

SNUPPS

Standardized Nuclear Unit
Power Plant System

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May 16, 1984

Nicholas A. Petrick
Executive Director

SLNRC 84-0083 FILE: 0278
SUBJ: Response to NRC Review
of SNUPPS FSAR Chapter 14
for Callaway License

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

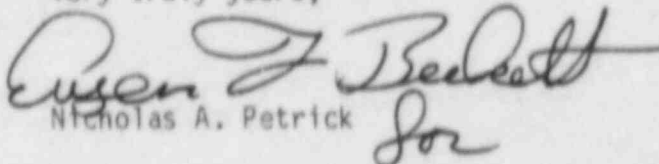
Docket Nos.: STN 50-482 and STN 50-483

Reference: NRC letter (B. Youngblood) to Union Electric Company
(D. Schnell) and Kansas Gas and Electric Company
(G. Koester) dated May 15, 1984: Request for Addi-
tional Information

Dear Mr. Denton:

The enclosure provides responses to FSAR Chapter 14 review questions in the reference letter. The responses to each are provided in the enclosure, as are related change pages which will be incorporated in the next revision to the Standardized Nuclear Unit Power Plant System FSAR. While these issues were identified during review of the Callaway Plant Unit #1 test program, the responses and associated SNUPPS FSAR changes also apply to the Wolf Creek Generating Station #1.

Very truly yours,


Nicholas A. Petrick *for*

SLA/nld3all
Enclosures

cc: D. F. Schnell	UE	W. Schum/A. Smith	USNRC/WC
G. L. Koester	KGE	B. L. Forney	USNRC/RIII
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SNUPPS FSAR Changed pages

Purpose of change

640.28-1

Provide new response to question 640.28

640.29-1, 2

Provide new response to question 640.29

14.2-77

Amend abstract S-03KE01

14.2-93b

Amend abstract S-03NF02

14.2-151

Amend abstract S-090007

640.18-1 and 2

Amend response to question 640.18

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Q640.28
(14.2.12)

The response to Item 640.18 on the Plant Performance Test (FSAR Subsection 14.2.12.2.27) should restate that the heat removal capability of the containment air coolers will be verified by extrapolation of data taken from the actual test conditions to the postulated post-accident heat load condition.

RESPONSE

Post-accident heat removal is predominantly by steam condensation (~97%) while the plant performance test verifies the convective cooling capability of the containment air coolers. Extrapolation of test data to postulated post-accident conditions, as requested, is thus not appropriate. Verification of post-accident heat removal capability is provided via the vendor's Topical Report which has been reviewed and approved for this purpose by the NRC (American Air Filter Topical Report, TR-7101). The response to question 640.18 in the SNUPPS FSAR has been revised to document this response and to reference the Topical Report via FSAR Section 6.2.2.3.

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Q640.29
(14.2.12)

Recent FSAR revisions have made modification to various test abstracts. Provide technical justification for each of the following test abstract modifications, or modify the test abstracts accordingly.

- (1) The Spent Fuel Pool Crane Preoperational Test (FSAR Subsection 14.2.12.1.54) should reinstate acceptance criteria regarding proper operation of the control circuits and associated interlocks.
- (2) The LOCA Sequencer Preoperational Test (FSAR Subsection 14.2.12.1.64) should reinstate acceptance criteria for load group 2 and diesel generator operation (Acceptance Criteria items j through p have been deleted).
- (3) The Reactor Protection System Logic Test (FSAR Subsection 14.2.12.1.73) should reinstate the acceptance criteria for all loop response times measured in the test method.
- (4) The Plant Performance Test (FSAR Subsection 14.2.12.2.27) should provide objectives and test method regarding evacuation alarm audibility. Alternatively, the Public Address System Preoperational Test (FSAR subsection 14.2.12.2.21) should provide acceptance criteria regarding evacuation alarm audibility in high noise areas.

RESPONSE

- (1) The preoperational test procedure employed at Callaway and the test procedure as written for Wolf Creek include an acceptance criterion as requested. The criterion used in the test is included in the SNUPPS FSAR.
- (2) These acceptance criteria were deleted inadvertently and have been reinstated as requested.

