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P. A. Morris, Director
Division of Reactor Licensing

QUESTIONS RELATING TO INSTRUMENTATION, CONTROL AND EMERGENCY POWER; INDIAN POINT NUCLEAR GENERATING UNIT NO. 3; DOCKET NO. 50-286.

Please include the attached questions among those in preparation for transmittal to the applicant.

Original Signed By
E. G. Case

Edson G. Case, Director
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ESB-56
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Questions

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DATE ▶	6/16/71	6/16/71	6/ /71			

QUESTIONS ON PROTECTION AND CONTROL SYSTEMS

(For transmittal to the applicant if the areas of concern are not adequately covered in the FSAR)

1. With regard to the protection systems which actuate reactor trip and engineered safety feature action, the following information should be provided:
   a. A list of those systems designed and built by Westinghouse that are identical to those of the Indian Point Nuclear Generating Unit No. 2 (as documented in the Unit 2 FSAR) and a list of those that are different, with a discussion of the design differences;
   b. A list of those systems and their suppliers that are designed and/or built by suppliers other than Westinghouse; and
   c. Identification of those features of the design which do not conform to the criteria of IEEE 279 and the Commission's proposed General Design Criteria and an explanation of the reasons for these.

2. With regard to the control systems designed by Westinghouse the following information should be provided:
   a. Identification of the major plant control systems (e.g., primary temperature control, primary water level control, steam generator water level control) which are identical to those in Unit No. 2; and

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b. A list and a discussion of the design differences in those systems not identical to those used in Unit No. 2. This discussion should include an evaluation of the safety significance of each design difference.

3. State the seismic design criteria for the reactor protection system, engineered safety feature circuits, and the emergency power system. The criteria should address: (1) the capability to initiate a protective action during the design basis earthquake, and (2) the capability of the engineered safety feature circuits to withstand seismic disturbances during post-accident operation. Describe the qualification testing requirements which will be used to assure that the criteria are satisfied and how these requirements will be imposed on equipment suppliers.

4. Describe the quality assurance procedures which apply to the equipment in the reactor protection system, engineered safety feature circuits, and the emergency electric power system. This description should include the quality assurance procedures used during equipment fabrication, shipment, field storage, field installation, and system component checkout, and the records pertaining to each of these.

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5. Submit the criteria and their bases which establish the minimum requirements for preserving the independence of redundant reactor protection systems, engineered safety feature systems and Class IE* electrical systems through physical arrangement and separation and assure minimum availability during any *design basis event. The submittal should include a discussion of the administrative responsibility and control to be provided to assure compliance with these criteria during the design and installation of these systems. The criteria and bases for the installation of electrical cable for these systems should, as a minimum, address:

   a. Physical separation among redundant cables routed in containment, penetration areas, cable spreading rooms, control rooms and other congested or hostile areas.

   b. Spacing of wiring and components in control boards, panels, and relay racks.

   c. Circuit overload protection (single phase and three phase).

6.** For electrical and mechanical equipment of the reactor protection system and engineered safety features located in the primary containment or elsewhere in the plant, state the design criteria which take into account the potential effects on these components of

* Class IE electrical systems and design basis events are defined in the Proposed IEEE Criteria for Class IE Electrical Systems for Nuclear Power Generating Stations (IEEE-308).

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radiation resulting from both normal operation and accident conditions superimposed on long-term normal operation. Describe the analysis and testing performed to verify compliance with these design criteria.

7.** Identify all safety related equipment and components (e.g., motors, cables, filters, pump seals) located in the primary containment which are required to be operable during and subsequent to a loss of coolant accident or a steamline break accident. Describe the qualification tests which have been or will be performed on each of these items to assure their performance in a combined high temperature, pressure, and humidity environment.

8. State the criteria which have been established to assure that loss of the air conditioning and/or ventilation system will not adversely affect the operability of safety related control and electrical equipment located in the control room and other equipment rooms. Describe the analysis performed to identify the worst case environment (e.g., temperature, humidity). State the limiting condition with regard to temperature that would require reactor shutdown, and how this was determined. Describe any testing (factory and/or onsite) which has been or will be performed to confirm satisfactory operability of control and electrical equipment under extreme environmental conditions.

** These questions relate to the engineered safety feature chapter of the SAR and should be forwarded to the applicant with other questions concerning that chapter.

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9. Describe how reactor protection system and engineered safety equipment will be identified physically as safety related equipment in the plant to assure appropriate treatment, particularly during maintenance and testing operations. Also, describe your identification scheme for distinguishing between redundant channels of the above mentioned systems.

10. a. Describe the method for periodic testing of engineered safety feature instrumentation and control equipment. We interpret IEEE 279 to require the same high degree of on-line testability for engineered safety feature actuation as is required for the reactor trip system.

    b. Can both ESF logic trains be concurrently bypassed by placing them in the test mode?

11. Provide a description of the instrumentation systems included in your design for remote monitoring of post-accident conditions within the primary containment. Provide an analysis to show that these systems provide appropriate wide range information for the full spectrum of postulated accidents.

12. Can both reactor trip bypass breakers be concurrently closed?

13. Are there four annunciator drops in the control room to indicate, respectively, the opening of the protection system instrument cabinet doors (for test purposes)?

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several of which apparently could be eliminated without violating the provisions of IEEE-308 or -279. Please describe any circuit modifications you may wish to make in this regard or submit justification for retaining the existing design.

3. Submit the result of your grid stability analyses showing the effect on the grid of the sudden loss of (a) Unit No. 3, and (b) the largest unit on the grid. (Assume the losses are not concurrent).

4. In terms of protection system criteria what are the design bases for the diesel fuel oil transfer system?

5. Describe the monitoring system which indicates to the operator the loss of a battery charger (or chargers).

6. What indicates to the operator that one (or more) diesel generators has (have) been disabled for test or maintenance purposes?

7. We understand that a single exhause fan serves to ventilate both battery rooms. Justify this design in terms of (a) hydrogen build-up time (worst case conditions) and (b) the surveillance of roving operators, or propose an alternate redundant design powered from the emergency buses.

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14. In terms of protection system criteria, what are your design bases for the post-accident instrumentation which guides the operator in switching (manually) ffom the injection to the recirculation mode. What are your design bases for the control circuits for the associated valves, pumps, etc?

15. In the event of an accident, a timer in each logic train is used to delay hot leg injection. Provide an analysis of the failure of either timer resulting in immediate hot leg injection. Discuss the consequences of such a failure.

16. Are the circuits which prevent valves from being opened such that low pressure piping is subjected to high pressure fluids designed in accordance with protection system criteria?

17. Is the Emergency Feedwater system an engineered safety feature?

QUESTIONS ON EMERGENCY POWER SYSTEM

1. What are the 2000 hour and 2 hour ratings of the diesel generators?

2. Safety Guide 6 recommends against the use of automatic transfer circuits (swing buses) between redundant buses. We have observed that there are several swing buses in your d.c. system,

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8. Justify your 80 hour, as opposed to seven-day, onsite diesel fuel supply.

9. Is the ventilation system for the cable tunnels powered from the emergency buses? Provide a basis for your answer.

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