Georgia Power Company
333 Piedmont Avenue
Atlanta, Georgia 30308
Telephone 404 526-3195

Mailing Address
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201
Telephone 205 868-5086

J. D. Woodard
Senior Vice President

the southern electric system

January 27, 1997

Docket Nos. 50-321 HL-5302
50-366

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

Edwin I. Hatch Nuclear Plant
120 Day Response to Generic Letter 96-06

Ladies and Gentlemen:

On September 30, 1996, the Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions". The GL required a 30 day initial response and a written summary report within 120 days.

Georgia Power Company (GPC) provided a 30 day response by letter dated October 21, 1996.

The 120 day response requires a written summary report with the following information:

1) Determine if containment air cooling systems are susceptible to waterhammer or two-phase flow conditions during postulated accident conditions,

2) Determine if piping systems that penetrate containment are susceptible to thermal expansion of fluid so that overpressurization of piping could occur,

3) Conclusions that were reached relative to susceptibility for waterhammer and two-phase flow in the containment air cooler cooling water system and overpressurization of piping that penetrates containment,

4) The basis for continued operability of affected systems and components as applicable, and

5) Corrective actions that were implemented or are planned to be implemented.

6) If systems were found to be susceptible to the conditions that are discussed in GL 96-06, identify the systems affected and describe the specific circumstances involved.

A072 1/1

9702040105 970127
PDR ADOCK 05000321
P PDR

Georgia Power

Georgia Power Company has determined that containment air coolers may be susceptible to waterhammer and two phased flow, and that some isolated piping systems that penetrate primary containment may overpressurize due to fluid expansion, during postulated accident conditions. GPC has determined that these systems remain operable, but that some procedure changes and physical modifications are necessary to meet ASME code allowable stresses. GPC has enclosed a written summary report detailing the applicability of this generic letter, the basis for continued operability of associated systems, and a summary of corrective actions implemented and planned.

Mr. J. D. Woodard states he is Senior Vice President of Georgia Power Company and is authorized to execute this oath on behalf of Georgia Power Company, and to the best of his knowledge and belief, the facts set forth in this letter are true.

Sincerely,

J. D. Woodard

Sworn to and subscribed before me this 27th *day of* January *1997.*

Debra J. Burrett
Notary Public

My Commission Expires: 9-14-98

Enclosures:
I. Waterhammer in Containment Coolers and Two-Phase Flow in Safety Related Piping and Components
II. Overpressurization of Isolated Piping

cc: (See next page.)

cc: *Georgia Power Company*
Mr. H. L. Sumner, 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. L. A. Reyes, Regional Administrator
Mr. B. L. Holbrook, Senior Resident Inspector - Hatch

State of Georgia
Mr. J. D. Tanner, Commissioner - Department of Natural Resources

Enclosure I

Waterhammer in Containment Coolers
and
Two-Phase Flow in Safety Related Piping and Components

Requested Action from GL 96-06

1) "Determine if containment air cooler water systems are susceptible to either waterhammer or two phase flow conditions during postulated accident conditions."

GPC Response

Waterhammer

At Plant Hatch, containment coolers are not required for post LOCA or MSLB operation, and are not credited in the accident analysis. In each Hatch unit, there is a containment area cooling system and a containment equipment cooling system. On Unit 1, the containment area coolers use plant service water (PSW) in an open system. Water is taken from the Altamaha River, pumped through the coolers, and discharged to the main condenser/cooling tower circulating water system. The Unit 1 PSW system also serves safety related cooling loads outside of containment following an accident. On Unit 2, the containment area coolers use chilled water in a closed loop system. No safety related cooling loads are served by the Unit 2 chilled water system. On both Units, containment equipment coolers use Reactor Building Closed Cooling Water (RBCCW) in a closed loop system.

Although not credited in the accident analysis, the Emergency Operating Procedures (EOP's) direct the operator to use the containment area coolers for drywell temperature control. If temperatures cannot be controlled such that containment spray (from the RHR system) is required, these coolers are removed from service. The EOP's do not provide for the use of the RBCCW and the containment equipment coolers, thus, this system is not a concern for waterhammer.

Following a LOCA signal, the containment area coolers automatically shut down and water flow to the coolers stops. Following a Loss of Offsite Power (LOSP), the coolers will automatically restart, powered from the Emergency Diesel Generators. Thus, waterhammer is not a concern for LOSP without a LOCA. In the LOCA condition, water could boil in the coolers due to heatup of the containment, creating steam voiding. Thus, restarting the coolers could lead to void collapse, and the potential for waterhammer.

