DCS-016

Docket No. 50-461

SEP 22 1982

Mr. George Wuller
Supervisor - Licensing
Illinois Power Company
500 South 27th Street
Decatur, Illinois 62525

Dear Mr. Wuller:

Subject: Questions Relating to Degraded Core Hydrogen Control and the Emergency Plan Dose Assessment Reporting System

Your letter of July 22, 1982 provided information related to meteorological measurements systems, data acquistion and an assessment scheme for the Emergency Plan. The following areas require additional clarification in order to assess the adequacy of the program.

810.57 The dose assessment systems that will be utilized at Clinton are intended to satisfy the Class A transport and diffusion concepts throughout the Plume Exposure EPZ. In lieu of a Class B model, the Class A technique will be extended to the boundary of the Ingestion EPZ. Please provide the technical basis of the dose calculations methodology that will utilize real-time meteorological information and a Class A transport and diffusion model (as described in NUREG-0654, Appendix 2) to assess the impact of air-borne releases in the event of a radiological emergency conditions.

810.58 Illinois Power indicated in the July 22, 1982 letter that the values of the meteorological measurements will be available in the Control Room and other facilities (TSC, EOF) from primary and backup towers. In Amendment 16 to the FSAR, Section 10.2.2.8, Illinois Power outlined their intention to rely on backup meteorological information from data sources outside of their control. Please clearly identify and describe the meteorological measurement methods, systems, an equipment that are utilized to assess the transport and diffusion characteristics of air-borne releases. Identify the measures that will be taken to assure the availability of the basic meteorological information characteristic of the site in the event the primary system is unavailable and provide assurance that the relationship between any backup or alternate data source and primary system has been evaluated.

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810.59 As part of the communication system that would assure rapid and continuous transfer of meteorological and radiological data to appropriate offsite groups, a remote interrogration system, as describe in Appendix 2 to NUREG-0654, is necessary to achieve this objectives. Please identify the means for remote interrogation of systems that provide meteorological data and effluent transport and diffusion estimates.

The staff has reviewed the information submitted in your letter of October 16, 1981 regarding hydrogen control. In view of the more recent HCOG and Grand Gulf information, and the informal discussions with your staff on changes in the submitted information, please provide responses to the enclosed questions.

Please provide a schedule for responding to these questions within two weeks of receipt of this letter. If you have any questions, please call J. H. Williams at (301) 492-9777.

Sincerely,

Cecil O. Thomas, Acting Chief
Standardization and Special
Projects Branch
Division of Licensing

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REQUEST FOR ADDITIONAL INFORMATION FOR USE IN THE INTERIM EVALUATION OF THE HYDROGEN IGNITION SYSTEM FOR MARK III CONTAINMENTS.

1. Provide a detailed description of the Hydrogen Ignition System (HIS) and its power supplies; include the total number of igniters, the number of circuit breakers, and a simplified electrical system schematic showing all the above stated items and any other major component.

2. Provide the following igniter information:
   a) Vendor;
   b) Model;
   c) Qualification Program; and
   d) Design Criteria.

3. Provide a detailed description of the preoperational surveillance and periodic testing programs of the HIS.

   a) How will the system be tested? Specifically, what indicates that a particular igniter is or is not functioning properly?

   b) Specify the frequency of testing.

   c) Are hydrogen detectors to be used as part of the HIS? If so, please specify the types of detectors, number, location of sampling ports, system response time, and testing format and frequency.

4. Describe the glow plug igniter selection program; i.e., how will actual igniters be selected for installation in the assemblies.

5. Please provide construction drawings for several "typical" igniter mounts in the wetwell and containment regions. Also, provide a

complete list of the approximate elevation,azimuthal and radial coordinates for each igniter in containment, and the corresponding elevation coordinate of the nearest ceiling (include the make-up of the nearest ceiling, i.e., open, solid, grated). Indicate whether all enclosed regions of the containment are served by redundant igniters.

6. For each floor within the containment annular region and the drywell, please provide information on the cross-sectional flow area and identify the various areas as gratings, solid regions, or equipment blockage.

7. Discuss the design adequacy of the igniter assembly to withstand pool swell events and the drywell negative pressure response.

8. Please provide full size (Size E) sectional drawings of the containment and identify the location of each igniter, it's electrical division, and location of vacuum breaker lines and purge compressor lines.

