

JAN 27 1975

508

Docket Nos. 50-508
50-509

R. C. DeYoung, Assistant Director for LWRs, Group 1, ONRR

WASHINGTON PUBLIC POWER SUPPLY SYSTEM, WPPSS NUCLEAR PROJECTS
NO. 3 AND NO. 5

Plant Name: WPPSS Nuclear Projects Nos. 3 and 5

Licensing Stage: Construction Permit

Docket Numbers: 50-508/509

Responsible Branch and Project Manager: LWR 1-3, P. O'Reilly

Technical Review Branch Involved: Electrical, Instrumentation
and Control Systems Branch

Applicant's Response Date Necessary for Completion of Next

Action Planned on Project: March 28, 1975

Requested Completion Date: January 24, 1975

Description of Response: Second Set of Questions and Positions

Review Status: Awaiting Information

The enclosed set of questions and positions was prepared by the ONRR:RS, Electrical, Instrumentation and Control Systems Branch. These questions and positions resulted from our evaluation of the information presented in the PSAR through Amendment 8 and are based on applicable IEEE Standards, Regulatory Guides, Technical Positions and compliance with those sections of 10 CFR 50 relevant to the branch's area of responsibility. We continue to note that our review takes cognizance of the material included from CESSAR and was limited to those systems and equipment which are within the applicant's scope of supply and which interface (or do not interface) with Combustion Engineering NSSS Standard Design (CESSAR).

Significant problem areas include the following:

1. Qualification of Class IE Equipment.
2. Conformance to applicable Branch Technical Positions.
3. Conformance to applicable IEEE Standards and NRC Regulatory Guides.
4. Design criteria relating to safety related systems and components.

Memo 4

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-2-

JAN 27 1975

- 5. Qualification Test Program for the Main Generator Load Break Switches.

for T Ippolito

Victor Stello, Jr., Assistant Director
for Reactor Safety
Office of Nuclear Reactor Regulation

Enclosure:
Second Set of Questions and Positions

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ENCLOSURE

WPPSS UNITS 3 AND 5 NUCLEAR
POWER STATIONS
SECOND SET OF QUESTIONS AND POSITIONS

222.0

ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEMS

222.26

(3.10.2.1)

(3.10.2.2)

Confirm that the seismic qualification procedure and program as outlined in Section 3.10.2.1 of the PSAR will apply to the safety related equipment not supplied by CE (Section 3.10.2.2). Identify and provide justification for any exceptions.

222.27

(3.11.3)

The response to Item 222.5 indicates that all safety related equipment and components listed in Table 3.11-1 which are environmentally qualified by operating experience can not be identified at this time. Accordingly, verify the following:

1. That this information will be provided when it becomes available.
2. For each piece of equipment identified in 1. above the basis for establishing the adequacy of operating experience will also be provided.
3. Documentation will be provided to demonstrate that the requirements for the intended plant use will be met by the available operating experience.

222.28

(3.0,5.0)

The response to Item 222.2 is incomplete. Table 5.2-7 does not discuss the degree of conformance with the stated branch position for interfaces between the Reactor Coolant System (RCS) and systems whose design pressure is less than the design pressure of the Reactor Coolant System. Provide this discussion for those interfaces (between the RCS and systems whose design pressure is less than the design pressure of the RCS) for which the stated position applies. Also, state the criteria that ensures an equivalent degree of protection will be provided for those identified low pressure systems which interface with the RCS and do not conform to the stated position.

222.29 (BTP)

(3.0, 6.0,

7.0, 8.0)

With respect to the application of the single failure criterion to manually-controlled, electrically-operated valves, we require the following:

1. Single failures of both active and passive components in the electric systems of valves and other fluid system components should be considered in designing against single failures, even though the fluid system component may not be called upon to function to a given safety system operational sequence.
2. Where it is determined that failure of a single active or passive component in an electric system can cause mechanical motion of a passive component in a fluid system and this motion results in loss of capability to perform the system safety function, it is acceptable, in lieu of design changes that also may be acceptable, to disconnect power to the electric systems of the component. The plant technical specifications should include a list of all electrically-operated passive valves, and the required positions of these valves, to which the requirement for removal of electric power is applied in order to satisfy the single failure criterion.
3. Electrically-operated valves which are classified as active valves, but which are manually-controlled should be operated from the main control room. Such valves may not be included among those valves from which power is removed in order to meet the single failure criterion unless: (a) electric power can be restored to the valves from the main control room, (b) valve operation is not necessary for at least 10 minutes following indications of a plant condition requiring such operation, and (c) it is demonstrated that there is reasonable assurance that all necessary operator actions will be performed within the time shown to be adequate by the analysis. The plant technical specifications should include a list of the required positions on manually-controlled electrically-operated valves and should identify those valves to which the requirement for removal of electric power is applied in order to satisfy the single failure criterion.
4. When the single failure criterion is satisfied by removal of electric power from passive valves or from active valves meeting the requirements of 3. above, the associated valves should have redundant position indication in the main control room and the position indication system should itself meet the single failure criterion.

