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Docket Nos. 50-424
50-425

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

Gentlemen:

VOGTLE ELECTRIC GENERATING PLANT
10 CFR 50.46 ANNUAL ECCS MODEL CHANGES REPORT

Enclosed is Georgia Power Company's 10 CFR 50.46 Annual ECCS Model Changes Report in compliance with the reporting requirements of 10 CFR 50.46. On January 20, 1992, Georgia Power Company became aware of significant errors and changes in the Westinghouse ECCS Evaluation Model for the small break loss of coolant accident (LOCA) permanently assessed against the current Vogtle Electric Generating Plant VANTAGE-5 ECCS Models. Therefore, this annual report also identifies significant errors/changes of more than 50°F in peak cladding temperature (PCT) results. This enclosed report serves as both Georgia Power Company's annual and significant errors/changes report in compliance with 10 CFR 50.46.

Attachment A provides information regarding the effect of the ECCS Evaluation Model errors/changes on the current Vogtle Unit 2 analysis peak cladding temperature results reported in section 15.6 of the Vogtle Electric Generating Plant Units 1 and 2 Final Safety Analysis Report (FSAR).

Attachment B provides a summary of the plant change safety evaluations performed under the provisions of 10 CFR 50.59 that also affect the PCT results. It should be noted that the facility change safety evaluations included in Attachment B reflect only those which result in non-zero PCT impact assessments. Also, it should be noted that Attachments A and B apply only to Vogtle Unit 2 until the end of Cycle 2 operation.

Attachment C provides information on the VANTAGE-5 ECCS Evaluation Model errors/changes on PCT reported in the VANTAGE-5 Fuel Licensing Amendment (ELV-02166, dated November 29, 1990).

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Georgia Power



Attachment D provides a summary of the plant change safety evaluations performed under the provisions of 10 CFR 50.59 that also affect the PCT results. It should be noted that only the VANTAGE-5 small break LOCA errors and changes resulted in a PCT sum that is significant. Also, it should be noted that Attachments C and D apply to the current Vogtle Unit 1 operation with VANTAGE-5 fuel and will apply to Vogtle Unit 2 at the beginning of Cycle 3 operation on about May 3, 1992.

This information package constitutes Georgia Power Company's Annual Report to the NRC per the reporting requirements of 10 CFR 50.46(a)(3)(ii). This package also serves as Georgia Power Company's significant errors/changes report as required by 10 CFR 50.46(a)(3)(ii).

It has been determined that compliance with the requirements of 10 CFR 50.46 continues to be maintained when the effects of plant design changes and use of plant margins performed under 10 CFR 50.59, which could affect the large break LOCA and small break LOCA analyses results, are combined with the effects of the ECCS Evaluation Model errors/changes applicable to Vogtle Units 1 and 2.

If you have any questions regarding this report, please contact this office.

Sincerely,

C. K. McCoy

CKM/HWM/gps

Attachment

cc: Georgia Power Company
Mr. W. B. Shipman
Mr. M. Sheibani
NORMS

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

ATTACHMENT A

EFFECT OF WESTINGHOUSE ECCS EVALUATION MODEL
SIGNIFICANT ERRORS/CHANGES ON THE LOCA ANALYSIS RESULTS
FOUND IN FSAR SECTION 15.6 FOR VOGTLE UNIT 2*

## BACKGROUND

Provisions in 10 CFR 50.46 required applicants and holders of operating licenses or construction permits to notify the Nuclear Regulatory Commission (NRC) of errors and changes in the Emergency Core Cooling System (ECCS) Evaluation Models on an annual basis, when the errors and changes are not significant. Reference 1 defines a significant error or change as one which results in a calculated fuel peak cladding temperature (PCT) different by more than 50°F from the temperature calculated for the limiting transient using the last acceptable model, or as a cumulation of changes and errors such that the sum of the absolute magnitudes of the respective temperature changes is greater than 50°F.

