GENE-T1500013-001
DRF No. T15-00013
March 1996

GIRAFFE TEST

Apparent Test Results Report (ATR)

Helium Series Tests (H)

H-1 & H-2 Tests

Prepared by: Maryann Herzog
M. Herzog, Senior Engineer
SBWR Test Responsible Engineer

IMPORTANT NOTICE REGARDING
CONTENTS OF THIS REPORT
PLEASE READ CAREFULLY

The only undertakings of the General Electric Company (GE) respecting information in this document are contained in the contract between the customer and GE, as identified in the purchase order for this report and nothing in this document shall be construed as changing the contract. The use of this information by anyone other than the customer or for any purpose other than that for which it is intended, is not authorized; and with respect to any unauthorized use, GE and Toshiba make no representation or warranty, and assume no liability as to the completeness, accuracy, or usefulness of the information contained in this document.

TABLE OF CONTENTS

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

D/W	Drywell
GE	General Electric
GIRAFFE	Gravity-Driven Integral Full-Height Test for Passive Heat Removal
LOCA	Loss-of-Coolant Accident
PCC	Passive Containment Cooling (System)
SBWR	Simplified Boiling Water Reactor
S/C	Suppression Chamber
TOGE	Toshiba/GE
W/W	Wetwell

1.0 TEST SUMMARY

The objectives of tests H-1 and H-2 are to demonstrate the operation of a passive containment cooling system with the presence of a lighter-than-steam non-condensable gas and to provide a database for computer codes used to predict SBWR containment system performance in the presence of a lighter-than-steam non-condensable gas.

The H-1 and H-2 test initial conditions are provided in Reference 1. The test procedures and instrument locations are proprietary information.

Test H-1 is a base case with nominal initial conditions for the SBWR containment at one hour from the initiation of a LOCA caused by a guillotine rupture of one of the main steam lines. At the start of Test H-1, the drywell contains a mixture of steam and nitrogen at a total pressure of approximately 0.3 MPa. Test H-2 is a repeat of Test H-1, except helium replaces the total volume of nitrogen in the drywell.

2.0 CONCLUSION

For both tests H-1 and H-2, the D/W peak pressures were confirmed to be well below the design limit. These tests demonstrated the successful operation of the PCCS with the presence of a heavier-than-steam and a lighter-than-steam non-condensable gas.

3.0 MAJOR TEST RESULTS

3.1 Test H-1 Results

The test results provided in Figures 1 through 6 are proprietary information.

The figure 1 plots of the measured D/W and W/W pressures are proprietary information.

The figure 2 plots of the measured water levels in the non-condensable gas vent line and the LOCA vent line are proprietary information. The figure 5B locations of the differential pressure measurement locations are proprietary information.

The figure 3 plots of the measured D/W temperatures at the seven thermocouple locations are proprietary information.

The figure 4 plots of the measured PCC tube bulk fluid temperatures are proprietary information.

The figure 5A plot of the measured suppression pool surface temperature is proprietary information.

The figure 6 plot of the preliminary measured PCC inlet flow rate is proprietary information.

3.2 Test H-2 Results

The test results provided in Figures 7 through 12 are proprietary information.

The figure 7 plots of the measured D/W and W/W pressures are proprietary information.

The figure 8 plots of the measured water levels in the non-condensable gas vent line and the LOCA vent line are proprietary information.

The figure 9 plots of the measured D/W temperatures at the seven thermocouple locations are proprietary information.

The figure 10 plots of the measured PCC tube bulk fluid temperatures are proprietary information.

The figure 11 plot of the measured suppression pool surface temperature is proprietary information.

The figure 12 plot of the preliminary measured PCC inlet flow rate is proprietary information.

4.0 TEST ANOMALIES and FAILED INSTRUMENTS

There were no test anomalies or failed instruments

5.0 REFERENCES

1. GIRAFFE Helium Test Specification, General Electric Company Specification 25A5677, rev. 1, May 1995

FIGURE 1 TEST H-1 D/W and W/W PRESSURES

w

FIGURE 2 TEST H-1 NON-CONDENSABLE GAS VENT and LOCA VENT WATER LEVELS

FIGURE 3 TEST H-1 D/W TEMPERATURE

FIGURE 4 TEST H-1 PCC TUBE BULK FLUID TEMPERATURE

FIGURE 5A TEST H-1 SUPPRESSION POOL SURFACE TEMPERATURE

FIGURE 5B DIFFERENTIAL PRESSURE MEASUREMENT LOCATIONS IN S/C

FIGURE 6 TEST H-1 PCC INLET FLOW RATE

FIGURE 7 TEST H-2 D/W and W/W PRESSURES

FIGURE 8 TEST H-2 NON-CONDENSABLE GAS VENT and LOCA VENT WATER LEVELS

FIGURE 9 TEST H-2 D/W TEMPERATURE

FIGURE 10 TEST H-2 PCC TUBE BULK FLUID TEMPERATURE

FIGURE 11 TEST H-2 SUPPRESSION POOL SURFACE TEMPERATURE

FIGURE 12 TEST H-2 PCC INLET FLOW RATE