

SURVEILLANCE PROCEDURE

SP-429

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

WASTE GAS SYSTEM LEAK RATE TEST

REVIEWED BY: Plant Review Committee

Date 11/1/79Meeting No. 79-43

APPROVED BY: Nuclear Plant Manager

Date 11/6/79

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1.0 SURVEILLANCE REQUIREMENTS

- 1.1 The leak rate of the waste gas system shall be measured at least once each refueling interval. This test has been written to allow independent or simultaneous testing of the waste gas system in three separate sections. Section 6.6 deals with the vent header, Section 6.7 details procedures for testing the compressors and associated high pressure piping, and Section 6.8 covers the decay tanks and associated inlet and outlet manifolds.

1.2 TECHNICAL SPECIFICATION REFERENCES

<u>Technical Specification</u>	<u>Surv. Req'd. During Modes</u>	<u>Mode Notes</u>	<u>Surv. Freq.</u>	<u>Freq. Notes</u>
NUREG-0578 (NRR lessons learned)	5 and 6		R	

MODE NOTES: None

SURVEILLANCE FREQUENCY:

R - At least once per 18 months.

FREQUENCY NOTES: None

2.0 ACCEPTANCE CRITERIA

To be furnished at a later date.

3.0 REFERENCES NEEDED TO DO PROCEDURE

- 3.1 FPC Dwg. #FD-302-691
- 3.2 OP-412, Waste Gas Disposal System

4.0 SPECIAL CONDITIONS OR REQUIREMENTS

Initials

- 4.1 Any operation requiring the support of the waste gas system must be suspended during the performance of this test. _____
- 4.2 System pressures must be stabilized for a period of 15 min. prior to the start of leak collection data taking. _____
- 4.3 If at any time during the performance of this test Plant Operations requires unanticipated use of the waste gas system, the test shall be terminated and the system returned to normal operation per OP-412, Waste Gas Disposal System. _____
- 4.4 If at any time during the performance of this test a leak rate in excess of the acceptance criteria is observed, terminate the test and repair as necessary. After repairs have been completed, restart the test. _____
- 4.5 Pressure in the vent header must not exceed 2 psig to prevent leakage through the loop seals. _____
- 4.6 Radiological control required during the performance of this test will be established by Radiation Work Permit (RWP). _____

- 4.7 The waste gas sample system shall remain in normal operation during the performance of this test. _____
- 4.8 One waste gas decay tank is at a pressure of 80 psi or as high as possible and one of the remaining tanks is at a pressure sufficient to pressurize the system between WDV-397 and the compressor inlet to a pressure of 2 psig. The outlet piping of the compressors to the inlet valves of the waste gas decay tanks will be pressurized to 80 psig by running the compressors only. _____
- 4.9 Threaded valves and nipples have been installed in the top of the sightglasses on each of the waste gas compressor seal separator tanks. _____

5.0 EQUIPMENT REQUIRED

- 5.1 Soap bubble solution approved for use on stainless steel piping and components.
- 5.2 Nitrogen (N₂) bottle with pressure regulator and flow meter calibrated in "scfh".
- 5.3 Fittings and calibrated test gauges as required by Enclosure 1 (Figures 1, 2, and 3).

6.0 PROCEDURE

- 6.1 Verify that all special conditions or requirements as called for by Section 4.0 of this procedure are complete. _____

Initials

- 6.2 Notify the Shift Supervisor that the test is to begin and of the nature of the test. _____
- 6.3 Verify that the waste gas system and waste gas sampling system are configured for normal operation per Valve Check List I of OP-412, Waste Gas Disposal System. _____
- 6.4 Assemble the low pressure test rig (LPTR) and connect to WDV-479 per Figure 1 of Enclosure 1. _____
- 6.5 Pressurize N₂ test rig to approximately 10 psig and assure zero leakage. _____
- 6.6 Perform the leak rate test on the vent header as follows:
- 6.6.1 Place the control switches for the waste gas compressors (WDP-1A and 1B) in the "Pull-to-Lock" position and close the suction valves (WDV-384 and 385). _____
- 6.6.2 Close nitrogen supply valves NGV-47, 44, and 174.
NOTE: Tank level indication will be lost at this point. _____
- 6.6.3 Pressurize the vent header to 2 psig from one of the waste gas decay tanks by increasing the set points on pressure regulating valve WDV-397 and opening WDV-393, 394, or 395 on tank 3A, 3B, or 3C, respectively. _____
NOTE: Instrument Technician may be required to perform this step.

