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March 9, 1984

United States Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Mr. George W. Knighton, Chief
Licensing Branch 3
Office of Nuclear Reactor Regulation

SUBJECT: Beaver Valley Power Station - Unit 2
Docket No. 50-412
ICSB Meeting Minutes

Gentlemen:

Your letter of September 19, 1983, forwarded "Safety Review Requests for Additional Information" from the Instrumentation and Control Systems Branch (ICSB). Duquesne Light Company (DLC) met with the ICSB on December 5-8, 1983, to discuss their questions contained in your letter. The enclosed minutes of that meeting were prepared by DLC and have been reviewed by the ICSB reviewer. Those items listed as "closed" are understood to be closed only in the sense that the information requested by the ICSB reviewer has been provided.

DUQUESNE LIGHT COMPANY

By R. J. Washabaugh for E. J. Woolever
E. J. Woolever
Vice President

KAT/wjs
Attachment

cc: Mr. H. R. Denton, Director NRR (w/a)
Mr. D. Eisenhut, Director Division of Licensing (w/a)
Mr. G. Walton, NRC Resident Inspector (w/a)
Ms. L. Lazo, Project Manager (w/a)

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MINUTES OF

DECEMBER 5-8, 1983

MEETING BETWEEN
THE
NRC INSTRUMENTATION AND CONTROL SYSTEMS BRANCH
AND
DUQUESNE LIGHT COMPANY

1. (7.1) Identify any plant safety-related system or portion thereof, for which the design is incomplete at this time.

Response:

The following is a list of plant safety-related systems or portions thereof, for which the design is presently incomplete:

1. Plant Safety Monitoring System (includes ICC instrumentation and portions of the Reg. Guide 1.97 instrumentation)

2. Pressurizer Relief and Safety Valve Indication System

3. Main Steam Radiation Monitoring System

4. Control Room Isolation and Pressurization System

5. Charging Pump Miniflow Isolation Valves

Status:

Closed

2. (7.1) As called for in Section 7.1 of the Standard Review Plan, provide information as to how your design conforms with the following TMI Action Plan Items as described in NUREG-0737:

(a) II.D.3 - Relief and safety valve position indication

(b) II.F.1 - Accident monitoring instrumentation (Subparts 4, 5, and 6)

Response:

a) FSAR Sections 1.10 and 7.5 record the commitment to incorporate safety-related pressurizer power-operated relief valve position indication.

b) Subparts 4 and 5: FSAR Table 7.5-1, and Section 1.10 were referenced indicating compliance with NUREG-0737.

Subpart 6: The H_2 Analyzers are used to monitor hydrogen concentration inside containment post accident. The analyzers and their piping system, controls, indications, accuracy and qualification meet the requirements of NUREG 0737 II.F.1, Attachment 6. The analyzer system is automatically initiated within thirty minutes after an initiating event from accessible control panels.

Status:

a) Confirmatory; based upon filling in the "later" information in Table 7.5-1.

b) Closed

3. (7.1) Provide a brief overview of the plant electrical distribution system, with emphasis on vital buses and separation divisions, as background for addressing various Chapter 7 concerns.

Response:

The basic electrical plant distribution system was discussed referencing FSAR Section 8.3.1 and Figure 8.3-3 which depicted the "Vital Bus System One Line." The discussion demonstrated the arrangement of the two-train/four-channel redundant Class 1E uninterruptible power supply system including its operability and associated load groups.

Status:

Closed

4. (7.1) Describe design criteria and tests performed on the isolation devices in the Balance of Plant Systems. Address results of analysis or tests performed to demonstrate proper isolation between separation groups and between safety and nonsafety systems.

Response:

A description of the isolation devices used for digital signals was presented. The qualification aspects of the devices was discussed. Test reports are available to verify the qualification and design of the devices.

The discussion also described the voltage regulating isolation transformers that are used to provide for Class 1E to Class 1E and Class 1E to non-Class 1E isolation. Factory tests were described that demonstrated the transformer's ability to provide for isolation.

Status:

Closed

5. (7.1) Describe features of the Beaver Valley 2 environmental control system which insure that instrumentation sensing and sampling lines for systems important to safety are protected from freezing during extremely cold weather.

Discuss the use of environmental monitoring and alarm systems to prevent loss of, or damage to, systems important to safety upon failure of the environmental control and monitoring system circuits.

