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Georgia Power
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Docket Nos. 50-321
50-366

HL-5185

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

Edwin I. Hatch Nuclear Plant
Response to Request for Additional Information:
Drywell Air Temperature Submittal

Gentlemen:

By letter dated February 21, 1996, Georgia Power Company (GPC) submitted a request to revise the Plant Hatch Unit 1 and Unit 2 Technical Specifications to change the Drywell Air Temperature Limiting Condition for Operation from ≤ 135°F to ≤ 150°F. By letter dated May 1, 1996, GPC responded to a request for additional information. In response to GPC's May 1 submittal, the NRC requested GPC to provide further information relative to drywell air temperature. The NRC's questions and GPC's response to each question are provided in the enclosure.

Please contact this office if you have questions or comments.

Sincerely,

J. T. Beckham, Jr.

IFL/eb

Enclosure: Response to Request for Additional Information
Drywell Air Temperature Submittal

Attachments: Drywell Air Temperature Vs. Time Figure

cc: (See next page.)

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cc: *Georgia Power Company*
Mr. H. L. Sumner, Jr., Nuclear Plant General Manager
NORMS

U. S. Nuclear Regulatory Commission, Washington, D. C.
Mr. K. Jabbour, Licensing Project Manager - Hatch

U. S. Nuclear Regulatory Commission, Region II
Mr. S. D. Ebneter, Regional Administrator
Mr. B. L. Holbrook, Senior Resident Inspector - Hatch

Enclosure

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NRC Question 1:

Identify those analyses contained in the Final Safety Analysis Report (FSAR) that previously credited a drywell air temperature of 135°F. Of these analyses, identify those that were not reanalyzed (if any) and provide supporting justification.

GPC Response:

Short and long term primary containment pressure and temperature (P-T) response, which was reanalyzed during the Mark I Containment Long Term Program (LTP), assumed a 135°F initial drywell air temperature. The change to 150°F initial temperature was justified during the extensive containment reanalysis performed to support the Plant Hatch Unit 1 and Unit 2 power uprate program. General Electric, the vendor who designed the Mark I containment, was retained to perform the containment evaluations for both the Mark I LTP and Power Uprate. Below is a list of containment analyses and evaluations performed for power uprate. The containment response is described in Unit 1 FSAR, Sections 5.2 and 14.4 and in Unit 2 FSAR, Section 6.2.

1. Short-term containment P-T response to design basis LOCA (DBA-LOCA)
2. DBA-LOCA Containment Dynamic Loads
3. Long-term containment P-T response to DBA-LOCA
4. LOCA Pool Temperature Response
5. SRV Containment Dynamic Loads
6. Subcompartment Pressurization
7. Drywell P-T Response to Small Steamline Breaks
8. Primary containment metal-water reaction

Of these 8 categories, the assumed initial drywell temperature only affects items 1, 2, 3, and 7, and the impact in all cases is very low. For example, consider the large quantity of decay and sensible energy released during an instantaneous guillotine break of a 24-in recirculation line with the reactor initially at 2609 MWt power (the initial break flow is approximately 50,000 lbm/second). Compare this to the higher initial energy of 150°F nitrogen versus 135°F. The effect is insignificant and drywell temperature increases only 2 - 3 degrees. Because the accident temperatures are not

significantly affected, post-accident drywell temperature monitoring capability is not affected.

NRC Question 2:

For those analyses that were reanalyzed assuming a drywell temperature of 150°F, compare the results of these current analyses with the results of the previous analyses and discuss to what extent the previously established acceptance criteria are affected. Provide justification for any instances where the previous acceptance criteria have been exceeded.

GPC Response:

Containment P-T analyses were reanalyzed for power uprate at 150°F initial drywell temperature and 1.75 psig initial containment pressure, as compared to the Mark I LTP program which was performed for the old rated power. The results were submitted to the NRC with Reference 1, in Table 4-1 of NEDC-32405P. Further clarification on the codes and methods was provided in GPC's response to the NRC's request for additional information (Reference 2, Question 19). The results showed the primary containment peak pressure for the uprated power case was approximately 2.5 psi higher than the Mark I LTP case primarily due to the higher initial pressure. Peak drywell gas temperature increased 2-3 degrees.