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- 6.6.4 Set the LPTR to maintain 2 psig by venting a small amount of N₂ gas while adjusting the pressure regulator. _____
- 6.6.5 Close the vent on the LPTR. _____
- 6.6.6 Close the instrument air supply to WDV-397 and 396 and assure they "fail closed". _____
- 6.6.7 Open WDV-479 and allow 15 min. for the header pressure to stabilize at 2 psig. _____
- 6.6.8 Record the initial data required by Data Sheet I. _____
- 6.6.9 Maintain the vent header pressure at 2 psig for a period of not less than 1 hr. _____
- 6.6.10 At the conclusion of the test, close WDV-479. _____
- 6.6.11 Record the final data required by Data Sheet I. _____
- 6.6.12 Determine the vent header leak rate as shown by Data Sheet I. _____
- 6.6.12.1 If leakage is excessive, locate and repair as necessary. _____
- 6.6.13 Disconnect the LPTR and restore the vent header to normal operation as follows:
- 6.6.13.1 Open waste gas compressor suction valves WDV-384 and 385 and restore the compressor to normal operation. _____
- 6.6.13.2 Reset pressure reducing valve WDV-397 as required by Section 5.0 of OP-412, Waste Gas Disposal System. _____
- 6.6.13.3 Restore the instrument air supply to WDV-396 and 397. _____
- 6.6.13.4 Open NGV-47, 44, and 174. _____

NOTE: Tank level indication will return to normal at this point.

- 6.6.13.5 Verify normal system lineup per OP-412, Waste Gas Disposal System. _____
- 6.7 Perform the leak rate test on the waste gas compressors and discharge piping as follows:
- 6.7.1 Close waste gas decay tank inlet valves WDV-390, 391, and 392. _____
- 6.7.2 Place the control switches for the waste gas compressors (WDP-1A and 1B) in the "Pull-to-Lock" position and close the suction valves (WDV-384 and 385). _____
- 6.7.3 Assemble the high pressure test rig (HPTR) per Figure 2 of Enclosure 1. _____
- 6.7.4 Connect the HPTR to the fittings provided on the waste gas compressor seal separation tank sightglasses. _____
- 6.7.5 Pressurize the HPTR to approximately 80 psig and assure zero leakage. _____
- 6.7.6 Adjust the pressure regulating valve on the HPTR to maintain 80 psig while venting a small amount of N₂ gas from the vent on the HPTR. _____
- 6.7.7 Close the vent on the HPTR. _____
- 6.7.8 Open the isolation valves on the HPTR attachment fittings at both waste gas seal separator tanks. _____
- 6.7.9 Allow 15 min. for system pressure to stabilize. _____
- 6.7.10 Record the initial data required by Data Sheet I. _____
- 6.7.11 Maintain the waste gas compressor and discharge piping pressure at 80 psig for a period of not less than 1 hr. _____

- 6.7.12 At the conclusion of the test, close the isolation valves on the HPTR attachment fittings at both waste gas seal separator tanks. _____
- 6.7.13 Record the final data required by Data Sheet I. _____
- 6.7.14 Determine the waste gas compressor and discharge piping leak rate as shown on Data Sheet I. _____
- 6.7.14.1 If leakage is excessive, locate and repair as necessary. _____
- 6.7.15 Disconnect the HPTR and restore the waste gas compressors and discharge piping to normal operation as follows:
- 6.7.15.1 Open the inlet valve to the waste gas decay tank to be placed in service for waste gas collection, WDV-390, 391, or 392 for 3A, 3B, or 3C, respectively. _____
- 6.7.15.2 Open waste gas compressor suction valves WDV-384 and 385 and restore the compressors to normal operation. _____
- 6.7.15.3 Verify normal system lineup per OP-412, Waste Gas Disposal System. _____
- 6.8 Perform the leak rate test on the waste gas decay tanks (3A, 3B, and 3C) and their associated inlet and outlet manifolds as follows.

NOTE: These tanks should be tested when at their highest pressure (approximately 80 psig) and in the decay mode of operation. This will allow for testing at a time when the leak

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rate will be the highest and N₂ use will be the least to achieve test pressure of 80 psig.

- 6.8.1 Connect HPTR to the respective pressure transmitter piping drain valve as shown on Figure 3 of Enclosure 1. _____
- 6.8.2 Pressurize HPTR to approximately 80 psig and assure zero leakage. _____
- 6.8.3 Adjust the pressure regulating valve on the HPTR to maintain 80 psig or tank pressure while venting a small amount of N₂ gas from the vent on the HPTR. _____
- 6.8.4 Close the vent on the HPTR. _____
- 6.8.5 Open the isolation valve on the HPTR. _____
- 6.8.6 Allow 15 min. for system pressure to stabilize. _____
- 6.8.7 Record the initial data required by Data Sheet I. _____
- 6.8.8 Maintain test pressure (approximately 80 psig) for a period of not less than 1 hr. _____
- 6.8.9 Record final data as required by Data Sheet I. _____
- 6.8.10 At the conclusion of the test, close the HPTR isolation valves. _____
- 6.8.11 Determine leak rate of the waste gas decay tanks and associated manifolds as shown on Data Sheet I and record. _____
- 6.8.12 Disconnect HPTR and assure normal system lineup per OP-412, Waste Gas Disposal System. _____

