GULF STATES UTILITIES COMPANY
POST OFFICE BOX 2951 • BEAUMONT, TEXAS 77704
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December 9, 1982
RBG-13,983
File Code No. G9.5, G9.11

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Schwencer:

River Bend Station Units 1 and 2
Docket Nos. 50-458/459

Gulf States Utilities' (GSU) August 13, 1982, letter responded to your letters of June 23 and July 23, 1982, concerning Containment Issues. This letter and its attachments provide additional information related to these concerns. Attachment 1 is a cross reference of Containment Issues to the GSU Action Plans and the current status of GSU's ongoing work. Attachment 2 describes the Plant Specific Action Plans and the Generic Action Plans which are consistent with those adopted by the Containment Issues Owners Group (CIOG) of which GSU is a member.

GSU will formally summarize its responses to the containment issues approximately 30 days after the conclusion of the CIOG Program. At that time GSU will provide all remaining plant specific responses available and an estimate of when any additional information will be provided. It is currently estimated that the CIOG activities will be concluded in early April, 1983.

B001

If you have any questions concerning the status shown in Attachment 1 for Plant Specific Responses provided, please inform us so that additional information may be provided in our April, 1983 update.

Sincerely,

J E Booker

J. E. Booker
Manager-Engineering,
Nuclear Fuels & Licensing
River Bend Nuclear Group

JEB/LAE/kt

Attachments

December 9, 1982
RBG-

ATTACHMENT 1

CONTAINMENT ISSUES CROSS REFERENCE

CONCERN NO.	ADDRESSED IN ACTION PLAN NO.	STATUS
1.1	1	Open Generic
1.2	1	Open Generic
1.3	2	Open P/S Generic
1.4	1	Open Generic
1.5	3	Open P/S
1.6	4	Open P/S Generic
1.7	47	Closed P/S
2.1	5	Open P/S
2.2	5	Open P/S
2.3	5	Open P/S
3.1	6	Open P/S
3.2	7	Closed Generic
3.3	6	Open P/S
3.4	8	Open P/S
3.5	8	Closed P/S N/A
3.6	9	Open Generic
3.7	6	Open P/S
4.1	10	Open P/S
4.2	11	Open P/S
4.3	12	Closed P/S
4.4	13	Closed P/S
4.5	14	Closed P/S
4.6	15	Closed P/S
4.7	16	Open Generic
4.8	17	Closed P/S N/A
4.9	18	Closed P/S N/A
4.10	16	Open Generic
5.1	19	Closed P/S N/A
5.2	50	Closed Generic
5.3	18	Closed P/S N/A
5.4	20	Closed P/S
5.5	21	Closed P/S
5.6	19	Closed P/S N/S
5.7	48	Closed P/S
5.8	22	Closed P/S
6.1	45	Closed P/S
6.2	38	Closed P/S N/A
6.3	23	Open P/S
6.4	39	Closed P/S
6.5	23	Open P/S
7.1	13	Closed P/S
7.2	24	Closed P/S
7.3	40	Closed P/S

ATTACHMENT 1

CONTAINMENT ISSUES CROSS REFERENCE

CONCERN NO.	ADDRESSED IN ACTION PLAN NO.	STATUS
8.1	25	Closed P/S
8.2	26	Closed P/S
8.3	28	Closed P/S N/A
8.4	27	Open P/S
9.1	11	Open P/S
9.2	19	Closed P/S
9.3	28	Closed P/S
10.1	29	Open P/S
10.2	30	Closed P/S
11	31	Open P/S Generic
12	41	Closed P/S N/A
13	42	Closed P/S N/A
14	32	Closed P/S N/A
15	43	Closed P/A N/A
16	33	Closed P/S
17	46	Closed P/S N/A
18.1	44	Open P/S
18.2	44	Open P/S
19.1	34	Closed P/S N/A
19.2	35	Open Generic
20	36	Closed Generic
21	49	Closed P/S
22	37	Closed Generic

P/S = Plant Specific
N/A = Not Applicable

RIVER BEND STATION - UNIT 1

GULF STATES UTILITIES COMPANY

ACTION PLAN TO ADDRESS

ADDITIONAL CONTAINMENT ISSUES

Action Plan 1 - Generic

I. Issues Addressed

1.1 Presence of local encroachments, such as the TIP platform, the drywell personnel airlock, and the equipment and floor drain sumps, may increase the pool swell velocity by as much as 20 percent.

1.2 Local encroachments in the pool may cause the bubble breakthrough height to be higher than expected.

1.4 Piping impact loads may be revised as a result of the higher pool swell velocity.

II. Program for Resolution

1. Provide details of the one-dimensional analysis which was completed and showed a 20-percent increase in pool velocity.

2. The two-dimensional model will be refined by addition of a bubble-pressure model and used to show that pool swell velocity decreases near local encroachments. The code is a version of SOLA.

3. The inherent conservatisms in the code and modeling assumptions will be listed.

4. The modified code will be benchmarked against existing clean pool PSTF data.

5. A recognized authority on hydrodynamic phenomena will be retained to provide guidance on conduct of the analyses.

6. The effects of the presence of local encroachments on pool swell will be calculated with the two-dimensional code. These calculations will be based upon the worst-case encroachment geometry identified in Item 6.a. Three-dimensional effects (such as bubble breakthrough in nonencroached pool regions) will be included based upon empirical data.

