Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

August 30, 1982

Mr. A. Schwencer, Chief
Licensing Branch #2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: LaSalle County Station Units 1 and 2
Concerns Regarding the Adequacy of the
Design Margins of the Mark I and II
Containment Systems
NRC Dockets Nos. 50-373 and 50-374

References (a): R. L. Tedesco letter to L. O. DelGeorge dated July 2, 1982.

(b): C. W. Schroeder letter to A. Schwencer dated July 9, 1982.

Dear Mr. Schwencer:

Reference (a) listed 22 concerns which Mr. John Humphrey had identified regarding Mark III Containments. It also asked that the licensee provide a schedule for responding to those concerns which were identified as being potentially applicable to LaSalle County Station. Reference (b) stated that Commonwealth Edison Company expected to respond to these concerns by September 1, 1982. The purpose of this letter is to provide our response to these concerns.

Several design features distinguish LaSalle from the basis of the concerns. First, LaSalle's peak containment pressure occurs early in a transient during steam blowdown to the suppression pool. This feature minimizes the concerns of long term containment temperature and pressure. Second, drywell and wetwell sprays do not affect heat removal capability of RHR because flows remain nearly constant regardless of RHR mode. Therefore, spray operation and mode cycling are not significant concerns. Finally, the equipment qualification environment in the wetwell is close to drywell conditions minimizing those concerns regarding environment.

With this transmittal, Commonwealth Edison considers our commitment in Reference (b) to be complete.

B001

Enclosed for your use are one (1) signed original and thirty-nine (39) copies of this letter and the attachment.

If there are any further questions in this matter, please contact this office.

Very truly yours,

CW Schroeder 8/31/82

C. W. Schroeder
Nuclear Licensing Administrator

lm

cc: NRC Resident Inspector - LSCS
M. D. Lynch, Proj. Manager

4901N

3. <u>ECCS Relief Valve Discharge Lines Below the Suppression Pool Level</u>

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 these relief valves.

Response:

Effects of RHR heat exchanger relief valve discharge into the suppression pool were considered in the design of LaSalle. However, the loads were predicted to be insignificant or bounded by other loads.

a. <u>Vent Clearing</u>

Relief valve lines discharge through ramshead devices ten feet below normal water level. Discharge through these ramsheads is directed horizontally along the containment wall. No piping or structures lie in the path of the ramshead discharge. Furthermore, no piping or supporting steel are within 7 vertical feet of these ramsheads except downcomers which are not in the path of discharging fluid. Hence, no significant external loads will result from clearing of these lines.

b. <u>Air Clearing</u>

The air discharge through the RHR discharge line produces an air bubble which loads components in the suppression close to the discharge exit. The maximum loading is on the pool boundary and is only 55% of the design basis load. The downcomers column and downcomer bracing was also examined and all of the loads were well below the design basis loads.

c. <u>Steam Condensation</u>

Steam condensation vibration phenomena can occur if high-pressure, high-temperature steam is continuously discharged into the pool at high-mass velocity through ramshead discharge devices, when the pool is at elevated temperatures. These steam quenching vibrations may result in loads on pool boundaries and submerged structures.

ASME rated capacity through the RHR relief valve is about 50 pounds/sec which is less than 20% of the capacity of each MSRV line. Due to the substantially lower steam flow in the RHR relief lines and administrative controls to prevent heat addition to the suppression pool such as this postulated scenario during high pool temperatures, loads resulting from such steam condensation phenomena are judged to be insignificant. The mass flux of the RHR discharge is approximately 150 $lbm/sec\text{-}ft^2$ and examining the condensation map in the DFFR, Revision 2, at the low pool temperature during this discharge, steam condensation is smooth and steady. This is the zone in which the discharge normally operates.

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

Response:

At low suppression pool levels approximately ten feet of submergence is provided for the RHR relief valve discharge lines (DAR Figures 1.1-3 and 1.1-4). This submergence will provide for ample mixing and complete condensation of effluent from the discharge lines.

