GENERAL ELECTRIC

NUCLEAR POWER

SYSTEMS DIVISION

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April 8, 1983

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Attention: Mr. D.G. Eisenhut, Director
Division of Licensing

SUBJECT: IN THE MATTER OF 238 NUCLEAR ISLAND
GENERAL ELECTRIC STANDARD SAFETY ANALYSIS REPORT (GESSAR II)
DOCKET NO. STN 50-447

CONTAINMENT DESIGN MARGINS

The purpose of this letter is to transmit for your review the GESSAR II Action Plan for resolving the containment design issues identified by John Humphrey. This action plan has been developed in response to the letter from D.G. Eisenhut to G.G. Sherwood, "Adequacy of the Design Margins for the Mark III Containment System of GESSAR II Nuclear Island," August 10, 1982. As defined in the attached sheets, the expected date for completion of the balance of the information for submittal is July 22, 1983.

Very truly yours,

Willa for

Glenn G. Sherwood, Manager
Nuclear Safety & Licensing Operation

Attachments

cc: F.J. Miraglia (without attachments)
D.C. Scaletti
C.O. Thomas (without attachments)
L.S. Gifford (without attachments)

E003

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 1

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% increase in pool velocity.

2.+ The two-dimensional model will be refined by addition of a bubble pressure model and used to show the 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 methods used for Grand Gulf will be applied to create a plant unique GESSAR pool encroachment calculation.

III. Schedule

Item 6 will be completed for submittal on July 22, 1983.

\+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 2

I. Issues 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 completed 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 velocity fields generated in Action Plan Element 2.1 will be reviewed. If the velocity field in the vicinity of a given submerged structure is always less in the encroached case than the unencroached case, it will be argued that the existing load definition is adequate. If higher velocities are found, the revised loads will be calculated.

3. If found to be necessary, newly defined submerged structure loads will be compared to the loads which were used as a design basis for equipment and submerged structures in the suppression pool for GESSAR.

III. Schedule

Items 1-3 will be completed for submittal on July 22, 1983.

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* General Electric expects that the results produced under this similarly-worded Action Plan Element for GGNS will prove to be either bounding or representative for GESSAR, and the GGNS results will then be identified as the applicable GESSAR response.

Action Plan 3

I. Issues 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. Action Plan 1 is expected to demonstrate by a conservative analysis that the maximum impact on the HCU floor due to encroachments is less than the existing design basis. Therefore, this is no longer an issue.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 4

I. Issues Addressed

1.6 Local encroachments or the steam tunnel may cause the pool swell froth to move horizontally 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 grating will be calculated from this information.

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

III. Schedule

Items 1 and 2 will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 5

I. Issues Addressed

2.1 The annular regions between the safety relief valve lines and the drywell wall penetration sleeves may produce condensation oscillation (CO) 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 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 occurred. The data will also be reviewed to confirm that the amplitudes were not closely related to acoustic effects.

2.+ GE intends to produce a generic SRVDL sleeve CO load definition. 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. This new load case, taken in combination with existing main vent CO loads (CLR-basis), will then be compared, on an amplified response spectrum (ARS) basis, to other existing loads to show that existing load cases are bounding.

\+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

3. Deleted

4. Provide a detailed description of all hydrodynamic and thermal loads that are imposed on the SRVDL and the SRVDL sleeve during LOCA blowdowns.

5. The appropriate section(s) of GESSAR will be revised to specify "applicant to provide" SRVDL sleeve design which accommodates loads created by steam flow through the annulus region.

6. The appropriate section(s) of GESSAR will be revised to specify "applicant to provide" definition of the external pressure loads which the SRVDL enclosed by the sleeve can withstand.

7. Calculate the maximum lateral loads which could be applied to the sleeve by phenomena analogous to the Mark I and Mark II downcomer lateral loads.

III. Schedule

Items 4, 5, 6, and 7 will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 6

I. Issues Addressed

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

3.7 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 appropriate section(s) of GESSAR will be revised to specify the applicant to define all applicable dynamic loads and to demonstrate that all relief valve lines will be designed not to produce unacceptable loads on the containment boundary, the relief valve line containment penetration, submerged structures or safety related equipment.

2. The appropriate section(s) of GESSAR will be revised to specify "applicant to provide" design/configuration of relief valve lines which exhaust into the suppression pool.