6.a An evaluation will be made with drawings of various plant encroachments and pool geometries to establish that the results of the Grand Gulf Analysis are bounding or representative.

III. Status

Items 1 through 3 are complete and were submitted in a letter from L. F. Dale, MP&L, to H. R. Denton, NRC, Reference #AECM-82/353, dated August 19, 1982. Items 4 through 6 are scheduled for completion by December 31, 1982. Item 6.a is scheduled for completion by January 29, 1983.

IV. Results To Date

GSU as a member of the Containment Issues Owners Group endorses the submitted results of Action Plan Programs 1.1, 1.2 and 1.4. The results of these analyses apply to River Bend Station or will be shown to be bounding or representative with the completion of Action Plan 6.a.

Action Plan 2 - Generic/Plant Specific

I. Issue Addressed

1.3 Additional submerged structure loads may be applied to submerged structures near local encroachments.

II. Program for Resolution

1. The results obtained from the two-dimensional analyses complete as part of the activities for Action Plan 1 will be used to define changes in fluid velocities in the suppression pool which are created by local encroachments. Supporting arguments to verify that the results from two-dimensional analyses will be bounding with respect to velocity changes in the suppression pool will be provided.

2. The new pool velocity profiles will be use to calculate revised submerged structure loads using the existing or modified submerged structure load definition models.

3. The newly defined submerged structure loads will be compared to the loads which were used as a design basis for equipment and structures in the River Bend Station suppression pool.

III. Status

Items 1 through 3 are estimated to be completed by December 31, 1982.

IV. Results to Date

None available

Action Plan 3 - Plant Specific

I. Issue Addressed

1.5 Impact loads on the HCU floor may be imparted and the HCU modules may fail, which could prevent successful scram if the bubble breakthrough height is raised appreciably by local encroachments.

II. Program for Resolution

1. If the results from Action Plan 1 show that the bubble breakthrough height is increased to the height of the HCU floor, additional analyses will be performed to determine the structural capabilities of the HCU floor to withstand water slug impacts.

III. Status

Item 1 is estimated to be completed by December 31, 1982.

IV. Results to Date

None available

Action Plan 4 - Generic/Plant Specific

I. Issue Addressed

1.6 Local encroachments or the steam tunnel may cause the pool swell froth to move horizonally and apply lateral loads to the gratings around the HCU floor.

II. Program for Resolution

1. A bounding analysis for determining the horizontal liquid and air flows created by the presence of the steam tunnel and HCU floor will be performed. The forces imposed on the HCU floor supports and gratings will be calculated from this information.

1.a An assessment will be made of the potential effects which variations in HCU floor support arrangement and grating location may produce. This assessment will result in the selection of a bounding arrangement for defining lateral loads.

2. It will be demonstrated that the affected structures can withstand the lateral loads.

III. Status

Item 1.a. is estimated to be completed by January 29, 1983.

Item 1 and 2 are estimated to be completed by December 31, 1982

IV. Results to Date

None available

Action Plan 5 - Generic/Plant Specific

I. Issues Addressed

2.1 The annular regions between the safety relief valve lines and the drywell wall penetration sleeves may produce condensation oscillation (C.O.) frequencies near the drywell and containment wall structural resonance frequencies.

2.2 The potential condensation oscillation and chugging loads produced through the annular area between the SRVDL and sleeve may apply unaccounted-for loads to the SRVDL. Since the SRVDL is unsupported from the quencher to the inside of the drywell wall, this may result in failure of the line.

2.3 The potential condensation oscillation and chugging loads produced through the annular area between the SRVDL and sleeve may apply unaccounted-for loads to the penetration sleeve. The loads may also be produced at or near the natural frequency of the sleeve.

II. Program for Resolution

1. The existing condensation data will be reviewed to verify that no significant frequency shifts have occurred. The data will also be reviewed to confirm that the amplitudes were not closely related to acoustic effects.

2. The driving conditions for condensation oscillation at the SRVDL exit will be calculated. Based on these calculations, existing test data will be used to estimate the frequency and bounding pressure amplitude of condensation oscillation at the SRVDL annulus exit.

3. A wide difference between the C.O. frequency and structural resonances will be demonstrated. The margin between the new loads and existing loads will be quantified.

4. A detailed description of all hydrodynamic and thermal loads that are imposed on the SRVDL and

SRVDL sleeve during LOCA blowdowns will be provided.

5. Ensure that thermal loads created by steam flow through the annulus have been acocunted for in the design.

6. State the external pressure loads that the portion of the SRVDL enclosed by the sleeve can withstand.

III. Status

Items 1 through 6 are estimated to be completed by January 31, 1983.

IV. Results to Date

None available

Action Plan 6 - Plant Specific

I. Issues Addressed

3.1 The design of the STRIDE did not consider vent clearing condensation oscillation, and chugging loads which might be produced by the actuation of the RHR heat exchanger relief valves.

3.3 Discharge from the RHR relief valves may produce bubble discharge or other submerged structure loads on equipment in the suppression pool.

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

II. Program for Resolution

1. The vent that pressurizes the relief valve discharge line in the steam-condensing mode will clear the water out of this line. Calculations will be submitted to demonstrate that there will not be a water leg in the discharge piping when the RHR system is in the steam-condensing mode.

The following information will be submitted for all relief valves that discharge to the suppression pool.