Response:

The Class 1E electrical heat tracing system was discussed including its ability to monitor each line and provide control via the associated RTD. The discussion included mention of the local and remote annunciation including the ability to read actual temperature measurements for each circuit. FSAR Section 8.3.1.1.3 was referenced.

Status:

Closed

6. (7.1) Provide a list of any non-Class 1E control signals that provide input to Class 1E control circuits.

Response

The requested list was provided

Status:

Closed

7. (7.1) Identify where microprocessors, multiplexers, or computer systems are used in or interface with safety-related systems. Also identify any "first-of-a-kind" instruments used for safety-related systems.

Response:

For radiation monitoring, BVPS-2 is utilizing a microprocessor for each safety-related radiation monitoring variable. The microprocessor is classified Class 1E and qualified in accordance with IEEE 323 for the environment in which the microprocessor is located. There are fourteen microprocessors for Category I radiation monitors. The vendor for the BVPS-2 radiation monitoring system is GA Technologies, who has provided these monitors to a variety of other nuclear power plants.

The multiplexers used in the SSPS are similar to those used on previous plants.

In addition, BVPS-2 also has a first-of-a-kind processor based Plant Safety Monitoring System. Section 7.7 of the FSAR was referenced.

Status:

Closed

8. (7.1) We request that the setpoint methodology for each Reactor Protection System (RPS) and Engineered Safeguards Features (ESF) trip setpoint values be provided for both NSSS and BOP scope of supply at the time the Technical Specifications are submitted for review.

Response:

A description of the setpoint methodology will be provided when the Technical Specifications are submitted.

Status:

Confirmatory; based upon the submittal of the methodology.

9. (7.1) Identify any Balance of Plant scope safety-related equipment (other than those listed in Section 7.1.2.4 of the FSAR) that cannot be tested during reactor operation. Include auxiliary relays or other components in the safety-related systems.

Response:

FSAR Section 7.1.2.4 lists the non-testable equipment. No other non-testable equipment has been identified.

Status:

Closed

10. (7.1) In Section 7.1.2.6 of the FSAR compliance with R.G. 1.53 addresses only protection systems. Provide the equivalent information for other systems important to plant safety.

Response:

The FSAR confirms compliance with single failure criteria for all safety-related equipment.

Source:

Closed

11. (7.1) Discuss the following:

(a) Response time testing of BOP and NSSS protection systems using the design criteria described in position C.5 of R.G. 1.118 and Section 6.3.4 of IEEE 338.

(b) Identify any temporary jumper wires or test instrumentation which will be used. Provide further discussion to describe how the test procedures for the protection systems conform to R.G. 1.118 position C.6.

(c) Typical response time test methods for pressure and temperature sensors.

(d) Compliance with Standard Technical Specifications for Westinghouse Pressurized Water Reactors (NUREG-0452, Rev. 4) as related to the third paragraph of the discussion under R. G. 1.118 on page 52 of FSAR Table 1.8-1.

Response:

a) This was discussed as indicated in the FSAR position on R.G. 1.118 and the Pre-operational Test Program Test Abstracts 14.2.12.2.2 and 14.1.12.2.4.

b) No temporary jumper wires will be utilized during operational testing of the protection system.

c) The response time test method planned to be utilized for temperature sensors is the Westinghouse analysis methods currently in use on Beaver Valley Unit 1.

d) Beaver Valley is in compliance with the Standard Technical Specification.

Status:

Closed; temperature sensor response time test methods have been identified.

12. (7.2) Using detailed plant design drawings, discuss the reactor trip breaker and undervoltage relay testing procedures and the capability of independent verification of the operability of reactor trip breaker shunt and undervoltage coils.

Response:

This information is not yet available pending the development of the response to Generic Letter 83-28 (due April 1, 1984).

Status:

Confirmatory; pending the transmission of the response to G.L. 83-28.

13. (7.2) (7.6) Using detailed plant design drawings, discuss the reactor coolant loop isolation design and valve interlocks.

Response:

A discussion of the various interlocks on the reactor coolant pump and loop isolation valves which are utilized in bringing an inactive loop into service was provided. There was some discussion of the increased probability of protection system challenges due to 1/2 logic (versus 2/3 logic) when the instrumentation in the isolated loop is placed in the trip mode. A summary of the actions taken in the reactor coolant and protection systems when going to N-1 will be submitted.