The following presents an assessment of the effect of modifications to the Westinghouse ECCS Evaluation Models on the LOCA analysis results found in the Final Safety Analysis Report (FSAR) Section 15.6 for Vogtle Unit 2.*

## LARGE BREAK LOCA

### ECCS EVALUATION MODEL

The large break LOCA analysis for Vogtle Unit 2 was examined to assess the effect of the modifications to the Westinghouse large break LOCA ECCS Evaluation Model on PCT results reported in FSAR Section 15.6.* The large break LOCA analysis results were calculated using the 1981 version of the Westinghouse large break LOCA ECCS Evaluation Model (Reference 2). The limiting size break analysis assumed the following information important to the large break LOCA analyses:

- 17x17 Standard Fuel Assembly
- Core Power = 1.02 * 3411 MWT
- Vessel Average Temperature = 589.6°F
- Steam Generator Plugging Level = 5%
- $F_Q$ = 2.32
- F-delta-H = 1.55

* Applies only to Vogtle Unit 2 until the end of Cycle 2 operation.

For Vogtle Unit 2*, the limiting size break resulted from the double-ended guillotine rupture of the cold leg piping with a discharge coefficient of $C_D$ = 0.6 for the maximum safeguards condition. The analysis-of-record calculated PCT was 1995.8°F.

NEW LOCA MODEL ASSESSEMENTS

There were no new modifications to the Westinghouse ECCS Evaluation Models identified that would affect the 1981 Evaluation Model (Reference 2) large break LOCA analysis results found in FSAR Section 15.6 for Vogtle Unit 2.*

RESULTANT LARGE BREAK LOCA PCT

As discussed above, the PCT results for Vogtle Unit 2* are the following:

| | | |
|---|---|---|
| 1. | Analysis-of-Record for Vogtle Unit 2* (Reference 3) | 1995.8°F |
| 2. | Prior LOCA Model Assessments | |
| | a) Modifications to Westinghouse ECCS Evaluation Model (Reference 4) | + 16.0°F |
| | b) Fuel Rod Model Revisions (Reference 5) | + 41.0°F |
| | c) Fuel Rod Burst and Blockage Application (Reference 5) | + 165.0°F |
| | d) Steam Generator Flow Area Application (Reference 5) | + 10.0°F |
| | e) Plant Margin on FQT (Reference 5) | - 47.0°F |
| 3. | New LOCA Model Assessments - None | + 0.0°F |
| | ECCS Model Errors/Changes Resultant PCT | = 2180.8°F |

CONCLUSION

An evaluation of the effect of modifications to the Westinghouse large break 1981 ECCS Evaluation Model was performed for the large break LOCA analysis results found in FSAR Section 15.6 for Vogtle Unit 2.* When the effects of the large break ECCS model errors/changes were combined with the current plant analysis results, it was determined that compliance with the requirements of 10 CFR 50.46(b) would be maintained.

* Applies only to Vogtle Unit 2 until the end of Cycle 2 operation.

## SMALL BREAK LOCA

### ECCS EVALUATION MODEL

The small break LOCA analysis for Vogtle Unit 2* was also examined to assess the effect of the modifications to the Westinghouse small break LOCA ECCS Evaluation Model on PCT results reported in FSAR Section 15.6 for Vogtle Unit 2.* The small break LOCA analysis results were calculated using the October 1975 version of the Westinghouse small break LOCA ECCS Evaluation Model incorporating the WFLASH computer code (Reference 6). The analysis assumed the following information important to the small break LOCA analyses:

- 17x17 Standard Fuel Assembly
- Core Power = 1.02 * 3411 MWT
- Vessel Average Temperature = 589.6°F
- Steam Generator Plugging Level = 5%
- $F_Q$ = 2.20 at 10 ft
- F-delta-H = 1.55

For Vogtle Unit 2, the limiting size small break resulted from a four-inch equivalent diameter break in the cold leg. The analysis-of-record calculated PCT was 1537°F.

### NEW LOCA MODEL ASSESSMENTS

There were no new modifications to the Westinghouse ECCS Evaluation Models identified that would affect the WFLASH small break LOCA analysis results found in FSAR Section 15.6 for Vogtle Unit 2.*

### RESULTANT SMALL BREAK LOCA PCT

As discussed above, the PCT results for Vogtle Unit 2* are the following:

| | | |
|---|---|---|
| 1. | Analysis-of-Record for Vogtle Unit 2* (Reference 3) | 1537.0°F |
| 2. | Prior LOCA Model Assessments | |
| | a) Fuel Rod Model Revisions (Reference 5) | + 37.0°F |
| | b) Rod Internal Pressure Assumption (Reference 5) | + 40.0°F |
| 3. | New LOCA Model Assessments - None | + 0.0°F |
| | ECCS Model Errors/Changes Resultant PCT | = 1614.0°F |

* Applies only to Vogtle Unit 2 until the end of Cycle 2 operation.