2. Isometric drawings and P&IDs showing line and vacuum breaker locations will be provided. This information will 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.

- Any lines equipped with load-mitigating devices (e.g., spargers or quenchers).

3. The range of flow rates and character of fluid (i.e., air, water, steam) that is discharged through the line and the plant conditions (e.g., pool temperatures) when discharges occur will be defined.

4. The sizing and performance characteristics (including make, model, size, opening characteristics, and flow characteristics) of any vacuum breakers provided for relief valve discharge lines will be noted.

5. The potential for oscillatory operation of the relief valves in any given discharge line will be discussed.

6. The potential for the failure of any relief valve to reset following initial or subsequent opening will be evaluated.

7. The location of all components and piping in the vicinity of the discharge line exit and the design bases will be provided.

III. <u>Status</u>

Items 1 through 7 are estimated to be completed by December 31, 1982.

IV. <u>Results to Date</u>

None available

Action Plan 7 - Generic

I. Issue Addressed

3.2 The STRIDE design provided only 9 in. of submergence above the RHR heat exchanger relief valve discharge lines at low suppression pool levels.

II. Program for Resolution

1. The Humboldt Bay pressure suppression test data demonstrated for relationship of discharge submergence on condensation effectiveness. An evaluation based on this data will be submitted which shows that the maximum discharge from the relief valves can be quenched under all possible submergence conditions.

III. Status

Item 1 is complete. Results were submitted in a letter from L. F. Dale, MP&L, to H. R. Denton, NRC, reference #AECM-82/353, dated August 19, 1982.

IV. Results to date

GSU as a member of the Containment Issues Owner's Group endorses the results submitted for Action Plan Program 7.1. The conclusion of this evaluation applies to RBS. In addition, the minimum submergence of the RBS RHR SRV discharge is 25 inches of suppression pool water above the line exit after the pool level has been drawn down by ECCS operation and pool water has flooded the drywell to the top of the weir wall.

Action Plan 8 - Plant Specific

I. Issues Addressed

3.4 The RHR heat exchanger relief valve discharge lines are provided with vacuum breakers to prevent negative pressure in the lines when discharging steam is condensed in the pool. If the valves experience repeated actuation, the vacuum breaker sizing may not be adequate to prevent drawing slugs of water back through the discharge piping. These slugs of water may apply impact loads to the relief valve or be discharged back into the pool at the next relief valve actuation and apply impact loads to submerged structures.

3.5 The RHR relief valves must be capable of correctly functioning following an upper pool dump, which may increase the suppression pool level as much as 5 ft., creating higher back pressures on the relief valves.

II. Program for Resolution

1. An Analysis will be performed to determine if a water slug from the suppression pool is drawn into the RHR heat exchanger relief valve discharge line. Credit will be taken in this analysis for vacuum breaker performance and pressurization of the discharge line by the heat exchanger vent line.

2. If the analysis shows that water is drawn up from the suppression pool, water slug loads on relief valve piping and submerged structures will be determined and appropriate design modifications implemented if necessary.

3. The River Bend Station design does not incorporate an upper pool dump. Hence, Issue 3.5 is not applicable.

III. Status

Item 1 & 2 is estimated to be completed by January 31, 1983.

Item 3 is considered closed for RBS with this submittal.

IV. Results to date

Issue 3.5 is not applicable to RBS.

Action Plan 9 - Generic

I. Issue Addressed

3.6 If the RHR heat exchanger relief valves discharge steam to the upper levels of the suppression pool following a design basis accident, they will significantly aggravate suppression pool temperature stratification.

II. Program for resolution

1. An evaluation of all scenarios which could lead to discharge from the RHR heat exchanger relief valves will be made.

1.a A bounding quantity of energy which could be added to the suppression pool due to actuation of the RHR heat exchanger relief valves will be identified. This definition will be based upon the maximum energy-addition rates due to failures in the individual plant RHR pressure controllers.

2. The dischrage plume from the relief valves will be investigated. This plume will establish the maximum area of the pool which can be affected.

III. Status

Items 1, 1.a, and 2 are estimated to be completed by December 31, 1982.

IV. Results to date

None available

Action Plan 10 - Plant Specific

I. Issue Addressed

4.1 The present containment response analyses for drywell break accidents assume that the ECCS systems transfer a significant quantity of water from the suppression pool to the lower regions of the drywell through the break. This results in a pool in the drywell which is essentially isolated from the suppression pool at a temperature of approximately 135°F. The containment response analysis assumes that the drywell pool is thoroughly mixed with the suppression pool. If the inventory in the drywell is assumed to be isolated and the remainder of the heat is discharged to the suppression pool, an increase in bulk pool temperature of 10°F may occur.

II. Program for Resolution

1. A calculation will be made that assumes that the drywell pool is isolated after the blowdown fills up to the top of the weir wall and that the remainder of the blowdown is added to the suppression pool.

III. Status

Item 1 is estimated to be completed by December 31, 1982.

IV. Results to Date

None available.

Action Plan 11 - Plant Specific

I. Issues Addressed

4.2 The existence of the drywell pool is predicated upon continuous operation of the ECCS. The current emergency procedure guidelines require the operators to throttle ECCS operation to maintain vessel level below level 8. Consequently, the drywell pool may never be formed.