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Q640.29

(14.2.12.) (contd)

- (3) All loop response times are measured and recorded in this test. Response times for five of the trips are compared to typical Westinghouse values but are not subject to SNUPPS specific acceptance criteria since neither the SNUPPS FSAR nor the proposed Technical Specifications establish quantitative limits for these trips. NRC Office of Inspection and Enforcement Region III raised this issue at Callaway in inspection report 50-483/84-01(DE), 2/22/84. After discussion and further review, Region III concluded that the test approach, as described above, was acceptable. Disposition of this item is documented in inspection report 50-483/84-09, 5/9/84.
- (4) The Plant Performance Test Abstract (S-090007) has been modified to include evacuation alarm audibility in the objective as requested. The test method statement previously in the abstract, together with the note under acceptance criteria, provides a reasonable description of the means by which audibility is verified. Operators are dispatched throughout the plant to verify audibility and log location and acceptability to appropriate data sheets. Problem areas are reported for corrective action.

Much of the alarm audibility testing at Callaway was performed in conjunction with test S-04QF01, the public address system preoperational test. The test procedure included an acceptance criterion requiring alarm audibility in high noise areas. This criterion implements a portion of the more general one in the abstract, "The evacuation alarm system operates in accordance with system design specifications." This test was performed during hot functional testing high noise conditions at Callaway. Testing performed under S-04QF01 to the requirements of S-090007 was not repeated for the Plant Performance test.

Since the containment air cooler post accident heat removal mechanism is mainly steam condensation, and the normal operation heat removal mechanism is the cooling of the air stream with little or no condensation, it is not possible to accurately extrapolate preoperational test data to verify the post accident heat removal capability. On SNUPPS, the heat removal capability of the containment air coolers is accurately determined by mathematical and computer modeling developed by the air cooler supplier. The accuracy of the model was verified during the prototype testing of 3 different coils at 3 different post accident pressures. Topical Report AAF-TR-7101 (Reference 1 to FSAR Section 6.2.2.3) provides a comparison of the measured heat removal during the tests to the computer analysis predictions. The comparisons show very close agreement between the predicted and actual heat removal abilities. The NRC has approved the topical report for reference in Construction Permit and Operating License applications.

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14.2.12.1.54 Spent Fuel Pool Crane Preoperational Test (S-03KE01)*

14.2.12.1.54.1 Objectives

- a. To demonstrate proper operation of the spent fuel pool bridge crane control circuits and associated interlocks.
- b. To document the data obtained during testing of the spent fuel pool bridge crane at 125 percent of rated load.

14.2.12.1.54.2 Prerequisites

- a. Required component testing and instrument calibration are completed.
- b. Required electrical power supplies and control circuits are operational.

14.2.12.1.54.3 Test Method

Operability of the spent fuel pool bridge crane control circuits and associated interlocks is verified.

14.2.12.1.54.4 Acceptance Criteria

- a. The spent fuel pool bridge crane control circuits and interlocks operate in accordance with system design.
- b. The spent fuel pool bridge crane electric and manual hoists support 125 percent of their rated load.
- c. The spent fuel pool bridge crane monorail center span deflection at rated load is within design specifications.
- d. The spent fuel pool crane bridge, trolley, and hoist speeds at rated loads are within design specifications.

