Georgia Power Company
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201
Telephone 205 877-7122

C. K. McCoy
Vice President, Nuclear
Vogtle Project

Georgia Power
the southern electric system

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Gentlemen:

VOGTLE ELECTRIC GENERATING PLANT
RPV SURVEILLANCE CAPSULE TEST RESULTS

In accordance with the requirements of 10 CFR 50, Appendix H, paragraph III A, Georgia Power Company (GPC) hereby submits the enclosed summary report which concerns reactor vessel surveillance materials testing for Vogtle Electric Generating Plant, Unit 2 (VEGP-2). Specifically, the summary report presents results of the examination of reactor vessel material contained in reactor pressure vessel (RPV) surveillance capsule "U", the first capsule to be removed from the VEGP-2 reactor in the continuing surveillance program which monitors the effects of neutron irradiation of the VEGP-2 RPV materials under actual operating conditions. The subject RPV surveillance capsule was removed from the VEGP-2 RPV on September 25, 1990, during the first refueling outage.

The postirradiation mechanical testing of the reactor vessel materials contained in RPV surveillance capsule "U" was performed for GPC by Westinghouse Electric Corporation. Testing was performed in accordance with 10 CFR 50, Appendices G and H, American Society for Testing and Materials (ASTM) Specification E185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," and Westinghouse procedures. The analysis of the subject reactor vessel materials resulted in the following conclusions:

- The capsule received an average fast neutron fluence (E > 1.0 MeV) of 4.44×10^{18} n/cm^2 after 1.18 effective full power years (EFPY) of plant operation.

- Irradiation of the reactor vessel lower shell plate B8628-1 Charpy specimens, oriented with the longitudinal axis of the specimen parallel to the major rolling direction (longitudinal orientation), to 4.44×10^{18} n/cm^2 (E > 1.0 MeV) resulted in no 30 ft-lb transition temperature increase and in a 50 ft-lb transition temperature increase of 5°F. This results in a 30 ft-lb transition temperature of -10°F and a 50 ft-lb transition temperature of 50°F for longitudinally oriented specimens.

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- Irradiation of the reactor vessel lower shell plate B8628-1 Charpy specimens, oriented with the longitudinal axis of the specimen normal to the major rolling direction (transverse orientation), to 4.44×10^{18} n/cm^2 (E > 1.0 MeV) resulted in no 30 ft-lb transition temperature increase and in a 50 ft-lb transition temperature increase of 5°F. This results in a 30 ft-lb transition temperature of 30°F and a 50 ft-lb transition temperature of 80°F for transversely oriented specimens.

- The weld metal Charpy specimens irradiated to 4.44×10^{18} n/cm^2 (E > 1.0 MeV) resulted in no 30 and no 50 ft-lb transition temperature increases. This results in a 30 ft-lb transition temperature of -15°F and a 50 ft-lb transition temperature of 5°F for the weld metal.

- Irradiation of the reactor vessel weld heat-affected-zone (HAZ) metal Charpy specimens to 4.44×10^{18} n/cm^2 (E > 1.0 MeV) resulted in no 30 and no 50 ft-lb transition temperature increases. This results in a 30 ft-lb transition temperature of -80°F and a 50 ft-lb transition temperature of -45°F for the weld HAZ metal.

- The average upper shelf energy of lower shell plate B8628-1 (longitudinal orientation) resulted in an energy increase of 10 ft-lb after irradiation to 4.44×10^{18} n/cm^2 (E > 1.0 MeV). This results in an upper shelf energy of 99 ft-lb for longitudinally oriented specimens.

- The average upper shelf energy of lower shell plate B8628-1 (transverse orientation) resulted in a energy increase of 9 ft-lb after irradiation to 4.44×10^{18} n/cm^2 (E > 1.0 MeV). This results in an upper shelf energy of 79 ft-lb for transversely oriented specimens.

- The average upper shelf energy of the weld metal increased 6 ft-lb after irradiation to 4.44×10^{18} n/cm^2 (E > 1.0 MeV). This results in an upper shelf energy of 98 ft-lb for the weld metal.

- The average upper shelf energy of the weld HAZ metal increased 16 ft-lb after irradiation to 4.44×10^{18} n/cm^2 (E > 1.0 MeV). This results in an upper shelf energy of 122 ft-lb for the weld HAZ metal.

- The surveillance capsule "U" test results indicate that the surveillance material 30 ft-lb transition temperature changes and upper shelf energy decreases are less than the Regulatory Guide 1.99 Revision 2 predictions.

- The surveillance capsule materials exhibit a more than adequate upper shelf energy level for continued safe plant operation and are expected to maintain an upper shelf energy of no less than 50 ft-lb throughout the life (32 EFPY) of vessel as required by 10 CFR 50, Appendix G.

- The calculated end-of-life (32 EFPY) maximum neutron fluence (E > 1.0 MeV) for the Vogtle Electric Generating Plant Unit 2 reactor vessel is as follows:

  Vessel inner radius * - 3.04×10^{19} n/cm^2
  Vessel 1/4 thickness - 1.66×10^{19} n/cm^2
  Vessel 3/4 thickness - 3.59×10^{18} n/cm^2

  * Clad/base metal interface

The actual capsule fluence of 4.44×10^{18} n/cm^2 for RPV surveillance capsule "U" is less than the predicted capsule fluence of 4.5×10^{18} n/cm^2, which is specified in table 16.3-3 of the Final Safety Analysis Report.

The recent revision to 10 CFR 50.61 states that the licensee must submit an assessment of the pressurized thermal shock (PTS) value with the next update of the pressure temperature limits, or the next reactor vessel material surveillance report, or 5 years from the effective date of this rule, whichever comes first. The results from the reactor vessel material surveillance report indicate that:

- All RT_{PTS} values remain below the NRC screening values for PTS. The PTS values for the limiting beltline region lower shell plate B8628-1 for 32 EFPY and 48 EFPY are 124°F and 127°F, respectively.

With regard to changes to the plant Technical Specifications as a result of the postirradiation analysis of the reactor vessel material contained in RPV surveillance capsule "U", Georgia Power Company does not plan on making any changes for VEGP-2 at this time. The second capsule removal for VEGP-2 is planned at approximately 5 EFPY.

Ten copies of the summary report, Westinghouse WCAP-13007, are enclosed for your use.

Should there be any questions, please contact this office.

Sincerely,

C. K. McCoy

CKM/PAH/gmb

Enclosure: Westinghouse WCAP-13007, "Analysis of Capsule U from the Georgia Power Company Vogtle Electric Generating Plant Unit 2 Reactor Vessel Radiation Surveillance Program"

xc: Georgia Power Company
Mr. W. B. Shipman (w/enclosure)
Mr. L. A. Ward (w/o)
Mr. M. Sheibani (w/o)
NORMS (w/enclosure)

U. S. Nuclear Regulatory Commission
Mr. S. D. Ebneter, Regional Administrator (w/enclosure)
Mr. D. S. Hood, Licensing Project Manager, NRR (w/2 enclosure)
Mr. B. R. Bonser, Senior Resident Inspector, Vogtle (w/enclosure)