CONCLUSION

An evaluation of the effect of modifications to the Westinghouse small break WFLASH ECCS Evaluation Model was performed for the small break LOCA analysis results found in FSAR Section 15.6 for Vogtle Unit 2.* When the effects of the small break ECCS model errors/changes were combined with the current plant analysis results, it was determined that compliance with the requirements of 10 CFR 50.46(b) would be maintained.

## REFERENCES

1. "Emergency Core Cooling Systems; Revisions to Acceptance Criteria," Federal Register, Vol. 53, No. 180, pp. 35996-36005, dated September 16, 1988.

2. WCAP-9220-P-A, Revision 1 (Proprietary), WCAP-9221-A, Revision 1 (Non-Proprietary), "Westinghouse ECCS Evaluation Model - 1981 Version," 1981, Eicheldinger. C.

3. Vogtle Units 1 and 2 Final Safety Analysis Report, Revision 1, March 1991.

4. ELV-01184, "Vogtle Electric Generating Plant, 10 CFR 50.46 Annual ECCS Model Changes Report," letter from W. G. Hairston (GPC) to USNRC, dated December 22, 1989.

5. ELV-03014, "Vogtle Electric Generating Plant, 10 CFR 50.46 ECCS Model Significant Errors/Changes Report," letter from W. G. Hairston (GPC) to USNRC, dated July 26, 1991.

6. "Westinghouse Emergency Core Cooling System Small Break October 1975 Model," WCAP-8971-A (Non-Proprietary).

* Applies only to Vogtle Unit 2 until the end of Cycle 2 operation.

ATTACHMENT B

EFFECT OF SAFETY EVALUATIONS PERFORMED
ON THE LOCA ANALYSIS RESULTS FOUND IN
FSAR SECTION 15.6 FOR VOGTLE UNIT 2*

## LARGE BREAK LOCA

### NEW SAFETY EVALUATION ASSESSMENTS

No new safety evaluations have been identified since the last 10 CFR 50.46 report (Reference 1) that would affect the large break loss of coolant accident (LOCA) peak cladding temperature (PCT) analysis results.

### RESULTANT LARGE BREAK LOCA PCT

As discussed above, the licensing basis PCT results for Vogtle Unit 2* is the following:

| | | |
|---|---|---|
| 1. | Resultant PCT from ECCS Evaluation Model Errors/Changes Reported in Attachment A | 2180.8°F |
| 2. | Prior Safety Evaluation Assessments | |
| | a. Safety Evaluation for Charging Pump Increased Runout (Reference 2) | + 2.0°F |
| | b. Safety Evaluation for Safety Injection Flow Changes (Reference 2) | + 3.0°F |
| | c. Safety Evaluation for Containment Purging (Reference 2) | + 10.0°F |
| 3. | New Safety Evaluation Assessments - None | + 0.0°F |
| | Licensing Basis PCT | = 2195.8°F |

### CONCLUSIONS

It was determined that compliance with the requirements of 10 CFR 50.46(b) would be maintained when safety evaluations for changes which affected the large break LOCA analysis results were combined with the effect of the large break ECCS Evaluation Model errors/changes reported in Attachment A applicable to Vogtle Unit 2.*

* Applies only to Vogtle Unit 2 until the end of Cycle 2 operation.

## SMALL BREAK LOCA

NEW SAFETY EVALUATION ASSESSMENTS

No new safety evaluations have been identified since the last 10 CFR 50.46 report (Reference 1) that would affect the small break LOCA PCT analysis results.

RESULTANT SMALL BREAK LOCA PCT

As discussed above, the licensing basis PCT results for Vogtle Unit 2* is the following:

| | | |
|---|---|---|
| 1. | Resultant PCT from ECCS Evaluation Model Errors/Changes Reported in Attachment A | 1614.0°F |
| 2. | Prior Safety Evaluation Assessments | |
| | a. Safety Evaluation for Veritrak Transmitters (Reference 2) | + 3.7°F |
| | b. Safety Evaluation for Steam Generator Lower Level Tap Relocation (Reference 3) | + 11.0°F |
| 3. | New Safety Evaluation Assessments - None | + 0.0°F |
| | Licensing Basis PCT = | 1628.7°F |

CONCLUSIONS

It was determined that compliance with the requirements of 10 CFR 50.46(b) would be maintained when safety evaluations for changes which affected the small break LOCA analysis results were combined with the effect of the small break ECCS Evaluation Model errors/changes reported in Attachment A applicable to Vogtle Unit 2.*

## REFERENCES

1. ELV-03014, "Vogtle Electric Generating Plant, 10 CFR 50.46 ECCS Model Significant Errors/Changes Report," letter from W. G. Hairston (GPC) to USNRC, dated July 26, 1991.