5. The phrase "electrically-operated valves" includes both valves operated directly by an electric device (e.g., a motor-operated valve and a solenoid-operated valve) and those valves operated indirectly by an electric device (e.g., air operated valves whose air supply is controlled by an electric solenoid valve).

List appropriately in the PSAR any valves for which Items 2, and 3, above may apply and for each valve listed provide the requested information.

222.30 (BTP)
 (3.10.2.2)
 (3.11.2.7)
 (7.1.2.5)

The response to Items 222.3 and 222.13 with regard to conformance to the requirements of IEEE Std 323-1974 is unacceptable. We require that all safety related equipment within WPPSS scope of supply meet the requirements of this standard. This includes the aging and/or ongoing qualification provisions in accordance with this standard or suitable alternative methods or procedures to achieve the requirement.

222.31 (BTP)
 (7.1.2.12)

The response to Item 222.7 is unacceptable. Provide responses to the following:

1. Interrupting devices actuated by fault current are not considered to be isolation devices within the context of Regulatory Guide 1.75.

The Guide defines "isolation device" in terms of preventing malfunctions in one section of a circuit from causing unacceptable influences in other sections of the circuit or other circuits. Under the postulated conditions of a loss of coolant accident, loss of offsite power, and a cable tray fire, the proximity of circuits energized from redundant Class IE power sources could lead to concurrent high fault currents (e.g. short-to-ground) which in turn, threaten the redundant main circuit breakers. Also the susceptibility of non-Class IE loads energized from redundant Class IE power sources to any design basis event would likewise threaten the redundant main circuit breakers. Tripping of the main circuit breakers would cause the loss of emergency power to redundant "divisions" of equipment. It is recognized that proper breaker or fuse coordination would preclude such an event. However, because the main breakers are in series with the fault and could experience momentary

currents above their set points, it is prudent to preclude the use of interrupting devices actuated by fault current as acceptable devices for isolating non-Class IE circuits from Class IE or Associated circuits.

Breakers that trip upon receipt of a signal other than the one derived from the fault current or its effects (e.g., an accident signal) are acceptable since the downstream circuits would already be isolated from their respective power sources under accident conditions and could pose no threat to these sources.

State how your revised criteria conform to the above interpretation of this aspect of the Guide.

2. Identify any associated circuits that do not conform to the recommendations of Paragraphs 4.5a and 4.5b of this Regulatory Guide. For each circuit identified submit the results of an analysis performed in accordance with Paragraph 4.5c of the guide.

222.32
(7.0, 8.0)

Identify all safety related signals that are derived from an indirect measurement of the desired process variable. Justify the use of all indirect measurements which are identified.

222.33
(7.1)
(16.4)

The response to Item 222.11 is incomplete. Supplement the information contained in the PSAR to include the following:

1. Provide the response times that are either your preliminary design numbers, estimates based on prior test of similar systems and equipment, or the response times that are assumed in the accident analysis. Exclude the response times provided in Section 7.3.1.1.1, Item C, Sub-item 9(a).
2. Confirm that the response time of all safety related systems including sensors will be tested periodically. Provide a preliminary program that indicates the frequency for which sensor response times will be tested periodically. Describe the capability included in your design to perform these tests.

222.34 (BTP) Our position with regard to post-accident monitoring display
(7.5.2.6) instrumentation is that the instrumentation systems should be:

1. Designed in accordance with the requirements of IEEE Std 279-1971.
2. Redundant with indicators in the control room for both channels with at least one channel recorded. (The recording system, recorders and associated circuitry and components, are required to be seismically qualified to verify their operability following, not necessarily during, seismic events.)
3. Energized from the onsite Class IE power supplies.

The information contained in Section 7.5.2.6 and in the Tables of Section 7.5 of the PSAR concerning post-accident monitoring instrumentation does not appear to conform to the above. Therefore, verify compliance to this position.

222.35 (BTP) For all safety related instruments not supplied by
(6.0, 7.0, 8.0) Combustion Engineering state how their design criteria will conform to the following position.

1. The range selection for instrumentation shall be such as to exceed the expected range of the process variable being monitored.
2. The accuracy of all the safety trip points will not be numerically larger than the accuracy that was assumed in the accident analysis.
3. The trip set points should be located in that portion of an instrument's range which is most accurate and must be located in a region with the required accuracy.
4. All safety trip points will be chosen to allow for the normal expected instrument system set point drift such that the technical specification limit will not be exceeded.
5. Verification of the above criteria shall be demonstrated as a part of the qualification test program required by IEEE Std 323-1974.