III. Schedule

Items 1 and 2 will be completed for submittal on July 22, 1983.

Action Plan 7

I. Issues Addressed

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

II. Program For Resolution

The Program for Resolution of Action Plan Element 6.1 and 6.2 apply to this item; accordingly, this issue is closed.

Action Plan 8

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 five feet creating higher back pressures on the relief valves.

II. Program For Resolution

The Program for Resolution of Action Plan Element 6.1 and 6.2 apply to this item; accordingly, this issue is closed.

Action Plan 9

I. Issues 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

The Program for Resolution of Action Plan Element 6.1 and 6.2 apply to this item; accordingly, this issue is closed.

Action Plan 10

I. Issues 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.+ Complete analysis to quantify maximum bulk suppression pool temperature increase produced as a result of an isolated drywell pool.

+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

Action Plan 11

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 EPG's 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 than currently anticipated. Therefore, the drywell air which would have been drawn back into the drywell will remain in the containment and higher pressures will results in both the containment and the drywell.

II. Program For Resolution

1.+ Calculations will be submitted to demonstrate that failure to form the drywell pool will not cause adverse consequences. The calculations will quantify the variation of suppression pool level without formation of the drywell pool and with upper pool dump.

2.+ Interactions between ESF system operation and suppression pool level will be reviewed to assure that higher suppression pool level will not degrade performance.

3.+ A realistic analysis of the effects of failure to recover the drywell air mass will be performed. This analysis will include the effects of containment heat sinks and the mitigating effects of containment spray.

\+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 12

I. Issues 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 7½° cooler than the bulk pool temperature. Thus, the heat transfer through the RHR heat exchanger will be less than expected.

II. Program For Resolution

1.+ A study will be completed to identify and quantify the major conservatisms which have been used in the analyses of RHR suppression pool cooling performance.

2.+ An assessment will be provided of the maximum difference which could exist between the bulk suppression pool temperature and the RHR heat exchanger inlet temperature. Based on existing test data this assessment should show that the difference will be below 7½°F. An analysis will be performed to assess the effect of this temperature difference on peak pool temperature.

3.+ Applicable heat exchanger test data and other test data will be reviewed to provide assurance that the correct heat exchanger capacity has been used.

\+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

Action Plan 13

I. Issues Addressed

4.4 The long term analysis of containment pressure/temperature response 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. Program For Resolution

1.+ The maximum increase in bulk suppression pool temperature which could occur as a result of temperature stratification will be determined from Action Plan 12. The maximum suppression pool surface temperature will be estimated based on the current understanding of thermal stratification as contained in GESSAR. The effects of this higher surface temperature on containment airspace pressure and temperature will be calculated.

2.+ The conservatism inherent in assuming thermal equilibrium between the containment atmosphere and suppression pool surface will be quantified. This conservatism results from neglecting the effects of drywell and containment heat sinks and conduction of heat through the containment structure into the secondary containment.

\+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

Action Plan 14

I. Issues 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 vent row. An upper pool dump may contribute to additional suppression pool temperature stratification. The large volume of water from the upper pool further 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.

\+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

Action Plan 15

I. Issues 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 Kuo Sheng, the RHR system may be required to operate nearly continuously in order to maintain suppression pool temperature at or below the maximum permissible value.

II. Program For Resolution

Under normal plant operating conditions, the required operational frequency (duty cycles) of the RHR system pool cooling mode will depend to a large extent on the temperature of the essential service water provided. GESSAR II contains no information on essential service water temperature (except for conservative assumptions used in performing containment accident response analysis), since this is a plant specific parameter established and specified by the Applicant/AE. Consequently, General Electric believes this item is not applicable to GESSAR and is considered closed.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 16

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. 150-155 of 5/27/82 transcript).

II. Program For Resolution

1. A discussion of analyses and test results will be provided to demonstrate that the RHR system design achieves satisfactory pool mixing.

III. Schedule

Item 1 will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 17

I. Issues 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. Program For Resolution

1.+ Additional analyses will be completed which incorporate lower RHR heat exchanger heat transfer coefficients during the period when the RHR system is in the containment spray mode. The analyses will be performed both with and without the presence of the bypass leakage capability.

2.+ The analyses performed in Item 1 will be repeated so that the effects of containment heat sinks can be included and quantified. The containment spray will be assumed to be operational only when it is necessary to assure pressure control.