2. ELV-01184, "Vogtle Electric Generating Plant, 10 CFR 50.46 Annual ECCS Model Changes Report," letter from W. G. Hairston (GPC) to USNRC, dated December 22, 1989.

3. ELV-02368, "Vogtle Electric Generating Plant, 10 CFR 50.46 Annual ECCS Model Changes Report," letter from W. G. Hairston (GPC) to USNRC, dated December 20, 1990.

* Applies only to Vogtle Unit 2 until the end of Cycle 2 operation.

ATTACHMENT C

# EFFECT OF WESTINGHOUSE ECCS EVALUATION MODEL ERRORS/CHANGES ON THE LOCA ANALYSIS RESULTS FOUND IN THE VOGTLE UNITS 1 AND 2 VANTAGE-5 FUEL DESIGN LICENSING AMENDMENT*

## BACKGROUND

Provisions in 10 CFR 50.46 required applicants and holders of operating licenses or construction permits to notify the Nuclear Regulatory Commission (NRC) of errors and changes in the Emergency Core Cooling System (ECCS) Evaluation Models on an annual basis when the errors and changes are not significant, and within 30 days of discovery when the errors and changes are significant. Reference 1 defines a significant error or change as one which results in a calculated fuel peak cladding temperature (PCT) different by more than 50°F from the temperature calculated for the limiting transient using the last acceptable model, or as a cumulation of changes and errors such that the sum of the absolute magnitudes of the respective temperature changes is greater than 50°F.

The following presents an assessment of the effect of the significant errors and changes to the Westinghouse ECCS Evaluation Models on the LOCA analysis results found in the Vogtle Units 1 and 2 VANTAGE-5 Fuel Design Licensing Amendment (Reference 2).

## LARGE BREAK LOCA

### ECCS EVALUATION MODEL

The large break LOCA analysis for Vogtle Units 1 and 2* was examined to assess the effect of errors and changes to the Westinghouse large break LOCA ECCS Evaluation Model on PCT results reported in Reference 2. The large break LOCA analysis results were calculated using the Westinghouse BASH large break LOCA ECCS Evaluation Model (Reference 3). The limiting size break analysis assumed the following information important to the large break LOCA analyses:

- 17x17 VANTAGE-5 Fuel Assembly
- Core Power = 1.02 * 3565 MWT
- Vessel Average Temperature = 587.3°F
- Steam Generator Plugging Level = 10%
- $F_Q$ = 2.50
- F-delta-H = 1.65

* Applies to Vogtle Unit 1. Also applies to Vogtle Unit 2 beginning with Cycle 3 operation on about May 3, 1992.

For Vogtle Units 1 and 2*, the limiting size break resulted from the double-ended guillotine rupture of the cold leg piping with a discharge coefficient of $C_D$ = 0.6. The VANTAGE-5 analysis calculated PCT was 2037°F.

NEW LOCA MODEL ASSESSMENTS

The following errors and changes to the Westinghouse ECCS Evaluation Models would affect the BASH Evaluation Model large break LOCA analysis results:

Fuel Rod Model Update, IMP Database Errors, and Miscellaneous Input Changes

The previous 10 CFR 50.46 report (Reference 4) contained an item assessed against the Vogtle VANTAGE-5 large break LOCA analysis-of-record. The item was an initial condition inconsistency in the fuel rod model which resulted in a +10°F PCT assessment. An inconsistency in the fuel rod heatup model of LOCBART resulted in an incorrect initialization. A reanalysis was performed for the full power nominal operating temperature which used an updated LOCBART code version containing corrections to resolve the fuel rod model initial inconsistency issue. Therefore, the assessment on the fuel rod model initial revision item documented in the previous 10 CFR 50.46 report (Reference 4) is deleted from the PCT assessments and is incorporated in the reanalysis results discussed below.

