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Docket Nos.: 50-458/459

Mr. William J. Cahill, Jr.
Senior Vice President
River Bend Nuclear Group
Gulf States Utilities Company
Post Office Box 2951
Beaumont, Texas 77704
ATTN: Mr. J. E. Booker

Dear Mr. Cahill:

Subject: Request for Additional Information - Recent Containment Concerns

In the performance of the River Bend licensing review, the staff has identified concerns in regard to the recent issues about the Mark III containment. The information that we require is identified in the enclosure.

We request that you provide your schedule for submittal of this information no later than fourteen days after receipt of this letter. If you require any clarification of this request, please contact R. L. Perch, Project Manager, (301) 492-8136.

Sincerely,

/S/

A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing

Enclosure:
As stated

cc w/ enclosure:
See next page

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Request for Additional Information
on Mr. Humphrey's Concerns

1.0 Effects of Local Encroachments on Pool Swell Loads

1.1 Provide the details of the analysis that yields a maximum 20% increase in pool velocity due to the TIP platform.

1.2 The response by Mississippi Power and Light (MP&L) has not totally addressed the Humphrey concern. The results of an analysis were introduced by MP&L to address the concern that local encroachment could cause solid slug impact above 20 feet.

The referenced analysis, however, was for a six foot encroachment rather than the 10 to 11 foot actual projection. Also, the conservatisms noted in the analysis (proceedings page 109, lines 4 through 14), with the exception of the encroachment being finite in the circumferential direction, existed when the analysis was done with the clean pool. Yet, the model underpredicted incipient breakthrough (nine feet vs. 12 feet). The remaining conservatism, (finite circumferential length of the encroachment), will certainly mitigate the effect but it cannot eliminate it. Thus, the arguments do not provide sufficient bases for dismissing the results shown to MP&L by Humphrey on May 17th.

Therefore, either (1) provide sound quantitative arguments as to why these results can be dismissed; or (2) provide realistic estimates (including bases) of the maximum distance that the breakthrough point can move up locally as a result of the 11 foot encroachment.

1.3 Provide the analysis and bases which produces the maximum additional submerged loads due to encroachments.

1.4 This concern is resolved assuming a maximum velocity of 60 ft/sec (refer to 1.1) can be established.

1.5 Response should be consistent with 1.2.

1.6 Provide the details of the analysis which shows the bounding lateral loads on grating to be less than the dead weight of the structure.

2.0 Safety Relief Valve Discharge Line Sleeves

2.1 Provide documentation to support the position expressed in the proceedings that the inclusion of C.O. sources at the SRVDL sleeve exists with strength equal to 2 1/2% of design and at dominant frequencies approaching structural resonance does not lead to loads which exceed existing design margins on the suppression pool boundaries.

2.2 Provide a detailed description of all hydrodynamic and thermal loads that are imposed on the SRVDL during LOCA blowdowns. In addition, if any of the following load conditions are <u>not</u> applied, provide justification for such exclusion.

(a) <u>external</u> pressure loads on that segment of the SRVDL enclosed within the sleeve; and

(b) thermal loading resulting from steam flow through the annulus formed by the <u>outer</u> surface of the SRVDL and the inner surface of the SRVDL sleeve.

2.3 Provide a detailed description of all hydrodynamic and thermal loads that are imposed on the SRVDL sleeve during LOCA blowdowns. In addition, if any of the following loading conditions are not applied, provide justification for such exclusion.

(a) "self induced" lateral loads acting on the sleeve tip as distinct from lateral loads resulting from submerged structure drag consideration. Thus, these loads would be analogous to downcomer lateral loads which are employed in the Mark I and Mark II designs; and

(b) thermal loading resulting from steam flow though the annulus formed by the outer surface of the SRVDL and the inner surface of the SRVDL sleeve.

3.0 ECCS Relief Valve Discharge Lines Below the Suppression Pool Level

3.1 Provide the following information for the RHR heat exchanger relief valve discharge line and for all other relief lines that exhaust into the pool.

(a) Provide isometric drawings and P&IDs showing line and vacuum breaker location. Information should include the following: The geometry (diameter, routing, height above the suppression pool, etc.) of the pipe line from immediately downstream of the relief valve up to the line exit. The maximum and minimum expected submergence of the discharge line exit below the pool surface should be included. Also, if any of these lines are equipped with load mitigating devices (e.g., spargers, quenchers it should be so noted;

(b) The range of flow rates and character of fluid (i.e., air, water steam) which is discharged through the line and the plant conditions (e.g., pool temperatures) when these occur;

(c) The sizing and performance characteristics of any vacuum breaker with which these lines are equipped: (include make, model, size opening characteristics and flow characteristics).