Specific cases were not performed to investigate the impact of the increase in assumed initial temperature alone. Based on GE experience performing both long and short-term P-T containment analyses, the higher initial drywell temperature has virtually no impact on the P-T response.

The original design for Plant Hatch prior to LTP reanalysis was done for a peak pressure of 62 psig for Unit 1 and 56 psig for Unit 2 and a peak temperature of 281°F for Unit 1 and 340°F for Unit 2. The analyses done assuming 150°F drywell temperature yields a peak temperature of 290°F - 292°F for Unit 1 and 289 - 292°F for Unit 2 and a peak pressure of 49.6 psig for Unit 1 and 45.5 for Unit 2. These pressures are well below the original design parameters. The temperature response was approved per the NRC SE Section 3.7.1.2 dated August 31, 1995.

NRC Question 3:

Of the FSAR analyses that are affected, list those analyses that define the limiting cases for the proposed change in drywell temperature.

GPC Response:

This is provided in the response to Question 1. The proposed change in drywell temperature affects the analyses very little.

NRC Question 4:

For the analyses that were performed, identify any differences in methodologies and assumptions from those that were credited previously and are part of the plant's licensing bases.

GPC Response:

Analyses were performed by GE using the M3CPT computer code for various reactor operating points. These points included rated as well as off-rated conditions. For the rated conditions the analysis method and input assumptions were identical to those used in the Mark I Long-Term Program (LTP). For off-rated conditions, a detailed model was used for input to M3CPT because the M3CPT is overly conservative at off-rated conditions. Long term response was evaluated using the SHEX computer code.

Key parameter differences for analysis included an increase in initial drywell temperature from 135°F to 150°F, an increase in initial drywell pressure to 1.75 psig and an initial suppression pool temperature of 100°F . For long-term temperature evaluation, the ANS/ANSI 5.1 decay heat model was used to calculate decay heat values as input to the SHEX computer code.

The response to Question 19 of Reference 2 provides detailed information on the differences in methodologies and assumptions between the power uprate containment analyses and the plant's previous licensing basis.

NRC Question 5:

Confirm that the temperature of the suppression pool was assumed to be 100°F for the analyses that were performed.

GPC Response:

The initial suppression pool temperature was assumed to be 100 °F. The response to Question 19 of Reference 2 provides previously docketed confirmation.

NRC Question 6:

Based on the analyses that were performed (i.e., drywell temperature of 150°F and a suppression pool temperature of 100°F), provide the new pressure and temperature curves (plotted vs. time) that establish the bounding conditions for equipment qualification. Provide justification for any instances where the previous curves are exceeded.

GPC Response:

The attached figure shows the new temperature curve for the Plant Hatch Units 1 and 2 long-term response to small steam line breaks, which imposes the most severe conditions on drywell air temperature. The small steam line breaks were analyzed for power uprate conditions (including 150°F initial drywell temperature) using essentially the same method as used for evaluation of the long term containment response to the DBA-LOCA. The results were only 1 degree higher than the pre-uprate analysis, and remained below the EQ temperature envelope.

The Plant Hatch EQ program monitors daily operating temperatures at 15 locations in the drywell. Equipment qualified life is an integration of the aging effects from these local daily readings with the effects from a postulated accident. Qualified components are replaced prior to the time at which the aging from normal day-to-day effects plus the effect of a postulated accident would exceed the component's qualified life.

The proposed change to 150°F bulk average drywell temperature will not change the method or frequency of determining the day-to-day effects. Also, the proposed change will not result in change in the mode of operation for the drywell cooling systems. These systems are designed to maintain the drywell well below 150°F bulk average temperature, but are dependent on river water temperature (Unit 1) and are affected by outside ambient temperature.