Status:

Confirmatory; pending the submittal of the N-1 information.

14. (7.2) (7.3) Table 7.2-4 provides reactor trip correlation for reactor trip signal, accident analysis, and technical specifications. Please provide a similar table for safety interlocks and bypasses.

Response:

The safety interlocks and bypasses date is dependent upon the technical specifications which will be generated in mid 1984. A table similar to Table 7.2-4 will be provided to the ICSB in response to this question.

Status:

Closed

15. (7.2) (7.3) Describe the steam generator level instrumentation. Identify the instrument channel used for protection functions and the control functions. Address the control and protection interaction conformance to Section 4.7 of IEEE Std. 279-1971.

Response:

The steam generator level instrumentation was described. The NRC expressed concern that there was not adequate protection against the controlling channel failing low and resulting in overfill of the steam generator.

Status:

Open; DLC will study the matter and respond at a later date

16. (7.2) (7.6) Using detailed schematics, describe the design of pressurizer PORV control and the block valves control, and verify that no single failure will preclude the automatic actuation logic for all modes of operation.

Response:

The control of the pressurizer PORV's was discussed. The NRC expressed concern that the protection portion of the interlock did not appear to be single-failure proof and therefore might not be able to isolate flow in the event of the degredation of the control grade pressure transmitters.

Status:

Open

17. (7.2) The information in Section 7.2.1.1.2 for "Reactor Trip on a Turbine Trip" is insufficient. Please provide further design bases discussion on this subject, per BTP ICSB 26 requirements. As a minimum you should:

(1) Using detailed drawings, describe the routing and separation for this trip circuitry from the sensor in the turbine building to the final actuation in the reactor trip system (RTS).

(2) Discuss how the routing within the nonseismic Category 1 turbine building is such that the effects of credible faults or failures in this area on these circuits will not challenge the reactor trip system and thus degrade the RTS performance. This should include a discussion of isolation devices.

(3) Describe the power supply arrangement for the reactor trip on turbine trip circuitry.

(4) Discuss the testing planned for the reactor trip on turbine trip circuitry.

(5) Discuss qualification of the sensors.

Identify other sensors or circuits used to provide input signals to the other protection systems which are located or routed through nonseismically qualified structures. This should include sensors or circuits providing input for reactor trip, emergency safeguards equipment such as the auxiliary feedwater system, and safety grade interlocks. Verification should be provided that the sensors and circuits meet IEEE-279 nd are seismically and environmentally qualified. Testing or analyses performed to insure that failures of nonseismic structures, mountings, etc. will not cause failures which could interfere with the operation of any other portion of the protection system should be discussed.

Response:

A detailed discussion of the reactor trip on a turbine trip was presented using detailed drawings. Included in the discussion was the potential degradation of the reactor protection system, the power supply arrangement, and the train systems with 2 out of 3 logic. It was shown that the technical specifications provided agreed with the standard technical specifications.

Status:

Closed

18. (7.2) (7.3) Identify where instrument sensors or transmitters supplying information to more than one protection channel are located in a common instrument line or connected to a common instrument tap. The intent of this item is to verify that a single failure in a common instrument line or tap (such as a break or blockage) cannot defeat required protection system redundancy.

Response:

The instrument sensors supplying information to more than one protection channel located in a common instrument line or connected to a common instrument tap consists of loop flow and pressurizer pressure and level instrumentation per the standard Westinghouse design.

Source:

Closed

19. (7.2) Discuss the method of redundantly tripping the turbine following receipt of reactor protection signals requiring turbine trip.

Response:

Detailed electrical schematics were used to describe the reactor protection system initiated turbine trip.

Status:

Closed

20. (7.2) As discussed in Section 7.2.2.3.1 of the FSAR, an isolated ouput signal from protection system channels is provided for automatic rod control. Discuss how this signal is derived. Discuss what steps, if any, are taken to prevent unnecessary control action during testing of protection system channels with a test source.

Response:

NIS power range detector testing imposes the test signal on the existing flux signal. As shown on Fig. 7.2 sheet 9, any power range signal going high because of test will inhibit manual or automatic rod withdrawal. The NIS signal used for this function is derived from the NIS through an isolation device as shown on the NIS block diagram.

Status:

Closed

21. (7.2) Discuss surveillance of the RTD bypass loop flow indications. Confirm that technical specifications will include surveillance requirements for these indications.