On Unit 1, water to the containment area coolers is from the PSW system. The PSW pumps take suction from the Altamaha River and during normal operation, supply cooling water to the plant turbine building, reactor building, and containment area coolers at an elevation higher than the pumps. The water is discharged from the plant to the circulating water system flume via a common pipe for the turbine building and reactor building. The discharge piping is at a lower elevation than the containment coolers. Following a LOCA signal, PSW to the turbine building isolates and the containment area coolers shut down,

reducing the backpressure in the system to nearly atmospheric pressure. Since the coolers are above the discharge piping, their internal pressure will be below atmospheric pressure, and boiling will occur at lower temperatures that at atmospheric conditions.

Because of the open system design on Unit 1, boiling can occur rapidly in containment area coolers following a LOCA or MSLB. An evaluation has been performed which determined that waterhammer is not expected to occur. Because the coolers are at a higher elevation than the discharge piping in the open system design, the containment coolers will tend to drain following the cooler shutdown. Steam voiding will tend to facilitate draining more rapidly. Manually restarting the coolers will refill the system, and due to the open system design, there will be little downstream "back pressure" to cause a rapid void collapse which could lead to waterhammer. Thus, the transient is similar to normal system startup after the coolers have been drained, and no significant waterhammer loads are expected.

On Unit 2, the containment area coolers are supplied by a closed loop chilled water system. The high point in the system is a surge tank, located outside of containment, which will maintain the static pressure in the piping and coolers above atmospheric pressure. Thus, boiling will occur at higher temperatures than at atmospheric pressure conditions.

If boiling occurs in the Unit 2 containment coolers, steam voiding may occur. Because of the closed loop design, restarting the system can lead to void collapse and waterhammer may occur. A detailed waterhammer analysis has not been performed. Thus, plant procedures have been revised to prohibit operation when containment temperatures are above the point where boiling may occur. GPC plans to review the feasibility of performing a detailed waterhammer analysis to determine if prohibiting operation at elevated temperatures must remain in place in the future.

Basis for Continued Operability

Because boiling may occur, a simplified waterhammer evaluation was performed to determine the maximum transient system pressure and associated reaction loads on the component supports. On Unit 1, the evaluation has demonstrated that, due to the system configuration, waterhammer loads will not be significant and the containment area coolers may be used without restriction following a postulated accident. On Unit 2, preliminary evaluation shows that the containment boundary provided by the system piping and cooling coils is expected to be maintained following a waterhammer event.

The basis for this conclusion for Unit 2 is as follows:

1. Waterhammer will result in a pressure wave that will exert increased forces on the piping and cooler boundary as well as system supports. A simplified pressure

evaluation has shown that the piping and cooler materials are expected to withstand the waterhammer pressures without rupture.

However, GPC has not performed a rigorous analysis to ensure that following a waterhammer event on Unit 2, the stresses or loads on the coolers, piping, or supports the will remain within design allowable values.

2. Since a rigorous analysis was not performed for Unit 2, GPC considered the consequences of cooler or piping leakage due to the potential waterhammer.

   Although not expected, the piping or cooling coils could leak following a waterhammer event. It is expected that if any leakage develops, that the cooling water flow will be out of the leak into the containment. The cooling water system pressure is expected to be greater than containment pressure, and thus any leakage will be into the containment.

3. GPC does not expect that a large rupture of the piping system or the coolers will occur. However, GPC has evaluated the consequences and available operator actions available to mitigate such an event.

   The containment area cooling system must be started manually by the operator for a potential for waterhammer to exist. Should a large rupture of the containment coolers or the piping system occur, safety related isolation valves could be manually closed from the control room to isolate the leak and maintain containment integrity.

Actions Implemented or Planned

On Unit 1, no waterhammer loads are expected following boiling due to the system design. Thus, no further actions are required.

On Unit 2, waterhammer loads can occur following restart of the coolers. GPC has thus prohibited operation of the coolers above the expected boiling temperatures following a LOCA or MSLB. Thus, no further action is required. Should GPC wish to provide more operating flexibility of the containment area coolers in the future, a detailed waterhammer evaluation may be performed, and documented in the system design.

Two Phased Flow

As stated in the waterhammer discussion, neither the containment area coolers or containment equipment coolers are credited for providing cooling following analyzed accidents, and thus, the effects on heat removal capability of the coolers due to two phased flow are not a concern for Plant Hatch.

Conclusions

1. GPC has determined that the Unit 2 containment area coolers may be susceptible to waterhammer following a LOCA or MSLB accident.

2. GPC has revised plant procedures for the Unit 2 containment area coolers to preclude their operation when containment temperatures are above the expected boiling temperatures for each cooler.

Enclosure II

Overpressurization of Isolated Piping

Requested Action from GL 96-06

2) "Determine if piping systems that penetrate the containment are susceptible to thermal expansion of fluid so that overpressurization of piping could occur."