*See the Wolf Creek Site Addendum

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- i. With the group 1 dc load group isolated from its power source and the group 2 dc load group voltage at minimum, a loss of offsite power concurrent with a train B SIS initiates the following, in accordance with system design:
 1. Safety-related group 2 loads are shed.
 2. Group 2 diesel generator starts, and its feeder breaker closes.
 3. Group 2 LOCA sequencer actuates, and the associated components are sequenced. Sequenced pumps reach full flow within design times.
- j. Group 2 diesel generator supplies the required loads, while maintaining voltage and frequency within design specifications.
- k. With load group 2 supplying loads following a loss of offsite power concurrent with a train B SIS, the group 1 ac and dc busses are verified de-energized, indicating no interconnection of load groups.
 1. Following group 2 diesel generator operation for 2 hours at the short-time rated load and 22 hours at continuous rated load, group 2 diesel generator starts, attains voltage and frequency within design limits and time, and accepts the LOCA sequenced loads while maintaining voltage and frequency within design limits, on loss of group 2 ac voltage concurrent with a train B SIS.
- m. Each diesel generator is capable of carrying the short-time rating load for 2 hours and the continuous rated load for 22 hours, without exceeding design limits.
- n. Fuel oil consumption of each diesel, while operating at the continuous rated load, is within design specifications.
- o. Each diesel generator cooling water system, with the diesel generators operating for 2 hours at the short-time rating load and 22 hours at the continuous rating load, maintains the diesel temperatures within design specifications.
- p. The controls required for the loss of offsite power concurrent with a SIS (shedding, sequencing etc.) function with minimum dc voltage available.

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14.2.12.2.27 Plant Performance Test (S-090007)*

14.2.12.2.27.1 Objectives

- a. To monitor the balance-of-plant and electrical systems under loaded conditions during hot functional and power ascension testing. The ability of the ventilation systems to maintain ambient temperatures within design limits is also verified. To monitor the concrete temperatures surrounding hot penetrations and to verify evacuation alarm audibility in high noise areas.

14.2.12.2.27.2 Prerequisites

- a. Required component testing, instrument calibration, and system flushing/cleaning are complete.
- b. Required HVAC systems have been balanced.
- c. Required electrical power supplies and control circuits are operational.

14.2.12.2.27.3 Test Method

This procedure does not provide a test method. It provides a monitoring and data collection function only, with the resultant datum evaluated against provided design values, as applicable.

14.2.12.2.27.4 Acceptance Criteria

- a. Evacuation alarm audibility in high noise areas is verified.
- b. The containment coolers maintain containment temperature within design.

Note: Each monitored point will be evaluated throughout the test to verify that the applicable system or component is functioning per design.

*See the Wolf Creek Site Addendum

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Q640.18
(14.2.12.1) Provide test descriptions 1) that will verify that the plant's ventilation systems are adequate to maintain all ESF equipment within its design temperature range during normal operations; and 2) that will verify that the emergency ventilation systems are capable of maintaining all ESF equipment within their design temperature range with the equipment operating in a manner that will produce the maximum heat load in the compartment. If it is not practical to produce maximum heat loads in a compartment, describe the methods that will be used to verify design heat removal capability of the emergency ventilation systems.

Note that it is not apparent that post-accident design heat loads will be produced in ESF equipment rooms during the power ascension test phase; therefore, simply assuring that area temperatures remain within design limits during this period will probably not demonstrate the design heat removal capability of these systems. It will be necessary to include measurement of air and cooling water temperature and flows and the extrapolations used to verify that the ventilation systems can remove the postulated post-accident heat loads.

RESPONSE

The Plant Performance Test Procedure S-090007 (Section 14.2.12.2.27), records ambient room temperatures throughout the plant and cooling water system conditions during hot functional testing and power ascension. The recorded temperatures are evaluated to determine potential problems.

The ability of the ESF pump room coolers to maintain the ESF pump rooms within their design limits, for the conditions specified in Section 9.4.3.3, is verified throughout the test program. Each room is monitored during the period when the largest heat load is present. See Sections 14.2.12.1.29, 14.2.12.1.35, 14.2.12.1.37, 14.2.12.1.41, and new section 14.2.12.1.87. For rooms that do not have coolers (e.g., diesel generator rooms) the SNUPPS program of verifying the fan capacity provides adequate system verification.

Maintaining the containment air temperature within design limits is verified during the highest attainable heat load. See Section 14.2.12.2.27. Containment cooler fan capacity and proper cooling water flow are verified. See Sections 14.2.12.1.48 and 14.2.12.1.32, respectively. Containment cooler operation at design peak accident pressure is also verified. See Section 14.2.12.1.77.