\+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

Action Plan 18

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 sprays on and off 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 increase the cyclical duty of the containment sprays.

II. Program for Response

1. Analyses completed for Grand Gulf Action Plan 18 demonstrated that containment spray cycling is not an issue. These results are also applicable to GESSAR. This item is considered closed.

Action Plan 19

I. Issues Addressed

5.1 The worst 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 EPG.

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. Program For Resolution

1.+ A complete spectrum of analyses for varying break sizes will be completed neglecting depressurization of the drywell prior to initiation of containment sprays, but including the effects of containment heat sinks.

2. Not applicable.

3.+ An evaluation of the need for reducing the GE internal draft Technical Specification recommendations, intended for publication in GGNS Chapter 16, covering a proposed allowable technical specification for drywell leakage, will be provided. Any revised limit would be based upon a pressure of 6 psig in the drywell which would reflect the additional pressure produced by upper pool dump. In the evaluation, credit will be taken for drywell and containment heat sinks.

NOTE: Refer to the GESSAR II SER section 6.2.1.7

\+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 20

I. Issues 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 which exceeds the concentration limit of 4% by volume.

II. Program For Resolution

1. The total allowable leakage will be assumed to be released from any one location in the drywell wall. The potential for pocketing of hydrogen which is contained in this leakage will be reviewed.

III. Schedule

Item 1 will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 21

I. Issues 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. Program For Resolution

1. A list of essential equipment located near the drywell wall will be provided. The list will include a qualitative assessment of the equipment's sensitivity to temperature and the distance of the equipment from the drywell wall.

III. Schedule

Item 1 will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 22

I. Issues Addressed

5.8 The possiblity 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. Program For Resolution

1.+ A new analysis will be performed using the capability bypass leakage. This analysis will show that a temperature of 330°F is not reached in the drywell until after ten minutes. In this interval, the operator will have received sufficient information to manually scram the reactor.

2. A detailed list of alarms and parameter displays will be developed which inform the operator of conditions in the drywell. This will include drywell cooling performance, temperature, airflows, leak detection, etc.

III. Schedule

Item 2 will be completed for submittal on July 22, 1983.

+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

Action Plan 23

I. Issues Addressed

6.3 The recombiners may produce "hot spots" near the recombiner exhausts which 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 for the region above the recombiner exhausts will be submitted. These drawings will demonstrate that no essential equipment can be affected by the recombiner thermal plume for the GESSAR design. Also, a table showing all essential equipment in the vicinity of each recombiner and the distance from such equipment to the nearest recombiner will be submitted.

2. A description of the criteria used for actuating the containment sprays on high temperature will be submitted. This description will include details regarding location and response time for the temperature sensors which are used for containment temperature indication.

III. Schedule

Items 1 and 2 will be completed for submittal on July 22, 1983.

Action Plan 24

I. Issues 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 qualification. Additionally, the bulk suppression pool temperature was used in the analysis instead of the suppression pool surface temperature.

II. Program For Resolution

GESSAR II contains no information on environmental qualification, since this falls within the Architect-Engineer scope. Should such calculations be provided in the future, GE will perform the calculation in accordance with NUREG-0588.

This item is not applicable to GESSAR and is considered closed.

Action Plan 25

I. Issues 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) a temperature near maximum operating (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), 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 response different than the FSAR descriptions.

II. Program For Resolution

GESSAR II does not contain technical specifications which define these parameters. The applicant will provide technical specifications which are compatible with the assumptions used in the transient analyses.

Action Plan 26

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. Program For Resolution

GESSAR II does not contain technical specifications which define these parameters. The applicant will provide technical specifications which are compatible with the containment design bases.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 27

I. Issues 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 analysis will be completed to establish the containment response under the bounding scenario.

III. Schedule

Items 1 through 3 will be completed for submittal on July 22, 1983.

NOTE: Refer to the GESSAR III SER section 6.2.1.5

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 28

I. Issues Addressed

9.3 It appears that some confusion exists as to whether SBA's 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. Program For Resolution

1. A response will be provided confirming that the small break accident and the stuck open relief valve transient were treated as design basis accidents. The analyses for these transients are completed using licensing basis values for the initial conditions.

III. Schedule

Item 1 will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 29

I. Issues Addressed

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

II. Program For Resolution

1. An evaluation will be performed to identify possible weir wall overflow scenarios based on the GESSAR II containment and auxiliary system design.

