July 18, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
GEORGIA POWER COMPANY, et al.	)	Dockets Nos. 50-424
	)	50-425
(Vogtle Electric Generating	)	
Plant, Units 1 and 2)	)	

APPLICANTS' STATEMENT OF MATERIAL FACTS AS TO WHICH NO GENUINE ISSUE EXISTS TO BE HEARD REGARDING CONTENTION 10.7 (HYDROGEN RECOMBINERS)

Pursuant to 10 C.F.R. § 2.749(a), Applicants submit in support of Applicants' Motion for Summary Disposition of Joint Intervenors' Contention 10.7 that no genuine issue exists to be heard with respect to the following material facts:

1. Joint Intervenors' Contention 10.7 challenges the environmental qualification of the hydrogen recombiners utilized at the Vogtle Electric Generating Plant ("VEGP").

2. The hydrogen recombiners installed at VEGP are the Model B electric hydrogen recombiner systems manufactured by Westinghouse Electric Corporation ("Westinghouse"). Affidavit of Richard B. Miller dated July 11, 1985 ("Miller Affidavit") at ¶ 3.

3. The Model B electric hydrogen recombiner system is a natural convection, flameless, thermal reactor type

hydrogen/oxygen recombiner. Using only electric heaters it heats a continuous stream of the air-hydrogen mixture to a temperature sufficient for spontaneous recombination of the hydrogen with the oxygen in the air to form water vapor. Id. at ¶¶ 3-4.

4. The Model B hydrogen recombiner system consists of three main components: a recombination unit containing the electric heater banks, a power supply panel that contains the equipment necessary to power the heaters, and a control panel that directs the operation of the system. Id. at ¶ 6.

5. The Westinghouse Model B electric hydrogen recombiner system does not have any transducers or sensors that are important to or necessary for its operation following a design basis accident. Id. at ¶ 15-18.

6. In the event of a loss-of-coolant accident ("LOCA") at VEGP, plant personnel will monitor the concentration of hydrogen inside containment by means of the containment hydrogen monitoring system. That system also does not contain any transducers or sensors important to its proper functioning that are located inside containment and would be subject to the extreme environmental conditions that would result from a design basis accident. Affidavit of Glenn H. Stolz at ¶¶ 3-4.

7. Depending upon the containment atmospheric conditions, the correct power for recombiner operation

will be determined. Proper operation of the recombiner system is determined by observing the amount of electric power drawn by the recombination unit, which is shown by instrumentation on the control panel. Miller Affidavit at ¶¶ 16-18.

8. While thermocouples are attached to one heater bank in the recombination unit, those thermocouples do not activate or govern in any way the operation of the recombiner system, are not needed for its proper operation, and will not be used to monitor its proper operation following a LOCA. Id. at ¶ 18.

9. Of the three main components comprising the Westinghouse Model B electric hydrogen recombiner system, the recombination unit, the power supply panel, and the control panel, only the recombination unit is located inside containment and could be subject to LOCA conditions. For that reason, only the recombination unit must be environmentally qualified to withstand exposure to accident conditions. Id. at ¶ 22.

10. The Westinghouse Model B electric hydrogen recombiner system is the successor to the Westinghouse Model A hydrogen recombiner system. Both models consist of a recombination unit, a power supply panel, and a control panel. The power supply and control panels are identical for both models, and the recombination units are very similar. Id. at ¶¶ 58-62.

11. Designed in 1971, the Model A recombiner underwent extensive environmental qualification testing intended to demonstrate its ability to function properly following exposure to normal operating and accident conditions. Id. at ¶¶ 20, 23.

12. That testing program included the following tests, all of which either the recombination unit or the particular components tested successfully passed:

(a) temperature cycling in which the recombination unit was heated and then cooled eighty times (Id. at ¶ 24);

(b) tests under LOCA conditions in which those components that might be affected by rapid pressurization or by high pressure steam were subjected to pressures and temperatures that represented maximum post-LOCA containment conditions (Id. at ¶¶ 25-35);

(c) radiation testing in which electrical components that might be adversely affected by radiation were exposed to several post-LOCA containment steam, pressure, temperature, and spray transients; were irradiated to a total integrated dose equal to the maximum dose to which those components might be exposed under normal operating and accident conditions; and were then subjected to an additional LOCA transient (Id. at ¶¶ 36-39);

(d) tests conducted to demonstrate the long term capability of the recombination unit and its heater banks in which heating elements were subjected to temperatures

in excess of expected post-LOCA temperatures, the recombination unit was operated at temperatures well in excess of LOCA temperatures for a number of days, and the components of the recombination unit mounted on a small scale frame were exposed to a pressure transient and then operated at the lower containment pressures predicted for post-LOCA environments (Id. at ¶¶ 40-43);

(e) a containment pressure test in which heating elements underwent twelve pressure cycles (Id. at ¶ 44);

(f) a hydrogen test in which the maximum temperature in the recombination unit was held constant while the hydrogen concentration was varied up to 6.2 volume percent (Id. at ¶ 45);

(g) an air flow blockage test in which the air flow openings in the recombination unit were gradually blocked while the unit was energized (Id. at ¶¶ 46-47);

(h) an over temperature test involving operating the recombination unit at maximum power and then introducing a four percent air-hydrogen mixture (Id. at ¶ 48);

(i) an over voltage test in which heating elements were subjected to a post-LOCA containment environment and then tested at 1307 VAC, which was well in excess of the voltage of 480 VAC applied during normal operation (Id. at ¶ 49);

(j) a heater capacity test in which the temperature distribution within the recombination unit was measured

with various combinations of heating elements disconnected (Id. at ¶ 50); and

(k) a series of tests performed on the power cables that included thermal aging, irradiation, post-LOCA containment steam and spray exposure, voltage tests, and flame tests (Id. at ¶¶ 51-55).