GPC Response

In response to information concerning the potential for thermally-induced overpressurization of water-filled, isolated piping inside the containment, a system-by-system review of the associated configurations at Hatch was performed. The review considered water filled containment penetration piping and certain isolated system piping within the containment. The purpose for this review process was; 1) to identify penetrations in which sections would potentially be susceptible to overpressurization occurrences, 2) establish an immediate basis for acceptability of the potentially susceptible piping configurations, and 3) to establish, as appropriate, plans for long-term corrective actions to increase the level of functional assurance.

Using the surveillance procedure for local leak rate testing, 42SV-TET-001-1S (Unit 1), 42SV-TET-001-2S (Unit 2), the Units 1 and 2 P&IDs, and FSAR Tables 7.3-1 (Unit 1) and 6.2-5 (Unit 2) for Hatch as guidance, all penetrations were screened for susceptibility to thermally induced overpressurization. An initial screening was performed to reduce the number of penetrations to be reviewed. Penetrations that met the following criteria did not require a detailed engineering evaluation since they would not be susceptible to overpressurization:

1) Containment penetrations that had a check valve to relieve fluid expansion.
2) Containment penetrations that were not water filled.
3) Containment penetrations that contained fluid at temperatures greater than, or equal to the MSLB/LOCA environment conditions.
4) Containment penetrations for instrumentation qualified for post-accident conditions.
5) Containment penetrations that are open to containment atmosphere.

Based on this screening, the following penetrations were identified to be potentially susceptible and required further evaluation:

Residual Heat Removal (RHR) Shutdown Cooling Suction Line
Drywell Floor Drain Sump discharge line
Drywell Equipment Drain Sump discharge line
Demineralized water lines to the Drywell
Drywell Chemical Drain Sump line (Unit 2 only)

None of these isolated piping sections are required to operate following an accident, except to remain closed to maintain containment integrity.

Basis For Continued Operability

Following an accident, these lines are not expected to fail, based on the following:

1. Some of the heat and subsequent thermal expansion potential will be dissipated by the piping and the valves outside of containment.

2. Overpressurization will cause some elastic expansion of the piping. If the valves don't leak as expected, overpressurization may cause some plastic piping deformation. Should plastic deformation occur, the resulting strains are expected to be less than the ultimate material strength. This deformation may be above that allowed by design codes for faulted conditions. However, the actual material characteristics are expected to be such that the material will deform to accommodate the increased water volume due to post-accident temperature increases, even if the valves do not leak.

3. Each of these lines is isolated by a gate valve outside of containment and a gate valve or a check valve inside of containment. These valves can potentially leak through packing, bonnet gaskets, and/or by the valve seats to accommodate the volume expansion of water due to the post-accident containment temperature increase, thus minimizing the potential for overpressure. Any leakage would help to lower the pressures expected from the thermal expansion of water, and resulting stresses would then be lower than estimated should no leakage occur.

Actions Implemented or Planned

Georgia Power Company has drained the Unit 2 demineralized water line between the isolation valves.

GPC has drained the Unit 2 chemical sump discharge line between the containment isolation valves.

GPC will drain the Unit 1 demineralized water line between the isolation valves during the next outage requiring a drywell entry. This line can only be drained from inside of the drywell.

GPC will revise procedures to include draining of each demineralized water line penetrating containment and the Unit 2 chemical drain line following each outage in which the lines are used. These procedures will be in place prior to startup from the Unit 2 Spring 1997 refueling outage and the Unit 1 Fall 1997 refueling outage.

GPC will complete analysis and if necessary, perform modifications to the RHR Shutdown Cooling suction line, Drywell Floor Drain Sump discharge line, and Drywell Equipment Drain Sump discharge line to prevent potential overpressurization. These modifications

will be completed prior to startup from the Spring, 1997 refueling outage for Unit 2 and the Fall, 1997 refueling outage for Unit 1.

Conclusions

1. GPC has determined that some isolated piping systems penetrating containment may be susceptible to thermal overpressurization.

2. GPC has performed operability determinations and has concluded that all susceptible systems remain operable as required to perform their intended safety function.

3. GPC will implement procedural changes to drain systems prior to startup from the Spring, 1997 refueling outage for Unit 2, and from the Fall, 1997 refueling outage for Unit 1.

4. If analysis does not show that post accident stresses are within existing design requirements, GPC will perform required modifications to prevent overpressurization for the RHR Shutdown Cooling suction line, Drywell Floor Drain Sump discharge line, and Drywell Equipment Drain Sump discharge line prior to startup from the Spring, 1997 refueling outage for Unit 2 and the Fall, 1997 refueling outage for Unit 1.