The reanalysis above included the updated LOCBART code version plus two other changes. The changes included corrections to the IMP database which Westinghouse uses to prepare input to the ECCS Evaluation Model computer programs and changes to miscellaneous input parameters which resulted in overly conservative input values, such as > 10% degraded safety injection flow and higher than predicted initial fuel temperatures. The result of discrepancies in the IMP database is that standard fuel geometric information was inadvertently included in the analysis for VANTAGE-5 fuel. This caused variations in the core volume, fuel rod diameters, etc. which affected the analysis-of-record calculated PCT in a conservative direction. Therefore, a reanalysis was performed which corrected these input changes to the VANTAGE-5 ECCS Evaluation Model for Vogtle Units 1 and 2.

The cumulative effect of the changes/errors on the calculated PCT was determined by performing calculations using the BASH Evaluation Model for both the full power nominal temperature and reduced temperature operations. The analysis calculations confirmed that the effect of the ECCS Evaluation Model changes were insignificant as defined by 10 CFR 50.46(a)(3)(i). The calculations showed that the PCT decreased by 25°F. Therefore, a 25°F benefit has been assessed against the Vogtle VANTAGE-5 large break LOCA PCT results.

* Applies to Vogtle Unit 1. Also applies to Vogtle Unit 2 beginning with Cycle 3 operation on about May 3, 1992.

RESULTANT LARGE BREAK LOCA PCT

As discussed above, errors and changes to the Westinghouse large break LOCA ECCS Evaluation Model will result in the following PCT esults for VANTAGE-5:

| | | |
|---|---|---|
| 1. | VANTAGE-5 Analysis Results (Reference 2*) | 2037.0°F |
| 2. | Prior LOCA Model Assessments | |
| | Steam Generator Flow Area Application (Reference 4) | + 10.0°F |
| 3. | New LOCA Model Assessments | |
| | Fuel Rod Model Update, IMP Database Errors, and Miscellaneous Input Changes | - 25.0°F |
| | ECCS Model Errors/Changes Resultant PCT | = 2022.0°F |

CONCLUSION

An evaluation of the effect of errors and changes to the Westinghouse large break BASH ECCS Evaluation Model was performed for the large break LOCA analysis results found in the Vogtle Units 1 and 2 VANTAGE-5 Fuel Design Reference 2.* When the effects of the large break ECCS model errors/changes were combined with the VANTAGE-5 plant analysis results, it was determined that compliance with the requirements of 10 CFR 50.46(b) would be maintained.

## SMALL BREAK LOCA

ECCS EVALUATION MODEL

The small break LOCA analysis for Vogtle Units 1 and 2* was examined to assess the effect of the errors/changes to the Westinghouse ECCS Evaluation Model on PCT results (the cumulative sum of which are significant) reported in Reference 2. The small break LOCA analysis results were calculated using the NOTRUMP version of the Westinghouse small break LOCA ECCS Evaluation Model (Reference 5). The analysis assumed the following information important to the small break LOCA analyses:

- 17x17 VANTAGE-5 Fuel Assembly
- Core Power = 1.02 * 3565 MWT
- Vessel Average Temperature = 587.3°F

* Applies to Vogtle Unit 1. Also applies to Vogtle Unit 2 beginning with Cycle 3 operation on about May 3, 1992.

- Steam Generator Plugging Level = 10%
- $F_Q$ = 2.48 at 9.5 ft
- F-delta-H = 1.70

For Vogtle Units 1 and 2*, the limiting size small break resulted from a three-inch equivalent diameter break in the cold leg. The VANTAGE-5 analysis calculated PCT was 2037°F.

NEW LOCA MODEL ASSESSMENTS

The following errors and changes to the Westinghouse ECCS Evaluation Models would affect the NOTRUMP small break LOCA analysis results found in Reference 2, the sum of which are significant:

Fuel Rod Model Update, IMP Database Errors, and Miscellaneous Input Changes

The previous 10 CFR 50.46 report (Reference 4) contained two items assessed against the Vogtle VANTAGE-5 small break LOCA analysis-of-record. The cumulative PCT assessments of these two items (+77°F) were determined to be significant. These two items were the fuel rod model revision (same issue discussed in the large break LOCA section) and the rod internal pressure assumption. A reanalysis was performed for the full power nominal operating temperature which used an updated LOCTA-IV code version containing corrections to resolve both the fuel rod model revision issue and the Zircaloy-4 creep model and the change to the rod internal pressure assumption. The Zircaloy-4 creep model and the rod internal pressure assumption were combined into one item in the previous 10 CFR 50.46 report. Therefore, the two assessments on these issues documented in the previous 10 CFR 50.46 report (Reference 4) are deleted from the PCT assessments and are incorporated into the reanalysis results discussed below.