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

Response:

We predict RHR relief valve discharge response amplitude and frequency content to be bounded by loads already in the LaSalle design basis. Several sets of test data for ramshead air discharges (e.g. Quad Cities and Monticello tests), show a linear dependency of bubble pressure (and therefore air bubble loads) with air volume or mass. RHR relief valve discharge lines represent small air volumes (typically 20-25%) as compared to MSRV discharge line air volumes. As a result the RHR bubble source strengths are expected to be 25% of the MSRV first actuation source strengths. The RHR source strengths are lower due to the reduced bubble pressure.

Consequently, submerged structure loads and pool boundary loads resulting from these RHR relief valve discharges are substantially less than for corresponding design basis loads. It has been found that RHR air bubble load magnitudes on such structures as adjacent downcomers, support columns, bracing pipes and pool walls are from 15-55% depending on proximity of the corresponding targets to the RHR discharge points of their corresponding design basis magnitudes for these targets. Hence, RHR air bubble loads are well within the previously considered design basis from the point of view of amplitude.

Frequency (f) of air bubble oscillation as a function of air mass (m) can be expressed as: $f \sim m^{-1/3}$

Since the RHR relief line air masses are the order of 25% of MSRV line air masses the above expression would predict RHR air bubble frequencies of about 1.6 times corresponding MSRV air bubble frequencies. Nominal MSRV air bubble frequencies are typically around 5-6 hertz. Therefore, RHR air bubble frequencies of near 8-9.6 hertz might be expected, which is within the 3.4 hertz to 9.9 hertz range considered in the design basis.

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.

Response:

Repeated actuation of RHR relief valves is highly unlikely. The nature of this event is such that the valve would lift and remain open until the heat exchanger was isolated or reactor pressure was reduced. The low probability notwithstanding the vacuum breaker valves are sized such that they will limit the amount of water being drawn back into the relief line after the relief valve closed. A maximum of approximately 2.0 feet of water is anticipated in the discharge line after the valve closes. The vertical height of the discharge line before the vacuum breaker valve is 4'-8". This height is sufficient to account for the reflood of water in the discharge line. The additional 2.0 feet during a subsequent actuation will not result more significant loads than those mentioned in the response to question 3.2.

3.5 N/A for Mark I and II Containments

Response:

The LaSalle plant does not have an upper pool dump capability.

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.

Response:

The discharge lines are submerged 10 feet below the suppression pool surface. The suppression pool is 26 feet deep and the discharge of any hot effluent into the suppression pool at the low submergence will provide for ample mixing and not cause stratification within the pool. During a LOCA, the RHR heat exchanger is not utilized in the steam condensing mode which negates any stratification in the pool. The steam condensing mode is only used during a controlled and normal operating condition. At this time, the RHR steam condensing mode is in use, the suppression pool is at its low normal operating temperature.

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 pool. (p. 132 of 5/27/82 transcript)

Response:

Other than main steam SRV and RHR heat exchanger relief valves, only the RCIC turbine exhaust line may discharge steam into the suppression pool. The exhaust line has a diameter of 10 inches and is submerged 10 feet below the suppression pool low water level. This discharge is a very low energy discharge and is estimated not to cause appreciable loads or stratification in the pool. The maximum operating condition of the discharge line is saturated steam at 10 psig (1160.7 Btu/lbm) at a rate of 7.8 lbm/sec. This rate is approximately 3% of the capacity of each MSRV line. The MSRV discharge loads bounds the RCIC turbine discharge.

All of the other discharge lines other than the MSRV only discharge water well below the water surface.

4. Suppression Pool Temperature Stratification

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. (1)*

Response:

The downcomers are raised 6 inches above the drywell floor (FSAR Figure 3.8-3) so the amount of water that would be trapped on the drywell floor is equal to 2% of the minimum suppression pool volume. If the temperature of the suppression pool was raised from its initial value of 100°F to its upper limit of approximately 200°F, an additional rise of 2°F would be expected. The case of a pipe break inside containment is not the worst case for containment temperature response and an increased final temperature for this case is not significant.

*see footnotes on page 18

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. (2)

Response:

No credit is taken for formation of a pool of water on the drywell floor at LaSalle. If a pool is formed, the effect is negligible.

