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APR 12 1984

MEMORANDUM FOR: Elinor Adensam, Chief, Licensing Branch #4
Division of Licensing

FROM: Faust Rosa, Chief, Instrumentation & Control Systems Branch
Division of Systems Integration

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION AND AGENDA ITEMS FOR MEETING WITH VOGTLE UNITS 1&2 APPLICANT

Plant Name: Vogtle, Units 1&2
Docket Nos.: 50-424/425
Licensing Status: OL
Responsible Branch: LB #4
Project Manager: M. Miller
Review Branch: ICSB
Review Status: Incomplete

DESIGNATED ORIGINAL

Certified By [signature]

In our memorandum to you dated January 4, 1984, we stated that the ICSB review for Vogtle 1&2 will use meeting discussions to resolve our concerns. Attachment 1 is a list of items which ICSB would like to discuss with the applicant. The applicant should be prepared to use detailed instrument, control and fluid system schematic drawings to explain system designs and to provide verification that design bases and regulatory criteria are met. Attachment 2 is a list of formal questions that relate to IE Bulletin concerns. We request that a written response be provided for these questions. Additional written responses may be required for some items in Attachment 1 after meeting discussions.

We request that the Project Manager arrange the review meetings to resolve these concerns for the last week in August 1984 as previously agreed to.

"Original Signed By:
Faust Rosa"

Faust Rosa, Chief
Instrumentation & Control Systems Branch
Division of Systems Integration

Enclosures:
As stated

cc: R. Mattson
R.W. Houston
T. Novak
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ATTACHMENT 1

QUESTIONS FOR MEETING(S) WITH APPLICANT
ON VOGTLE UNITS 1 AND 2 INSTRUMENTATION AND CONTROLS

Following is a list of items for discussion at meetings with the applicant to provide the NRC staff with information required to understand the design bases and design implementation for the instrumentation and control systems for Vogtle Units 1 and 2. The applicant should be prepared to use detailed instrument, control, and fluid system drawings at the meetings in explaining system designs and to provide verification that design bases and regulatory criteria are met.

DESIGNATED ORIGINAL
Certified By Cheryl Thompson

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

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 (Subpart 4)
(c) II.K.3.10 - Proposed Anticipatory Trip Modification

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.

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 non-safety systems.

5. (7.1) Describe features of the Vogtle Units 1 & 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 system. Discuss electrical independence of the environenmental control and monitoring system circuits.

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

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.

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.

9. (7.1) Identify any Balance of Plant scope safety related equipment (other than those listed in Section 7.1.2.5 of the FSAR) that cannot be tested during reactor operation. Include auxiliary relays or other components in the safety-related systems.

10. (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.

11. (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.

12. Describe the steam generator level instrumentation. Identify the
(7.2) instrument channel used for protection functions and the control
(7.3) functions. Address the control and protection interaction conformance to Section 4.7 of IEEE Std. 279-1971 and the use of the selector switch in steam generator level input shown in FSAR Figure 7.2.1-1 (Sheet 13).

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

14. The information in Section 7.2.1.1.2 for "Reactor Trip on a Turbine
(7.2) 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 non-seismic 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 seismic 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 non-seismically 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 and are seismically and environmentally qualified. Testing or analyses performed to insure that failures of non-seismic structures, mountings, etc. will not cause failures which could interfere with the operation of any other portion of the protection system should be discussed.

15. (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 break or blockage) cannot defeat required protection system redundancy. Include a discussion of the pressurizer pressure transmitters mentioned in the second paragraph on page 7.2.1-6 and the fifth paragraph on page 7.2.2-19 of the FSAR.

16. (7.2) Provide specific values for the P-6, P-9, and P-13 interlocks.

17. (7.2) Discuss the method of redundantly tripping the turbine following receipt of reactor protection signals requiring turbine trip.

18. (7.2) Table 7.2.1-1 of the FSAR shows a 1/4 logic entry for reactor trip on low reactor coolant flow. Please discuss.

19. (7.2) As discussed in Section 7.2.2.3.1 of the FSAR, an isolated output 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.

20. (7.2) Discuss surveillance of the RTD bypass loop flow indications. Confirm that technical specifications will include surveillance requirements for these indications.

21. Recent review of Waterford revealed heaters were used to control
(7.2) temperature and humidity within insulated cabinets housing electrical transmitters that provide inputs to the RPS. These heaters were unqualified and concern was raised that heater failure could cause transmitter degradation. Please address any similar installations at Vogtle Units 1&2. If heaters are used, describe design criteria.

22. Address the conflicts between the logic for the reactor coolant
(7.2) pump undervoltage and underfrequency trips described in Table 7.2-1-1 of the FSAR and that shown in Figure 7.2.1-1 (Sheet 5).

