system leak rate test shall be conducted at 200 psig  $\pm 5\%$  to assure meeting all requirements. If specific sections of the system are to be tested, refer to Technical Specifications 4.5.1 and 4.6.1 for minimum acceptable test pressures.

7.0 REQUIRED PLANT STATUS AND PREREQUISITE CONDITIONS

- 7.1 The plant should be in Mode 1, 2, or 3.
- 7.2 The DHR system is in the normal standby mode per OP-404, Decay Heat Removal System.
- 7.3 The RB spray system is in the normal standby mode per OP-405, Reactor Building Spray System.
- 7.4 RWP(s) for the performance of the test have been issued and approved.

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7.5 System fluid and PTR fluid are at approximately the same temperature.

8.0 TEST METHOD

Initials

8.1 Verify all required plant status and prerequisite conditions have been met.

8.2 Verify that the DHR system is aligned as required by Valve Check List III of OP-404, Decay Heat Removal System.

8.3 Verify that the RB spray system is aligned as required by Valve Check List I of OP-405, Reactor Building Spray System.

8.4 Notify the Shift Supervisor that test is to begin and of the nature of the test.

8.5 Connect PTR to DHR system as follows:

a. Verify SFV-87 is closed.

b. Connect PTR to DHV-89.

8.6 Perform leak rate test on "A" train as follows:

8.6.1 Open and tag out breakers for DHP-3A and RBSP-3A.

NOTE: Implement the "Action Statements" of Technical Specifications 3.5.1 and 3.6.1.

8.6.2 Verify RCV-53 is closed.

8.6.3 Align DHR system valves as follows:

8.6.3.1 Close the following:

a. DHV-34F

b. DHV-18

c. DHV-15

8.6.3.2 Open the following:

- a. DHV-8
- b. DHV-39
- c. DHV-91
- d. DHV-41
- e. DHV-48

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8.6.4 Align RB spray system valves as follows:

- a. Open BSV-5.
- b. Open BSV-28.

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8.6.5 Start PTR and pressurize to test pressure.

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8.6.6 Visually check PTR connection for leakage; assure zero leakage before continuing.

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8.6.7 Pressurize the system as follows:

8.6.7.1 Notify the Control Center Operator that system pressure test is now in progress.

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8.6.7.2 Slowly open DHV-89.

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8.6.7.3 Verify that system pressure increases to test pressure (+5% -0%).

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8.6.7.4 Allow 15 min. for system stabilization.

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8.6.7.5 Initiate inspection of components and piping for evidence of leakage.

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8.6.7.6 If leakage is detected, collect the leakage for a period of not less than 1 hr. and record on Data Sheet I.

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8.6.7.7 Determine the system leak rate per Data Sheet I.

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8.7 Return the system to normal as follows:

8.7.1 Close DHV-89. \_\_\_\_\_

8.7.2 Stop the PTR pump. \_\_\_\_\_

8.7.3 Align DHR valves as follows:

8.7.3.1 Close the following:

a. DHV-48 \_\_\_\_\_

b. DHV-8 \_\_\_\_\_

c. DHV-39 \_\_\_\_\_

d. DHV-41 \_\_\_\_\_

e. DHV-91 \_\_\_\_\_

8.7.3.2 Open the following:

a. DHV-34F \_\_\_\_\_

b. DHV-13 \_\_\_\_\_

c. DHV-18 \_\_\_\_\_

8.7.3.3 Remove the tag from DHP-3A. \_\_\_\_\_

8.7.4 Align RB spray system as follows:

8.7.4.1 Close the following:

a. BSV-28 \_\_\_\_\_

b. BSV-5 \_\_\_\_\_

8.7.4.2 Remove the tag from RBSP-3A. \_\_\_\_\_

8.8 Perform leak rate test on "B" train as follows:

8.8.1 Open and tag out the breaker for DHP-3F and RBSP-3B. \_\_\_\_\_

NOTE: Implement the "Action Statements" of Technical  
Specifications 3.5.1 and 3.6.1.

8.8.2 Align the valves of the DHR as follows:

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- 8.8.2.1 Close the following:
- a. DHV-35F \_\_\_\_\_
  - b. DHV-24 \_\_\_\_\_
- 8.8.2.2 Open the following:
- a. DHV-7 \_\_\_\_\_
  - b. DHV-48 \_\_\_\_\_
- 8.8.3 Pressurize the PTR to test pressure. \_\_\_\_\_
- 8.8.4 Assure zero leakage of PTR before continuing. \_\_\_\_\_
- 8.8.5 Repeat Section 8.6.7 for the "B" train. \_\_\_\_\_
- 8.9 Return the system to normal as follows:
- 8.9.1 Close DHV-89. \_\_\_\_\_
- 8.9.2 Stop the PTR pump. \_\_\_\_\_
- 8.9.3 Align the DHR system as follows:
- 8.9.3.1 Close the following:
- a. DHV-48 \_\_\_\_\_
  - b. DHV-7 \_\_\_\_\_
- 8.9.3.2 Open the following:
- a. DHV-35F \_\_\_\_\_
  - b. DHV-24 \_\_\_\_\_
- 8.9.3.3 Remove the tag from DHP-3B. \_\_\_\_\_
- 8.9.4 Align RB spray system as follows:
- 8.9.4.1 Remove the tag from RBSP-3B. \_\_\_\_\_
- 8.10 Determine the total system leak rate for the DHR system per Data Sheet I. \_\_\_\_\_
- 8.11 Determine the total system leak rate for the RB spray system per Data Sheet I. \_\_\_\_\_

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8.12 When the total system leak rate has been determined to be less than 6 gph each for both the DHR and RB spray systems, return the system to normal as follows:

8.12.1 Verify that the DHR system is aligned per Valve Check List III of OP-404, Decay Heat Removal System. \_\_\_\_\_

8.12.2 Verify that the RB spray system is aligned per Valve Check List I of OP-405, Reactor Building Spray System. \_\_\_\_\_

8.12.3 Vent and remove the PTR. \_\_\_\_\_

#### 9.0 DATA COLLECTION

9.1 Refer to Data Sheet I.

#### 10.0 ACCEPTANCE CRITERIA

10.1 The leak rate of either the DHR system or the RB spray system may not exceed 6 gph.

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DATA SHEET IENCLOSURE 1

## Decay Heat Removal System:

LOCATION	TIME START	TIME STOP	DELTA TIME	VOLUME	LEAK RATE*	INITIALS
TOTAL						

## Reactor Building Spray System:

TOTAL						

$$\text{*Leak Rate} = \frac{\text{Volume (gals.)}}{\text{Time (hrs.)}}$$

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