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 temperatu.e in the lower part of the pool where the suction is located will be as much as 7 1/2° cooler than the bulk pool temperature. Thus, the heat-transfer through the RHR heat exchanger will be less than expected.

Response:

A lower heat exchanger inlet temperature will reduce the heat removal rate, however the effects of this are negligible. Stratification effects are discussed elsewhere in this response; high pool temperature is a concern related to steam condensation stability. Unstable steam condensation can be observed at high pool temperatures above 200°F and 210°F (depending on mass flux) during SRV discharges. The postulated 7 1/2°F difference between RHR suction and bulk pool temperature will abate the steam condensation concern it creates. LaSalle DAR Chapter 6 provides pool temperature response data. In the worst case, isolation/scram - loss of 1 RHR loop, the peak pool temperature was conservatively predicted to be 187°F. This peak temperature was predicted to occur late in the event when the maximum bulk pool temperature limit is 210°F. If the 187°F were translated up 7°F to 194°F, safety limits are not exceeded.

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

Response:

The submergence of all the discharge piping into the suppression pool is of such depth to provide for ample mixing. This will provide for uniform suppression pool temperature. In addition the maximum wetwell air space pressure is governed by short term effect of a DBA. The effect of slightly higher long term pressure is insignificant.

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. (3)

Response:

Although LaSalle's RHR suction and discharge are in the bottom half of the pool, we expected adequate mixing because of their opposing locations. During the operation of the wetwell spray to cool the wetwell air space, full flow through the RHR heat exchanger is utilized. The excess flow not required for spray operation is diverted into the suppression pool providing an effluent discharge jet which contributes to mixing. No other LaSalle design features contribute to pool statification.

4.6 The initial suppression pool temperature is assumed to be 95^{0}F while the maximum expected service water temperature is 90^{0}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 maximum permissible value.

Response:

We are confident that the occurrence of maximum service water temperature is a short term event and regular RHR pool cooling will not be required for station operation. LaSalle service water comes from the cooling lake which is similar to other Commonwealth Edison cooling lakes. Peak temperatures have been observed to be of short duration. Nevertheless, the RHR heat exchangers and pumps are designed for long term continuous operation should it be required to maintain low suppression pool temperatures.

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.

Response:

No adverse interactions of the RHR suppression pool suction and discharge effect conclusions of the generic pool temperature analyses. The suction and discharge for both RHR trains are located approximately 130^{0} apart for RHR train A and 70^{0} apart for RHR train B at a radius of approximately 40 feet. Discharge velocity is near 4 feet per second. This is a sufficient distance between the suction and discharge and discharge velocity to provide for ample mixing.

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.

Response:

Because of near constant flow rates through the RHR heat exchanger regardless of mode, operation of RHR in the containment spray mode will not adversely affect the heat removal rate of RHR. When the drywell spray is initiated, the flow through the RHR heat exchanger is approximately equal to its normal flow. This will not decrease the heat transfer coefficient drastically. The slightly reduced flow will provide for additional cooling of the spray water. During the wetwell spray operation, full flow is utilized through the RHR heat exchanger. The flow not required for the wetwell spray is diverted back into the suppression pool. During this mode of operation the heat transfer coefficient is not reduced.

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 to maximum 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.

Response:

The two modes of RHR (pool cooling and wetwell spray) run concurrently by procedure at LaSalle. This practice has been observed to minimize stratification and mode switching effects.

4.10 Justify that the current arrangement of the discharge and suction points of the pool cooling system maximizes pool mixing.

Response:

Maximization of system performance has never been a design criteria for LaSalle's RHR. Design adequacy is met by maximizing distances between suctions and discharges and sufficient discharge velocity to allow thermal mixing.

5. Drywell to Containment Bypass Leakage

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.

Response:

Although an intermediate break may produce a greater amount of leakage, the effects of bypass leakage were found most severe for a small break. FSAR Section 6.2.1.1.5 describes the effects of suppression pool bypass on containment pressure. The most limiting conditions for bypass leakage are those primary break sizes which do not cause rapid reactor depressurization. This corresponds to breaks of less than approximately 0.4 ft^2. FSAR Figure 6.2-14 show the allowable leakage capacity as a function of primary system break area.