Detailed drywell temperature analysis also shows that the proposed change to 150°F will not change the EQ accident profile. The EQ composite curve uses the pressure curve from the maximum recirculation line break (DBA-LOCA) and the temperature curve from the limiting small steam line break. This curve is shown in Unit 1 FSAR figure 7.16-2. The P-T response for the large break LOCA was submitted with the response to Question 19 of Reference 2 and is essentially unchanged from the pre-uprate values.

NRC Question 7:

Given the higher temperature conditions that are proposed for the drywell, confirm that accident mitigating systems will continue to satisfy design assumptions (e.g., residual heat removal service water (RHRSW) does not flash to steam leading to potential chugging and water hammer effects, etc.).

GPC Response:

The safety analyses for power uprate were all done assuming a 150 °F initial drywell temperature (and more importantly, higher core power and pressure). Accident mitigating systems were reviewed to assure they will continue to satisfy design assumptions.

Utilizing more recently approved methodology that allows a lower decay heat assumption than previous analyses, the safety analyses for power uprate result in a decrease in post-LOCA peak suppression pool temperature. The analyses and methodology are docketed in the Plant Hatch Power Uprate submittal (Reference 1, Table 4) and the subsequent GPC responses to the NRC's requests for additional information (Reference 2). Since the analyzed peak pool temperature does not increase, calculated net positive suction head for the RHR and CS pumps will not decrease.

Specifically, in regards to the example stated in the question, the RHRSW system does not communicate with the drywell. RHRSW inlet temperature is river water temperature, which for ECCS OPERABILITY is procedurally limited to 95 degrees. RHRSW outlet temperature is a function of RHR temperature and the transfer characteristics of the RHR heat exchanger. When placed in shutdown cooling mode while in hot shutdown, RHRSW has been subjected to RHR temperatures, via the heat exchanger, well in excess of post-LOCA peak suppression pool temperature. No flashing, chugging, or water hammer occurs in this alignment. It follows that RHRSW flashing is not a concern post-LOCA.

NRC Question 8:

Discuss the measures that have been taken to validate the ability of the RHRSW system to cool the drywell (per GL 89-13) and confirm that the analyses that have been performed do not overestimate the ability of the RHRSW system to remove heat.

GPC Response:

The Drywell Cooling system for Unit 1 is served by the Plant Service Water system (P41) and the Unit 2 system is served by an independent Primary Containment Chilled Water system (2P64). The systems are designed to maintain a normal bulk average temperature of 135°F in the drywell during normal plant operation. The Drywell coolers are not safety-related and were not required to be addressed in GL 89-13. However, the systems incorporate design features that assure system availability not only for normal operating plant conditions but also for conditions following a postulated LOCA. These systems are maintained in accordance with a plant preventive maintenance procedure which requires them to be inspected and cleaned as necessary once each refueling outage. The increase in drywell temperature does not affect the RHRSW system function for suppression pool cooling.

NRC Question 9:

Given the uncertainties involved and the absence of any margin between the analyzed value of 150°F and the proposed TS limit, discuss the methodology that will be used to ensure that the average air temperature of the drywell will not exceed 150°F.

GPC Response:

Drywell average temperature is calculated once each shift in accordance with each Unit's plant procedure for Technical Specifications (TS) Surveillance Checks.

The calculation is a weighted volumetric average for temperature elements in each level of the drywell recorded on multipoint recorders in the Main Control Room. The instrument loop uncertainty has been calculated to be $\pm$ 4.59°F for Unit 1 and $\pm$ 6.25°F for Unit 2. Administrative controls are in place to take the TS Actions if the drywell air temperature reaches the TS limit.

Enclosure
Response to Request for Additional Information:
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Reference Documents

1. GPC's Letter from J. T. Beckham, Jr. to NRC, Log HL-4724, "Request for License Amendment: Power Uprate Operation," January 13, 1995.

2. GPC's Letter from J. T. Beckham, Jr. to NRC, Log HL-4812, "Response to Request for Additional Information: Power Uprate Submittal," April 5, 1995.