9.1 The current FSAR analysis is based upon continuous injection of relatively cool ECCS water into the drywell through a broken pipe following a design basis accident. The EPGs direct the operator to throttle ECCS operation to maintain reactor vessel level at about level 8. Thus, instead of releasing relatively cool ECCS water, the break will be releasing saturated steam, which might produce higher containment pressurizations that currently anticipated. Therefore the drywell air which would have been drawn back into the drywell will remain in the containment, and higher pressures will result in both the containment and the drywell.

II. Program for Resolution

1. A calculation will be performed, demonstrating that continuous addition of saturated steam to the drywell and the failure to form the drywell pool will not produce pressures and temperatures above the design conditions.

III. Status

Item 1 is estimated to be completed by December 31, 1982.

IV. Results to Date .

None available

Action Plan 12 - Plant Specific

I. Issue Addressed

4.3 All Mark III analyses presently assume a perfectly mixed, uniform suppression pool. these analyses assume that the temperature of the suction to the RHR heat exchangers is the same as the bulk pool temperature. In actuality, the temperature in the lower part of the pool where the suction is located will be as much as 7 1/2°F cooler than the bulk pool temperature. Thus, the heat transfer through the RHR heat exchanger will be less than expected.

II. Response

1. The River Bend Station analysis assumes that the RHR suction temperature is 5°F less than the bulk suppression pool temperature. In addition, a sensitivity analysis on the RHR heat exchanger heat transfer coefficient shows that containment peak pressure is not very sensitive to the RHR Hx heat transfer coefficient (see FSAR Figure 6.2-36).

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 13 - Plant Specific

I. Issues Addressed

4.4 The long-term analysis of containment pressure/temperature rsponse assumes that the wetwell airspace is in thermal equilibrium with the suppression pool water at all times. The calculated bulk pool temperature is used to determine the airspace temperature. If pool thermal stratification were considered, the surface temperature, which is in direct contact with the airspace, would be higher. Therefore the airspace temperature (and pressure) would be higher.

7.1 The containment is assumed to be in thermal equilibrium with a perfectly mixed, uniform temperature suppression pool. As noted under Topic 4, the surface temperature of the pool will be higher than the bulk pool temperature. This may produce higher-than-expected containment temperatures and pressures.

II. Response

1. The River Bend Station analysis assumes that the surface temperature of the pool is 5°F greater than the bulk temperature. Our containment and LOCA analysis, documented in FSAR Section 6.2.1, incorporates this assumption.

III. Status

Based on the above response, these issues are considered closed for RBS with this submittal.

Action Plan 14 - Generic/Plant Specific

I. Issue Addressed

4.5 A number of factors may aggravate suppression pool thermal stratification. The chugging produced through the first row of horizontal vents will not produce any mixing from the suppression pool layers below the top vent row. An upper pool dump may contribute to additional suppression pool temperature stratification. The large volume of water from the upper pool furhter submerges RHR heat exchanger effluent discharge, which will decrease mixing of the hotter, upper regions of the pool. Finally, operation of the containment spray eliminates the heat exchanger effluent discharge jet, which contributes to mixing.

II. Program for Resolution

1. Testing information will be submitted to demonstrate the effectiveness of chugging as a mixing mechanism in the suppression pool.

III. Status

Item 1 is complete and was submitted in a letter from L. F. Dale, MP&L to H. R. Denton, NRC, Reference #AECM-82/353, dated August 19, 1982.

IV. Results to Date

GSU as a member of the Containment Issues Owners Group endorses the submitted results of Action Plan Program 14.1. This information applies to River Bend Station. Additionally, River Bend Station design does not use the upper pool dump concept and does not use containment sprays.

Action Plan 15 - Plant Specific

I. Issue Addressed

4.6 The initial suppression pool temperature is assumed to be 95°F, while the maximum expected service water temperature is 90°F for all GGNS accident analyses, as noted in FSAR Table 6.2-50. If the service water temperature is consistently higher than expected, as occurred at Kuosheng, the RHR system may be required to operate nearly continuously in order to maintain suppression pool temperature at or below the maixmum permissible value.

II. Response

1. The River Bend Station analysis uses an initial suppression pool temperature of 100°F and a service water temperature of 95°F. The worst-case maximum standby service water temperature is 90°F for RBS, as described in FSAR Section 9.

III. Status

Based on the above reponse, this issue is considered closed for RBS with this submittal.

Action Plan 16 - Generic

I. Issues Addressed

4.7 All analyses completed for the Mark III are generic in nature and do not consider plant-specific interactions of the RHR suppression pool suction and discharge.

4.10 Justify that the current arrangement of the discharge and suction points of the pool cooling system maximizes pool mixing (pp. 150 through 155 of the May 27, 1982, transcript).

II. Program for Resolution

1. Information regarding RHR system effectiveness tests that have previously been conducted or that are in the planning stages will be evaluated. The evaluation is expected to show that a wide variety of RHR suction and discharge arrangements have been tested and are being tested under a variety of initial conditions. The arrangements used in the owners' plants will be compared to the various arrangements used in the previously noted tests.

III. Status

Item 1 is estimated to be completed by December 31, 1982.

IV. Results to Date

None available.

Action Plan 17 - Plant Specific

I. Issue Addressed

4.8 Operation of the RHR system in the containment spray mode will decrease the heat transfer coefficient through the RHR heat exchangers due to decreased system flow. The FSAR analysis assumes a constant heat transfer rate from the suppression pool, even with operation of the containment spray.