Response:

The RTD bypass loop flow indication will be tested every refueling outage.

Status:

Closed

22. (7.2) Recent review of Waterford revealed heaters were used to control temperature and humidity within insulated cabinets housing electrical transmitters that provide input to the RPS. These heaters were unqualified and concern was raised that heater failure could cause transmitter degradation. Please address any similar installations at BVPS-2. If heaters are used, describe design criteria.

Response:

Heaters are not used to control temperature and humidity within insulated cabinets at Beaver Valley 2.

Status:

Closed

23. (7.3) Using detailed plant design drawings, discuss the control room isolation and pressurization systems.

Response:

Although the design of these systems is incomplete, the concept for the design was discussed.

Status:

Open: pending the finalization of the design.

24. (7.3) Using detailed plant design drawings, discuss the containment automatic isolation system. No radiation signal was shown on the logic diagram. Please address the diversity requirement stated in Standard Review Plan Section 6.2.4. Also discuss which valves are preselected for manual operation stated in Item 14 of FSAR Section 6.2.4.1.

Response:

FSAR Table 6.2-60 was used as a focal point to discuss containment isolation features. The NRC requested that Duquesne Light identify those pieces of BOP equipment which perform system protection functions but do not perform ESF functions.

Status:

Confirmatory; pending the submittal of the requested data.

25. (7.3) (7.4) Using detailed system schematics, describe the sequence for automatic initiation, operation, reset, and control of the auxiliary feedwater system. The following should be included in the discussion:

(a) the effects of all switch positions on system operation,

(b) the effects of single power supply failures including the effect of a power supply failure on auxiliary feedwater control after automatic initiation circuits have been reset in a post accident sequence.

(c) any bypasses within the system including the means by which it is insured that the bypasses are removed.

(d) initiation and annunciation of any interlocks or automatic isolations that could degrade system capability.

(e) the safety classification and design criteria for any air systems required by the auxiliary feedwater system. This should include the design bases for the capacity of air reservoirs required for system operation.

(f) design features provided to terminate auxiliary feedwater flow to a steam generator affected by either a steam line or feed line break.

(g) system features associated with shutdown from outside the control room.

Response:

Schematics of the Auxiliary Feedwater System were presented. Startup of the auxiliary feedwater motor driven pumps and turbine driven

pumps along with operation of the auxiliary feedwater Control Valves was discribed.

Status:

Closed

26. (7.3) (7.4) Using detailed plant design drawings, illustrate that the components in the auxiliary feedwater turbine-driven pump fluid paths are totally independent from AC power sources. Discuss the capability to control or terminate auxiliary feedwater flow under a loss of AC power event.

Response:

Detailed drawings were used to descirbe the following design. The turbine driven pump will operate in the absence of ac power. Steam will be delivered to the turbine by fail open solenoid valves in branch piping from the main steam headers. Auxiliary feedwater will be delivered to the steam generators through the auxiliary feedwater control valves which are normally open. Steam will be removed from the steam generators via the main steam safety valves.

All safety related instrumentation is powered from the dc power system and would be available for at least two hours.

Status:

Closed

27. (7.3) (7.4) Discuss the water sources of the auxiliary feedwater system and the capability to transfer one source to the other.

Response:

Detailed drawings were used to describe the auxiliary feedwater sources from the primary plant demineralized water storage tank and the demineralized water storage tank. In addition, the emergency supply from the service water system was described.

Status:

Closed

28. (7.3) For main steam and feedwater line valve actuation, describe control circuits for isolation valves and include automatic, manual and test features. Indicate whether any valve can be manually operated and indicate specific interfaces with the safety system electrical circuits.

Response:

Detailed drawings were used to discuss main steam and feedwater valve actuation. During the review some inconsistencies were found in the drawings describing feedwater isolation. Additionally it appeared that the low T avg. reactor trip feedwater isolation was not redundant.

Status:

Open: pending resolution of the drawing inconsistencies and pending DLC providing an adequate description of the low T avg. reactor trip feedwater isolation.

29. (7.3) Using detailed schematics, describe the operation of the containment depressurization system initiating circuits, bypasses, interlocks, and functional testing.

Response:

The designs of the quench and recirculation spray systems were discussed in detail using P&ID's to describe the fluid system design and the recirculation spray system interface with safety injection (ECCS function). Electrical schematics were reviewed to describe the actuation circuits for pumps starts and the automatic valve actions for system operation.