Attachment

Edwin I. Hatch Nuclear Plant
Drywell Air Temperature Vs. Time

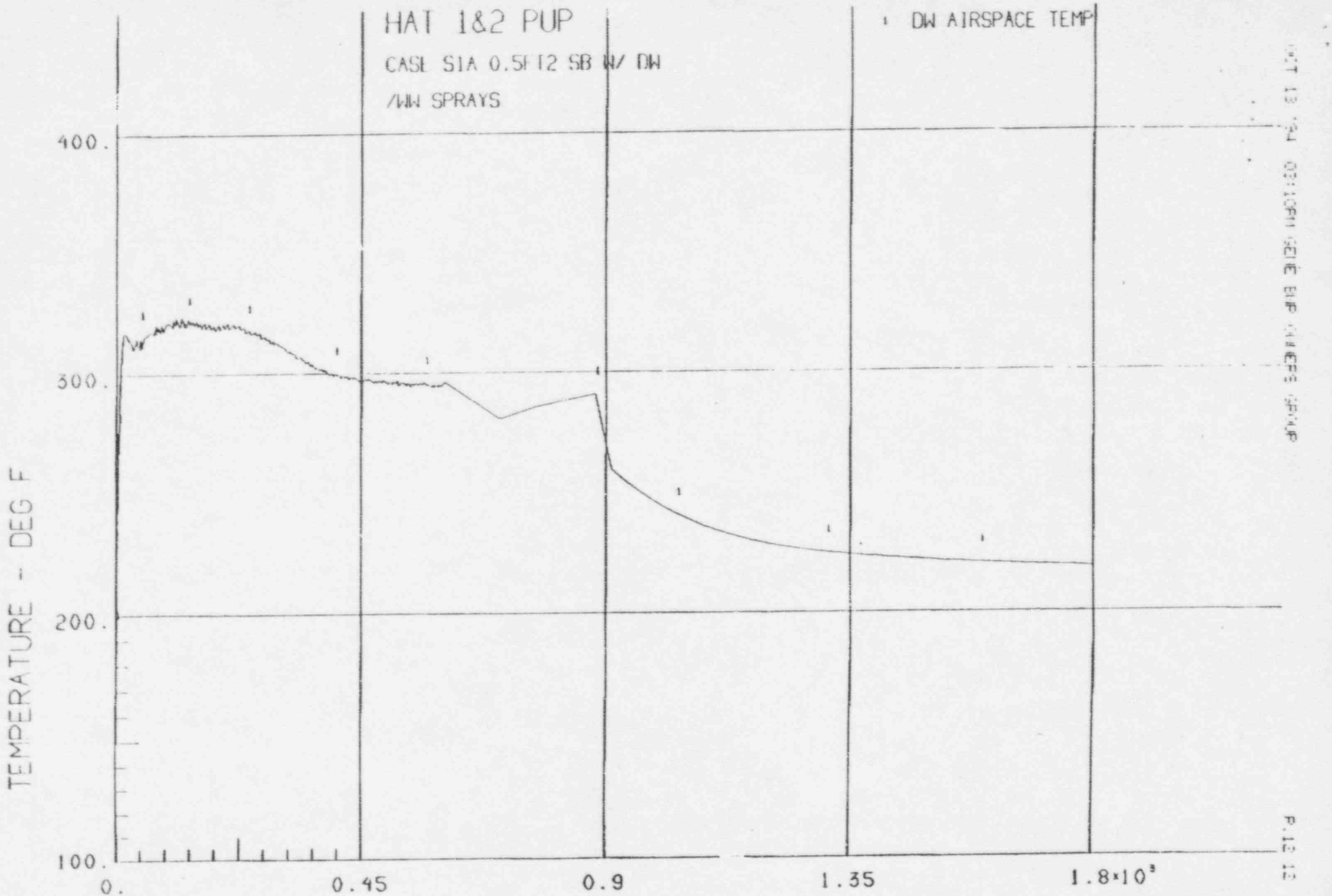

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Fig. 9