23. Using detailed plant design drawings, discuss the control room
(7.3) essential HVAC system.

24. Using detailed plant design drawings, discuss the containment auto-
(7.3) matic isolation system.

25. Using detailed logic and schematic diagrams, describe the combusti-
(7.3) ble gas control system initiating circuits, bypasses, interlocks and functional testing.

26. Using detailed system schematics, describe the sequence for auto-
(7.3) (7.4) matic 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.

27. (7.3) Section 7.3.1.1.1.1 of the FSAR does not include the turbine-driven auxiliary feedwater pump as relying on ESFAS initiation. Please discuss.

28. (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.

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

30. For main steam and feedwater line valve actuation, describe control
(7.3) 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.

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

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

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

34. As discussed in Section 5.4.15.2 of the FSAR, the reactor vessel head
(7.3) vent 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.

35. (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.

36. (7.3) Using detailed electrical schematics and piping diagrams, discuss the automatic and manual operation and control of the station service cooling 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.

37. (7.3) Identify any pneumatically operated valves in the ESF system. Using detailed schematics, describe their operation on loss of instrument air system.

38. (7.3) Discuss the testing provision in the engineered safety feature P-4 interlocks.

39. (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 the Vogtle Unit 1& 2 design.

40. Confirm that the BOP interface requirements specified in WCAP-8760,
(7.3) "Failure Mode and Effects Analysis of the Engineered Safety Features Actuation System," have been met and include a statement in the FSAR to that effect.

41. On August 6, 1982, Westinghouse notified the staff of a potential
(7.3) 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 Vogtle Units 1 and 2.

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

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

a) Location of transfer switches and remote control stations (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 non-safety related instrumentation on the auxiliary shutdown panel.

44. (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) The design philosophy used in the selection of equipment/systems to be monitored.

2) Justification for not providing bypass and inoperable status indication in accordance with position B2 of ICSB Branch Technical Position No. 21 for the fuel handling building ESF HVAC system as stated in Section 7.5.5.3 of the FSAR.

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.

45. (7.5) Use schematic and layout drawings to discuss the physical separation and wiring for redundant safety related instruments on the main control board.

46. (7.6) Provide a discussion (using detailed drawings) on the residual heat 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) Testing of the RHR isolation valves as required by Branch Position E. of BTP RSB 5-1.

b) 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.

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

47. (7.6) Identify points (other than RHR) 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.

48. Using detailed system schematics, describe the power distribution
(7.6) for the accumulator valves and associated interlocks and controls including position indication in the control room and bypass indicator light arrangement. Discuss conformance to the requirements of Branch Technical Position ICSB No. 4.

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

50. Describe the automatic and manual design features permitting switch-
(7.6) over 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.

ATTACHMENT 2

ICSB QUESTIONS ON VOGTLE UNITS 1&2

420.2 Provide response to IE Bulletin 79-27 concerns.

(7.5) (An event requiring operator action concurrent with failure of important instrumentation upon which these operator actions should be based.)

420.3 Provide response to IE Bulletin 80-06 concerns.

(7.3) (Potential design deficiencies in bypass, override, and reset circuits of engineered safety features.)

420.4 Provide response to IE Information Notice 79-22 concerns.

(7.7) (Control system malfunction due to a high energy line break inside or outside of containment.)

420.5 Provide response to IE Bulletin 79-21 concerns.

(7.3) (Level measurement errors due to environmental temperatures effects on level instrument reference legs.)

420.6 Control System Failure concerns.

(7.7) The analyses reported in Chapter 15 of the FSAR are intended to demonstrate the adequacy of safety systems in mitigating anticipated operational occurrences and accidents.

Based on the conservative assumptions made in defining these design-basis events and the detailed review of the analyses by the staff, it is likely that they adequately bound the consequences of single control system failures.

To provide assurance that the design basis event analyses adequately bound other more fundamental credible failures, you are requested to provide the following information:

(a) Identify those control systems whose failure or malfunction could seriously impact plant safety.

(b) Indicate which, if any, of the control systems identified in (a) receive power from common power sources. The power sources considered should include all power sources whose failure or malfunction could lead to failure or malfunction of more than one control system and should extend to the effects of cascading power losses due to the failure of higher level distribution panels and load centers.

(c) Indicate which, if any, of the control systems identified in (a) receive input signals from common sensors. The sensors considered should include, but should not necessarily be limited to, common hydraulic headers or impulse lines feeding pressure, temperature, level or other signals to two or more control systems.

(d) Provide justification that any simultaneous malfunctions of the control systems identified in (b) and (c) resulting from failures or malfunctions of the applicable common power source or sensor are bounded by the analyses in Chapter 15 and would not require action or response beyond the capability of operators or safety systems.