The reanalysis above included the updated LOCTA-IV code version plus two other changes. The changes included corrections to the IMP database which Westinghouse uses to prepare input to the ECCS Evaluation Model computer programs and changes to miscellaneous input parameters which resulted in overly conservative input values, such as reduction in the axial offset from +30% to +13% and an increased steam generator water mass.

The result of discrepancies in the IMP database is that standard fuel geometric information was inadvertently included in the analysis for the VANTAGE-5 fuel. This caused variations in the core volume, fuel rod diameters, etc. which affected the analysis-of-record calculated PCT in a

* Applies to Vogtle Unit 1. Also applies to Vogtle Unit 2 beginning with Cycle 3 operation on about May 3, 1992.

conservative direction. Therefore, a reanalysis was performed which corrected these input changes to the VANTAGE-5 ECCS Evaluation Model for Vogtle Units 1 and 2.

As mentioned previously, the reanalysis included an updated LOCTA-IV code version. The reanalysis also included an updated version of NOTRUMP which used revised convergence criteria and a modified steam generator model.

The cumulative effect of these changes on the small break LOCA analysis PCT calculations was determined using the 1985 small break LOCA Evaluation Model (Reference 5) by performing computer analysis calculations for both the full power nominal temperature and reduced temperature operation. The analysis calculations confirmed that the cumulative effect of the changes on the small break LOCA ECCS Evaluation Model were significant as defined by 10 CFR 50.46(a)(3)(i). The calculations showed that the PCT decreased by 249°F. Therefore, a 249°F benefit has been assessed against the Vogtle VANTAGE-5 small break LOCA PCT results.

RESULTANT SMALL BREAK LOCA PCT

As discussed above, errors and changes to the Westinghouse small break LOCA ECCS Evaluation Model (the sum of which are significant) will result in the following PCT results for VANTAGE-5:

| | | |
|---|---|---|
| 1. | VANTAGE-5 Analysis Results (Reference 2*) | 2037.0°F |
| 2. | Prior LOCA Model Assessments - None | + 0.0°F |
| 3. | New LOCA Model Assessments<br>Fuel Rod Model Update, IMP Database Errors, and<br>Miscellaneous Input Changes | - 249.0°F |
| | ECCS Model Errors/Changes Resultant PCT = | 1788.0°F |

CONCLUSION

An evaluation of the effect of errors and changes to the Westinghouse small break NOTRUMP ECCS Evaluation Model was performed for the small break LOCA analysis results found in the Vogtle Units 1 and 2 VANTAGE-5 Fuel Design Reference 2.* When the effects of the small break ECCS model errors/changes (the sum of which are significant) were combined with the VANTAGE-5 plant analysis results, it was determined that compliance with the requirements of 10 CFR 50.46(b) would be maintained.

* Applies to Vogtle Unit 1. Also applies to Vogtle Unit 2 beginning with Cycle 3 operation on about May 3, 1992.

## REFERENCES

1. "Emergency Core Cooling Systems; Revisions to Acceptance Criteria," Federal Register, Vol. 53, No. 180, pp. 35996-36005, dated September 16, 1988.

2. ELV-02166, "Vogtle Electric Generating Plant, Request for Technical Specifications Changes, VANTAGE-5 Fuel Design," letter from W. G. Hairston (GPC) to USNRC, dated November 29, 1990.

3. "The 1981 Version of the Westinghouse ECCS Evaluation Model Using the BASH Code," WCAP-11524-A (Non-Proprietary), March 1987.

4. ELV-03014, "Vogtle Electric Generating Plant, 10 CFR 50.46 ECCS Model Significant Errors/Changes Report," letter from W. G. Hairston (GPC) to USNRC, dated July 26, 1991.

5. "Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code," WCAP-10081-A (Non-Proprietary).