5.2 Under Technical Specification limits, bypass leakage corresponding to $A/\sqrt{K}$ = 0.1 ft^2 constitutes acceptable operating conditions. Smaller-than-IBA-sized breaks can maintain break flow into the drywell for long time periods, however, because of the RPV would be depressurized over a 6 hour period. Given, for example, an SBA with $A/\sqrt{K}$ = 0.1, project time period for containment pressure to reach 15 psig is 2 hours. In the latter 4 hours of the depressurization the containment would presumably experience ever-increasing overpressurization. (4)

Response:

Allowable steam bypass leakage capacity for all break sizes is provided in FSAR Figure 6.2-14. Using conservative assumptions, containment pressurization predictions are made in FSAR 6.2.1.1.5 showing ample time for operator action to mitigate bypass leakage consequences.

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

Response:

The response to item 4.8 established that there is no decreased effectiveness of the RHR system during operation of the wetwell spray mode and the response to item 4.9 described concurrent operation of pool cooling and spray modes. LaSalle's RHR will not experience any adverse cycling effects from bypass leakage.

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. (5)

Response:

LaSalle containment is inerted, therefore the described phenomenon is not an issue.

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.

Response:

There is no equipment in the wetwell which could be affected by bypass leakage. Also, the design conditions for the drywell and wetwell for LaSalle are more comparable than those for a Mark III design.

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.

Response:

An alarm will alert the reactor operator of a high drywell temperature. If the drywell air temperature exceeds 135°F the operator is instructed to reduce it to within the limit or proceed to a hot and then cold shutdown.

Bypass leakage as described above would delay the containment pressurization on the order of seconds because of a slightly greater volume (386,600 ft^3 vs. 221,500 ft^3) if the wetwell air space is included. The delay notwithstanding, operator guidance is provided to limit containment temperature. No adverse high temperature effects due to bypass leakage are predicted.

6. <u>RHR Permissive on Containment Spray</u>

6.1 We understand that GE has recommended for Mark III containments that the combustible gas control systems be activated if the reactor vessel water level drops to within one foot of the top of the active fuel. Indicate what your facility is doing in regard to this recommendation.

Response:

This is not applicable to the LaSalle plant. The LaSalle containment is inerted. This recommendation was not made to LaSalle.

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 operate the recombiners without containment spray. (5)

Response:

There is no interlock between the wetwell spray and the recombiner.

6.3 The recombiners may produce "hot space" near the recombiner exhausts which might exceed the environmental qualification envelope or the containment design temperature. (5)

Response:

The LaSalle containment is inerted and it is not expected that the recombiner will be used. However, if the recombiner is operated its exhaust will be cooled to below 250°F prior to its release to the wetwell. There is no equipment present in the wetwell which could be affected by the recombiner exhaust. The wetwell air space is a large open area which provides for ample mixing.

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

Response:

The analyzers used for the air monitoring system are kept at a temperature of 300°F. This precludes any condensation of steam in the equipment.

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

Response:

The recombiners are not located in the containment. They are located in the reactor building and the heat produced by their operation is such that the temperature produced from the heat released is below the environmental temperature envelope.

7. <u>Containment Pressure Response</u>

7.1 The wetwell 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.

Response:

The peak containment pressure and temperature occurs briefly within the first 20 seconds of a DBA. During this time there is a large amount of mixing in the wetwell and the ability of the pool to stratify is very small. The peak containment pressure and temperature will not increase due to ample mixing and the short duration when the peak conditions occur. The minimal long term effects of slightly higher temperatures and pressures can be mitigated by wetwell spray.

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 environment qualification. Additionally, the bulk suppression pool temperature was used in the analysis instead of the suppression pool surface temperature. (6)

Response:

The environmental parameters for the wetwell are described in FSAR Appendix M, Section M.4.1.1. The wetwell conditions are based on the long-term bases, rather than in the first few moments following a LOCA. Only the suppression pool, uniformly mixed, was considered in the analyses and it was assumed that the wetwell air space would be equal to the bulk suppression pool temperature. The envelope was conservatively determined based on the above and is shown in Table M.4-3. The heat transfer from suppression pool to atmosphere is inconsequential because there is no equipment in the wetwell air space.