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- 6.9 Sum the individual leak rates as determined by Step
6.6.14, 6.7.14, and 6.8.11 and record on Data Sheet I. _____
- 6.10 Notify the Shift Supervisor of test completion and of
the results of the test. _____

7.0 ENCLOSURES

Enclosure 1 Figures 1, 2, and 3

Enclosure 2 Data Sheet I

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Figure 1 (LPTR)

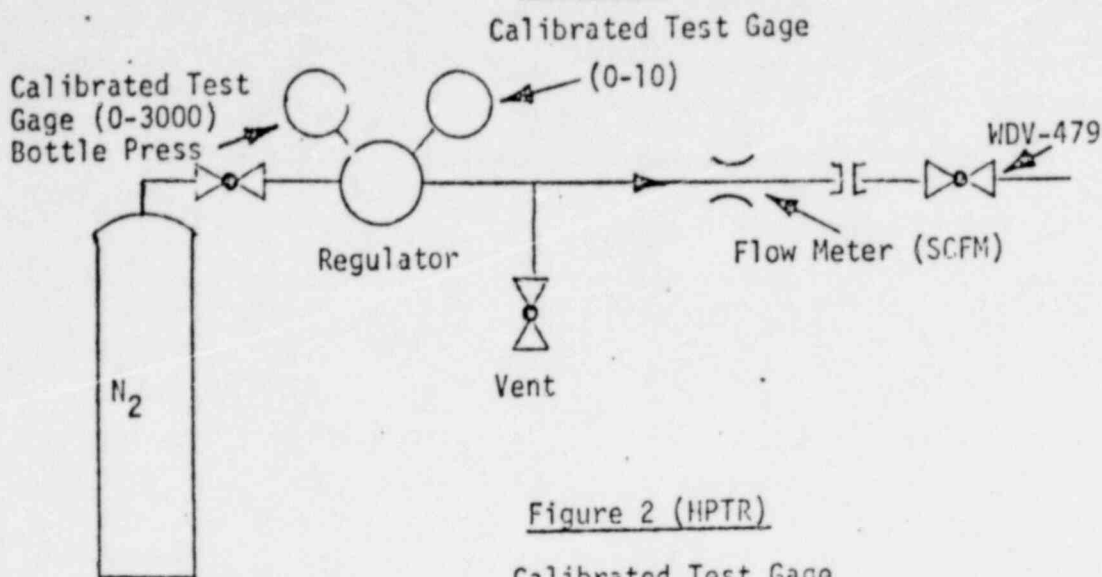


Figure 2 (HPTR)