III. Schedule

Items 1 and 2 will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 30

I. Issues Addressed

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

II. Program For Resolution

1. The wording of the requirement, and the interpretation of this requirement which was used to assure that the requirement was met, will be provided.

III. Schedule

Item 1 will be completed for submittal on July 22, 1983.

Action Plan 31

I. Issues 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 effect load definition for vent clearing.

II. Program For Resolution

The Mark III containment load definitions in GESSAR II are reported on a generic basis assuming equal water levels in the suppression pool and drywell weir annulus. During normal plant operation, elevation differences between these pool waters will be controlled by the applicable Technical Specifications which define such influential parameters as drywell/containment temperature, humidity and pressure. It is the responsibility of the Mark III Owner/AE who follows the GESSAR containment design to develop Technical Specifications which are consistent with their FSAR defined loads.

GESSAR II does not include these Technical Specifications; consequently, General Electric believes this issue is not applicable and is considered closed.

Action Plan 32

I. Issued Addressed

14.0 A failure on the check valve in the LPCI . . 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 spray.

II. Program For Resolution

1.+ The potential effect of maximum backflow which can occur will be estimated. This will include calculating the maximum backflow which can occur, evaluating thermal interaction with the relatively cool RHR spray flow and estimates of the limitations on flashing created by flow through the spray nozzles.

2.+ An evaluation of the possibility of adding interlocks to prevent simultaneous actuation of these valves will also be performed.

\+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

Action Plan 33

I. Issues Addressed

16.0 Some of the suppression pool temperature sensors are located (by GE recommendation) 3" to 12" 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 required safety action could be delayed.

II. Program For Resolution

1. The GESSAR suppression pool temperature monitoring system and the Emergency Procedure Guidelines will be reviewed to ensure that proper sensor installation locations have been defined, and that the appropriate operator instructions exist for determining bulk suppression pool temperature.

III. Schedule

Item 1 will be completed for submittal on July 22, 1983.

Action Plan 34

I. Issues Addressed

19.1 The chugging loads were originally 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 effect chugging loads.

II. Program for Resolution

1.+ The maximum, bounding effect of vent submergence on chugging loads will be quantified, and it will be shown that sufficient margin exists in the current load definition to bound any submergence conditions.

\+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 35

I. Issues 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.

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

+ These results are generic in that they deal with analytical methods, data, or a combination of the two. The GGNS Action Plan response is applicable, and this element is considered to be closed.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 36

I. Issues Addressed

20.0 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. Program For Resolution

1. No action is required on this item based on MP&L/GE discussions with the NRC staff. This item is closed.

Action Plan 37

I. Issues 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. GE believes that the development program through which the emergency procedure guidelines have passed has adequately addressed this concern. GE has participated in bringing this concern to the attention of the Emergency Procedures Committee of the BWR Owners Group. GE will pursue generic resolution of this issue with the BWR Owners Group. Accordingly, GE believes that for GESSAR, this issue is closed.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 38

I. Issues Addressed

1.8 Bechtel drawing C-1043A which supposedly represents the as-built condition of the TIP platform does not show the platform extending into the suppression pool. This is not in agreement with MP&L's contention that the TIP platform extends into the pool.

II. Program For Resolution

1. Although the specific issue relates only to GGNS, GE will review the GESSAR drawings to ensure that the TIP platform base extends into the suppression pool.

2. A sketch will be provided to show the general configuration and elevations in relation to the pool normal operating level range.

3. The drawings will also be reviewed to ensure all other significant structures, e.g., the personnel hatch, at this near-pool elevation also extend beneath the pool surface.

III. Schedule

Items 1-3 will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 39

I. Issues Addressed

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

II. Program for Resolution

1. The containment air monitoring system (CAMS) has been removed from the GE scope of supply. GE's normal change control process is being followed to remove the CAMS descriptions from GESSAR and insert the words "applicant to provide." The status of this documentation change process will be reported.

III. Schedule

The status report cited above will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 40

I. Issues Addressed

1.7 GE suggests that at least 1500 square feet of open area should be maintained in the HCU floor. In order to avoid excessive pressure differentials, at least 1500 square feet of opening should be maintained at each containment elevation.

II. Program for Resolution

1. References to the applicable portions of GESSAR Appendix 1C which address this issue will be provided.

2. The amounts of open area contained in the GESSAR design at the HCU floor, and at key containment elevations about the HCU floor, will be provided.