II. Response

1. This concern is not applicable to the River Bend Station design (no containment sprays).

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 18 - Plant Specific

I. Issues Addressed

4.9 The effect on the long-term containment response and the operability of the spray system due to cycling the containment spray on and off to maximize pool cooling needs to be addressed. Also provide and justify the criteria used by the operator for switching from the containment spray mode to pool cooling mode, and back again.

5.3 Leakage from the drywell to containment will increase the temperature and pressure in the containment. The operators will have to use the containment spray in order to maintain containment temperature and pressure control. Given the decreased effectiveness of the RHR system in accomplishing this objective in the containment spray mode, the bypass leakage may increased the cyclical duty of the containment sprays.

II. Response

1. These concerns are not applicable to GSU's River Bend Station design (no containment sprays).

III. Status

Based on the above response, these issues are considered closed for RBS with this submittal.

Action Plan 19 - Plant Specific

I. Issues Addressed

5.1 The worse case of drywell-to-containment bypass leakage has been established as a small-break accident. An intermediate-break accident will actually produce the most significant drywell-to-containment leakage prior to initiation of containment sprays.

5.6 The test pressure of 3 psig specified for the periodic operational drywell leakage rate tests does not reflect additional pressurization in the drywell which will result from upper pool dump. This pressure also does not reflect additional drywell pressurization resulting from throttling of the ECCS to maintain vessel level which is required by the current EPGs.

9.2 The continuous steaming produced by throttling the ECCS flow will cause increased direct leakage from the drywell to the containment. This could result in increased containment pressures.

II. Response

1. The River Bend Station Project considered the entire spectrum of breaks for the bypass study, as discussed in FSAR Section 6.2.1. Furthermore, RBS does not have containment sprays.

2. Concern 5.6 is not applicable to GSU's River Bend Station design (no upper pool dump).

3. Existing analysis for RBS shows that for an SBA that assumes continuous steaming, containment and drywell design limits are not exceeded.

III. Status

Based on the above response, these issues are considered closed for RBS with this submittal.

Action Plan 20 - Plant Specific

I. Issue Addressed

5.4 Direct leakage from the drywell to the containment may dissipate hydrogen outside the region where the hydrogen recombiners take suction. The anticipated leakage exceeds the capacity of the drywell purge compressors. This could lead to pocketing of hydrogen exceeding the concentration limit of 4 percent by volume.

II. Response

1. RBS does not use compressors but a mixing system. The mixing system is manually initiated when the concentration of H_2 in

   the drywell reaches 3.5 V/O. The two openings of the mixing system that allowed air to flow into the drywell from the containment are located diametrically opposite each other on the circumference of the drywell wall above the suppression pool. The drywell atmosphere is exhausted into the larger containment volume through two other penetrations located at the top of the drywell by means of two recirculation fans. Since the drywell atmosphere is continuously exhausted, there cannot be any other leakage; hence, the possibility for H_2 to pocket does not

   exist.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 21 - Plant Specific

I. Issue Addressed

5.5 Equipment may be exposed to local conditions which exceed the environmental qualification envelope as a result of direct drywell-to-containment bypass leakage.

II. Response

1. This is not a concern for RBS, since a scram would occur prior to exceeding the qualification temperature.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 22 - Plant Specific

I. Issue Addressed

5.8 The possibility of high temperatures in the drywell without reaching the 2 psig high-pressure scram level because of bypass leakage through the drywell wall should be addressed.

II. Response

1. Based on existing analysis, drywell pressure reaches the 2-psig scram-initiation signal within 5 seconds, assuming a break area of 0.1 ft^2. Periodic testing is performed to ensure that a bypass area no greater than 0.1 ft^2 (10 percent of allowable) exists.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 23 - Plant Specific

I. Issues Addressed

6.3 The recombiners may produce "hot spots" near the recombiner exhausts that might exceed the environmental qualification envelope or the containment design temperature.

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.

II. Program for Resolution

1. Arrangement drawings of the hydrogen recombiner areas of the containment will be submitted to demonstrate that no essential equipment could be affected by the recombiner thermal plume, which is only 50°F above the ambient temperature at the recombiner exhaust.

III. Status

Item 1 is estimated to be completed by December 31, 1982.

IV. Results to Date

None available

Action Plan 24 - Plant Specific

I. Issue Addressed

7.2 The computer code used by General Electric to calculate environmental qualification parameters considers heat transfer from the suppression pool surface to the containment atmosphere. This is not in accordance with the existing licensing basis for Mark III environmental qualificaiton. Additionally, the bulk suppression pool temperature was used in the analysis instead of the suppression pool surface temperature.

II. Response

1. The RBS analysis was done using SWEC codes. The environmental design criteria (EDC) was developed in accordance with NUREG 0588. Additionally, the analysis assumes that the surface temperature of the pool is 5°F greater than the bulk pool temperature. In addition, equipment qualification envelopes are based on design conditions of 185°F.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 25 - Plant Specific

I. Issue Addressed

8.1 This issue is based on consideration that some technical specifications allow operation at parameter values that differ from the values used in assumptions for FSAR transient analyses. Normally, analyses are done assuming a nominal containment pressure equal to ambient (0 psig) and a temperature near maximum operating temperature (90°F) and do not limit the drywell pressure equal to the containment pressure. The technical specifications permit operation under conditions such as a positive containment pressure (1.5 psig) and temperatures less than maximum (60 or 70°F), and drywell pressure can be negative with respect to the containment (-0.5 psid). All of these differences would result in transient responses different than the FSAR descriptions.