Status:

Closed

30. (7.3) Using logic and schematic diagrams, describe the safety injection system initiating circuits, bypasses, interlocks, and functional testing.

Response:

The design of the safety injection systems were discussed in detail.

Status:

Closed

31. (7.3) Using logic and schematic diagrams, describe the AC emergency power system (diesel generators and sequencer), initiating circuits, bypasses, interlocks, and functional testing.

Response:

The basic electrical power arrangement of the redundant Class lE diesel generator units was described as per FSAR Section 8.3. Schematics were used to show the Emergency Diesel Generator Sequencer and the load shedding schemes.

Status:

Closed

32. (7.3) As discussed in Section 5.4.15.2 of the FSAR, the reactor vessel head test system consists of two parallel flow paths with redundant isolation valves in each flow path. Discuss operation of this system from the

control room. Since the redundant valves are powered from the same vital power supply, discuss what measures (separation, grounded shield leads etc) are used to satisfy item A(8) of II.B.1 of NUREG-0737.

Response:

Schematics for the Reactor Head Vent System Valves 2RCS*SOV200A&B, 201A&B and 2RCS&HCV250A&B were presented. The power source which supplied each valve was identified indicating that all valves in each flow path were operated from the same power train. The rationale for this design was discussed.

Status:

Closed

33. (7.3) Using detailed drawings, describe the ventilation systems used to support engineered safety features areas including areas containing systems required for safe shutdown. Discuss the design bases for these systems including redundancy, testability, etc.

Response:

A discussion of selected ventilation systems used to support engineering safety features areas, including areas containing systems required for safe shutdown, was provided at the ICSB meeting. The discussion focused on the design bases for the systems including redundancy and testability. Logic and electrical schematic diagrams and facilities functional diagrams were presented.

Status:

Closed

34. (7.3) Using detailed electrical schematics and piping diagrams, discuss the automatic and manual operation and control of the station service water system and the component cooling water system. Discuss the interlocks, automatic switchover, testability, single failure channel independence, indication of operability, and the isolation functions.

Response:

A detailed discussion using electrical schematics and piping diagrams was provided to the staff. Reference was made to FSAR 7.3 and 7.6 regarding pressure switches, FSAR 9.2-1 and 9.2-2 regarding important safety functions. Regarding isolation valve no-go testing, the NRC requested that a list be compiled.

Status:

Confirmatory; pending the submittal of an isolation valve no-go testing list and a revision to FSAR Figure 9.2-4.

35. (7.3) Identify any pneumatically operated valves in the ESF system. Using detailed schematics, describe their operation on loss of instrument air system.

Response:

There are no pnuematically operated valves in the BVPS-2 ESF systems which must operate actively to achieve an ESF safety function. The NRC expressed particular interest in the letdown containment isolation valves and the letdown orifice isolation valves. This involved a discussion of the consequences of an inadvertant relief to the pressure relief tank.

Status:

Closed

36. (7.3) Discuss the testing provision in the engineered safety feature P-4 interlocks.

Response:

The planned test for the P-4 interlocks is a procedure involving entering the panel to read voltages to verify SI block reset. DLC will condider a design change to install a testing capability from the panel face.

Status:

Open; pending DLC decision on the design change.

37. (7.3) On May 21, 1981, Westinghouse notified the Commission of a potentially adverse control and protection system interaction whereby a single random failure in the volume control tank (VCT) level control system could lead to a loss of redundancy in the safety injection system for certain Westinghouse plants. Discuss the VCT level control system in Beaver Valley 2 design.

Response:

A discussion of a potentially adverse control and protection system interaction demonstrated that a single failure in VCT level control channel LT-115 involvement, could eventually lead to a loss of redundancy in the safety injection system. However, because of the four following bases, this arrangement is not considered to compromise plant safety.

1. Plant operating procedures
2. Charging pump operating characteristics
3. Plant design bases for safety related systems and plant technical specifications
4. Volume control tank (non-safety) design basis

Thus, adequate capability for maintaining plant safety was demonstrated.

Status:

Closed

38. (7.3) Discuss the fault tree analysis (FTA) technique and the interface with WCAP-8760, "Failure Mode and Effects Analysis of the Engineered Safety Features Actuation System." Confirm that the interface requirements specified in WCAP-8760 have been met and include a statement in the FSAR to that effect.