9. Discuss the consideration of local impingement of break spray on the igniter assembly.

10. Evaluate whether the sheet-flow into the wetwell impinges on any igniter.

11. Discuss the effect of submergence on igniter performance. For those igniters which will continue to be necessary, describe the testing which will be performed to assure igniter performance before, during and after being subjected to submergence conditions.

12. Considering the actuation criteria of safety systems including operator action:

a) nder what conditions are the sprays activated?

b) How long after the sprays are actuated does the spray system attain full flow rate?

c) When during an emergency situation would the HIS be activated?

d) Wh role, if any, would the hydrogen recombiner play with respect to the HIS?

e) What are the emergency procedure criteria for post accident containment purge/vent?

13. Regarding the containment atmosphere mixing mechanisms:

a) Describe the flow rate of the ventilation system in the containment/wetwell regions.

b) What are the elevations and radial positions of the spray rings?

c) Which spray ring operates when a single RHR loop is operating and what is the flowrate under such conditions? Does the spray water contain chemical additives?

d) Describe any sprays, fans or other systems that could move air in the annular wetwell region and estimate the air velocities in the region due to these systems.

14. Briefly explain the workings of the "drywell purge system" incluo g purge compressors and vacuum breakers. Estimate flowrates from the system during an accident. Describe the operation of the Combustible Gas Control System (CGCS) during hydrogen burns (including a discussion of the logic for the purge compressors and vacuum breakers).

15. In Mark III containments, the sprays are not made up of dedicated components but share pumps with other subsystems intended to deliver water cool to the core. A basic postulate of degraded core accidents is that cooling water to the core is unavailable (e.g., cooling pumps unavailable). It appears inconsistent to assume that components of a core cooling system would be available to provide containment spray flow. Therefore, provide justification for the assumption that sprays are available.

16. The discussion heretofore provided to justify the applicability of the HCOG CLASIX-3 sensitivity study for the Clinton plant is insufficient. Therefore, provide the following plant-specific CLASIX-3 containment transient analysis*:

(1) SORV Base Case Transient;

(2) Small Break LOCA Base Case;

(3) Small Break LOCA with a burn criterion of 10% hydrogen concentration and 100% complete combustion in the containment assuming a minimum oxygen concentration of 6.5% in the drywell; and

(4) Small Break LOCA with a burn criterion of 10% hydrogen concentration, 100% completeness and a flame speed of 12 fps.

*Note: If spray availability is questionable, do not consider them in the containment analysis. [Even though the HCOG sensitivity study (HGN-001, Jan., 1982) presents a "no spray" SORV case in which the compartment pressures are relatively low with respect to the SORV base case. This is so, since the containment oxygen concentration is slightly below the five percent molar concentration criterion, which results in the absence of a containment burn. However, if the transient is extended in time, the oxygen concentration would exceed five percent and trigger a containment burn. Hence, the "no-spray" SORV case may be more severe than the SORV base case with respect to peak temperatures and pressures.] If credit is taken for spray availability provide and justify the following inputs to the CLASIX-3 analysis:

(1) flowrates per spray train;
(2) number of spray trains to be used;
(3) containment to wetwell carry-over fraction;
(4) percentage of carry-over which is in droplet form and sheet-flow;
(5) droplet mass mean diameter;
(6) drop efficiency; and
(7) sheet-flow efficiency.

17. Identify the most severe pool dynamic load conditions in the wetwell when considering the effect of hydrogen combustion in the drywell. Discuss the effects of the pool dynamic loads on the containment structures and the essential equipment within the zone of influence. Also, evaluate in a similar manner the most severe drywell negative differential pressure transient and the pool dynamic loads created within the drywell.

18. Are there any accident sequences that might lead to the introduction of hydrogen and steam directly into the containment without having passed through the suppression pool?

19. Provide an evaluation of the potential and consequences of flame acceleration in the various containment regions including consideration of circumstances leading to transition to detonation.

20. Provide an analysis of the concomitant effects of the largest conceivable containment detonation which could occur. Demonstrate that the effects of such an event could be safely accommodated by structures and essential equipment. Also, provide an estimate of the limiting size of a cloud of detonable gas with regard to the structural capability of the containment shell and the drywell.