II. Response

1. The containment peak pressure is sensitive to variables that affect long-term analysis, such as initial suppression pool temperature, decay heat rate, containment unit cooler heat transfer coefficient, and passive heat sink area. The sensitivity analysis for the above-mentioned variables for RBS shows that the resulting containment pressure and temperature are below the design conditions. Also, parametric studies of the initial conditions over the expected range indicate that the analyses results are relatively insensitive to these assumptions.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 26 - Plant Specific

I. Issues Addressed

8.2 The draft GGNS technical specifications permit operation of the plant with containment pressure ranging between 0 and -2 psig. Initiation of containment spray at a pressure of -2 psig may reduce the containment pressure by an additional 2 psig, which could lead to buckling and failures in the containment liner plate.

8.3 If the containment is maintained at -2 psig, the top row of vents could admit blowdown to the suppression pool during an SBA without a LOCA signal being developed.

II. Response

1. The RBS Environmental Design Criteria (EDC) specifies the containment pressure range as 0.1 to -1.0 in. wg. Also, RBS does not have containment sprays. RBS does, however, have containment unit coolers, and analysis has been done that considers the failure of chilled water control valves to close and isolate chilled water to one containment unit cooler. Supplied with a continuous flow of 57°F chilled water, one containment unit cooler continues reducing containment pressure and temperature. At -12 in. wg (-0.43 psig) pressure, the chilled water isolation valves are closed automatically by redundant signals from differential pressure transmitters that sense the differential pressure between the containment and the shield building annulus.

2. Concern 8.3 would not be applicable to RBS. The containment pressure range during normal conditions would be -0.1 to -1.0 wg. Therefore, the top row of vents cannot admit blowdown without a LOCA signal being generated.

III. Status

Based on the above response, these issues are considered closed for RBS with this submittal.

Action Plan 27 - Plant Specific

I. Issue Addressed

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.

II. Program for Resolution

1. A complete list of scenarios which might result in reduced containment air mass will be developed.

2. The list of scenarios developed in Item 1 will be reviewed and a worst case, bounding scenario will be selected.

3. An evaluation will be completed to establish the containment response under the bounding scenario.

III. Status

Item 1 is scheduled to be completed by December 31, 1982.

IV. Results to Date

None available

Action Plan 28 - Plant Specific

I. Issue Addressed

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 licensing values.

II. Response

1. The RBS analysis discussed in FSAR Section 6.2 considers SBAs and stuck-open SRV accidents as design basis accidents, assuming:

- Maximum initial suppression pool temperature.
- Maximum initial conditions
- Loss of offsite power
- Single active failure (i.e., minimum availability of engineered safety features).

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 29 - Plant Specific

I. Issue Addressed

10.1 The suppression pool may overflow from the weir wall when the upper pool is dumped into the suppression pool. Alternatively, negative pressure between the drywell and the containment that occurs as a result of normal operation or sudden containment pressurization could produce a similar overflow. Any cold water spilling into the drywell and striking hot equipment may produce thermal failures.

II. Program for Resolution

1. Although RBS does not incorporate an upper pool dump, an evaluation currently in progress will be completed that will define the extent of drywell flooding due to weir wall overflow. The effect of cold water striking safety-related equipment will be evaluated to ensure that no thermal failures occur.

III. Status

Item 1 is scheduled to be completed by January 31, 1983.

IV. Results to Date

None available

Action Plan 30 - Plant Specific

I. Issue Addressed

10.2 Described the interface requirement (A42) that specifies that no flooding of the drywell shall occur. Describe your intended methods to follow this interface.

II. Response

1. There is no A42 Document applicable to RBS which specifies that no flooding of the drywell occurs. The concern relates to ensuring that the weir wall has sufficient heighth to account for an upper pool dump without overflowing the weir wall. Since RBS does not have upper pool dump, this issues is not applicable.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 31 - Generic/Plant Specific

I Issue Addressed

11.0 Mark III load definitions are based upon the levels in the suppression pool and the drywell weir annulus being the same. The GGNS technical specifications permit elevation differences between these pools. This may affect load definition for vent clearing.

II. Program for Resolution

1.a An evaluation of the maximum elevation differences that can exist between the weir annulus and the suppression pool will be made for each owner. If these elevation variations are outside the parameters established for GGNS, a bounding set of parameters will be defined.

2. A discussion will be given of how pressure differences between the wetwell and the drywell will be controlled.

3. The charges in hydrodynamic loads that may result form these maximum possible level differences will be evaluated.

III. Status

Items 1.a. through 3 is estimated to be completed by December 30, 1982.

IV. Results to Date

None available

Action Plan 32 - Plant Specific

I. Issue Addressed

14.0 A failure in the check valve in the LPCI line to the reactor vessel could result in direct leakage from the pressure vessel to the containment atmosphere. This leakage might occur as the LPCI motor operated isolation valve is closing and the motor operated isolation valve in the containment spray line is opening. This could produce unanticipated increases in the containment pressure.