Response:

The interface between Westinghouse (NSSS) and Balance of Plant (BOP) equipment electric and controls is identified in the Failure Modes and Effects Analysis (FMEA) for the BOP safety system. Each relay contact which is part of the Engineered Safety Features Actuation System is shown in the elementary diagrams of the BOP equipment. Failure of the relay contact and failure of the NSSS actuation signal which energizes the relay are shown on the fault tree development by component number and electrical train designation. This information appears in the FMEA with the relay actuation signal failure identified as the NSSS interface. The FMEA documents the results of the fault tree analysis.

Status:

Confirmatory; pending the inclusion of a specific statement in the FSAR confirming that all specified interface requirements have been met.

39. (7.3) On August 6, 1982, Westinghouse notified the staff of a potential undetectable failure in online test circuitry for the master relays in the engineered safeguards systems. The undetectable failure involves the output (slave) relay continuity proving lamps and their associated shunts provided by test pushbuttons. If after testing, a shunt is not provided for any proving lamp because of a switch contact failure, any subsequent safeguards actuation could cause the lamp to burn open before its associated slave relay is energized. This would then prevent actuation of any associated safeguards devices on that slave relay. Until an acceptable circuit modification is designed, Westinghouse has provided test procedures that ensure that the slave relay circuits operate normally when testing of the master relays is completed. Discuss this issue as applied to Beaver Valley 2.

Response:

This item has been reported to the NRC by DLC Significant Deficiency Report (SDR) 82-04.

Status:

Open; pending resolution of SDR 82-04.

40. (7.4) Verify whether the systems required for safe shutdown can be periodically tested during normal operation. Provide a cross-reference to Technical Specification sections for those components that will be tested during normal operation.

Response:

At the ICSB meeting it was verified that the testability of the systems was incorporated into the design. Reference was made to FSAR Section 7.1.2.4 for those components that will not be tested during normal operations.

Status:

Closed

41. (7.4) Use plant design drawings to discuss the main steam power operated relief valve control scheme. Is this a safety grade system?

Response:

A detailed discussion of the control scheme for the main steam atmospheric relief valves was provided. This system is a safety grade system.

Status:

Closed

42. (7.4) FSAR Section 7.4.1.2.2 states, "Loss of instrument air does not prevent the operation of the minimum systems necessary for hot standby."

Provide further discussion for valve operation in auxiliary feedwater system, steam generator PORV, RHR system, and other pneumatic operators used in the safe shutdowns systems.

Response:

Specific valves were used to illustrate that instrument air is not required for any valve to move to its safety position during reactor operation.

Status:

Closed

43. Provide a table showing safe shutdown display information and identify safety grade items.

Response:

FSAR Table 7.5-1 was discussed. The variable designated AI on this table are used to satisfy the safe shutdown display information requirements of R.G. 1.97, Rev. 2.

Status:

Closed

44. (7.4) Describe the capability of achieving hot and cold shutdown from outside the control room. As a minimum, provide the following information:

a. Location of transfer switches and remote control stations (ESP and ASP) (include layout drawings, etc).

b. Design criteria for the remote control station equipment including transfer switches.

c. Description of distinct control features to both restrict and to assure access, when necessary, to the displays and controls located outside the control room.

d. Discuss the testing to be performed during plant operation to verify the capability of maintaining the plant in a safe shutdown condition from outside the control room.

e. Description of isolation, separation and transfer/override provisions. This should include the design basis for preventing electrical interaction between the control room and remote shutdown equipment.

f. Description of any communication systems required to coordinate operator actions, including redundancy and separation.

g. Description of control room annunciation of remote control or overridden status of devices under local control.

h. Means for ensuring that cold shutdown can be accomplished.

i. Discuss the separation arrangement between safety-related and nonsafety-related instrumentation on the auxiliary shutdown panel.

Response:

Schematics for the emergency shutdown panel and the alternate shutdown panel were presented. All of the items were addressed and answered satisfactorily.

Status:

Closed

45. (7.4) Use detailed schematics to describe the control circuits of the pressurizer pressure control (PORV and heater control), including the interlock and bypass provision from the remote control panel.

Response:

Elementary diagrams for the pressurizer heaters, backup and control groups, were presented and discussed. Refer to Item 16 for the PORV description.