(d) The potential for oscillatory operation of the relief valves in any given discharge line;

(e) The potential for failure of any relief valve to reseat following initial or subsequent opening; and

(f) The location of all components and piping in the vicinity of the relief line exit.

3.2 Demonstrate that the steam exhaust from the RHR relief valve discharge lines will be completely condensed when the suppression pool is as its lowest level.

3.6 Describe the restrictions on the plant operators that prevent them from operating the RHR heat exchangers in the steam condensation mode under accident conditions.

3.7 The concerns related to the RHR heat exchanger relief valves discharge lines should also be addressed for all other relief lines that exhaust into the pool.

3.8 Justify that vacuum breaker design is adequate to perform function for discharge line layout at Grand Gulf;

3.9 Evaluate the consequences of upper pool dump with respect to flooding of relief valve discharge lines and loss of pressure relief capability; and

3.10 Provide a) any supporting analyses and test results for vacuum breaker performance, dynamic loads and heat exchanger pressure; and b) basis for conclusion that heat exchangers can withstand transient involving, clearing of partially flooded discharge lines.

3.11 Provide the design basis for both the relief lines and equipment and piping in the vicinity of the relief line exit.

4.1 Provide the details of the bounding analysis that shows a 10°F effect on suppression pool temperature if the water holdup in the drywell is assumed to be isolated.

4.2 Discuss the effect of the throttling ECCS operation on the accident analysis provided in the FSAR (i.e., pool level considering upper pool dump). Show that the resulting differences have no adverse effect on any ESF systems and their intended functions.

4.3 Provide the details of the analysis used to compute the thermal stratification at the RHR heat exchanger intake and justify all assumptions used.

4.4 Quantify the maximum suppression pool surface temperature and the resulting maximum containment atmosphere temperature and pressure. Provide the details of the assumptions used in the analysis that shows a 50°-60°F temperature difference between the pool and the containment atmosphere.

4.5 Describe the effects of single failures and operator actions (e.g., actuating containment sprays) on the mixing of the pool. Provide the bounding thermal stratification that would result and its effect on the impacted structures and systems.

Also, provide documentation to support the claim made in the proceedings that chugging in the Mark III containment promotes good thermal mixing of the suppression pool. Where appropriate, citation of the information which has been supplied in Attachment O of Appendix 3B of GESSAR II would be acceptable for this purpose.

4.6 State how long and how often the RHR system will have to operate to keep the suppresion pool at or below 95°F for normal operating modes. Verify that the RHR system is designed for this type of operation for long periods of time.

4.7 Describe in detail the thermal and fluid flow interaction between the suction and discharge portions of the RHR system. Show that adequate mixing will occur and that the FSAR analysis assumptions regarding this system are met.

4.8 Describe the procedures available to the operator to switch the RHR system from containment spray mode to pool cooling mode and vice versa. Quantify how much decreased pool cooling capability exists when containment sprays are on. Compare this decreased effectiveness to the assumptions used in the FSAR analyses and provide revised analysis of this effect on the impacted accident sequences.

4.9 Discuss the possible effects on the long term containment response and the operability of the spray system due to cycling the containment sprays on and off to maximize pool cooling. Also, provide the and justify the criteria used by the operator for switching from the containment spray mode to pool cooling mode, and back again.

4.10 Provide justification for any margin in RHR heat exchanger capacity as used in FSAR pool cooling calculations that could be used to compensate for the effect of thermal stratification in pool. In justification, refer to applicable experimental data for heat exchangers such as used at Grand Gulf and provide basis for assumptions used for heat exchanger capacity.

5.1 During the meeting discussion on this concern, Mr. Humphrey stated that the bypass capability for an IBA was 0.1 to 0.2 ft^2 less than that for an SBA. Describe the scenario and assumptions used in the Grand Gulf calculations that resulted in the conclusion that little differences existed between the IBA and SBA results.

5.3 Provide the analysis or operating experience that shows cycling of the containment sprays will not adversely affect its long-term performance.

5.4 Provide the basis for the conclusion that hydrogen diffusing through the drywell wall would mix as rapidly and not pocket anywhere as hydrogen that is pushed through the vents into the suppression pool.

5.5 Describe any temperature sensitive equipment that is close to the drywell wall in the region when steam bypass is possible.