13. Of these tests, the temperature cycling test (a), hydrogen test (f), air flow blockage test (g), over temperature test (h), heater capacity test (j), and that portion of the long term capability testing (d) consisting of operation of the recombination unit at temperatures in excess of LOCA temperatures were performed upon a production model of the recombination unit. Id. at ¶¶ 24, 41, 45, 46, 48, 50.

14. The LOCA tests (b) and that part of the long term capability testing (d) involving operation of the recombination unit at the lower containment pressures predicted for a post-LOCA environment were conducted upon full-scale production components mounted on a special heater frame that was approximately 3/4 the height of the heater frame in a production model recombination unit. Id. at ¶¶ 25-26, 42.

15. Those tests sufficed to qualify the complete full-scale recombination unit to the conditions involved in the tests because of the simplicity of the design of that unit. A mechanically passive device, the

recombination unit has no moving parts and consists primarily of structural members, power cables, and heating elements. All of those components that could be affected by LOCA conditions were included in the tests, and no purpose would be served by testing a full size prototype. Id. at ¶¶ 27, 42.

16. Westinghouse performed radiation testing (c) on those electrical components necessary to the operation of the recombination unit following a LOCA. The remaining components of the recombination unit were not tested because either they were not needed for the proper operation of the recombination unit or because they were made of metal and would not be adversely affected by radiation. Id. at ¶ 36.

17. The containment pressure test (e), over voltage test (i), and the part of the long term capability testing (d) consisting of exposing the heating elements to temperatures in excess of post-LOCA temperatures were conducted only upon the heating elements. In each of these tests the heating elements were the component in the recombination unit most likely to be damaged by the conditions involved in the test. The purpose of those tests was to examine the specific capabilities of the heating elements in order to demonstrate their performance. Therefore, other components of the recombination unit were not included in the tests. Id. at ¶ 40, 44, 49.

18. Finally, Westinghouse performed the cable testing (k) only upon samples of the power cables taken from a production recombination unit. The intent of those tests was to establish the qualification of those cables pursuant to the standards set by IEEE 383-1974. Those cables are the only components of the recombination unit that need to be qualified to IEEE 383-1974 standards, and, therefore, the cable testing was conducted only on those cables. Id. at ¶ 51.

19. Westinghouse's generic environmental qualification testing program for the Model A recombiner system demonstrated the environmental qualification of that recombiner system under the standards of IEEE 323-1974. The cable testing performed upon the power cables established the qualification of that cable material in accordance with IEEE 383-1974. Id. at ¶¶ 20-22.

20. The Model B hydrogen recombiner system is a slightly modified version of the older Model A hydrogen recombiner. When it developed the Model B recombiner from the Model A design, Westinghouse did not permit any changes to be made that would have affected the qualification of the Model A recombiner. Westinghouse also initiated a test program to verify that those features of the Model B recombiner that differed from the Model A did not affect its environmental qualification. Id. at ¶¶ 21, 58.

21. Those tests, all of which were successfully executed, consisted of:

(a) a heat up test to measure the power required to reach recombination temperature (Id. at ¶ 64);

(b) an air flow test in which the flow rate was measured while the recombination unit was energized and found to surpass the design value (Id. at ¶ 65);

(c) an aging test involving cycling the recombination unit to operational temperatures and then to ambient temperatures 100 times (Id. at ¶ 66);

(d) hydrogen tests in which the recombination unit was energized and then exposed to air-hydrogen mixtures of various concentrations (Id. at ¶ 67); and

(e) spray tests in which the recombination unit successfully processed an air-hydrogen mixture following exposure to a chemical spray for several days (Id. at ¶ 68).

22. These tests, in conjunction with Westinghouse's generic qualification program for the Model A hydrogen recombiner system, demonstrate the environmental qualification of the Model B hydrogen recombiner system for use at VEGP. The maximum environmental extremes to which the recombination unit might be subjected under accident conditions at VEGP are (a) a temperature of 305°F (290°F plus a 15°F margin), (b) pressure of 50 psig, (c) radiation of 2×10^8 rads total integrated dose, and

(d) a chemical spray of 2000 ppm boron buffered with sodium hydroxide to a long term (more than 100 minutes from the beginning of the LOCA) ph of 8.5. In the testing performed by Westinghouse, either a complete recombination unit or those components that might suffer damage from the particular adverse environmental condition being simulated were exposed to the following extreme conditions: (a) temperature of 309°F, (b) pressure of 77 psia (62.7 psig), (c) radiation of at least 2×10^8 total integrated dose, and (d) a chemical spray of 2500 ppm boron buffered with sodium hydroxide to a pH of 10.0. Thus the VEGP post-LOCA environmental conditions are conservatively enveloped by the test conditions utilized by Westinghouse. Id. at ¶ 69.

Respectfully submitted,

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Dated: July 18, 1985

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CERTIFICATE OF SERVICE

I hereby certify that copies of Applicants' Statement of Material Facts as to Which No Genuine Issue Exists to Be Heard Regarding Contention 10.7 (Hydrogen Recombiners), dated July 18, 1985, were served upon those persons on the attached Service List by deposit in the United States mail, postage prepaid, or where indicated by an asterisk (*) by hand delivery, this 18th day of July, 1985.

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Dated: July 18, 1985

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