Status:

Closed

46. (7.4) Discuss the plant (tests to verify the capability of maintaining the plant in a safe shutdown condition from outside the control room. Describe design compliance with Regulatory Guide 1.68.2.

Response:

Testing to verify the capability of maintaining the plant in a safe shutdown condition from outside of the control room will be done in accordance with R.G. 1.68.2. This testing is described in FSAR Section 14.2.12.6.4 and will be further clarified in the response to FSAR question 640.03.

Status:

Confirmatory; pending the amendment to FSAR 14.2.12.6.4.

47. (7.5) Using detailed plant design drawings (schematics), discuss the design pertaining to bypassed and inoperable status indication. As a minimum, provide the information to describe:

1. Compliance with the recommendations of R.G. 1.47. Include a discussion of your comments in Section 7.1.2.5 of the FSAR.

2. The design philosophy used in the selection of equipment/systems to be monitored. Include a discussion of the logic diagrams in Section 7.5 of the FSAR.

3. How the design of the bypass and inoperable status indication systems comply with positions B1 through B6 of ICSB Branch Technical Position No. 21.

The design philosophy should describe as a minimum the criteria to be employed in the display of inter-relationships and dependencies on equipment/systems and should insure that bypassing or deliberately induced inoperability of any auxiliary or support system will automatically indicate all safety systems affected.

Response:

A discussion was held to describe the bypassed and inoperable status indication (BISI) system. The BISI logic diagrams were used to describe and answer questions asked by the NRC reviewer.

Status:

Closed

48. Use schematic and layout drawings to discuss the physical separation
(7.5) and wiring for redundant safety-related instruments on the main control board.

Response:

An explanation of the methods used to assure separation between 1E and non-instrumentation on the main control board was given.

Status:

Closed

49. Provide a discussion (using detailed drawings) on the residual heat
(7.6) removal (RHR) system as it pertains to Branch Technical Positions ICSB 3 and RSB 5 1 requirements. Specifically, address the following as a minimum:

a. The last statement under Section 7.6.2.1 of the FSAR.

b. Testing of the RHR isolation valves as required by Branch Position E. of BTP RSB 5-1.

c. Capability of operating the RHR from the control room with either onsite or only offsite power available as required by Position A.3 of BTP RSB 5-1. This should include a discussion of how the RHR system can perform its function assuming a single failure.

d. Describe any operator action required outside the control room after a single failure has occurred and justify.

In addition, identify all other points of interface between the Reactor Coolant System (RCS) and other systems whose design pressure is less than that of the RCS. For each such interface, discuss the degree of conformance to the requirements of Branch Technical Position ICSB No. 3. Also discuss how the associated interlock circuitry conforms to the requirements of IEEE Standard 279. The discussion should include illustrations from applicable drawings.

Response:

The RCS/RHR interface is the only high-pressure/low-pressure interface which falls under the requirement of BTP ICSB 3. FSAR Sections 5.4.7 and 7.6.2 and Figure 5.4-4 were discussed. Testing of the valves was discussed using FSAR Section 7.6.2. The capture key method of transferring valve power supplies was discussed in detail.

Status:

Closed

50. (7.6) Using detailed system schematics, describe the power distribution for the accumulator valves and associated interlocks and controls including position indication in the control room and bypass indicator light arrangement.

Response:

A description of the power removal scheme for the Accumulator Discharge Isolation Valves was presented.

The NRC reviewer was concerned that indication is not provided to indicate status of the slave contactor and suggested that a status light be provided. DLC agreed to incorporate a design change to address this concern.

Status:

Confirmatory; pending the submission of an acceptable design.

51. (7.6) Discuss interlocks for RCS pressure control during low temperature operation.

Response:

The interlocks for RCS pressure control during low temperature operation was discussed in detail and indicated that the low temperature overpressure protection system is a safety-grade system.

Status:

Closed

52. (7.6) Describe the automatic and manual design features permitting switchover from the injection to the recirculation mode of emergency core cooling, including protection logic, component bypasses and overrides, parameter monitored and controlled, and test capabilities.

Response:

Using electrical schematics and logic diagrams, the operation of the switchover from injection to recirculation was described in detail. The NRC reviewer expressed concern about the testability of the interlock for the charging pump miniflow isolation valves.

Status:

Open; pending the discussion of the testing planned for the interlocks on the above-mentioned valves.