

# CATEGORY 1

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SUBJECT: Forwards summary of results of flow distribution test on Unit 1 standby shutdown facility reactor coolant makeup pump.

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April 29, 1998

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555

Subject: Oconee Nuclear Station  
Docket Nos. 50-269, -270, -287  
Additional Information on the Standby Shutdown  
Facility Reactor Coolant Makeup Pump Test

In a letter dated July 8, 1996, the NRC issued for comment draft reports from the Office of Nuclear Reactor Regulation (NRR) and the Office for Analysis and Evaluation of Operational Data (AEOD). These draft reports contained analyses and recommendations regarding the testing, operation, design and reliability of the Oconee emergency power system and Standby Shutdown Facility (SSF). As requested in the July 8, 1996, NRC letter, Duke Energy reviewed the NRR and AEOD draft reports for accuracy and to determine a disposition for each recommendation.

In a meeting with the NRC on September 19, 1996, Duke Energy presented its understanding of the open issues and recommendations from the NRC draft reports, along with Duke Energy's plan for disposition of the issues. During the meeting, the NRC clarified Duke Energy's understanding of several of the open issues. A written response to the open issues and recommendations was provided by Duke Energy in a letter dated October 31, 1996.

In the Duke Energy letter dated October 31, 1996, Duke Energy committed to the performance of a flow distribution test on the SSF reactor coolant makeup pump for each Oconee unit. During the last Oconee Unit 1 refueling outage, a flow distribution test was performed on the Oconee Unit 1 SSF reactor coolant makeup pump. Attachment 1 contains a summary of the results of the flow distribution test on the Oconee Unit 1 SSF reactor coolant makeup pump.

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If there are any questions regarding this submittal, please contact Michael Bailey at (864) 885-4390.

Very truly yours,



W. R. McCollum, Jr., Site Vice President  
Oconee Nuclear Station

MEB

Attachment

cc:

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M. A. Scott, Senior Resident Inspector  
Oconee Nuclear Site

D. E. LaBarge, Project Manager  
NRR

**Results of Standby Shutdown Facility  
Reactor Coolant Makeup Pump  
Flow Distribution Test**

**Test Purpose**

The test would determine if the flow rate provided by the Standby Shutdown Facility (SSF) reactor coolant (RC) makeup system to each of the four Oconee Unit 1 RC pumps is adequate to prevent seal degradation or failure during an accident which requires operation of the SSF RC makeup system.

**Acceptance Criteria**

The flow rate provided to each RC pump during the flow distribution test shall be greater than or equal to the flow rate listed below:

1. Flow to 1A1 RC pump  $\geq$  5.9 GPM (5.8 GPM + 0.1 GPM uncertainty)
2. Flow to 1A2 RC pump  $\geq$  5.7 GPM (5.6 GPM + 0.1 GPM uncertainty)
3. Flow to 1B1 RC pump  $\geq$  5.9 GPM (5.8 GPM + 0.1 GPM uncertainty)
4. Flow to 1B2 RC pump  $\geq$  5.9 GPM (5.8 GPM + 0.1 GPM uncertainty)

**Test Method**

The Oconee Unit 1 SSF RC makeup pump was used to pump water from the Spent Fuel Pool to the four RC pumps via the RC pump seal injection lines while the Oconee Unit 1 fuel transfer canal was full and the reactor vessel head was removed for refueling. Mag meters were installed in each of the four seal injection lines to provide an accurate measurement of the seal injection flow rate. The mag meters are accurate to within  $\pm$  0.1 GPM. In addition to the mag meters, an ultrasonic flow meter was attached to each of the four seal injection lines. During the seal injection test, the ultrasonic flow meters displayed an accuracy of 7.5 to 9.5 percent for the model 1010 flow meters and 3.2 to 16.3 percent for the model 990 flow meters. The seal injection flow was measured using both the mag meters and the ultrasonic flow meters. The mag meter flow measurement was considered the official flow measurement during this test due to the accuracy of the meter.

**Results**

The following seal injection flow rates were measured during the SSF RC makeup system flow distribution test.

RC Pump	Mag Meter Flow Rate (GPM)	Ultrasonic Flow Rate (GPM)
1A1	8.6	7.2
1A2	6.3	6.1
1B1	8.4	7.6
1B2	6.7	6.2
Total	30.0	27.1

The flow rates that were measured using the mag meter remained steady to the nearest 0.1 GPM while the Oconee Unit 1 SSF RC makeup pump was running. Since the total SSF RC makeup system flow rate that was measured using the mag meter closely matches the total SSF RC makeup system flow rate which was measured during the past performance testing of the SSF RC makeup pump, the confidence in the mag meter performance test data is high.

The flow rates that were measured using the ultrasonic flow meter were steady to the nearest 1 GPM. While this performance test data is not as accurate as the mag meter results, the ultrasonic flow meter performance test data is useful as an alternate method of verifying the SSF RC makeup system flow rate which was provided to the Oconee Unit 1 RC pumps.

**Conclusion**

Since the flow rates that are provided through each seal injection line are greater than the acceptance criteria, the SSF RC makeup system is capable of providing enough flow to each of the four Oconee Unit 1 RC pumps to prevent seal degradation or failure during an accident which requires operation of the SSF RC makeup system.