CONTROL NUMBER

03185 8

LER NUMBER

79-000/02 L-0

CONTROL BLOCK: | 0 | 3 | 1 | 8 | 5 | 8 | (1)   (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

0 1 | T N S M P 1 | (2) | 0 0 0 0 0 0 0 0 0 0 0 | (3) | 4 1 1 1 1 1 | (4) | 0 | (5)
LICENSEE CODE · LICENSE NUMBER · LICENSE TYPE · CAT

CON'T 0 1 | REPORT SOURCE | L | (6) | 0 5 0 0 0 3 2 7 | (7) | 0 8 0 2 7 9 | (8) | 0 9 1 5 7 9 | (9)
DOCKET NUMBER · EVENT DATE · REPORT DATE

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

0 2 | During preoperational testing of the underfrequency into
0 3 | the solid-state protection system, arcing occurred across the
0 4 | underfrequency relay contacts. This condition delayed during
0 5 | testing the reactor trip and the reactor coolant pump
0 6 | breaker trip signals.
0 7 |
0 8 |

0 9 | SYSTEM CODE | C B | (11) | CAUSE CODE | E | (12) | CAUSE SUBCODE | A | (13) | COMPONENT CODE | I N S T R U | (14) | COMP SUBCODE | X | (15) | VALVE SUBCODE | Z | (16)

(17) LER/RO REPORT NUMBER | EVENT YEAR | 7 9 | — | SEQUENTIAL REPORT NO. | | | | / | OCCURRENCE CODE | 0 2 | REPORT TYPE | L | — | REVISION NO. | 0 |

ACTION TAKEN | F | (18) | FUTURE ACTION | Z | (19) | EFFECT ON PLANT | Z | (20) | SHUTDOWN METHOD | Z | (21) | HOURS (22) | 0 0 0 0 | ATTACHMENT SUBMITTED | Y | (23) | NPRD-4 FORM SUB. | N | (24) | PRIME COMP. SUPPLIER | Z | (25) | COMPONENT MANUFACTURER | Z 9 9 9 | (26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

1 0 | The relay panel will have SPF-1 relays modified internally
1 1 | so that there will be two normally closed contacts instead
1 2 | of one available for external connections. FINAL REPORT
1 3 |
1 4 |

1 5 | FACILITY STATUS | B | (28) | % POWER | 0 0 0 | (29) | OTHER STATUS (30) | NA | METHOD OF DISCOVERY | B | (31) | DISCOVERY DESCRIPTION (32) | by testing

1 6 | ACTIVITY RELEASED | Z | (33) | CONTENT OF RELEASE | Z | (34) | AMOUNT OF ACTIVITY (35) | NA | LOCATION OF RELEASE (36) | NA

1 7 | PERSONNEL EXPOSURES NUMBER | 0 0 0 | (37) | TYPE | Z | (38) | DESCRIPTION (39) | NA

1 8 | PERSONNEL INJURIES NUMBER | 0 0 0 | (40) | DESCRIPTION (41) | NA

1 9 | LOSS OF OR DAMAGE TO FACILITY (43) TYPE | Z | (42) | DESCRIPTION | NA

2 0 | PUBLICITY ISSUED | N | (44) | DESCRIPTION (45) | NA | NRC USE ONLY

NAME OF PREPARER ______________________ PHONE: ______________________

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420.5 On November 7, 1979, Westinghouse notified the Commission of a potential undetectable failure which could exist in the engineered safeguards P-4 interlocks. Test procedures were developed to detect failures which might occur. The procedures require the use of voltage measurements at the terminal blocks of the reactor trip breaker cabinets.

Concern:

In order to minimize the possibility of accidental shorting or grounding of safety system circuits during testing, the staff believes that suitable test jacks should be provided to facilitate testing of the P-4 interlocks. Provide a discussion on how the above issue will be resolved for Catawba.

Response:

In order to implement the Westinghouse recommended procedures, a voltage indicator will be wired to the reactor trip breaker terminal blocks. This will allow operating personnel to check the status of the P-4 interlock. This modification will be completed prior to fuel load.

420.6 Safety Injection Pump Suction Isolation Valve NI 100B and Safety Injection Pump Miniflow Header to Feedwater Valve NI 147B require power lockout to meet the single failure criterion. The power lockout scheme for each valve, as shown on Catawba Drawings CNEE-0151-01.10 and 0151-01.13, uses an additional manually controlled contactor (M2).

Concern:

The staff believes that a short of the #1-#2 contact set for either "MAINTAINED" switch (NI65 or NI73) would constitute a non-detectable failure and thus violate the single failure criteria. Provide a discussion of how the above will be resolved for Catawba.

420.7 TMI-2 Action Plan Item II.E.1.2 Part 2 requires safety-grade indication in the control room of auxiliary feedwater flow to each steam generator powered from emergency buses consistent with emergency power diversity requirements of Auxiliary Systems Branch Technical Position 10-1.

Concern:

The applicant's response to this Action Plan Item in the FSAR is inadequate and the staff believes changes are being made in this area. Provide a discussion of the power sources to be used for the auxiliary feedwater flow indication.