III. Schedule

Items 1 and 2 will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 41

I. Issues Addressed

6.2 General Electric 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 inability to actuate the recombiners without containment spray.

II. Program for Resolution

Review of the technical issues involved has indicated the interlock should be removed, and this design modification is currently being implemented via the established GE design change process. Documentation changes will be complete in early 1983. This activity is not seen as part of the GE Action Plan to resolve the issues identified by Mr. Humphrey as they relate to the GESSAR docket. However, the status of the GE actions on this issue will be reported.

III. Schedule

The status report cited above will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 42

I. Issues Addressed

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

II. Program for Resolution

1. Review of the technical issues involved has identified the need for documentation changes to insure that a seal-in of the LOCA signal is provided. This design modification is currently being implemented via the established GE design change process and it is anticipated the documentation changes will be complete in early 1983. The GE actions will involve clarification of the Suppression Pool Makeup System design specification so as to require seal-in of the LOCA signal within the Architect/Engineer design.

   This activity is not seen as part of the GE Action Plan to address Mr. Humphrey's concerns as they relate to the GESSAR docket. However, the status of the GE actions on this issue will be reported.

III. Schedule

The status report cited above will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 43

I. Issues Addressed

13. 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 to 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. Program for Resolution

1. Initially, both the containment and drywell are at elevated pressures (at least 9 psig). Transient analyses will be performed to show that, under these conditions, containment design external pressure will not be exceeded, even if both containment sprays are activated simultaneously. Both conditions, with and without containment air redistribution prior to spray activation, will be considered.

III. Schedule

Item 1 will be completed for submittal on July 22, 1983.

NOTE: Refer to the GESSAR II SER section 6.2.1.5

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 44

I. Issues Addressed

15. 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. Program for Resolution

1. The response of the STRIDE secondary containment will be evaluated for the most severe depressurization transient in the primary containment. The objective will be to show that the integrity of the secondary containment will not be violated, or to establish a need (and sizing basis) for a secondary containment vacuum relief.

III. Schedule

Item 1 will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 45

I. Issues Addressed

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

II. Program for Resolution

1. The insulation used at TVA STRIDE (GESSAR) is the stainless steel, "Mirror", heat reflective type of material, consisting of inner and outer layers of heavy gage stainless with 6 layers of thinner metal (SS) sheets in between. An analysis, using conservative assumptions, on the potential of this insulation material plugging ECCS suction strainers following a LOCA was completed by GE and found to be of minor significance.

III. Schedule

A summary report of the above analysis will be completed for submittal on July 22, 1983.

Action Plan 46

I. Issues Addressed

5.7 After upper pool dump, the level of the pool will be 6 feet higher, and drywell-to-containment differential pressure will be greater than 3 psi. 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. Program for Resolution

1. GE will review the possible suppression pool water levels and containment/drywell differential pressures over the period the compressors will be operated, in order to confirm that compressor purge discharge head will accomplish positive air flow through the drywell horizontal vents. The results of this review will be reported.

III. Schedule

Item 1 will be completed for submittal on July 22, 1983.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 47

I. Issues Addressed

Containment Pressure Response

7.3 The analysis assumes that the containment airspace is in thermal equilibrium with the suppression pool. In the short term this is non-conservative 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. Program for Resolution

1. The written response provided in MP&L's submitted AECM-82/237 letter concerning this issue is also applicable to GESSAR, and therefore GE believes this issue is closed.

Action Plan 48

I. Issues Addressed

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.

II. Program for Resolution

1. There are no gratings over the weir annulus in the GESSAR drywell design; therefore, GE believes this issue is not applicable.

GENERAL ELECTRIC -- GESSAR -- ACTION PLAN

Action Plan 49

I. Issues Addressed

21. 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 standby 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 assure that the shield annulus volume contains a hydrogen lean mixture of air to be admitted to the containment via containment vacuum breakers.

II. Program for Resolution

1. The GESSAR drywell purge hydrogen recombiner backup design will be reviewed to determine if any change is required to assure adequate reduction in containment hydrogen concentration occurs durings its operation. If a design change is found unnecessary, the applicable sections of GESSAR will be revised in accordance with GE's normal change control process.

III. Schedules

A report on the results of the above review will be completed for submittal on July 22, 1983.

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