7.3 The analysis assumes that the wetwell air space 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. (6)

Response:

During pool swell, isentropic compression is assumed for the wetwell air space. No heat or mass transfer is considered between the suppression pool and the wetwell air space. The pool swell analysis is performed to determine the maximum pool swell height to maximize the pool swell load and is not used to determine environmental parameters. Since the pool swell transient is of short duration, approximately two seconds, it is judged that the heat and mass transfer effects will be small and will not affect the pool swell transient. The determination of the environmental parameters and reasons why this is inconsequential are given in the response to question 7.2.

8. Containment Air Mass Effects

8.1 This issue is based on consideration that some Tech Specs allow operation at parameters 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. Tech Specs limit 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.

Response:

Model conservatisms and a bounding design basis justify Tech Specs that allow operation at conditions different from values used in the FSAR containment transient analyses. Maximum drywell temperature (135°F) to maximize peak drywell temperature and expected containment pressure (0 psig) were used as initial conditions.

Conservatisms in analytic models used in transient analyses understate design margin. Although it is reasonable not to always use bounding values, the effect of bounding values would be minimized if a less conservative model were used that did not understate design margin.

The results of conservative calculations predict containment pressure and temperature below the design basis so that any small increase in the predictions would not change the conclusion of design adequacy.

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.

Response:

The LaSalle plant technical specificiations permit operation of the plant with the containment pressure ranging between -0.5 and 2 psig. The initiation of the containment spray at a pressure of -0.5 psig will reduce the containment pressure to approximately -3.7 psig (see response to FSAR Question 021.45 where the initial conditions of the drywell and wetwell were -0.75 psig). The containment liner plate is designed to a pressure of -5 psig as shown in FSAR Table 3.8-11, Page 3.8-76. The design will take into account the effect of the containment spray actuation.

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. (7)

Response:

Not applicable to Mark II plants.

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.

Response:

During normal operation, automatic controls provide an inerted atmosphere in both drywell and wetwell. During accident conditions, calculations predict containment pressure response due to spray actuation (see response to 8.2). Only one scenario provides possibility of creating conditions mentioned above-venting containment without allowing purging air in. This is done only under iminent containment failure past the point of containment buckling concerns.

9. Final Drywell Air Mass

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. Since the operator is directed to throttle ECCS operation to maintain the reactor vessel water level to about the level of the steam lines, the break will be releasing saturated steam instead of releasing relatively cool ECCS water. Therefore, the drywell air which would have been purged and then drawn back into the drywell, will remain in the wetwell and higher pressures than anticipated will result in both the wetwell and the drywell.

Response:

The maximum containment pressure is controlled by a recirculation line break, all drywell atmosphere is assumed blown down to the wetwell. The pressure peaks in the short term while mass is still flowing through the downcomers. The effect of slowly blowing down the drywell atmosphere to the wetwell is clearly bounded by the recirc line break.

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

Response:

In the event that the wetwell pressure will increase due to direct leakage from the drywell during ECCS throttling, the EPG's indicate at what conditions the wetwell spray should be initiated. The RHR wetwell spray mode can mitigate the effects of prolonged leakage into the drywell having no effect or suppression pool cooling.

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.

Response:

The SBA is treated as a design basis accident (FSAR Section 6.2.1.1.3.1.4) and stuck open SRV accidents are treated as transients (FSAR Section 15.6.1). The SBA and stuck open SRV accident utilize licensing initial conditions.

11. Operational Control of Drywell to Containment Differential Pressures

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. (8)

Response:

Tech Specs limit operation under conditions of wetwell pressure greater than drywell pressure over 0.5 psi. The small increase in vent water level will not cause significant changes in predicted loads.

14. RHR Backflow Through Containment Spray

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 spray.

Response:

The failure of the check valve in the LPCI line will not result in direct leakage from the pressure vessel to the containment atmosphere through the containment spray header. There are two motor operated isolation valves in series in the containment spray line. An interlock is provided between these valves and the LPCI motor operated isolation valve. The containment spray line isolation valves can not begin to open unless the LPCI isolation valve is fully closed. This precludes any flow into the spray line due to a check valve failure in the LPCI line.

