POOR ORIGINAL

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METROPOLITAN EDISON, THREE MILE ISLAND STATION, UNIT #1; QUESTIONS RELATING TO INSTRUMENTATION, CONTROLS, AND POWER; DOCKET #50-289

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Please include the following questions among those in preparation for transmittal to the applicant:

1. Does the design of your protection system conflict in any way with the proposed IEEE Standard for Nuclear Power Plant Protection Systems? If so, please state reasons justifying your position.

2. (a) Please list all electrical components (cabling included) located within containment whose operation during the design basis accident (DBA) is required for the proper functioning of the engineered safety features.

   (b) Throughout what time intervals must each component operate?

   (c) What tests will be performed to ensure that these components can, in fact, withstand the postulated accident environment and perform as required?

3. The "trip" bus feeding the rod release mechanisms cannot, in our judgment, be disabled by any single fault. However, inasmuch as one can postulate several "first faults" (e.g., the connection of the positive side of a d.c. source to the bus) whose existence cannot be detected during routine testing, the bus is therefore vulnerable to the adverse effects of the first detectable fault. Thus, the design does not conform to the single failure criterion. Accordingly, please discuss any changes you may make to remove this vulnerability.

4. The protection system is required, under some circumstances, to take action in response to coolant pump-monitor operation. Is there sufficient margin in the protection system design to allow for single failures within the monitors which give rise to false indication of pump operation?

5. Identify the sources of power to:

   (a) Coils of trip circuit breakers in reactor protection system.
   (b) Rod drive clutch power supplies.

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6. Explain the purpose of separate dual logic channels for reactor building spray pumps and valves.

7. Discuss the significance of the alarm function of the incore instrumentation system. What are the consequences of its failure?

8. Discuss your criteria for the design of those sub-systems which control the operation of load-shedding and load-connecting circuit breakers under DBA conditions.

9. To what extent are your engineered safety feature systems vulnerable to an accidental reversal of a three-phase voltage supply? What precautions will be taken to prevent such an occurrence?

10. Please describe the proposed 250/125 vdc system. In addition, please provide answers to the following:

    (a) What is the capacity of each battery and battery charger?
    (b) What are the emergency loads in each d.c. bus section?
    (c) Will each battery be capable of carrying full emergency load?
    (d) What tests are to be performed on the batteries and what are the test frequencies?

11. (a) What is the rating of each diesel generator unit?
    (b) Assuming a failed generator, what margin does this represent in terms of power requirements for minimum engineered safety feature operation?

12. Discuss the independence of the diesel generator units with respect to:

    (a) Physical separation
    (b) Starting systems
    (c) Lubrication systems
    (d) Fuel supplies, fuel pumps
    (e) Cooling systems
    (f) Control signals
    (g) Fire protection

13. Assuming a total loss of external power coincident with a design basis accident, please perform a failure analysis to show that no single failure can prevent the actuation of sufficient engineered safety feature devices. Postulated failures should include, but not necessarily be limited to:

    (a) Short circuit
    (b) Open circuit
    (c) Failed diesel generator

(d) Failed engineered safety feature device
(e) Malfunctioning circuit breaker (load-shedding or connecting)
(f) Loss of one battery
(g) Faulted undervoltage monitor (at emergency bus)

14. Discuss why it is not necessary for radiation monitoring system to provide isolation or interlock function in the plant and gas discharge lines.

15. Describe the system which automatically drains wastes to the waste batch tank when they are sufficiently concentrated? What means are used to determine concentration of wastes? What are the consequences of failure of the automatic system?

16. Please provide justification for your assumption that gases are released at a low control rate in the event of a waste gas tank leak when the tank pressure can be as high as 100 psi.

17. Provide Radiation Monitoring System schematics which indicate location, equipment type, power sources, and interlock functions, if any. The schematics should show the relationship of the area, waste and gas disposal, ventilation, and site monitoring systems. These schematics should be accompanied by adequate description. Also, if possible, the radiation monitoring equipment characteristics such as range, sensitivity, type of sensor, sensor energy dependence, sampling rate, calibration, etc., should be given.

18. Discuss how the DBA dose calculations relate to the radiation monitoring system design.

19. Discuss what actions are initiated upon receipt of a high radiation alarm.

20. Discuss the reason for not monitoring or filtering the turbine building exhaust.

21. Describe the operation of the control room heating and ventilation systems during normal and emergency operations.

cc: S. Levine
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