5.6 Discuss the rationale used to eliminate upper pool dump consideration when estimating drywell leakage.

5.8 The possibility of high temperatures in the drywell without reaching the two psig pressure scram level because of bypass leakage through the drywell wall should be addressed.

6.3 Describe the location of equipment around and above the recombiners and show that high temperatures will not be seen by these equipment.

6.5 Discuss the possibility of local temperatures due to recombiner operation being higher than the temperature qualification profiles for equipment in the region around and above the recombiners. State what instructions, if any, are available to the operator to actuate containment sprays to keep this temperature below design values.

7.1 It appears that margins due to conservative assumptions, such as the assumption of uniform temperature in the containment airspace and the ignoring of the containment structure heat sinks, are sufficient to cover the effect due to the nonconservative assumption in pool temperature. It is noted, however, that the effects of these assumptions on containment pressure responses may depend on the rate and duration of the heating process (e.g., the effect of structure heat sinks may be less significant for a very slow and long term heating.

Based on the material available (MP&L and J. Humphrey's presentations), we feel that some quantitative comparisons of the opposing effects from the conservative and the nonconservative assumptions are desirable. If the conservative effects are substantially more significant than that due to the nonconservative assumption, as expected, a very simple comparison may be sufficient. Data needed for such assessment may already be available, such as the GE analysis referred to in Item 7.2.

7.2 List and justify the assumptions used in calculating the environmental qualification parameters for the containment airspace.

8.1 Explain more fully the effect of using conservative technical specification values in the short-term and long-term drywell and containment pressure and temperature response.

8.2 Describe the process used to arrive at the conclusion that inadvertent operation of containment sprays at worst initial conditions is not credible. Also, examine the effect of purge systems in reducing the air mass inside the containment.

8.3 Explain how the operator's knowledge of serious conditions such as an SBA will mitigate the consequences of the accident assuming an automatic scram on two psig inside the drywell does not occur. Show that the consequences are less severe than those analyzed in the FSAR.

8.4 Describe all of the possible methods both before and after an accident of creating a condition of low air mass inside the containment. Discuss the effects on the containment design external pressure of actuating the containment sprays.

9.1 Describe the long-term effect on the containment pressure and temperature following a DBA when the drywell air forced into the containment does not re-enter the drywell (i.e., operator throttling of the ECCS traps steam flowing from the break and drywell depressurization does not occur.

9.2 For the analysis requested in Q 9.1, include the effects of steam bypass into the containment.

9.3 It appears that some confusion exists as to whether SBAs and stuck-open SRV accidents are treated as transients or design basis accidents. Clarify how they are treated and indicate whether the initial conditions were set at nominal or most conservative values.

10.1 Justify the statement that any water which spills over the weir wall will do so gradually. Include the possible effect of drywell depressurization due to condensation of drywell vapor from water spillage.

10.2 Describe the interface requirement (A-42) that specifies that no flooding of the drywell shall occur. Describe your intended methods to follow this interface or justify ignoring this requirement.

11. With regard to this concern, the following clarification is requested:

(a) The limits of drywell-to-containment differential pressures which can exist in the GGNS and how these limits are maintained;

(b) Citation of the specific areas of the GESSAR II load methodology from which the effects of such differential pressures on SRV pool boundary of SRVDL internal pressures, pool swell loads, etc. are estimated; and

(c) The results obtained by application of these methods to the limiting cases described in (a) above.

14. The probability argument provided is inadequate. Using the single failure criterion and a mechanistic approach to the situation, show that either: 1) RHR operation in the LPCI mode will not occur when an automatic signal is generated to actuate containment sprays; 2) the containment spray system can withstand any backflow and the containment design pressure and temperature will not be exceeded; or 3) propose a design change that would eliminate this possibility.

16. Describe the instructions given to the operator that will allow him to correctly use pool level instrument in conjunction with pool temperature instruments to follow the temperature changes in the pool.

19. With regard to submergence effects on chugging loads, provide the following:

(a) The GGNS response to this concern cites a decreasing trend of chugging loads with decreasing vent mass flux. No such trend is identified in the GESSAR II load definition (see Question/Response 3B.15(b) of Attachment O to Appendix 3B). Further justification for neglecting this potential increase in chugging loads due to the increase in submergence caused by an upper pool dump is required.

(b) The GGNS response does not address the potential increase in chugging loads caused by the presence of encroachments which "effectively" increases submergence (by increasing the distance from the chug source to the free surface - see p. 252 of the proceedings). A response to this concern is required as well.

19.2 The effect of local encroachments on chugging loads needs to be addressed.