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.

Response:

There are no vacuum breaker valves between containment and the secondary containment (reactor building).

16. Effect of Suppression Pool Level on Temperature Measurement

Some of the suppression pool temperature sensors are located (by GE recommendation) 3" to 12" below the pool surface to provde 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.

Response:

When the suppression pool water level reaches 2.0 inches below the minimum water level, an alarm sounds. At this time the operator must take action to shutdown the reactor or restore water level to the minimum of 2.0 inches below the minimum water level. The pool temperature sensors are located approximately 1.0 feet below the minimum suppression pool level and, therefore, the sensors are submerged under all operating conditions.

17. Emergency Procedure Guidelines

The EPGs contain a curve which 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. (9)

Response:

LaSalle Power Plant has no upper pool that could be dumped into the suppression pool. If, however, the suppression pool water level rises, at a given reactor pressure, above the suppression pool load limit for whatever reason, the operator is instructed, to restore and maintain the water level below the suppression pool load limit or, if that cannot be done, to maintain the reactor pressure below the limit.

18. Effects of Insulation Debris (10)

18.1 Failure 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 definition.

Response:

The existing load definitions will not be changed due to the effect of insulation blockage of downcomers. The downcomers are equipped with caps and it is not believed that blockage of the downcomers or the extensive gratings above the downcomer can occur.

The controlling parameter in containment pressurization during a blowdown is the loss coefficient of the downcomer vent deflection shield. The area of the grate above the vents is greater than ten times the vent area. Any plausible restriction due to insulation blockage is clearly insignificant in the flow pressure drop from drywell to wetwell.

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.

Response:

LaSalle drywell piping insulation is stainless steel casing with thin rigid stainless steel spacers. Its strength is expected not to allow creation of many small pieces which would be transported into the suppression pool. Further strainer design allows system operation with 50% blockage.

21. Containment Makeup Air for Backup Purge

Regulation 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. For Mark I and II facilities, discuss the possibility of purge exhaust being mixed with the intake air which replenishes the containment air mass.

Response:

Primary containment makeup is from the nitrogen inerting system or the secondary containment. The primary containment purge exhaust is through the standby gas treatment system to the vent stack. The purge exhaust, therefore, cannot be mixed with the primary containment makeup.

22. Miscellaneous Emergency Procedure Guideline Concerns

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 EPG's to assure that they do not conflict with the expected course of the design basis accident.

Response:

The EPG is prepared to handle all accident conditions and therefore are symptom based. The guidelines were reviewed by GE owners' representative and the NRC.

1926L*

TABLE OF FOOTNOTES APPLICABLE TO

MARK I AND MARK II CONTAINMENTS

Footnote	Comment
1	This concern is related to the trapping of water in the drywell.
2	This issue applies only to those facilities for which EPG's are in effect.
3	For Mark I and II facilities, confine your response on this issue to those concerns which can lead to pool stratification (e.g., operation of the containment spray).
4	For Mark I and II facilities, refer to Appendix I to Section 6.2.1.1c of the Standard Review Plan (SRP).
5	This concern applies to those facilities at which hydrogen recombiners can be used.
6	This issue as phrased applies only to a Mark III facility. However, the concern can be generalized and applied to the earlier containment types. For Mark I and II facilities, indicate what methodology was used to calculate the environmental qualification parameters including a discussion of heat transfer between the atmosphere in the wetwell and the suppression pool.
7	Not applicable to Mark II facilities.
8	For Mark I and II facilities, consider the water in the downcomers.
9	This issue as phrased applies only to a Mark III facility. However, the concern can be generalized. Accordingly, discuss what actions the reactor operator would take in the event that the limitations on the suppression pool level and the pressure in the reactor vessel are violated.
10	This issue as phrased applies only to a Mark III facility. However, the concern can be generalized. Accordingly, discuss how the effects of insulation debris could perturb existing load definitions or could block suction strainers. In responding to this issue, you may refer to existing generic studies; e.g., the study done for the Cooper facility.