II. Response

1. This concern is not applicable to RBS (no containment sprays).

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 33 - Plant Specific

I. Issue Addressed

16. Some of the suppression pool temperature sensors are located (by GE recommendation) 3 in. to 12 in. below the pool surface to provide early warning of high pool temperature. However, if the suppression pool is drawn down below the level of the temperature sensors, the operator could be misled by erroneous readings, and the required safety action could be delayed.

II. Program for Resolution

1. The RBS Emergency Procedures will be written to either require the operator to verify level in the suppression pool before reading suppression pool temperature or to specify which suppression pool temperature instruments can be used following an accident.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 34 - Plant Specific

I. Issue Addressed

19.1 The chugging loads were orginally defined on the basis of 7.5 feet of submergence over the drywell to suppression pool vents. Following an upper pool dump, the submergence will actually be 12 feet, which may affect chugging loads.

II. Response

1. This concern is not applicable to RBS (no upper pool dump).

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 35 - Generic

I. Issue Addressed

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

II. Program for Resolution

1. An evaluation of the adequacy of available models to investigate the impact of longer acoustic paths on chugging load definition will be performed. A model will be selected, and the effects of encroachments will be quantified.

2. The inertial impedance effect on chugging loads will be quantified to the maximum extent possible.

III. Status

Items 1 and 2 are estimated to be completed by December 31, 1982.

IV. Results to Date

None available

Action Plan 36 - Generic

I. Issue Addressed

20.0 LOADS ON STRUCTURES, PIPING, AND EQUIPMENT IN THE DRYWELL DURING REFLOOD

During the latter stages of a LOCA, ECCS overflow from the primary system can cause drywell depressurization and vent backflow. The GESSAR defines vent backflow, vertical impingement, and drag loads to be applied to drywell structures, piping, and equipment, but no horizontal loading is specified.

II. Response

1. No action is required based on discusison between MP&L and the NRC Staff. The basis for this decision is applicable to RBS.

III. Status

This item is complete. Results were submitted in MP&L's submittal (Reference No. AECM-82/353 dated August 19, 1982).

Action Plan 37 - Generic

I. Issue Addressed

22.0 The EPGs currently in existence have been prepared with the intent of coping with degraded core accidents. They may contain requirements conflicting with design basis accident conditions. Someone needs to carefully review the EPGs to assure that they do not conflict with the expected course of the design basis accident.

II. Program for Resolution

1. The Owners Group believes that the development program through which the emergency procedure guidelines have passed has adequately addressed this concern. As a result of this issue, the Mark III Owners Group has brought this concern to the attention of the BWR Owners Groups. A generic resolution of this issue will be pursued with the BWR Owners Group.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 38 - Plant Specific

I. Issue Addressed

6.2 GE has recommended that an interlock be provided to require containment spray prior to starting the recombiners because of the large quantities of heat input to the containment. Incorrect implementation of this interlock could result in the inability to operate the recombiners without containment spray.

II. Response

1. This concern is not applicable to RBS (no containment sprays).

III. Status

Based on the above response, this item is considered closed for RBS with this submittal.

Action Plan 39 - Plant Specific

I. Issue Addressed

6.4 For the containment air monitoring system furnished by GE, the analyzers are not capable of measuring hydrogen concentration at volumetric steam concentrations above 60 percent. Effective measurement is precluded by condensation of steam in the equipment.

II. Response

1. The RBS hydrogen analyzers are not supplied by GE. The analyzers have the capability to measure under the following conditions:

- Pressure: -10 to 25 psig
- Temperature: 330°F max
- Relative Humidity: 100 percent

In addition, containment atmosphere sample lines are heat-traced to preclude condensation.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 40 - Plant Specific

I. Issue Addressed

7.3 The analysis assumes that the containment airspace is in thermal equilibrium with the suppression pool. In the short term, this is nonconservative for Mark III due to adiabatic compression effects and finite time required for heat and mass to be transferred between the pool and containment volumes.

II. Response

1. This concern is not applicable to RBS, since the analysis applies the first law of thermodynamics in determining containment pressure and temperature, i.e., adiabatic compression effects are accounted for.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 41 - Plant Specific

I. Issue Addressed

12.0 SUPPRESSION POOL MAKEUP LOCA SEAL-IN

The upper pool dumps into the suppression pool automatically following a LOCA signal with a 30-minute delay timer. If the signal that starts the timer disappears on the solid-state logic plants, the timer resets to zero, preventing upper pool dump.

II. Response

1. This concern is not applicable to RBS (no upper pool dump).

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 42 - Plant Specific

I. Issue Addressed

13.0 NINETY SECOND SPRAY DELAY

The "B" Loop of the containment sprays includes a 90-second timer to prevent simultaneous initiation of the redundant containment sprays. Because of instrument drift in the sensing instrumentation and the timers, GE estimates that there is a 1-in-8 chance that the sprays will actuate simultaneously. Simultaneous actuation could produce negative pressure transients in the containment and aggravate temperature stratification in the suppression pool.

II. Response

1. This concern is not applicable to RBS (no containment sprays).

III. Status

Bsed on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 43 - Plant Specific

I. Issue Addressed

15.0 SECONDARY CONTAINMENT VACUUM BREAKER PLENUM RESPONSE

The STRIDE plants had vacuum breakers between the containment and the secondary containment. With sufficiently high flows through the vacuum breakers to containment, vacuum could be created in the secondary containment.