Identify and justify any exceptions.

- 222.36 (BTP)
(7.2.1.1) The loss of load trip input to the reactor trip system (RTS) has been identified in Section 7.2.1.1.1.10 as not meeting all the requirements of IEEE Std 279-1971. We require that all trip inputs to the RTS meet all applicable requirements of this standard. Provide a description of your design criteria to meet the above position or provide detailed justification for the noted exceptions. Your response should address only those aspects of this trip which are not within Combustion Engineering scope of supply.
- 222.37
(7.0, 8.0) Provide your design criteria for the balance of plant safety related systems that assures disabling of one safety component does not, through incorporation of interlocking or sequencing controls, render redundant safety components inoperable. Your response should address those aspects of the design relating to instrumentation, controls and the electrical power system that are not addressed in CESSAR.
- 222.38
(8.2.1.2) The response to Item 222.22 is unacceptable. Either state that there are no 230 KV and 500 KV switchyard battery installations for your design or provide the requested information.
- 222.39
(8.2.1.5) It appears from the response to Item 222.17 that the Generator Load Break Switches which are to be used have not been previously used for this application at Nuclear Stations. Accordingly, provide a description of the Qualification Test Program that ensures these switches will perform their stated design function.
- 222.40
(8.3) Provide a discussion as to how your circuit protection criteria for ESF systems and equipment meet the stated criteria below. Exclude the diesel generator protective trips already discussed in Section 8.3.1.1.10e of the PSAR.
1. The number of equipment protective trips which shutdown safety system equipment under accident conditions shall be restricted to a minimum.
 2. The trip devices operative for accident conditions shall be tested periodically. The objectives of these tests are to ensure (a) the reliability of the trip setpoint, (b) trip setpoint drift, if any, and (c) repeatability of the trip at the set point.
 3. The bypass circuitry for those trips not retained under accident conditions shall be designed to IEEE-279 criteria as appropriate for the rest of the safety related systems.

222.41
(8.3.1.1) Section 8.3.1.1.10d, Item (6) states that means will be provided to permit applying selected nonsafety related loads in the plant to the diesel generator set within its capability. Provide the criteria that will be used to select and apply nonsafety related loads.

222.42
(8.3.1.1) The response to Items 222.19 does not appear to be acceptable. Provide the following additional information.

1. State the degree of conformance of the generator bus fault trip to the safety criteria (i.e., qualification, surveillance, indication, etc.).
2. Justify the contention in Section 8.3.1.1.10e of the PSAR that the reliability of the generator bus fault trip is equivalent to that of the generator differential itself.

222.43 (BTP)
(8.3.1.1) The proposed diesel generator qualification program as presented in Section 8.3.1.1.11.1 of the PSAR is incomplete. Supplement this section to include the following:

1. At least two acceptable full-load and margin tests should be performed on each diesel-generator set to demonstrate the start and load capability of the units with some margin in excess of the design requirements. Proposed full-load and margin testing should be evaluated on an individual case basis to take account of the differences in unit design.
2. Prior to initial fuel loading, at least 300 valid start and load tests should be performed with no more than three failures allowed. At least 90% of these start tests shall be made from design cold ambient conditions (design hot standby conditions if standby temperature control system is provided) and 10% from design hot equilibrium temperature conditions. This would include all valid tests performed offsite. A valid start and load test shall be defined as a start from the specified temperature conditions with loading to at least 50% continuous rating within the required time intervals, and continued operation until temperature equilibrium is attained.
3. A failure rate in excess of one per hundred should require further testing as well as review of the system design adequacy.

Identify and justify any exceptions.

- 222.44
(8.3.1.1) With regard to the response to Item 222.21 contained in Section 8.3.1.1.11.2, describe how the operator will be made aware of the NEMA MG-1 starting criteria for each engineered safety feature motor and how the operator will maintain adequate surveillance of the starting of all motors.
- 222.45
(9.4) Section 9.4 of the PSAR describes the various heating, ventilating and air conditioning (HVAC) systems serving the plant during emergency operating conditions. Provide a discussion as to how the instrumentation, electrical power distribution system, power supplies and equipment controls for these systems conform to the recommendations contained in Position 2(h) of Regulatory Guide 1.52. Your response should address those systems not contained in Table 6.2.3-1.
- 222.46
(3.0, 8.0) State the extent of conformance of the balance of plant safety systems to the recommendations contained in Regulatory Guides 1.89 and 1.93.