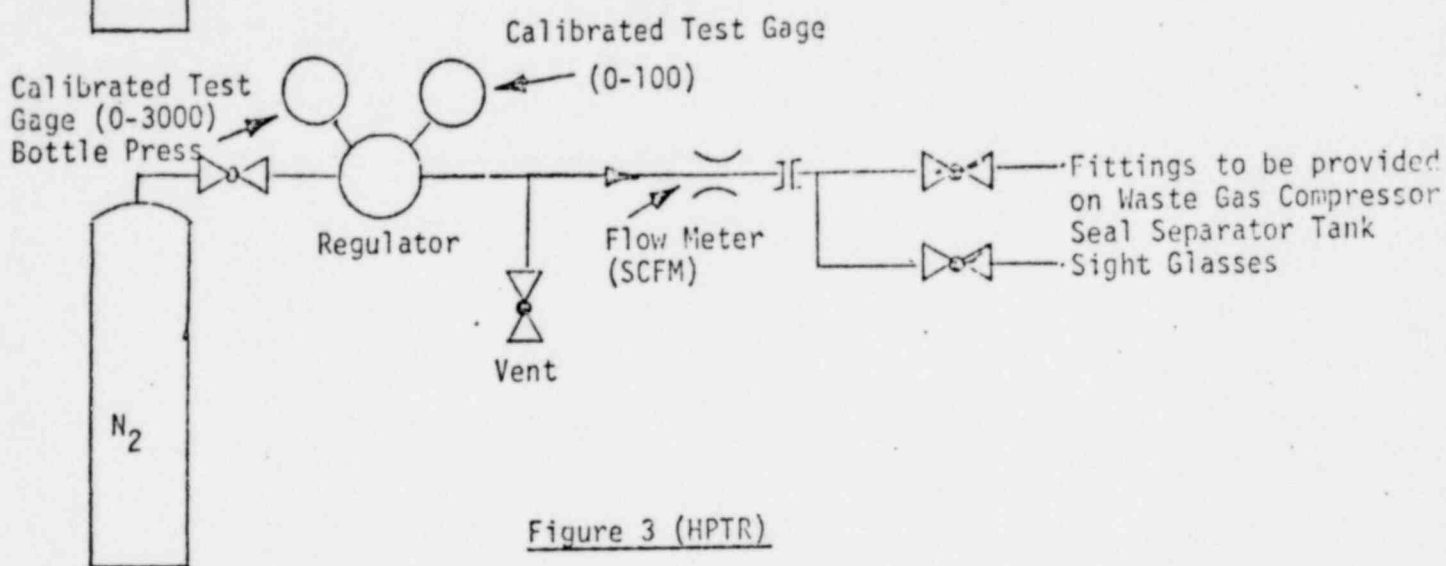
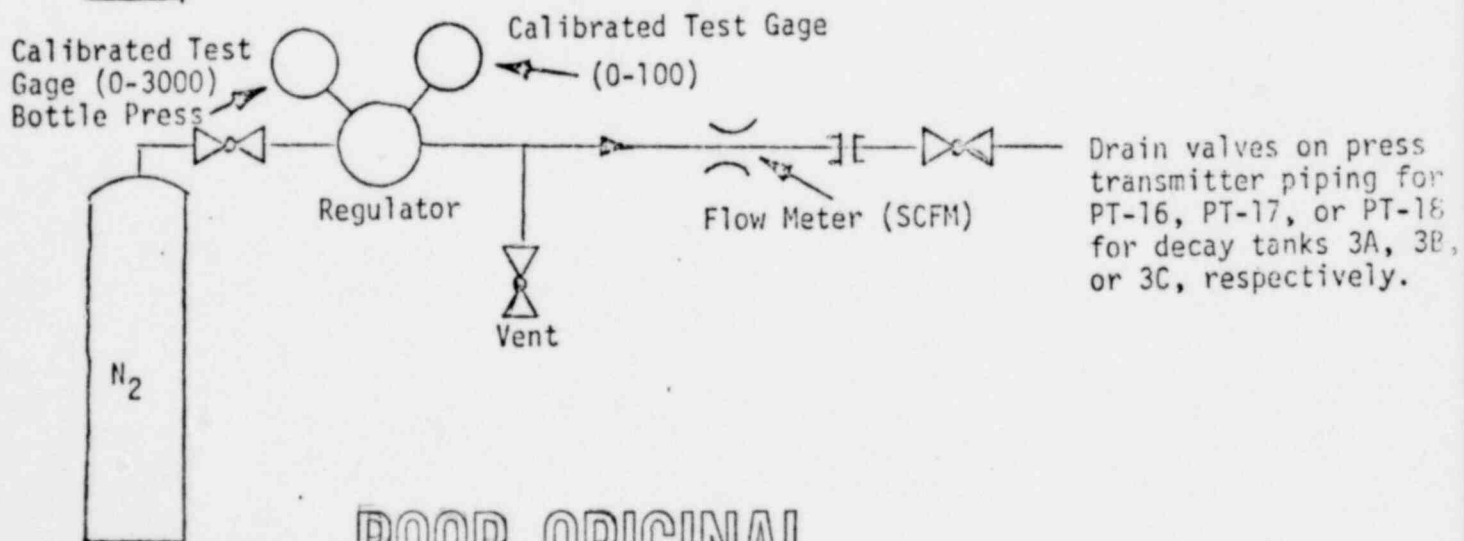


Figure 3 (HPTR)



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DATA SHEET I

Total System
Leak Rate

Initial

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Test Procedure Section	6.6	6.7	6.8	Initial
Time Started				
Time Ended				
Press of N ₂ Supply at Start (P ₁)				
Press of N ₂ Supply at End (P ₂)				
Regulator Flow Reading at Start (Q ₁)				
Regulator Flow Reading at End (Q ₂)				
Pressure of Section Being Tested				
Bottle Content in Std. Cu. Ft. (V _{std}) at a pressure of P _{std}				
Bottle Pressure When Full (P _{std})				
Leak Rate				

- (1) Determine bottle content (V₁) at beginning of test by the following method:

$$V_1 = \frac{(P_{std})(V_{std})}{P_1}$$

- (2) Determine bottle content at end of test by the following method:

$$V_2 = \frac{(P_{std})(V_{std})}{P_2}$$

- (3) Determine the volume of gas used by subtracting V₂ from V₁. Compare with Q₁-Q₂ to ensure no gross error exists in measurements.

- (4) Determine leak rate by dividing the volume used by the time of the test.

Signature _____

Date _____