ATTACHMENT D

EFFECT OF SAFETY EVALUATIONS PERFORMED
ON THE LOCA ANALYSIS RESULTS FOUND IN THE
VOGTLE UNITS 1 AND 2 VANTAGE-5 FUEL DESIGN LICENSING AMENDMENT*

LARGE BREAK LOCA

NEW SAFETY EVALUATION ASSESSMENTS

The VANTAGE-5 large break loss of coolant accident (LOCA) analysis results have been supplemented by the following safety evaluation which could affect PCT results:

A safety evaluation to determine the effect of a reduced full power operating temperature ($T_{HOT}$ Reduction) was performed on the Vogtle Units 1 and 2 transition to VANTAGE-5 fuel analysis large break LOCA (Reference 1). This evaluation considered an approximate 17°F reduction in the full power operating temperature. The evaluation determined that the large break LOCA analysis PCT results could be affected by a 13°F increase.

RESULTANT LARGE BREAK LOCA PCT

As discussed above, the plant modification could affect the resultant VANTAGE-5 PCT as follows:

| | | |
|---|---|---|
| 1. | Resultant PCT from ECCS Evaluation Model Errors/Changes Reported in Attachment C | 2022.0°F |
| 2. | Prior Safety Evaluation Assessments | |
| | a. Safety Evaluation for Containment Purging (Reference 2) | + 10.0°F |
| | b. Safety Evaluation for +/- 6°F Uncertainty Band (Reference 2) | + 11.0°F |
| | c. Transition Cycle Penalty (Reference 2) | + 50.0°F |
| 3. | New Safety Evaluation Assessments Safety Evaluation for Reduced Full Power Operating Temperature | + 13.0°F |
| | Licensing Basis PCT = | 2106.0°F |

CONCLUSIONS

It was determined that compliance with the requirements of 10 CFR 50.46(b) would be maintained when safety evaluations for changes which affected the large break LOCA analysis results were combined with the effect of the large break ECCS Evaluation Model errors and changes applicable to Vogtle Units 1 and 2 VANTAGE-5 fuel.*

* Applies to Vogtle Unit 1. Also applies to Vogtle Unit 2 beginning with Cycle 3 operation on about May 3, 1992.

## SMALL BREAK LOCA

NEW SAFETY EVALUATION ASSESSMENTS

The VANTAGE-5 small break LOCA analysis results have been supplemented by the following safety evaluation which could affect the PCT results:

A safety evaluation to determine the effect of a reduced full power operating temperature ($T_{HOT}$ Reduction) was performed on the Vogtle Units 1 and 2 transition to VANTAGE-5 fuel analysis small break LOCA (Reference 1). This evaluation considered an approximate 17°F reduction in the full power operating temperature. The evaluation determined that the small break LOCA analysis PCT results could be affected by a 21°F increase.

RESULTANT SMALL BREAK LOCA PCT

As discussed above, the plant modification could affect the resultant VANTAGE-5 PCT as follows:

| | | |
|---|---|---|
| 1. | Resultant PCT from ECCS Evaluation Model Errors/Changes Reported in Attachment C | 1788.0°F |
| 2. | Prior Safety Evaluation Assessments | |
| | a. Safety Evaluation for Steam Generator Lower Level Tap Relocation (Reference 2) | + 15.0°F |
| | b. Safety Evaluation for +/- 6°F Uncertainty Band (Reference 2) | + 4.0°F |
| 3. | New Safety Evaluation Assessments Safety Evaluation for Reduced Full Power Operating Temperature | + 21.0°F |
| | Licensing Basis PCT = | 1828.0°F |

CONCLUSIONS

It was determined that compliance with the requirements of 10 CFR 50.46(b) would be maintained when safety evaluations for changes which affected the small break LOCA analysis results were combined with the effect of the small break ECCS Evaluation Model errors and changes (the sum of which are significant) applicable to Vogtle Units 1 and 2 VANTAGE-5 fuel.*

* Applies to Vogtle Unit 1. Also applies to Vogtle Unit 2 beginning with Cycle 3 operation on about May 3, 1992.

## REFERENCES

1. ELV-02166, "Vogtle Electric Generating Plant, Request for Technical Specifications Changes, VANTAGE-5 Fuel Design," letter from W. G. Hairston (GPC) to USNRC, dated November 29, 1990.

2. ELV-03014, "Vogtle Electric Generating Plant, 10 CFR 50.46 ECCS Model Significant Errors/Changes Report," letter from W. G. Hairston (GPC) to USNRC, dated July 26, 1991.