II. Response

1. This concern is not applicable to RBS (no containment vacuum breakers).

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 44 - Plant Specific

I. Issues Addressed

18.0 EFFECTS OF INSULATION DEBRIS

18.1 Failures of reflective insulation in the drywell may lead to blockage of the gratings above the weir annulus. This may increase the pressure required in the drywell to clear the first row of drywell vents and perturb the existing load definitions.

18.2 Insulation debris may be transported through the vents in the drywell wall into the supression pool. This debris could then cause blockage of the suction strainers.

II. Program for Resolution

1. The type of insulation that will be used on RBS has not yet been determined. The above two concerns will be resolved after the insulation is selected. The amount of insulation that will be displaced by jet impingement from pipe breaks in the drywell will be quantified, and the effects of increased vent loss will be evaluated to ensure that any post-LOCA drywell pressure caused by this effect does not exceed the drywell design pressure.

2. An evaluation of the potential effects of possible ECCS suction strainer blockage will be provided.

III. Status

Schedule is dependent upon award of insulation contract. The current schedule for placement of the purchase order is December, 1983 and the above actions will be completed approximately three months after award.

IV. Results to Date

None available.

Action Plan 45 - Generic

I. Issue Addressed

6.1 GE had recommended that the drywell purge compressors and the hydrogen recombiners to be activated if the reactor vessel water level should drop to within 1 ft of the top of active fuel. This requirement was not incorporated in the emergency procedure guidelines.

II. Response

1. RBS does not have purge compressors. However, the Emergency Operating procedures for RBS will be written to require the operator to initiate the hydrogen recombiners if the reactor water level drops below the top of active fuel and cannot be restored. The hydrogen mixing system will be initiated when the hydrogen concentration in the drywell reaches 3.5 percent by volume.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 46 - Plant Specific

I. Issue Addressed

17.0 EMERGENCY PROCEDURE GUIDELINES

The EPGs contain a curve that specifies limitations on suppression pool level and reactor pressure vessel pressure. The curve presently does not adequately account for upper pool dump. At present, the operator would be required to initiate automatic depressurization when the only action required is the opening of one additional SRV.

II. Response

1. This concern is not applicable to RBS (no upper pool dump).

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 47 - Plant Specific

I. Issue Addressed

1.7 GE suggests that at least 1,500 sq ft of open area should be maintained in the HCU floor. In order to avoid excessive pressure differentials, at least 1,500 sq ft of opening should be maintained at each containment elevation.

II. Response

1. The RBS design provides an open area of 2,481 sq ft (i.e., a 39-percent open area) at the HCU floor. Flow at higher elevations is predominantly air and would not cause any significant pressure differentials. In addition, there is a 238-percent margin between the calculated peak pressure and the containment design pressure.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 48 - Plant Specific

I. Issue Addressed

5.7 After upper pool dump, the level of the pool will be 6 ft higher, and drywell-to-containment differential pressure will be greater than 3 psid. The drywell H_2 purge compressor head is nominally 6 psid. The concern is that after an upper pool dump, the purge compressor head may not be sufficient to depress the weir annulus enough to clear the upper vents. In such a case, H_2 mixing would not be achieved.

II. Response

1. This concern is not applicable to the River Bend Station design (no upper pool dump).

III. Status

Based on the above response, this item is considered closed for RBS with this submittal.

Action Plan 49 - Plant Specific

I. Issue Addressed

21.0 CONTAINMENT MAKEUP AIR FOR BACKUP PURGE

Regulatory Guide 1.7 requires a backup purge H_2 removal capability. This backup purge

for Mark III is via the drywell purge line, which discharges to the shield annulus, which in turn is exhausted through the stand by gas treatment system (SGTS). The containment air is blown into the drywell via the drywell purge compressor to provide a positive purge. The compressors draw from the containment; however, without hydrogen-lean air makeup to the containment, no reduction in containment hydrogen concentration occurs. It is necessary to ensure that the shield annulus volume contains a hydrogen-lean mixture of air to be admitted to the containment via containment vacuum breakers.

II. Response

1. RBS has no containment vacuum breakers. The RBS hydrogen purge system design has provisions to discharge filtered outside air into the containment/drywell and exhausts through the SGTS.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.

Action Plan 50 - Generic

I. Issue Addressed

5.2 Under technical specification limits, bypass leakage corresponding to A K = 0.1 sq ft constitutes acceptable operation conditions. Smaller-than-IBA-sized breaks can maintain break flow into the drywell for long time periods, however, because the RPV would be depressurized over a 6-hr period. Given, for example, an SBA with A K = 0.1, projected time period for containment pressure to reach 15 psig is 2 hr. In the latter 4 hr. of the depressurization, the containment would presumably experience ever-increasing overpressurization.

II. Response

1. GSU's River Bend Station design allows minimum bypass area (A K) of 1.1 sq ft for small breaks (0.1 sq ft). The bypass capacity is larger for intermediate and large breaks (see FSAR Figure 6.2-27). River Bend Station's redundant containment unit coolers and heat sinks provide more than adequate heat removal capability to prohibit containment overpressurization during the later part of reactor vessel depressurization. Finally, the operator can initiate rapid reactor vessel depressurization if containment pressure and temperature continue to rise.

III. Status

Based on the above response, this issue is considered closed for RBS with this submittal.